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CHAPTER 3

Factors Affecting Soviet Railroad Traffic

Control of Freight Traffic

Railroads occupy an altogether different position in Soviet economic life from that in Western countries. Railroad transportation is something to be conserved and minimized under Soviet doctrine. Indeed, transportation is regarded by the Soviet party and planning authorities as something of a necessary evil and the traffic that necessitates its existence is to be bent in such a way as to minimize its demand for service and adjusted to the least physical outlay feasible. The Western view of fostering traffic development through service and rate improvement, adjustment, and experimentation has no counterpart, nor is there any competition for traffic among railroads or between railroads and other carriers, which in Western countries results in active rate warfare, competitive solicitation, and service concessions to particular traffic in order to secure or retain it.[1] The Soviet shipper faces a single railroad administration and the position of the latter is strong.[2]

Thus, according to Soviet theory, freight traffic is not a phenomenon that the railroad administration, its superintendents, or its agents should accept as beyond their control. Indeed, they are expected to take an active part in planning efficient transport movement, in detecting and stamping out irregularities which undermine railroad efficiency, and in using the means at their disposal to influence shippers and receivers of freight in ways considered desirable. To be sure there are continual complaints of shortfall on the part of the transport authorities at all levels—criticism particularly of the passive attitude that carriers should accept whatever is offered for transportation

[1] Over certain routes, of course, both rail and water services are available and on very short hauls motor transport now offers an alternative. The general rate level, particularly on bulk commodities, often results in a combination of lower rates as well as superior service where railroads are used in place of water carriers. But these rail rate levels are the result of general policy, not of specific competitive adjustments, and are, in particular cases, modified by arbitrary increases when directly competitive with water or joint rail-water routes in an effort to shed traffic from the rails.

[2] American shippers chafed under a benevolent U.S. Railroad Administration during and immediately after the first war. They would find the dependent position of the Soviet shipper impossible to comprehend. As the recent American railroad mission puts it, "They [the railroads] have a peculiar relationship to their 'shippers.' In Russia the opportunity to ship is a privilege." (*Railway Age,* August 1960, pp. 9-14.)

between all points. Thus, the Western theory of common carrier obligation is definitely out of place in Soviet thinking, yet it seems to linger on in the actions of the railway servants.

Numerous factors not ordinarily present elsewhere affect the growth and pattern of Soviet rail traffic. Some arise out of the general institutional and economic context in which the Soviet railways operate. Of great importance is the full six-day workweek and various labor practices designed to secure the fuller utilization of the industrial plant,[3] together with the established principle that transportation equipment should be loaded and unloaded seven days a week. Moreover, the emphasis placed on conservation of the railroad plant leads in many instances to the staffing of shipping and receiving departments around the clock. This has been facilitated in the Soviet Union by an abundance of common labor and an absence of overtime or of penalty pay for night and Sunday work. Labor awaits the cars rather than the reverse, and loading and unloading norms expressed in hours can practicably be substituted for the demurrage tariff and its forty-eight hours free time which is common elsewhere.[4] The great significance of the longer workweek for rail efficiency is made manifest by the postwar conversion of American industry to the forty-hour week. For this development has been calculated by the Association of American Railroads to have cost as much as 15 per cent of the capacity of our freight car fleet, even though it had not been our custom generally to work more than half a day on Saturday.

While the techniques of Soviet plant managers in their efforts to fulfill the plan and to avoid censure often appear to produce irregularities in the rate of production throughout a month, these much-criticized irregularities are probably smaller at the shipping docks and, in any event, are hardly as severe as the weekly and monthly variations in rail traffic in a Western economy. Moreover, the evenness of the Soviet flow is less often and much less severely affected by holidays. This should result in a more even traffic, both in origination and delivery, as well as a steadier car handling by shippers and receivers, with a highly beneficial effect upon car turnaround. If a yearly average turnaround of fifteen days can be achieved in the United

[3] A virtually universal full six-day week has not existed in the U.S. during the time covered by our rail statistics.

[4] A probably characteristic overemphasis is reflected in the following: ". . . many factory managers keep warehouse crews working three shifts, seven days a week. Factories retain an 'enormous number of reserve loaders' who could otherwise be used on assembly lines, a top Soviet economist says." (Edmund K. Faltermayer in *The Wall Street Journal,* July 26, 1960, p. 1.)

States at a high level of business with the present workweek and with our customary periodicity, something approximating an eleven-day turnaround would be expected in the Soviet system if only these differences in the regularity of flow were taken into account and no allowance were made for the immediate attention given to car loading and unloading with maximum useful forces. The latter easily subtracts an additional two days.

It is, however, also to be noted that the Soviet seasonal pattern in rail traffic differed from our own pattern during the period for which monthly data are available in a manner favorable to the Soviet system. Indeed little appeared that could be described as a seasonal pattern, other than a weakness in the winter months. In part, this is the result of the absence of certain commercial practices which affect seasonal patterns elsewhere; in part, it is influenced by the seasonality of the inland water commerce; in part, it results from the stronger influence of the upward trend of rail traffic; but whatever its causes, it is conducive to more effective year-round utilization of the rail plant. No recent data are available on the seasonal pattern of Soviet traffic, but carloadings by months have been published through 1938 and it is assumed that little unfavorable change has occurred. Data for the years 1934 to 1938 are shown in Table 11. The pattern is obviously affected by trend and in some years the growth trend is of sufficient prominence to expunge the seasonal pattern, as in 1935 when the year's increase over 1934 was substantial. The whole period covered by these data is one of rising traffic, with the exception of 1938 when there was a

TABLE 11

AVERAGE DAILY CARLOADINGS OF SOVIET RAILWAYS, 1934-38, BY MONTH

	1934	1935	1936	1937	1938
January	51,800	50,661	77,603	79,340	75,241
February	53,091	56,101	76,355	78,135	79,784
March	52,000	59,163	86,692	81,194	80,000
April	55,353	61,977	88,956	89,681	85,339
May	57,217	69,251	92,442	95,945	92,626
June	57,816	72,665	89,944	97,976	96,709
July	56,669	72,952	90,415	98,711	96,322
August	57,169	73,626	90,216	97,617	94,766
September	56,553	74,664	90,008	96,867	94,621
October	58,492	75,159	86,526	94,108	93,924
November	57,970	75,651	83,997	89,734	90,918
December	54,373	74,550	80,391	78,041	75,992
Full Year	55,717	68,098	86,660	89,833	88,046

SOURCE: I. V. Kochetov, *Statistika zheleznodorozhnoi transporta* [Statistics of Railroad Transportation], Moscow, 1941, p. 61.

minuscule decline in loadings. That year gives the appearance of a break in trend toward midyear representing a change from a rising movement of traffic to a decline. Nothing resembling a fall peak is apparent; the tendency for heavy agricultural loadings to produce heavier September and October loadings was offset by a general decline. The relationships between the high and low months of each year are shown below, together with the change between annual averages:

	Per Cent of High over Low Month	*Annual Average Increase (per cent)*
1934	13	9
1935	44	22
1936	21	26
1937	26	4
1938	28	−2

That the Soviet roads are affected by seasonal conditions in agriculture and by the closing of river navigation in the winter season surely is apparent, but the conditions presented do not appear to require the maintenance of substantial surpluses of equipment during a good part of the year for brief service in a fall peak, a situation which must have a considerable favorable effect on the operating averages. The strong upward pattern of traffic during the last decade suggests that trend may have been of more importance than seasonal during this period also.

Although the U.S. railroads were favored by a marked flattening of the seasonal pattern during World War II, a substantial seasonal pattern has been evident throughout most of their history. During the fairly steady year-to-year levels of rail traffic of the 1920's, it was customary for October loadings to exceed those of the low month by from 30 to 40 per cent.[5] During years of cyclical trend, declines have been marked by a moderation of the fall peak which has sometimes brought it below the spring peak, while recovery has been marked by rapidly developed and exceptionally sharp peaks. There is no year since World War II that could be considered "normal" in the light of postwar adjustment, recession and recovery, steel and coal strikes, and Korea. Nevertheless it remains true that in any year when a recession is not in progress the fall peak poses difficulties for the rail carriers and has, in every year except 1949, 1954, and 1957-59,

[5] For a graphic illustration of the variation of ton-miles, which are closely related to loadings, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, New York, NBER, 1946, p. 45. The loadings can be secured from and are graphically shown in the weekly carloading reports of the Car Service Division, Association of American Railroads.

been accompanied by moderate to severe car shortages. An interesting analysis of the effect of the seasonal pattern on requirements of the carriers for car ownership is given by Loree for 1906 to 1919: he charts the car idleness and computes the surplus of cars which would have resulted had the 1919 car mileage been secured in each year as well as the 1916 percentage of average carload to average car capacity. He thus develops surpluses ranging from 80,478 cars in 1917 to 853,343 in 1915 with a car ownership in the vicinity of 2,300,000 cars.[6] This does not suppose a complete suppression of the peak, but only the flattening characteristic of war periods.

As will appear below,[7] the absence of a marked seasonal pattern in Soviet freight traffic is not necessarily the result in all years of an absence of seasonal in traffic demands, but reflects rather an absence of accommodation of the plant to peak requirements, with the result that accumulations of unshipped freight may develop in spring and fall periods. These have been studied only for the critical first half of the 1930's, but it may reasonably be supposed that some seasonal accumulations are accepted as necessary for transport efficiency, with the result that the railroads work under year-round traffic pressures more nearly comparable to those of our annual averages. An argument can be made for comparison of Soviet operating data with our October rather than our yearly data. It may be that the pressures for quick realization of agricultural market values receive scant recognition and that certain categories of seasonal consumer goods are absent. In any event, the position of railroads in relation to shippers' desires differs markedly from that in our highly competitive situation. Whereas our calculations of car requirements inevitably start with an estimate of October peak traffic and October operating factors, Soviet analysts are more likely to resort to the use of annual averages and give scant recognition to seasonal demands.

Just as it is apparently considered unnecessary to provide a plant and equipment adequate to care for peaks of traffic with normal dispatch, so also several other features characteristic of competitive systems are absent. The limited and slow passenger service has already been referred to. The virtual absence of commercial privileges—holding for reconsigning, billing to order, tender in advance of shipping instructions, stopping to partially load and unload—which have been estimated to cost more than a day in the turnaround of the

[6] L. F. Loree, *Railroad Freight Transportation,* New York, 1922, pp. 277-279.

[7] See Appendix A.

average U.S. car, must contribute to high car utilization.[8] Moreover, the relative absence of ocean-borne import and export traffic, the absence of a water traffic even remotely comparable to our Great Lakes system, and the practice in any event of limiting car detention at points of rail-water interchange avoid the substantial accumulations of cars under load which customarily lie behind our ocean and lake ports. It is not uncommon for from 3 to 5 per cent of our car supply to be absorbed in such port accumulations.

Use of Rates in Control of Traffic

It is uncertain what relative weight should be placed on rates and other factors that affect the movement of Soviet traffic, but Soviet administrators obviously place considerable reliance on them. The proposition familiar to Western jurisprudence that transport rates should reflect transportation conditions and maintain a cold neutrality toward economic objectives, regional aspirations, or changes in political goals, though it is sometimes honored in the breach, has no parallel in Russia. Neither under the tzars nor under the Soviet regime has there been any reluctance to use transport rates to influence economic behavior and to assist political, military, and economic policies. Neither agreements among shippers and carriers nor longstanding rate relationships existing without complaint stand in the way of adjustments that are believed to provide incentives to desired behavior or erect barriers to undesired behavior on the part of shippers. But whereas rate-making practices under the tzars tended to support the pecuniary interests of particular favored economic groups, these practices in the Soviet regime have been devoted largely to stimulating the economy of use of transport facilities. Under both systems virtually universal use has been made of distance scales of rates with varying taper[9] and adjusted to particular rates per ton-mile at varying lengths of haul. And this type of rate is employed for water as well as for rail transport

[8] See Loree, *Railroad Transportation*, p. 266. See also *Freight Traffic Report*, Federal Coordinator of Transportation, Appendix I, Exhibit 222 (December 15, 1933, carload transactions), where substantial variations in intermediate terminal time for various commodity groups can be attributed to this factor. It is not to be expected that the up to thirteen diversions which have occurred in the U.S. grain and perishable trades would be permitted in the Soviet system, nor that commodities would be held under load awaiting sale for periods sometimes exceeding thirty days. Certain of these practices can be pursued by the Soviet shipper at the cost of monetary penalties and at the risk of administrative suppression. It is characteristic of most such practices in the United States that they are effected at a small charge, but carry with them from twenty-four to forty-eight hours free time under the demurrage tariff.

[9] Taper is a declining rate per ton-mile with an increase in the length of haul.

and with no apparent effort to equalize the two on point-to-point hauls or to establish differentials related to quality of service, but rather with a direct application of distances via the rate-making routes regardless of the relative circuity of water routes.[10]

The Russian State Council in 1887 assumed comprehensive control of railroad rates and promptly undertook a revision of the grain rates, spurred by the fact that grain was one of the most important commodities in rail traffic and by far the largest item of export. The Council introduced a uniform distance scale for application throughout the Empire and applied a marked taper. The existence of established grain production in Central Russia shortly led, however, to modifications to provide very low short-distance rates for the benefit of the landowners of that region while long-haul rates were subjected to increases. When in 1896 the western portion of the Trans-Siberian Railway was opened, the principle of inverse taper was introduced for the purpose of protecting the established areas. Thus while the portion of the haul lying between 895 and 1,094 miles took a rate of 0.250 cents per ton-mile, the charge rose to 0.391 cents for distances between 1,095 and 1,888 miles, and for greater distances to 0.564 cents.[11] While these rates appear to have discouraged the development of grain growing in the newly opened areas, they were far less severe in their treatment of the long hauls than are present Soviet tariffs.

The characteristic form of Soviet rates as well as the remarkable simplicity of the rate system are illustrated by the rates approved by the USSR Council of Ministers in November 1948.[12] Since they apply to twelve major commodity groups including coal and coke, ores of all kinds, iron and steel, lumber, building materials, fertilizers, sugar beets, and potatoes, these rates cover a great part of the total rail traffic.[13] There is only a limited spread among commodity groups,

[10] An odd result is that rates for an inferior water service frequently exceed rail rates between the same points and provide an additional cause for frustration in the effort to increase the use of the improved waterways.

[11] See H. R. Meyer, *Government Regulation of Railway Rates,* New York, 1905, Chapter VII.

[12] As yet there has been very little study of Soviet rail rates by Western scholars. Some material is contained in Holland Hunter's *Soviet Transportation Policy,* Cambridge, Mass., 1957, pp. 209-227, and in his paper "Costs, Freight Rates, and Location Decisions in the USSR" in *Value and Plan: Economic Calculation and Organization in Eastern Europe,* edited by Gregory Grossman, Berkeley, 1960, pp. 322-337.

[13] Iu. I. Koldomasov, *Osnovy planirovaniia perevozok na zheleznodorozhnom transporte* [The Principles of Planning Shipments in Railroad Transportation], Moscow, 1949, Table 22, p. 155.

the beginning blocks of the scale placing coal and coke, iron and other ores, and pyrites on the same basis of 12 kopecks per ton-kilometer for hauls up to twenty-five kilometers. The highest basis is shown for potatoes at 22 kopecks. In many instances, the same rate per ton-kilometer is continued up to fifty kilometers, but on peat, shales, and sugar beets the rates per ton-kilometer are lower for between twenty-five and fifty kilometers than they are for under twenty-five kilometers. Compared with average revenues somewhat above 5 kopecks, these high short-haul rates are designed to divert very short-haul traffic to motor trucks. After fifty kilometers the rates taper down, reaching a minimum rate per ton-kilometer at various lengths of haul ranging from 6.67 kopecks at 150 kilometers for peat to 3.6 kopecks for coal and coke at 1,500 kilometers.[14] Ores, however, reach a minimum of 2.9 kopecks at 700 kilometers and other commodities reach varying minima at other lengths of haul. Beyond the distance at which the minimum rate per ton-kilometer is reached, inverse taper is applied and the ton-kilometer rate gradually increases with distance until the maximum rate is attained at 3,000 kilometers. Thus the ton-kilometer rate for coal is 4.02 kopecks over 3,000 kilometers and for ores 4.47 kopecks. For peat the rate reaches 12.51 kopecks at this distance. The character of the commodity and its availability (distribution territorially) obviously have affected the choice of distances at which the minimum ton-kilometer rates apply. The application of increasing ton-kilometer rates to growing lengths of haul can increase the actual rate very rapidly. Inverse taper, thus, can be a strong deterrent to "hauls of excessive length" which the Soviets attempt to keep under control, just as the high short-haul rates can be relied upon to encourage the relief of rail transport by trucks in movements within terminal districts and elsewhere where truck movement is likely to be more economical. As will be observed later, the monthly planning of traffic also has its effect and establishes norms for the selection of the several available types of carrier.

In order to encourage movement by water carrier, whether on the rivers or in the coasting trade, and in recognition of the lower costs of water transport for hauls of equivalent length, water carrier rates per ton-kilometer are generally fixed 30 per cent below those established for rail hauls. This does not mean, however, that there is any

[14] By Western standards this may be considered a very long haul for coal, but it can be explained by Soviet geography which lacks a Great Lakes system and effective east-west water routes and has to cope with the remoteness of some heavy industry from appropriate grades of coal.

fixed differential between rail and water rates, as frequently prevails in the United States where rates per ton between fixed points are related rather than ton-kilometer rates.[15] On the contrary, since water routes are usually longer than rail routes between any two points, the differential will be less and, in the case of highly circuitous water routes, the rates by water may actually exceed those by rail. Thus, for gasoline from Syzran to Moscow a river haul of 1,913 kilometers replaces a rail haul of 914 kilometers and the water rate exceeds that for rail. A similar phenomenon is observed for flour from Gorky to Leningrad where a water haul of 1,603 kilometers replaces a rail haul of 1,145 kilometers. Or again in the mixed rail-water haul from Nizhnedneprovsk to Orsha for rolled iron and steel transshipping at Gomel, a joint rail-water route of 1,169 kilometers replaces an all-rail route of 1,005 kilometers and the resulting charges are higher, despite the reduction of the rail transshipment and water rates by 30 per cent for such joint hauls.[16]

Because of the inferior service available by water—due partly to the slowness of navigation and partly to the delays in transshipment—more direct methods have been deemed necessary to divert traffic from rail lines to parallel water routes during the navigation season.[17] Whereas Western countries consider that reduced seasonal rail rates are necessary to meet water competition and retain business for the railroads, the Soviet authorities decree increased seasonal railroad rates on selected routes for particular commodities in order to discourage the use of rail routes and encourage water hauls.[18] Selected increased rates are also named in particular instances to discourage distribution of commodities over exceptionally long distances and to discourage cross hauls. For example, the rates were increased 100 per cent for coal originating on the Tomsk and Karaganda Road and moving to stations west of Kuibyshev and Ul'yanovsk. An increase of 50 per cent

[15] In our experience a widening of the differential has frequently diverted traffic—even at times high-grade traffic—to water routes despite the slower and less frequent service and the greater probability of loss or damage. For an illuminating discussion, see John L. Hazard, *Crisis in Coastal Shipping: The Atlantic-Gulf Case,* Austin, 1955, Chapter IV.

[16] An extensive table of comparisons is given in Koldomasov, *Osnovy planirovaniia,* Appendix 3. The 30 per cent concession for combined rail-water routes is referred to as privileged and is designed to encourage short-hauling of the railroads by effecting transfer to water for completion of the hauls.

[17] The short navigation season imposes an unusual bar to inducing shippers to a seasonal shift of practices. There is some evidence that the efficiency of water operations is substandard and that the administration is less than active in soliciting water routing of eligible business.

[18] Between a limited number of points a 100 per cent increase in rail rates applies for all commodities during the navigation season.

was prescribed for all loads of sugar beets in excess of 300 kilometers. Some seventy-one such special rates were established by a decree of the Council of Ministers on September 9, 1948, in what appears to be a continuing practice, some designed to deal with the availability of water routes during the navigation season, others to apply at all times to hauls considered wasteful. A detailed list and description of these increases are shown in Koldomasov.[19] Rate disparities of the magnitude that result from grafting these special decrees upon the normal tariff system cannot help but discourage to some extent undesired rail hauls, although the inflexibility of the system because of the administrative impediments in the way of rate changes by ministerial decree prevents reflection of conditions in detail as well as prompt variation with changes of circumstances and may, thus, occasionally pull in wrong directions. More direct methods are also employed which will be considered at a later point.

Whatever the effects of the efforts to influence transportation demand through rates, it is important to note the absence of the stimulus, characteristic in Western countries, that results from accommodation of rate structures to competitive influences. The Western tradition is not to discourage, but to encourage, transportation, and in a competitive system this produces all manner of rate stimulants designed to expand areas of distribution, permit cross penetration of markets, and enhance the length of haul. Grouping, the establishment of common points, equalization, and the use of differentials that offset production costs or other factors are noteworthy for their absence in the Soviet scheme. Low rates on basic commodities to encourage industrialization have generally been applied, but have usually adhered to the distance principle. To the extent that these practices have successfully promoted transportation in the West, their absence from Soviet policy must be judged to produce a difference in traffic conditions.

Zoning

Zoning of freight movement and of commodity distribution is a practice with which Great Britain and the United States became familiar during the two world wars. In neither country was it applied vigorously or extensively and it has generally been considered as a substantial failure.[20] Tolling was also used during wartime in the

[19] *Ibid.*, Appendix I.

[20] Zoning of coal by the U.S. Railroad Administration in the first war is generally pointed to as the outstanding failure. Rigid administration and failure to accommodate to the various qualities of coal are the chief elements in the indictment. They are probably weaknesses which are also found in the Soviet practice.

United Kingdom. Tolling is the interchanging of brand names so that distribution can be zoned by manufacturers associated in tolling agreements without affecting the competition of brands on the market. In a very modest way it was introduced voluntarily by some manufacturers in the United States during the inflation after World War II. Such a complication does not exist in the Soviet Union.

Zoning is, however, an integral part of Soviet planning for traffic movement. It takes many forms and in some instances is mandatory, while in other instances it is a plan for general observance subject to exceptions. For coal, stations are named on particular railroad lines beyond which a producing field or mine may not ship. They represent, in effect, transportation divides and appear to be calculated according to not only the rail mileage, but also the heating value of the coal which affects the tonnage to be moved.[21] Exceptions are said to be made for special quality coals for metallurgical and chemical purposes. The routing plan for cement specifies the railroads, portions of railroads, and terminal districts which may be served from origins on the various railroad systems subject to adjustment of market regions of varying demands to available supply. Molding sands are to be distributed from particular pits to named *oblasti.* A joint decree of the Ministries of the Food Industry and of Transportation governs the distribution of salt from origin stations, specifying the rail lines to which delivery may be made from such origins. The theory for analyzing traffic movements with a view to developing limits is reasonably well worked out. What it is impossible to ascertain is the effect of these measures, although it appears that they must have some effect in conserving transportation.

Despite considerable discussion among transport economists and others, despite a multitude of decrees, and despite planning techniques designed to analyze desired movement in advance and give it direction, Soviet officials never cease to criticize wasteful transportation, excessive hauls, cross hauls, and the like. Techniques are evidently far from perfect in application and considerable initiative still rests with local shipping units. This initiative is not always employed in ways calculated to satisfy railroad officialdom or the Ministry. Thus, Beshchev, the Minister of Transportation, complained in 1954 that too little progress had been made in eliminating irrational hauls,[22]

[21] What is theory and what is actual practice is difficult to discern in this and other matters.

[22] Speech before All-Union Conference of *Aktiv* of Railroad Transportation Personnel, condensed from *Pravda* of May 19, 1954, in *Current Digest of the Soviet Press,* 1954, No. 21, p. 4.

while Kaganovich was more vehement and cited many examples. Railroad transport "is still forced to haul excess freight and to make extremely long, counter, and other thriftless movements on which huge sums are expended. Shippers and consignees are not much interested in where a commodity comes from—they are not interested in rates nor do they protest the long distances. They will do anything to get the commodity."[23] The polemics of Kaganovich emphasize examples of inefficiency which can always be found in any large and complicated system; the writings of the analysts describe the system as it is supposed to work. Somewhere between is the actual position and it must be judged that the measures here loosely termed zoning have their constructive influence, although if Western experience is any guide at all, this is of the order of 2 or 3 per cent of traffic volume rather than any more impressive figure.

Of more practical importance is the readiness to embargo nonpriority traffic, sometimes for extended periods, in a way that no carrier under a competitive system could. This is sometimes to relieve a particular line or railroad, but may have more extended application. It provides a means to regulate traffic at the several peaks and at all times of transport shortage while maintaining essential traffic flows. And it is an effective method for enforcing zoning schemes or other studied limitations.

Control of Traffic Variation Through Storage at Origin

A consequence of the failure to provide capacity adequate for peak demands is enforced storage at origin, as a result of which backlogs customarily build up that are worked off in the spring. This is a situation of such long standing that it is apparently not looked upon as an object of comment save when the shortfall in capacity prevents moving the accumulations before subsequent seasonal increases in goods available for shipment develop. Regularity in rail traffic is highly prized and efforts are made to expand storage at origin to promote this result. Moreover the building of winter stocks of coal and metallurgical raw materials at the consuming plants is emphasized

[23] Speech before the Supreme Soviet Session, Council of the Union, reported in *Pravda*, April 27, 1954, p. 7, in *Current Digest of the Soviet Press*, 1954, No. 17. One of the more astonishing examples which he gives is that about 30 per cent of rail ton-kilometers in the coal traffic were produced in handling that portion of the coal traffic which moved beyond 1,800 kilometers. Moreover he cites an increase in the coal moved beyond 2,600 kilometers from 5.9 per cent of the total in 1952 to 7.1 per cent in 1953.

in rail as well as water movements.[24] Timing of movements for prices and speculative purposes or with a view to maneuvering the railroads into a delay claim appears to have no place in the distribution pattern, nor does storage on cars in advance of shipping instructions. Considerable emphasis appears to be given to the country storage of grains, although a distinct change in the composition of rail traffic has reduced the effect of the agricultural crop cycle on the seasonal pattern of traffic.[25] It is impossible to compare the contribution that storage makes to an even transport flow in the Soviet Union and in Western countries. There is evidence, however, suggesting a significantly greater role in the Soviet Union.

Planning of Traffic Movement

Through the regional Shippers' Advisory Boards railroads in the United States receive quarterly advance estimates of carloadings, which are helpful in car distribution and in other matters involving the effective movement of traffic. Soviet railroads have the advantage of a formal planning procedure, which very likely comes closer to an accurate forecast and which also serves many other useful purposes in mitigating the burden of freight traffic and providing for its effective coordination. These elaborate planning techniques with their excess of paper work cannot be expected to be without effect, for they involve detailed cooperation between the railroads and the shipping ministries and provision is made for check upon plan fulfillment. The detail of planning provides for the establishment of numerous norms for car handling, consolidation of shipments, and other matters tending toward more efficient use of the transport plant. An analysis of plans will disclose direct and indirect cross hauling and excessive hauls where the jurisdiction of a single railroad is not broad enough to comprehend them. Review by shipping ministries then becomes possible in order to secure superior performance in later plan periods.

[24] Such stocking is a necessity at rail-supplied plants to avoid undue delay of railway cars because of frozen lading. No data have come to view which disclose its magnitude.

[25] The following data (computed from series C-8 in Appendix C) are illustrative:

	Per Cent of Total Ton-Kilometers	
	Grain	Coal and Coke
1913	15.1	19.4
1940	7.9	35.0
1950	5.1	30.1
1958	6.2	26.8

The plan procedure was modified in 1939 to provide for monthly shipment plans which tie together origin and destination and which are to be prepared by the shipping ministries and subject to review by the railroads.[26] Emphasis is placed on the holding and consolidation of volume from particular origins to particular destinations in multiple-car consignments up to full trainloads, on the exchange of supplies among enterprises for the service of consuming ministries in such a way as to produce minimum hauls, and on similar matters affecting the efficiency of equipment use. Prospective short-line routings are checked by the rail carriers against line capacity, and prospective overloads are coped with by modifying operating practices or resorting, where necessary, to indirect routing of a portion of the volume over noncongested lines. As with other aspects of Soviet technique for traffic control, evaluation of the effects of planning processes is impossible from available data. Since the whole process is directed toward obtaining efficient use of the transport plant, however, it can only be presumed to be of some help in this direction.

Comparison of Soviet and U.S. Average Hauls

Notwithstanding all efforts to minimize average hauls and avoid excessive transportation, Soviet geography and Soviet industrial policy, particularly in its early emphasis upon large-size plant, have resulted in longer average rail hauls than in the United States. From the point of view of minimizing rail hauls, the Soviet distribution of heavy resources is unfortunate, but Soviet industrial policies have tended to exaggerate this disadvantage, as is well illustrated by the disregard of necessary long hauls in the Ural-Kuznetsk Combine.[27]

It is of vast importance, also, to note fundamental differences in the transportation geography of the two countries in order to evaluate the quality of Soviet transportation. The Soviet Union lacks a Great Lakes system; it lacks a river route for a main channel of heavy commodity flow which is as satisfactory as the Monongahela-Ohio-Kanawha system; it lacks reasonably direct coastwise transportation. Were it not for the Great Lakes system, the length of the rail haul of some 130 million tons of ore, coal, and grain in a busy year would have

[26] Koldomasov's book (*Osnovy planirovaniia*) is in greater part devoted to a description and discussion of plan techniques but contributes little to their evaluation.

[27] See Hunter, *Soviet Transportation*, pp. 47-50, and Franklyn D. Holzman, "The Soviet Ural-Kuznetsk Combine," *Quarterly Journal of Economics*, August 1957, pp. 368-405.

to be tripled.[28] In the absence of direct connecting coastwise transportation, the rail haul of some 40 million tons of tidewater coal would be roughly doubled, while some 200 billion ton-miles of petroleum transportation would have to be accommodated by a new trunk pipeline net or moved by inland water-rail routes in the absence of the Gulf-Atlantic coastwise service. In the absence of these water routes, were American industry distributed as at present, our average rail haul would be increased some 20 per cent. But the development of our resource pattern would have followed a different sequence had the stimulus of the lakes been absent.

The comparison of average hauls in Table 12 below is, for the most part, limited to the prewar period. The rapid rise of average rail hauls in the United States since the war is largely the result of a phenomenal growth of motor transport which has no parallel in the Soviet Union and which has diverted a large tonnage of short-haul business.[29]

TABLE 12

COMPARISON OF AVERAGE HAUL ON U.S. AND SOVIET RAILWAYS, 1928-39, 1950, 1959
(miles)

	U.S. Railways		*Soviet Railways*
	Actual Mileage[a]	Short-Line Mileage[b]	Tariff Mileage[c]
1928	318	286	374
1929	317	285	376
1930	316	285	351
1931	329	296	368
1932	347	312	395
1933	342	308	395
1934	337	303	406
1935	341	307	415
1936	337	304	418
1937	337	304	429
1938	356	321	449
1939	351	316	442
1950	416	375	451
1959	445	401	506

SOURCE: U.S. data from *Statistics of Railways*, I.C.C. for corresponding years; Soviet data from series C-3 in Appendix C.

[a] All U.S. data rounded to nearest mile.

[b] Reduced by 10 per cent to adjust approximately to short-line mileage. Occasional studies have demonstrated circuity in the carload freight service ranging from 12 to 13.8 per cent. See Stuart Daggett, *Principles of Inland Transportation*, New York, 1955, p. 368, and *Transport Economics*, January 1956, pp. 5-7.

[c] Converted into miles at 1.6 kilometers to the mile for ease of calculation, the underlying data being somewhat rough for most years.

[28] Assuming topography, in the absence of the lake system, permitted direct diagonal lines across the lakes region with the industry located upon such routes.

[29] Reporting motor common carriers, however, now show a traffic-revenue relationship which implies an average haul of approximately 200 miles.

Hence comparison with USSR data are difficult to interpret in the postwar period. The several postwar observations given, however, illustrate that Soviet average hauls continue above those of U.S. railroads.

Composition of Freight Traffic

The term "composition" of freight traffic denotes the proportions of various commodities and types of freight embraced in the total traffic. It is a necessary object of study if a system of transportation is to be understood because the character of the traffic affects the plant which must be provided, the type of equipment needed, the character of service required, the operating methods, and the operating results. Moreover, for the purposes of this study, it is of independent value to gather the available data on commodity composition of traffic since such information may assist in the evaluation of production data. Especially where railroad traffic represents so large a proportion of the whole, its composition may convey a good idea of the make-up of the economy. It should be recalled, of course, that data on the traffic of particular commodities are likely to be affected by the same infirmities as the total traffic data. Moreover, the Soviet classes of commodities do not correspond, in many instances, with the classes employed elsewhere, so that comparison is difficult and not entirely conclusive.[30]

Composition of traffic can be studied in carloadings, tonnage originated, tonnage handled, tonnage terminated, ton-mileage, and

TABLE 13

COMPOSITION OF SOVIET FREIGHT TRAFFIC, FIVE-YEAR INTERVALS, 1930-58
(per cent of total annual tons originated)

	1930	1935	1940	1945	1950	1955	1958
Coal and coke	17.3	24.4	25.7	36.0	32.0	30.7	29.6
Petroleum and petroleum products	5.5	5.8	5.0	5.4	5.2	6.1	6.9
Ores	4.1	6.7	5.6	4.5	5.7	6.6	6.7
Ferrous metals	3.5	4.9	4.6	5.4	5.2	5.7	5.4
Lumber building materials	13.0	10.9	7.2	6.7	8.7	7.4	7.5
Firewood	6.3	4.7	3.9	4.4	2.3	1.3	1.1
Mineral building materials	10.8	14.3	18.9	10.6	18.9	19.4	20.0
Grain	10.2	7.7	7.5	5.1	4.7	4.6	4.4
Other freight	29.3	20.6	21.3	21.9	17.5	18.2	18.1

SOURCE: Series C-7 in Appendix C.

[30] Detailed breakdown by commodities is not available after the middle 1930's, nor is the precise content of the present grouping fully defined. Certain changes in classification have occurred, but this is true of other countries as well.

revenue. Average haul, which may be computed from two of these sets of data, as well as average carload may also have their use. For parallel study with production data, tons originated or terminated should be the most useful, hence we begin our analysis with a consideration of these data. Table 13 gives the Soviet data. It will be observed that the composition has been changing over the twenty-five-year period represented here and a more detailed study could be made if it served a useful purpose. It will be noted especially that the share of coal and coke has grown, that it was more than double the 1930 share in 1945 and thereafter fell off somewhat. Petroleum shows a fair stability up to 1950, but an increase thereafter, the actual 1958 tonnage originated being more than two and a half times that of 1950.[31] Although ores stood below the middle 1930's through 1950, the share of ferrous metals has tended to grow. But in the form presented here the data are not well adapted to an analysis of the significance of traffic composition from the point of view of operations. Both a rearrangement and a comparison with U.S. composition will shed some light on that significance. Coal and coke, ores, and petroleum are all included in the U.S. data under products of mines. Petroleum products are, however, for the most part included in manufactures. Mineral building materials for the most part belong in the products of mines category, but such items as cement, brick, and tile are included under manufactures in the U.S. classification. The sum of lumber building materials and firewood in the Soviet classification should come close to approximating our products of forests. As animals and products are included under other freight in the Soviet classification, there is no Soviet equivalent to this U.S. classification. Recast under these several categories, and with the qualifications noted above, we obtain the Soviet figures shown in Table 15 below.

To make the U.S. data more nearly comparable, we must also adjust them. The unadjusted figures are shown in Table 14. In effecting adjustment, we may reduce the products of agriculture by 35 per cent to represent items presumably not covered in the Soviet grain category, for the proportion of grain and grain products in the United States products of agriculture fluctuates in the neighborhood of 65 per cent. This item, together with animals and products and less-than-carload freight, may be included in the other freight category which we have

[31] Actually coal and coke appears to have reached a peak in 1947 at 37.2 per cent of total tons originated. Ton-kilometrage of petroleum increased more rapidly than tonnage and in 1958 stood at three times the 1950 figure.

TABLE 14

COMPOSITION OF U.S. FREIGHT TRAFFIC, FIVE-YEAR INTERVALS, 1930-58
(per cent of total annual tons originated)

	1930	1935	1940	1945	1950	1955	1958
Products of agriculture	9.6	9.7	8.8	11.2	9.5	9.6	12.3
Animals and products	2.0	1.9	1.5	1.7	1.1	0.9	0.8
Products of mines	55.7	56.3	56.5	51.4	55.2	54.6	52.9
Forest products	6.0	5.4	5.8	5.3	5.8	5.9	6.1
Manufactures and miscellaneous[a]	24.1	24.9	25.9	28.9	27.6	28.5	27.5
Less-than-carload	2.6	1.8	1.5	1.5	0.8	0.5	0.4

SOURCE: *Statistics of Railways in the United States* for 1930, 1935, 1940, 1945, 1950, 1955, and 1958, Interstate Commerce Commission.

[a] Includes traffic consolidated by freight forwarders and tendered in carloads.

renamed "manufactures and miscellaneous." Thus recast, the comparable figures are shown in Table 15.

We may effect a further adjustment by breaking down the United States products of mines category and taking out of manufactures and miscellaneous certain items which we presume are covered in the Soviet products of mines category as developed above. Following this process, we combine anthracite and bituminous coal and coke, bring together crude petroleum and refined petroleum products including lubricating oils, sum up the several categories of ores and concentrates, and bring together as "mineral building materials" sand, gravel, stone, artificial stone, lime, plaster, brick, cement, and tile. Thus we are able to break down the products of mines category into elements which should reasonably coincide with the Soviet items which we grouped above under this head and we may transfer the remainder of the United States classification to manufactures and miscellaneous. The result, as given in Table 16, should represent a reasonably comparable tabulation. It will be observed that the change between the two broad categories is not great, but it reduces the apparent difference between the United States and the Soviet traffic composition.

What, if anything, may be learned from so rudimentary and imperfectly matched a classification? Certain of the groups are relatively homogeneous in their transportation characteristics. That is true of the products of mines category, with the exception of very small tonnages of certain nonferrous ores which are included. These commodities are of high density and relatively low value, and may be handled in bulk in quantities appropriate to the capacity of the cars. Individually they are one-way commodities and they will seldom be

TABLE 15

COMPOSITION OF U.S. AND SOVIET FREIGHT TRAFFIC, FIVE-YEAR INTERVALS, 1930-58
(per cent of total annual tons originated)

	1930		*1935*		*1940*		*1945*		*1950*		*1955*		*1958*	
	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.
Products of mines	37.7	55.7	51.2	56.3	55.3	56.5	56.5	51.4	61.8	55.2	62.8	54.6	63.2	52.9
Forest products	19.3	6.0	15.6	5.4	11.1	5.8	11.1	5.3	11.0	5.8	8.7	5.9	8.6	6.1
Grain	10.2	6.2	7.7	6.3	7.5	5.7	5.1	7.3	4.7	6.2	4.6	6.2	4.4	8.0
Manufactures and misc.	32.8	32.1	25.5	32.0	26.1	32.0	27.3	36.0	22.7	32.8	23.9	33.3	23.5	33.0

TABLE 16

COMPOSITION OF U.S. AND SOVIET FREIGHT TRAFFIC, FIVE-YEAR INTERVALS, 1940-58
(per cent of total annual tons originated)

	1940		*1945*		*1950*		*1955*		*1958*	
	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.	Soviet	U.S.
Coal and coke	25.8	36.8	36.0	34.0	32.0	32.4	30.7	29.0	29.6	28.9
Petroleum and petroleum products	5.0	5.4	5.4	4.3	5.2	3.2	6.1	2.9	6.9	2.8
Ores	5.6	8.7	4.5	7.3	5.7	8.5	6.6	10.1	6.7	7.9
Mineral building materials	18.9	8.0	10.6	6.7	18.9	12.2	19.4	14.9	20.0	15.7
Total products of mines	55.3	58.9	56.5	52.3	61.8	56.3	62.8	56.9	63.2	55.3
Forest products	11.1	5.8	11.1	5.3	11.0	5.8	8.7	5.9	8.6	6.1
Grain	7.5	5.7	5.1	7.3	4.7	6.2	4.6	6.2	4.4	8.0
Manufactures and miscellaneous	26.1	29.6	27.3	35.1	22.7	31.7	23.9	31.0	23.5	30.6

handled, except petroleum, in other than open-top equipment. The volume of movement, especially in the case of iron ore, coal, and coke, is great enough frequently to permit forwarding in multiple-car or trainload lots from a given mine to a particular consuming installation while employing cars of the greatest capacity available.[32] Given a large flow over a particular route, this traffic is the most favorable type to handle, enabling the development of heavy trainloads moving through yards and terminals adapted to the specialized flow. The rail costs are the lowest for such flows and the business, when well organized, is characteristically enormously profitable even at a level of rates quite low relative to the average.[33] In the Soviet case, the long average haul adds to the importance of the traffic in this category and presents the railroads with a more advantageous set of circumstances for attaining economy per ton-mile.

The forest products category is less homogeneous. It appears that the Soviet category is much more largely made up of logs, pulpwood, and firewood rather than the dressed and finished lumber in the American category. Consequently a larger portion can be satisfactorily loaded in open-top equipment and the quality of equipment furnished for loading is of less significance. This traffic, too, has the important

[32] This tends to promote the lowest ratio of tare weight to gross weight of any loaded movements in rail service.

[33] The continued prosperity of the American bituminous coal roads and of the ore roads, despite their short hauls, is a case in point. But the British coal roads during an earlier period were also excellent examples both in the Welsh fields and in the Midlands.

advantages of being relatively free from risk in transit, having relatively low value, and being able to load under most circumstances up to the full capacity of the car. On the other hand, open-top loads of logs, lumber, and poles are notorious for their propensity to shift in transit and thus to occasion delay at intermediate yards for readjustment of loads. When, however, the traffic is available in large volume, as from most producing regions, it produces desirable tonnage which can be handled with considerable economy of equipment.

Grain is also low-grade, heavy-loading traffic which frequently makes up into trainloads early in its movement, but it requires high-class closed cars for safe movement in bulk over long distances and it suffers from seasonality. As the Soviet harvest is spread over a longer period because of the machinery situation and since storage at origin is stressed, the seasonal characteristic has a less serious effect than on the roads of the western United States or of Canada.[34] But it nonetheless has an undesirable effect on this traffic which is mitigated in the Soviet case because the railroads do not serve harvesting over a dense network of branches in the grain-growing territory to the same extent as in most other countries with commercial grain agriculture. Moreover, the bulk of line-haul transportation the year round is performed by rail, hence the grain lines do not dry up at other than harvest time, while the relatively low yield and spread of the harvest tend to insure a less concentrated load. These two factors mean that the facilities necessary for normal traffic are more nearly adequate for the peak of the grain movement than is generally the case elsewhere and, along with the spread induced by local storage, they render unnecessary proportionately large advance accumulations of cars held idle awaiting grain loading. Except for the loss of car time in such accumulations, the grain traffic normally makes intensive use of car equipment, provided cars are not loaded when the ability of the terminal elevators to unload them promptly at destination is in doubt. This factor seems to be well under control in the Soviet case. It is worth noting that in each of the postwar years shown Soviet grain traffic appears to have been a smaller proportion of the whole than in the United States.

The manufactures and miscellaneous category is a catch-all of vast scope, so varied in its composition as to permit little useful comment.

[34] The Soviet position is more nearly comparable to ours before the first war. Given dry weather, the U.S. harvest may now be concentrated within a week's time in any particular loading area. Hence virtually all the cars required to load it must be stored in the loading area in advance, often some weeks in advance because of the unpredictability of the time of arrival of grain at country elevators.

Since it is much more limited in American statistics and since a rather detailed breakdown is also available, something can be said of its transportation characteristics. But our adjustments have necessitated bringing in livestock and products, much of the agricultural category, miscellaneous items from products of mines, less-than-carlot traffic, and forwarder traffic, since we are not able to take out these components of Soviet traffic. Yet it is in the relationship of this category in the two countries, as well as in its movement over time in the Soviet Union, that we may find some contrasts and developments of significance. Hence we cannot dismiss it, despite its heterogeneous composition.

It is to be observed that at five-year intervals since 1930, the shares of this category in the total in the Soviet Union have been consistently smaller than those for the United States, by from 3 to nearly 10 percentage points and, although the lag has diminished a bit since 1950, it remained greater in 1958 than in 1940. Despite our limited knowledge of Soviet traffic and the extensive adjustments it has been necessary to perform, it appears likely that this catch-all category has about the same commodity coverage in both countries. In any event, no further adjustment is possible from the available data. Hence it appears probable that, at least since the second war, Soviet minerals traffic has represented a larger proportion of the whole than in the United States, while over the entire period since the early 1930's manufactures and miscellaneous traffic as put together above has lagged. Among the important items making up the category, ferrous metals can be separated, although we cannot be sure that the separate commodity descriptions put together from the U.S. statistics are not more inclusive than this Soviet category. Such a comparison suggests that ferrous metals in the United States have consistently represented a larger proportion of total rail traffic, except in years such as 1958 when the steel industry was at a lower than average level, but the reader is cautioned to remember that rail traffic in the U.S is much less important and much less representative of the whole of domestic transportation than is the case in the Soviet Union.[35] Particularly is it to be noted that a very large volume of manufactured iron and steel moves in the United States by truck. The comparison also indicates that there has been a change over the 1940-58 period in

[35] The comparative data for ferrous metals as a percentage of total rail traffic are:

	1940	1945	1950	1955	1958
Soviet	4.6	5.4	5.2	5.7	5.4
U.S.	6.4	6.2	6.6	6.9	5.2

the position of the two countries in ferrous metals traffic as a proportion of the manufactures and miscellaneous category constructed earlier. Whereas in 1940 this proportion was smaller in the Soviet Union than in the United States, by 1945 the position was reversed and it has remained so, although the 1950 and 1955 data do not reveal a widening of the gap, while 1958 does not afford a good basis for comparison because of the reduced activity in the U.S.[36] The change is a modest one and must not be accorded great significance, although the Soviet share is probably understated in comparison with the U.S. one.[37] It appears likely that vehicles of all kinds as well as agricultural implements and parts stand higher in the U.S. composition, despite the fact that the greater part of this traffic moves in the United States by other methods of transportation. Beyond this, it is not possible to indulge in further speculation from the limited data except to note the probability that in food products and in consumer goods generally there is a sharp difference in quality, limitation of variety, and form of packaging which simplifies the problem of transportation. The Soviet items probably move in larger unit packages, are of higher unit density, and are frequently in a less final state of manufacture. Staples in all likelihood form a greater proportion than goods finely tailored for a cultivated demand attuned to style characteristics and brand differentiation. These differences, while probably of modest significance, nevertheless point to a manufactures and miscellaneous traffic which it should be possible to load more rapidly and readily in the car—traffic, in short, which is somewhat more favorable to railroad efficiency.[38]

The heavier proportion of mineral traffic is, of course, favorable to heavy car and train loading and, except under unusually bad weather conditions, is favorable also to the rapid loading and unloading of cars. This tendency is reinforced by the less fine classification of these items by size, chemical composition, and grade, and by less variety in the brick and tile list. It is especially notable that mineral building materials have far exceeded the similar category in the

[36] Ferrous metals traffic made up the following percentages of manufactures and miscellaneous traffic:

	1940	1945	1950	1955	1958
Soviet	17.6	19.8	22.3	23.9	22.9
U.S.	21.6	17.6	20.8	22.2	17.0

[37] Interstate Commerce Commission category 583, "Manufactured Iron and Steel," is particularly likely to include items not embraced in the Soviet category.

[38] It should be observed that, insofar as tonnage originated is overstated, it is most likely to be of importance in this category.

United States even though care has been taken to include in the U.S. compilation all items that could reasonably be included under the Soviet caption. It is difficult to account for so great an excess, but if it is accepted at face value it represents a category primarily composed of commodities of highly desirable transportation characteristics conducive to heavy carload and to rapid loading and unloading of cars, particularly when handled in bulk. It is also noteworthy that lumber, for the most part a commodity with desirable loading characteristics, has stood at nearly twice the proportionate U.S. level over almost the whole period selected for study and that examples of this traffic cited in the Soviet rail press give evidence of excellent loading achieved in practice. Like the grain traffic, the lumber traffic tends to be concentrated at limited points of delivery and interchange to the railroad system and hence would appear to be originated under somewhat more favorable circumstances than is much of the U.S. lumber traffic.

The available data are so inadequate that caution is necessary in drawing conclusions. Nevertheless, the following comments on the over-all composition of Soviet rail freight traffic would appear to be justified:

1. The similarities are more apparent than the differences, but the latter may be of sufficient magnitude to have some favorable effect on the rail operating task.

2. Soviet products of mines appear to have exceeded the proportion which they have represented of U.S. rail traffic since the war and to have been not far behind the U.S. proportion between 1935 and 1945. This growing disparity is the most significant difference between the two compositions and it is favorable to high utilization of cars and motive power, as well as of track capacity in those areas where minerals are preponderant in the traffic. The disparity by 1950 had certainly become great enough to have a favorable effect upon Soviet rail operations.

3. Forest products have consistently represented a greater proportion of Soviet than of U.S. freight traffic, and this also is to be regarded as a somewhat favorable circumstance.

4. Grain has been less important in the United States than in the Soviet Union over most of the period, although 1945, 1950, 1955, and 1958 show the opposite relationship because of exceptionally heavy grain movements in the U.S. during those years and the persistence with which grain remains "rail bound" in the face of the progressive diversion of many types of tonnage to other forms of transport.

5. Manufactures and miscellaneous traffic is a heterogeneous category about which not much can be said but which appears, since 1930, to have been a bit lighter in Soviet than in U.S. traffic—significantly so by 1955—and to have represented traffic on the average in a cruder state of manufacture, of more limited variety, moving in large packages or in bulk and in relatively large lots, all factors which are of some advantage to the carriers.

6. The ferrous metals category is probably lighter in the total composition of Soviet traffic, but heavier when expressed as a percentage of the manufactures and miscellaneous category to which it belongs. This, with other factors, helps to make that category a less difficult one for carriers to accommodate.

7. In sum, the differences in composition which the highly inadequate data suggest appear to be of some, but not of great, significance from the point of view of their effect on railway operations.

8. There is a lingering doubt, however, whether the overstatement of tonnage referred to earlier is not greater in the manufactures and miscellaneous group than in the products of mines and timber groups because significant underloading is more readily visible in most of the traffic in these last two groups, thus resulting in an actual position possibly more favorable than the data disclose.

9. What we are discussing here is the composition of *railroad* traffic in the two countries. Rail traffic in the Soviet Union, if accurately stated, should fairly represent the composition of the economy. In the United States it does not, for railroads account for less than half of the total movement and it is probably correct to say that as much manufactures and miscellaneous traffic is originated and handled to destination by truck as by rail while the great bulk of all petroleum, both crude and refined, is originated and handled to destination by transport other than rail. It is also likely that the general types of manufactures and miscellaneous traffic still on the railroads, while not representative of the whole, are reasonably similar to the types which characterize Soviet rail traffic in this category with the notable exceptions of forwarder traffic and a limited tonnage of high-grade consumer goods which probably have no counterpart in Soviet traffic.