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RAILROADS I  
6 MARCH 1946

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The attempt will be made this morning to give, very briefly, some idea of the part that Transportation plays in the normal industrial activity of the country with special reference to the railroads, leading up to the impact of war and some of the measures taken to meet the war situation.

Kipling once said:

"Everything in life from marriage to manslaughter turns on the speed and cost at which men, things and thought can be shifted from one place to another. If you tie up a nation's transport you can take her off your books."

Transportation is a means to an end. It is the vital link in the mechanism of distribution and exchange connecting production with consumption. It is absolutely essential to the proper functioning of any but the most primitive community. Division of labor is limited by the extent of the market; and the extent of the market is limited by the available means of transportation. Geographical division of labor and large scale production are possible only as transportation is developed to a point of reasonable efficiency and relatively low cost. Full utilization of natural resources and production at what is commonly called "comparative advantage", i.e. production of specific commodities in those areas best suited to their production, are possible only with a well developed transportation system.

Efficient transportation makes it possible today to raise cattle in large herds in our southwest for markets in the north and east. Citrus fruits from California and Florida can compete in the markets of New York and New England.

In Washington we drink coffee raised in Brazil, and we eat eggs laid by hens in the Dakotas (sometimes they give the impression of originating even further away than that); we eat bacon that may come from Canada or Denmark; sugar from Cuba and the Philippines.

In the development of intercourse between peoples also transportation has played a vital role. The easy movement of people provides for wider intercourse and as a consequence better knowledge and understanding of what the other fellow is doing. Efficient transportation of persons is essential also to large scale production, if we are to avoid dangerous concentrations of population.

I mentioned in the beginning that transportation is a means to an end. It should also be kept in mind that transportation takes place through time as well as through space. In relating supply and demand the time in transit may be a determining factor in the selection of the particular instrument of transport used in any given case. The speed of transport is therefore an

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important element to be considered in any attempt to measure the efficiency of transportation service. The nature of the market as well as the nature of the commodity may be a limiting factor on the permissible time in transit. The market may be perishable as well as the goods. Seasonal markets are of this kind. Military demand has a certain perishability also. There is no use in shipping material to a front or for a special operation that will not arrive until after that front has ceased to exist for one reason or another, or the special operation has been completed. The speed of operation also has a bearing on the capacity of the given agency of transport, in determining the number of units needed to move a given volume of traffic.

In the case of the railroads the speed of operation affects the turn-around time of cars, and an increase in speed will mean that fewer cars will be required to handle a given volume of traffic.

The economic and military potential of any given nation is directly dependent upon the extent and development of its transportation system. The position of this country may be indicated by the fact that our industrial and agricultural enterprises are serviced by a total of more than 3 million miles of roads, 29 thousand miles of waterways, 250 thousand miles of railroads, 95 thousand miles of pipe lines, and 50 thousand miles of airways. Our railway mileage is greater than the combined mileage of all the countries of Europe including Great Britain and Russia with Canada added. We rank fifth in railway mileage related to area with Great Britain, Germany, Italy and France ahead of us. Related to population we rank fourth with Canada, Australia and Argentina ahead of us.

Since the purpose of transportation is to facilitate production and exchange it may be worth while to note in passing the geographical distribution of our transportation mileage in relation to our productive capacity and population.

50 percent of our manufacturing capacity is located in the northeastern section of the country i.e. that part east of the Mississippi River and north of the Ohio. The map on the wall behind me indicates a corresponding concentration of railway mileage - nearly a quarter of the total mileage of the country is located in that same area - comprising 10 percent of the total area of that country. (In dealing with the problem of strategic zoning the location and extent of transportation facilities as well as agricultural and manufacturing capacity must receive consideration.)

In the same northeastern section of the country is concentrated also approximately 40 percent of the total population.

#### Importance of The Railroads.

The relative importance of the different agencies of transport is not reflected in the mileage figures I just gave. The railway mileage is only about 8 percent of the total whereas highway (road) mileage represents nearly

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90 percent. In the matter of service, however, the railroads performed about 62% of the total, measured in ton-miles, before the war as opposed to 8 percent for highways. During the war the railroads proportion increased to 70 percent of the total while the highway proportion declined to about 5 percent. This was due in part at least, to the rubber and gasoline shortages which developed, but the dominant role played by the railroads was not an accident. Certain characteristics of railroad transport were important factors.

The railroads provided a right-of-way which is unobstructed by the traffic of any other carrier than the individual railroad involved. Moreover, they are capable of handling an almost infinite variety of articles and a correspondingly wide variety in the size of shipments. Their service is reliable in that it is not subject to the vicissitudes of weather to the extent that other agencies are, and their operations are so organized that the day and hour of arrival at destination of goods shipped at any given time can in general be relied upon. The shortcoming in rail service is its incompleteness in cases where the shipper or receiver does not have a railroad siding of his own. In such cases the initial pick-up or final delivery has to be made by some other agency, usually motor truck. This has some importance when the transshipment of consignments that are heavy or otherwise difficult to handle is involved.

#### Routes.

There are 10 major railroad routes in this country which deserve mention at this point because of their relation to the whole pattern of production and distribution within the nation. These main traffic routes are shown on the map behind me.

1. The Trunk Line Route, which connects New England and the northern tier of states with the middle west. In point of the character and volume of traffic is the most important railroad route in the country. In this sector 23 percent of the rail mileage of the nation carries 37 percent of the total traffic. The two largest systems of the country, the Pennsylvania and the New York Central help to comprise this route. Other lines include, in addition to the New England roads, the Baltimore & Ohio, Erie. The westbound traffic consists chiefly of manufactured goods and coal, the eastbound traffic is largely raw materials, semi-finished products and food, for domestic consumption and export. The bulk of the traffic moves eastward, consequently the New England roads particularly, usually have a large proportion of the cars of other roads on their lines.

2. The second route is that between New York, Atlanta and New Orleans. The big railroads comprising this route are the Southern, the Seaboard and the Atlantic Coast Line. This route connects the agricultural production of the south with the industrial northeast, so that manufacturers of all kinds and coal move southward and cotton, lumber, fruits and vegetables move north. The bulk of the movement is northbound.

3. The third route is that between the general area around Chicago and Atlanta, Ga. and provides interchange of the grain and flour (together with some manufactures) from the northern Mississippi valley with the cotton, fruits and vegetables of the south. No individual railroad reaches between Chicago and Atlanta, but the southern, Louisville & Nashville and segments of the Illinois Central connect with the Central of Georgia and other "bridge" lines to complete the haul.

4. The fourth route is the Mississippi Valley route which carries the products of the upper Mississippi area again including manufactures from the Chicago district for consumption in the south and export through the Gulf ports. The northbound traffic consists of tropical fruits, sugar coffee and other products from Latin-America. The Illinois Central dominates this route and its fast freight trains make the run of 900 miles between New Orleans and Chicago in about 48 hours. Other roads in this route include the Chicago & Eastern Illinois, Missouri Pacific, the Gulf, Mobile and Ohio and the Texas & Pacific.

5. The fifth Route is the Western Grain Route which connects the grain-growing areas of the country north and west of Chicago with the elevators and mills of the upper Mississippi Valley. The most important roads comprising this route are the Chicago & North Western, Milwaukee, Burlington and the Rock Island. These roads carry grain to the junction with the trunk lines or the head of the Lakes for further movement to the eastern seaboard.

6. The Southwestern - Gulf route carries produce and raw materials of various kinds from Texas and Arkansas to St. Louis and Chicago. South westward the traffic is composed of manufactures, and some textiles in the form of clothing.

7. The Northern Trans-continental Route comprising the three roads: The Great Northern, Northern Pacific and Milwaukee carries lumber, apples and canned fish from the northwest to the mid-continent area and hauls ch agricultural implements and some coal westbound.

8. The Middle Trans-continental Route consisting of the Burlington-Union Pacific railroads and the Rock Island - Denver & Rio Grande, connecting with the Southern Pacific or Central Pacific and Western Pacific in U bring the fruits and vegetables from California to trunk line connections consumption in the middle and eastern section of the country.

9. The Southern Trans-continental Route of which the Southern Pacific and Santa Fe systems are the most important also carries fruits and vegetables from California for use in the mid-continent area and further movement east. These trans-continental routes haul iron and steel products agricultural implements and some coal west; but the bulk of normal movement is eastward.

This turned out to be a matter of considerable importance when we ei the war because these trans-continental carriers were built primarily as

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originating carriers for this eastbound traffic, with gathering lines in the west to bring traffic to concentration points for movement eastward. The location and design of yards, passing sidings and other facilities was based on this normal operation. When the war came these roads had imposed on this normal flow of traffic also a new westbound movement resulting from the sudden growth of manufacturing of various kinds in the west and superimposed on this traffic was the large volume of military movements for both the training areas in the southwest and embarkation to the theatres of conflict in the far east. This reversed the direction of movement of the bulk of traffic in the whole western section of the country so that these originating lines were called on to terminate also large volumes of traffic. The resulting load in some instances produced serious congestions. The ability of the roads to relieve these congestions and consequent delays to traffic was handicapped by shortages of manpower in the areas involved, and failure to receive promptly additional motive power from the builders. Shortages of critical materials delayed the delivery of new locomotives. The factor of most importance, however, was the inadequacy of existing terminal facilities.

It was possible to meet this situation with some success under the system of control set up by diverting traffic away from the overcrowded lines to less congested routes as the occasions required. Thus, by utilizing the flexibility of the railway system as a whole local surges in traffic could be generally absorbed.

The necessity, however, for some form of centralized control is well demonstrated by this situation. The railroads would almost certainly have been unable to extricate themselves from their difficulties acting individually. Central direction was essential in meeting this kind of emergency, and it needed to be prompt and unhesitating.

Impact of War

The general nature of the problems which confronted the transportation system of the country at the outbreak of war and the measures taken to meet these problems were conditioned by certain fundamental characteristics of the industry. Transportation by common carrier is a public service, and the individual operating units have been regularly subjected to certain controls established to protect the public interest. Because of these well established controls under which they normally operate the impact of war on these service agencies was less severe than in the case of ordinary private enterprises. Their efficient functioning is essential in both peace and war, and the product demanded remained substantially the same, i.e. the movement of goods and persons. Therefore no conversion or retooling was required. Moreover, the character or make-up of the traffic moved did not undergo sufficient change to require serious alterations in the normal methods of operations.

The proportions of the total tonnage loaded represented by the individual commodity groups were affected to only a minor degree by our

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entry into World War II. For example coal represented slightly more than 34 percent of the total tonnage in 1939 and was 33.5 percent of the total in 1944. Iron ore was 8.6 percent in 1940 and 9.1 percent of the total in 1944. Carloadings indicate more pronounced changes, but these were due to the effect of improved loading inaugurated during the war period which was more pronounced in the case of some commodities or groups than was possible with respect to others. The importance of these figures rests in the fact which they disclose that the advent of war did not change the proportion of the main commodity groups. The proportions which were basic for peacetime remained basic during war. The demands of war did not appreciably alter the peacetime pattern.

For many of the basic commodities also the general direction of movement and routes were not greatly altered. Ore and fuel still had to be moved from the mines to the blast furnaces, the locations of which remained substantially unchanged. Coal or other fuel had to be transported to essential industries including power plants and homes. A great proportion of the nation's food had to be transported from the customary areas of production to the usual centers of distribution and consumption. Many other staple articles moved along their customary courses. So, the same transportation facilities had to be used in time of war much as in time of peace and for substantially the same purpose.

Before the outbreak of World War II the distribution of the nation's traffic among the several modes of transport was substantially as follows: 62 percent of the total ton-miles was produced by the railroads of the country; 8 percent by the highway system; 19 percent by the inland waterways, and 10 percent by pipe lines. The war emergency caused a shift in the proportions so that in 1944 the railroads were handling 70 percent of total ton-miles; highways 4.5 percent; inland waterways 13.5 percent and pipe lines 12 percent. The decline in the proportion moved by highway was due to the rubber shortage and subsequent gasoline shortage. The diversion of traffic from the highways and coastal shipping was a factor in the increase shown in the proportion of total traffic moved via railroad. The ton-miles produced by domestic air lines in 1944 amounted to 0.5 percent of the total for all agencies.

Aside from the change in the relative utilization of the country's transportation facilities, the impact of war was less pronounced in some respects than for other industries also because some of the controls required to provide the unification of services necessitated by war were already in operation in peacetime. These controls had to be expanded or intensified, and centralized in a single wartime agency; but the normal system of regulation afforded a basis upon which the control required for war could readily be built. And the industry was already in harness. The ordinary wastes of competition had been reduced to a minimum with the welfare of the nation as a whole the underlying objective. The motive of control, therefore did not change, fundamentally.

This is not to say, however, that no changes came about. The advent of war immediately resulted in the establishment of a new set of priorities in the movement of both goods and persons.

Moreover the stability in the character of traffic indicated by the proportions of total tonnage represented by the commodity groups (mentioned earlier) was in some respects more apparent than real. While the relative tonnage of miscellaneous freight, which included more than 40% of the total, showed only minor change as a result of the war the composition of this group was actually considerably altered with the restrictions in the production of civilian goods and the substitution of war materials of various kinds. In addition, although the proportion of grain to the total tonnage did not change greatly the increase in absolute volume generated a problem of car supply requiring the establishment of special controls. (A system of permits was established to prevent the movement of grain to elevators that were already full, thus tying up railroad cars.) Behind this situation, as well as the difficulties encountered with respect to local transport was the general problem of equipment supply stemming from the underlying shortages of materials and manpower which resulted from the huge increase in the demands for both men and materials of our own armed services and those of our allies as the war progressed. The effect of these underlying factors is evident in the more important problems confronting the individual agencies of transport. The Office of Defense Transportation, which was created by executive order of the President 18 December 1941 "to insure maximum utilization of the domestic transportation facilities of the nation for the successful prosecution of the war" included in its organization certain staff divisions to look after such matters as Materials and Equipment, Rates, Storage, etc., and Carrier Divisions corresponding to the several types of carriers, as Railway Transport, Motor Transport, Local Transport, Water Transport, etc. Through these separate carrier divisions close contact was maintained with the operations and requirements of each type of carrier. Some of these matters will be dealt with in other lectures.

#### Army-Navy Controls.

In order to have some control over traffic in which they were directly interested both the Army and Navy established Transportation Divisions.

The Army & Navy transportation activities were of three general categories:

1. Transportation conducted entirely by their own forces - chiefly in the various theatres of operation.
2. Transportation purchased from civilian agencies - and
3. Cooperative activities, which consisted primarily in assisting the agencies involved in securing needed facilities or equipment - chiefly where movements of their traffic were involved.

We are interested primarily in the second of these categories of activity.

Originally Army transport activities centered in the Transportation Division of the Quartermaster Corps. This division was merged with the Transportation Corps of the Army Service Forces in 1942. In 1941 there had been a Traffic Control Branch and after Pearl Harbor a Regulating Station

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Section was established, with five control stations at strategic rail centers. These offices assumed control of all freight shipments and troop movements according to directives issued by the Commanding General, Western Defense Command. Contacts were made directly with the individual railroads. A storage-in-transit unit had also been set up prior to Pearl Harbor. With the creation of the Office of Defense Transportation and the various Transportation Divisions of the War Production Board the Army and Navy became vitally concerned with the operation of these agencies. The top Transportation Committees of the War Production Board had both Army and Navy representatives sitting regularly, as a consequence.

With respect to car supply over-all responsibility rested with the Car Service Division of the Association of American Railroads, Army and Navy liaison regarding equipment requirements was established through the Military Transportation Section of the Association of American Railroads, which made the necessary arrangements with its Car Service Division or with the railroads direct, as the situation required. With respect to troop movement the procedure was for camp or field office at point of origin to advise the Passenger Branch of the Traffic Control Division at Washington of the contemplated movement. Request for a route was then made by that office on the Military Transportation Section of the Association of American Railroads. The route was set up through the local passenger offices involved and the movement then given a "Main" number with notice to the individual railroads involved and the Traffic Control Division of the Army which in turn notified the transportation officer at the point of origin.

In the ordinary movement of freight the War & Navy Departments established their own routes and matters of car supply were handled directly with the individual carriers concerned. In emergency matters liaison was maintained with the Office of Defense Transportation and the Military Section of the Association of American Railroads. No direct liaison was maintained with the Interstate Commerce Commission.

Movement of Petroleum.

Because of its particular importance the movement of petroleum was placed under special controls. In July 1942 the Army-Navy Petroleum Board was created by order of the Commanding General, Army Service Forces and the Vice Chief of Naval Operations: "to coordinate the efforts of the services in all petroleum matters." It was made an agency of the joint chiefs of staff in January 1943 and at the suggestion of this Board the joint Army-Navy oil purchase agency was created in June of 1945. The functions of the Army-Navy Petroleum Board were:

- (1) To provide close Army-Navy cooperation and maintain close liaison with the Petroleum Administration for War.
- (2) To gather & prepare information on petroleum products.
- (3) To determine and consolidate Army-Navy requirements and the capacity of the oil industry to meet those requirements in collaboration with the Petroleum Administration for War.

- (4) To coordinate procurement, storage and overseas shipments.
- (5) To see that petroleum products were at the right delivery points at the right time.
- (6) To represent the Joint Chiefs of Staff in all petroleum matters with other Allied Nations.

Offices were established in each theatre and at each important oil port. The theatre oil offices made estimates of requirements for four months in advance and these estimates were flown to Washington after check. The problem of over-all supply was handled by the Planning Division of the Petroleum Board in collaboration with the Petroleum Administration for War which kept the industry informed. A very close check was kept on stocks everywhere to avoid congestion or depletion. Representatives were placed at the ports to speed tanker loading and unloading so as to quicken the turn-around time.

In the zone of the interior requirements were given to the Petroleum Administration for War which then allotted them to the various producing areas. The origin and destination points were given to the Office of Defense Transportation which arranged for the placing of the necessary tank cars. A special tank car section was created within the Railway Transport Division of the Office of Defense Transportation to handle this traffic. Some 60 alternate routes were set up to avoid overburdening any lines and so causing congestion and delay. The petroleum shipments were then consolidated in symbol trains which were given preferential movement even over passenger trains in some cases. The empty cars were accorded the same preference as loaded cars to insure prompt return to the loading points.

The magnitude of the accomplishment in this case is indicated by the fact that tank car movements of oil to the eastern seaboard, which were only approximately 3,000 carloads per week or 98,000 barrels per day in the last quarter of 1941 increased to a peak of over a million barrels per day in 1944 or more than 10-fold. This could not have been accomplished without the close supervision, with plenary power behind it, that was exercised by the Office of Defense Transportation. The carriers could not have done it acting individually, nor could the oil Companies.

#### War Department Traffic.

Freight moving on War Department bills of lading averaged between approximately 5 and 10 percent of the total inland traffic of the country, measured in ton-miles.

Slightly less than 91 percent of this traffic was moved by railroad, including LCL and express shipments, a little over 8 percent moved by highway and 1 percent by inland waterways. Shipments by air were relatively insignificant in point of tonnage. Except for the railroads the volume and nature of War Department traffic did not provide a ready means for the allocation of shipments among the individual carriers according to a set plan. The exigencies of the situation from time to time largely determined which particular carrier or carriers moved the shipments involved. The location of plants and destination of consignments were also important factors.

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The character of the shipment, i.e. whether it was ordinary or rush, its value and susceptibility to adverse weather conditions affected the manner of shipment and the particular means employed. In the case of highway carriers an effort was made, nevertheless, to allocate traffic on the basis of relative facilities and equipment provided by the individual operators, the territory covered and general reliability. Only carriers coming under Interstate Commerce Commission regulation were used. Records were kept to provide against inequities in the distribution of traffic that might result from the emergency character of many of the movements, and the danger of developing favored carriers.

Railroad Allocation.

In the case of the railroads the demand for some basis of allocation resulted from the large volume of traffic involved and the consequent danger of overloading particular carriers, thus obstructing the free flow of traffic, as well as the ethical consideration of providing an equitable share of the traffic to all the roads concerned "which were helping to support the war effort as tax payers." Some plan or basis of allocation was required in order to avoid confusion and the danger of discriminations.

War Department traffic, therefore, was apportioned among the individual railroads according to the respective line mileages on the basis of a count of individual cars. Originally an attempt was made to give consideration to the length of haul, but this had to be abandoned. It was recognized that a count of cars was not entirely equitable as a basis of allocation because of the differences in returns derived from different classes of freight; but distribution on the basis of revenues while theoretically more equitable would have entailed a complex and expensive method of checking to avoid over-loading particular routes and neglecting others. It would have required an estimated force of one hundred clerks in the Traffic Control Division to make the necessary checks if allocation had been made on the basis of revenues as opposed to a force of four clerks actually used under the scheme adopted.

On the other hand, an obvious criticism of the method of allocation employed arises from the use of line mileage rather than total track mileage as the basis of allotment. The allocation of War Department traffic had for its objective the prevention of an undue burden on particular lines by the spreading of the load as well as to afford revenue to all lines forming integral parts of the nation's transportation system. But the relative burden resulting from the war traffic load obviously depends upon the capacities of the respective lines; and, therefore, the allocation of traffic on the basis of length of line rather than track miles might effect the opposite of the intended result. For example, the Baltimore & Ohio has a two-track line between Pittsburgh and New York City whereas the Pennsylvania Railroad has a four-track line. Moreover, the Baltimore & Ohio's line mileage between these two points is slightly greater than the Pennsylvania Railroad's. On the basis of allocation used by the Control Division therefore the Baltimore & Ohio would be given more freight to handle over this route than the Pennsylvania Railroad whereas the Baltimore & Ohio's capacity is

obviously only about half that of the Pennsylvania Railroad's. Serious overloading of some of the smaller lines was apparently prevented by the fact that a large part of the total traffic was moved on other than War Department Bills of Lading where the actual capacity of the carriers to handle the freight was taken into account as well as the fact that the great proportion of the large war plants and heavy industries were located on the lines of the big systems.

The Navy made no attempt to arbitrarily allocate its traffic among individual carriers. Its Transportation Section took the position that its traffic formed so small a fraction of the total that any attempt to allocate it would have no significant result on the over-all load. Moreover, that Navy traffic, along with other traffic, was more or less automatically allocated because of its diversification both as to nature origin and destination. It may, in fact, be a fair question as to whether these elements of origin and destination location were not more potent factors in affecting the allocation of traffic than the scheme used by the Army's Control Division.

#### Rates

Just a word about rates because my time is nearly up. The railroad rate structure is composed of three kinds of rates:

- Class Rates
- Commodity Rates and
- Exception Rates

The Class Rates divide the traffic into five or six separate groups called classes partly on the principal that the cost of handling different commodities or articles of commerce differs and partly on the proposition that where the transportation cost is only a small fraction of the total cost of the article it can carry a higher rate than can lower grade articles. This is "charging what the traffic will bear."

Commodity Rates, as the name implies, are rates charged for the movement of specific commodities such as iron ore, certain kinds of lumber, or other specific commodity. Commodity rates are issued usually to induce traffic to move that might not otherwise reach some more distant market and frequently in the direction in which the equipment would otherwise have to move empty. Commodity rates are usually lower than the corresponding class rates would be.

Exception Rates are similar to commodity rates in that they are special rates given to particular items, frequently where there is some difficulty in establishing a proper class rate. A good many war items moved on Exception Rates for this reason.

You may have noted in the press recently some criticism of the War Department by a Congressional Committee in this matter of transportation charges - for paying more than was required in many cases. This undoubtedly happened because of the complex nature of railroad rates involving this

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question of the proper classification. The establishment of the class under which a commodity moves, especially when it is something new, may be a matter of judgment and the judgment of the carriers representatives will tend to lean in one direction - that of protecting the carrier's interest. The judgment of the shipper, however, may be just as good. Apparently some Army traffic officers were inclined to accept the judgment of the railroad representatives too uncritically. This problem need further study.

To Conclude:

It has been indicated that: first - transportation is a vital element in our industrial activity, secondly - that up to the present at least the railroads have performed the major share of the transportation service for industry. Finally, it is apparent, I think, that some form of centralized control over an essential service such as transportation is necessary in order to secure the highest degree of efficiency in the performance of that service in case of a national emergency. Some other points have been just mentioned and there are many matters that time has not permitted touching at all.

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