

**CONFERENCE PROCEEDINGS ON
TRANSPORTATION: THE 1970'S**

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PREFACE

The general objectives of the conference were (1) to bring together personnel who are vitally involved in the transportation system of the United States and (2) to cast an eye toward the coming decade concerning what is ahead for transportation. The underlying question which served as the catalyst was, "Where do we go from where we are?"

Approximately one hundred participants representing carriers, shippers, government, and private and public research institutions attended. The quality of the presentations and the formal and informal discussions indicated a very high degree of interest and concern with the future of the transportation system.

Four basic approaches appeared dominant throughout the conference: (1) a vital concern for the rapid technological changes taking place in the total transportation system. This concern provided the determinant for challenging discussions concerning, (2) the techniques and philosophy of pricing transportation services, (3) the role of regulation in maintaining the interests of the public and the carriers, and (4) the impact on the transportation system as an industry and as a vital function in the production and marketing of goods.

It appears that technological changes in transportation facilities and equipment will and have accelerated rapid changes in the marketing system. Institutions and the corresponding traditions are faced with adapting to change in rapid sequence in order to remain a part of the production and marketing process. Society in the form of taxpayers and legislators will be faced with an avalanche of technology designed to improve the flexibility and efficiency of the transportation system. The challenges to the latter are perhaps even more significant than to the carriers. Society will not only face increased costs to modernize the public ways but also the possibility of accelerated changes in the sociological profile of the culture. Rural America will perhaps feel the latter impacts more than urban America. This is perhaps more so the case in the Great Plains area than in any other part of the country.

In turn technological changes bring about pressure on carrier management to look upon marketing of transportation in a more sophisticated manner. With rapid changes in the technology of transportation among all modes, traditional pricing philosophy and techniques should be forthcoming. A turn toward cost oriented pricing among all modes will go a long way toward better satisfying the resource allocation responsibilities of the free enterprise pricing system.

But this evaluation in pricing calls for additional changes. In order to stave off the negative aspects of price competition and to provide a coordinated system which yields adequate returns and benefits the buyer and the needs of society, intramodal mergers will accelerate. In addition inter-modal integration will become both necessary and facilitative.

The pressures on the existing regulatory bodies including the Department of Transportation will be expanded. Greater efforts will need to be allocated to public policy and the specific programs to implement this policy. All agencies are going to become more professionalized, particularly at the board of commission level. The responsibility will be to be constantly cognizant of public needs in response to a dynamic industry.

The primary challenges are to researchers--both public and private. Research must be realistic; it must take account of both felt needs and yet the researchers must possess perspective. To the extent that transportation is a primary industry and an important function in the American economy, significantly more effort and dollars will have to be available to provide a constant flow of documented research.

David C. Nelson, Director
UPPER GREAT PLAINS TRANSPORTATION
INSTITUTE

THE DOYLE REPORT: THE TEST OF TIME*

John P. Doyle**

Let me reassure you that you will not be asked to sit while I read the seven hundred thirty-two pages of this report. Neither will we attempt to review all of its seventy-odd recommendations. I have picked several of what I consider major subjects to review. Then, I hope, we can move into a discussion of these or other subjects related to national transportation policy which are of interest to you.

Despite the billing on your program--"The Doyle Report"--a typical journalistic labeling--let me emphasize that our report was no one-man job. It was a team effort. I would particularly like to recognize the contributions of Dr. Marvin L. Fair of American University; Mr. Robert D. L'Heureux of Washington; Dr. Walter Kurylo of the Bureau of Public Roads; economists Ralph Rachel and Howard Nicholson; and Mr. Roland Quелlette, whom we stole from the Library of Congress. Without the dedicated work of these men and the others there would have been no report.

Tribute is also due Chairman Magnuson of the Senate Commerce Committee; the then senior minority member, Senator Schoeppel of Kansas; and Senator Smathers of Florida, then Chairman of the Surface Transportation Subcommittee. These men insured that we were not pressured to document somebody's pet conclusions and that no political hacks were loaded on our payroll. We were free to do the job as seemed best to us.

Since our study grew out of the hearings on what became the Transportation Act of 1958 it is understandable that the seven items the Commerce Committee specified be investigated and the sixteen we added were oriented primarily to problems of domestic surface transportation. We had all we could do within the time and funding allowed to cover this area, realizing full well that there were many problems of air and ocean transport that warranted attention. We did not, however, believe our study should have been extended--it was long enough as it was. In this sense the study is incomplete.

Remembering that the study was made and the conclusions reached from mid-1959 to the end of 1960, let's get with it.

*A Partial Review of Senate Report 445, 87th Congress, 3 January 1961.

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Policy

We considered national transportation policy as expressed in the preamble to the Interstate Commerce Act and in other more limited policy pronouncements. The preamble is of particular importance because both the Commission and the Courts render decisions based upon their specific interpretation of its broad wording. We found numerous inconsistencies and inadequacies in view of modern conditions. Specifically, we were critical of its failure formally to declare the essentiality of common carriers; of its silence on the desirability of private ownership and impartiality of Federal promotion; of its lack of flexibility and its tendency to preserve the status quo; of its reference to "destructive" competitive practices which has been interpreted so as to preserve specific carriers from their own failures; and of its failure to emphasize the need for physical reorganization of the transportation structure to keep up with changing conditions. We suggested a policy that we believed would correct these deficiencies and, with a few minor modifications, I believe our suggestion is still valid.

Suggested National Transportation Policy

It is hereby declared to be the national transportation policy to provide for flexible, coordinated, and impartial promotion and regulation of transportation in interstate commerce to the end that the needs of the commerce of the United States, of the Postal Service, and of national defense be met.

To attain this objective Federal promotional and regulatory programs in transportation shall:

1. Foster a safe, adequate, and coordinated national transportation system composed of carriers of all economically suitable modes, operating singly and in combination with each other and having as its nucleus privately owned and operated common carriers.
2. Recognize the national dependence upon public for-hire carriers obligated to serve equally all who apply. In furtherance of this policy government agencies should utilize such obligated carriers to the extent they are reasonably available and suitable for individual movement requirements.
3. Recognize and fully develop in the public interest the ever changing service and cost characteristics of each mode of transportation.
4. Recognize the public interest in safe and economical transportation at just and reasonable charges therefor.
5. Be so administered in promotional programs as to identify changing national, regional, and local needs for

transportation development and as to satisfy those needs in the most economical manner through expenditures which consider the relative economic fitness and the characteristics of the several modes, to the end that public transportation investments of the Nation are efficiently allocated.

6. Be so administered in regulatory actions as to recognize cost relationships in the adjustment of rates and charges without undue discrimination, preference, or advantages as between users of transportation or unfair competitive practices as between carriers. In furtherance of this policy proposed rates of one carrier, adjudged to be compensatory to the proponent under standards prescribed by the appropriate regulatory agency, shall not be denied to protect the traffic of other carriers of the same or a different mode nor to maintain existing rate relationships between users of transportation service.
7. Foster adjustments in the physical structure of the transportation system and the component modes and carriers thereof, through consolidation and otherwise, toward maximizing the potential of all to serve the needs of the public as a whole.
8. Further coordination and cooperation with the several States and the authorized officials thereof toward the development of simplified and effective economic and safety regulation of transportation.
9. Give primary consideration to the national public interest in all cases of conflict with the more limited interests of persons or localities.

All actions of Federal agencies in matters affecting transportation shall be carried out in accordance with the above declaration of policy.

There has been no amendment to the Preamble since our report and no bills introduced for the purpose.

National Survival

We were critical of the degree of readiness of our national transportation system to react to a nuclear war emergency. It is obvious that our people are less concerned with this possibility today than they were in 1959 but the possibility is still there. We are still unready for such an eventuality and there are many comparatively inexpensive steps we could take to improve our position. If we are to reject the need for transport preparedness without a prior mobilization period, we should do so deliberately--

not by default. There is hope that the Department of Transportation will make some progress in this area.

Trends

There is a lengthy section on economic trends in our study--projected to 1975 from data up to 1959--the latest year we had available. We predicted continued growth of non-regulated traffic in relation to regulated traffic and this has happened. We did not foresee the resurgence of some railroads in 1965 and 66 as a result of new and more aggressive marketing philosophies on the part of our Class I railroads and the improvement of net earnings resulting in part therefrom. We must remember that a portion of the improvement in railroad net earnings since 1962 stems from tax credits and depreciation changes. We should not be too complacent as a result of this spurt of activity. The long term shift from regulated to unregulated carriage continues as we predicted--in part as a result of inconsistent government actions and court decisions not in the general public interest. We should note that in the good years of '65 and '66 some sixteen per cent of our Class I rail carriers operating in the red. We should also note that many truckers are complaining about a cost-revenue squeeze. What this could portend for the future of privately operated common carriers, obligated to serve the public as a whole, seems quite obvious.

In 1960 we said there was no national crisis in transportation and there is none today. We said that there need not be if we would get busy to update regulatory law and practice. This, I believe, is still true.

We should make up our minds that we cannot, as a nation, expect non-discriminatory service from carriers obligated to serve all comers without protecting those carriers from the selective competition of unregulated, unobligated carriers. These pick and choose the cream traffic, leaving the unprofitable or marginally profitable skimmed milk for the obligated carriers, on whom much of the nation's commerce must depend. Alternatively, we might decide to junk the obligated carrier concept. We could be sure that the large volume shippers would be served or that they would serve themselves. What would happen to others and to the general commerce of the nation is anybody's guess.

There is another alternative. We could pay some heed to the 1942 report of the National Resources Planning Board which urged that each mode seek to perform those transportation services it can do best. This, to the horror of some, might reduce intermodal competition. It would certainly require a higher degree of intermodal coordination. It could materially reduce our national transportation costs.

Organization of Government

Our study group based its thinking in this area on the traditional separation of executive, legislative and judicial functions which has been the great strength of our government. Within that framework we considered various types of organization from the aspects of efficiency and simplicity.

We recommend a Department of Transportation to centralize executive functions relating to transportation and this has been created. It is unfortunate that, to get the Department at all, the Administration had to accept exclusion of certain important functions, which, hopefully, will be brought in at a future date. Internally, we recommended a functional type organization at the policy level, rejecting organization by clientele or by major purpose. This is, in general, the way the Department developed.

We recommended continued independence of the regulatory agencies as arms of Congress to perform the quasi-legislative functions of regulation. As you know, this was a key decision which was made.

Noting the lack of internal coordination on transportation matters in Congress and the frequent conflict of actions affecting transportation between the many committees concerned, we recommended formation of a non-legislative Joint Committee on Transportation that could study proposed actions and offer well thought out recommendations. This, to date, has not been done. It is badly needed and hopefully, some day, will arrive.

We recommended simplification of the procedure for legal review of Commission action through creation of a Circuit Court of Appeals for Transportation, with direct appeal to the Supreme Court. Faster, more convenient and more consistent action would result. This, too, remains for the future.

The study group also urged consolidation of the three regulator agencies into one--primarily because more and more cases overlap surface, air and ocean transport. It is interesting to note that the retiring Chairman of the ICC advocates the same step, saying that the Joint Board concept is not working as it should. Along with such consolidation the Congress should lay down positive provisions in the law--such as longer tenure and internal election of the Chairman and Vice Chairman--to minimize Executive Branch dictation in the regulatory field.

Organization of Transportation Law

There are two aspects of any body of law--its format and its substantive content. This section of our report dealt with the format.

Because of the time intervals between regulation of the railroads in 1887, the truckers in 1935, the domestic water carriers in 1940 and the freight forwarders in 1942 it was probably easier to write a separate part for each newly regulated mode than to rework the Act itself. Some provisions from earlier parts were carried forward and some new provisions were added. The result was a number of inconsistencies and inequalities documented at length in our report.

Format is no goal in itself. It is merely a tool to help us attain the objectives of equality and consistency of treatment and of clarity in expressing the Congressional intent. Where a specific result is intended the law should be specific. Where limited flexibility and exercise of regulatory discretion is desired the law should indicate the limits thereof. Where full

exercise of discretion is the goal the law should state the objective and direct the regulatory agency to attain that objective in the most practicable way.

We outlined a format that we believed would accomplish this, incident to consolidation of transportation law. While no positive action has occurred to date the Chairman of the Senate Commerce Committee last year requested the ICC to prepare a draft consolidation which, he said, might lead to substantive revision. The ICC, in its annual report, released December 28, states that it has nearly completed this draft for submission to the Congress in 1968.

Our recommended format was designed to aid rather than hinder the goals of intermodal coordination; consistency and equality of treatment; simplicity and ease of understanding. We suggested that each substantive provision in the present law (and future amendments) be tested for applicability to all modes of regulated transport. Those generally applicable would be grouped under the general title of a new act. There are many such sections in the law. Provisions not generally applicable would be placed under a separate title for the appropriate mode. In the process inequalities and inconsistencies would, of necessity, be pinpointed and, to the extent practicable, should be eliminated.

User Charges

Our recommendation favoring user charges on direct beneficiaries of federally provided transportation facilities have been echoed by every president since 1960, as we echoed the recommendations of earlier administrations. We did not, however, base our conclusions only on some vague idea of equality of treatment, desirable as that may be. We tried to show that charges for service and use for private purposes of facilities provided by the federal government are the norm rather than the exception--irrigation water for farmers; hydro-electric power; the elevator in the Washington Monument--to mention but a few. We tried, and I believe successfully, to shoot holes in the time-worn slogan, "The Waterways Forever Free." At least, our reasoning has never been challenged. The opposition has been based on self-interest and emotional appeal. We applied the same line of reasoning to the airways. As you know, the principle of user charges is accepted there, although applied as a tax on the passenger.

The level of the charges on any facility was outside the scope of our investigation. We strongly supported extension of the highway trust fund concept in the financing of other public transportation way. We emphasized the fundamental difference between user charges and taxes, which is essential to the concept.

Bills have been introduced in every recent Congress to implement these recommendations. To date they have been defeated by combinations of special interests. I believe most of us will see the day when, in regard to public facilities used for private purposes, the taxpayer will be treated as an investor, entitled to at least some return on his money. Investment in such facilities should result only from cold-blooded and consistent analysis of facts.

Coordination - Consolidation - Common Ownership

All of these bear upon the basic question of the efficient structure and practices needed to best serve the public. They relate to the public utility concept of transportation under which no carrier firm of any mode has a right to existence except as it serves the public with maximum efficiency. It is ridiculous to assert that a public utility operated by either a public or private agency exists primarily to pay the salaries of its workers and dividends to its stockholders as in industry generally. Under private ownership profits are essential, of course. Essential because they are needed to generate and attract required capital--else the enterprise dies and the public loses a desired service. Too often the top management of privately owned utilities overemphasizes profit to the firm to the exclusion of its public service obligations. In all fairness we must recognize the failure of the public to fulfill its part of the obligation--to protect the regulated utility from unregulated, unobligated competition.

Favoring voluntary coordination between carriers and modes is like respecting motherhood. It is a beautiful ideal. The astute head of Chicago - Northwestern, Mr. Ben Heineman, has been quoted to the effect that voluntary coordination ends at the point where one party fails to profit from the joint action. I think he is right. If the public wants coordination, it must find a combination of a carrot and stick--mostly carrot--to bring it about. Intra-modal consolidation would help by reducing the number of carrier firms that would have to coordinate.

Modification of the barrier to ownership of one mode by another, with proper regulatory safeguards, could also help. The end result would be regional, multi-modal transportation companies competing with each other and with single mode carriers to improve service and reduce cost. They could offer that quality of service the customer desires at the appropriate price. Coupled with public regulation to assure all were served in non-discriminatory fashion the results could be a new era for the user of transportation services. The urge toward private carriage would diminish and along with it illegal transportation would become less profitable and therefore less attractive.

The fear of monopoly so often cited as the reason for fragmented carrier ownership is no longer justified. Our country has demonstrated its ability to control regional utility monopolies. Highways, waterways and airways, and modern equipment, coupled with Federal regulatory power and private carriage have together ended the possibility of monopoly.

An ominous development just before Congress recessed for Christmas indicates the possibility of a new roadblock in the path of progress similar to the one Senator Kefauver tried to build several years ago. A bill to bar rail mergers for a three year period has been introduced in the Senate. Its sponsors claim, among other things, that recent merger proposals have been between strong railroads rather than acquisition of the weak by the strong and that this is wrong.

What kind of reasoning is this? The national public interest in mergers between railroads is greater efficiency and lower cost, to the ultimate

benefit of our economy. Merger should not be thought of only as a cure for sick railroads. Certainly, weak railroads should, where technically appropriate, be included in the resulting systems. This the ICC has power to require as a condition of its approval-- and should. Certainly communities that still need and use rail service should continue to receive it. This the ICC can require. Certainly railroad labor is entitled to reasonable protection, and this the ICC can and does require. What other objections to merger exist that warrant a blanket moratorium such as the one proposed?

The Congress recognized the need for rationalization of our over-built rail plant in 1920 when it directed the ICC to produce a plan for general consolidation. The legislative history shows that the need existed in 1940, when the mandate was lifted because a general plan acceptable to all could not be drawn up. The need still exists. We have an extensive rail network that does an admirable job under the circumstances. It is far from being as efficient and economical as it could be and as some of our more progressive rail managements are trying to make it. They should be encouraged.

Railroads are slowly moving in the direction of providing that service they do best--the movement of large volumes of freight. Because of the emergence of alternative transport, changing technology and changing user demand, railroads cannot profitably provide the same kind of general service they did prior to World War I. Nor should they be expected to. Piggyback and containerization on the rails, trucks on our highways, and air cargo can provide the versatility and flexibility needed in today's commerce and do it better than it was ever done in the past. Changes such as they can be delayed, unfortunately, but they cannot be permanently blocked. We should be working to foster them.

Intercity Rail Passenger Service

Our study group failed fully to foresee the recent rate of growth of urban areas and the full effects of the remarkable expansion of air traffic, both passenger and freight. This latter change is creating serious problems for the future. It still seems obvious that the general intercity rail passenger service of yesteryear is doomed--as we concluded. It seems even more obvious today that there are emerging some medium length, high density intercity corridors which, because of lack of terminal airspace, highway congestion, weather and other factors should and will be served by commercial surface transport. This, however, may not closely resemble our old ideas of a passenger train. On that subject we said, "--there will be an important demand for intercity rail passenger service within the large urban regions of the United States. This requirement is 10 to 20 years in the future." We goofed. The requirement is with us today and only seven years have passed. The experimental efforts led by the DOT should be continued and intensified.

Pricing

The last subject I have selected for discussion is carrier pricing. Last because, in the long run, I believe it the most important to our transportation future. We recommended that pricing be oriented more toward the

carrier's cost of providing specific service and less toward the monopoly pricing concept of "what-the traffic-will-bear." This is coming about--slowly, to be sure--reluctantly, in many cases--but, nonetheless, surely.

Much is made by some users of transportation about the sanctity of price structures. Why? These things were not handed down on tablets of gold. They grew up in the days of rail monopoly of intercity transport. They grew up when the West was almost wholly agricultural and our markets were centered in the East. Grain and grain products rate structures were largely formed in the days of home and neighborhood baking--before the demand for preblended bulk flour. These, and many others, are not transportation changes. They are changes in industrial, non-transportation technology, customer demand, population shifts and the like over which transportation has no control. Transportation, including transport pricing, must adapt to these changes like any other service industry.

While all of these non-transport changes were going on the structure of transportation itself was changing--and rapidly. Railroads found their high-rated traffic, which on some roads subsidized low-rated traffic, lost to expanding and improving truck transport. As revenue dropped price increases subjected still more traffic to erosion. The high-rated traffic just wouldn't "bear" what it used to. Finally, the railroads began to see the light. Changes such as heavy loading incentives; multiple cars and unit trains; Big John cars; tri-level rack cars and so on, all designed to exploit the very ability to move large volumes at relatively low cost, made it possible for the railroads to begin to adjust rates to some of these non-rail transportation changes. Rail rates started to better reflect cost of providing the service. Some of the lost traffic returned to the railroads. Some hitherto sacred rate structures were shattered. Those disadvantaged thereby complain long and loudly--which is natural. They should, however, realize that change is inevitable.

Economists have long known that cost of production must be the base of competitive pricing. We have competition. We now have the tools for complex cost analysis. We believed, in 1960, that cost oriented transport pricing was inevitable and highly desirable. Personally, I still think so. The direction the carriers and the ICC seem to be taking indicates we may have been right.

We are moving too slowly, however, and not in response to a clearly defined objective. Many of our transportation problems, I believe would disappear if we could define our objective and move positively, even if deliberately, toward it.

We should have a rule of rate making for the guidance of the regulatory bodies directing that transportation rate adjustments should, in the absence of a strong showing of public interest to the contrary, move in the direction of cost of providing the specific service.

Doyle in response to questions from the audience:

I think the Interstate Commerce Commission is completely capable of impartiality and I think they do a pretty darn good job of being impartial considering the limitations of human beings. Now I am not an exponent or a proponent of regulating all unregulated carriage. I would like to correct that statement if I may. I recognize the right of private carriage and I would fight for it if at any time the question came up. I don't believe that for very practical reasons it makes any sense to try to regulate for-hire carriage from the farm or fishing boat to the first point of entry into the flow of the stream of commerce, but I do believe that the bargain basement backhaul of a private carrier in agricultural commodities is in the long run detrimental to our national transportation system. It provides an opportunity for discrimination between producers. Quite a number of agricultural interests such as the potato growers in Idaho have been on record for years to end this exemption. The public position of the Farm Bureau and so forth in this thing is not at all representative of the attitudes of most of their members. On the waterways in regard to bulk exemption, if you remember the legislative history of the Act of 1940, this traffic was supposed to be non-competitive with the railroads. This is the reason provided for this exemption. This has not turned out to be completely true where traffic is intermodally competitive. I believe that there is a place for regulation of rate and for control of entry.

I am not so concerned with the question of partiality of the Interstate Commerce Commission as I am with the failure of the common carrier generally to provide the quality of service which people want. The common motor carrier in particular (and other common carriers) has been provided the quality of service they could have or they should provide and in some cases have tried to place themselves in a position of not serving by means of tariff provisions. I refer particularly to the LCL embargoes of the railroads and the failures of some common carrier truckers which has upset the American Trucking Association to no end, to give good coordinated handling service to railroads and airlines. They can cut their own throats if they continue that kind of operation.

The opposition to the bills concerning user charges on the waterways (even nominal ones) has not been based upon lack of a trust fund concept in the bill. Testimony and hearings has been based upon the emotional bias of the waterways, for ever free in the old Northwest Treaty, and things of this kind. Also on the fact that the "low cost carrier" will be completely put out of business if a nominal user charge were imposed on him. Every other form of transportation has the user charges imposed on it in the case of public way or the equivalent thereof in construction and maintenance costs in the case of private way. The user charge should be accompanied in my opinion with a trust fund concept and user charges should only be at a level that are required for that particular facility which is being provided by the government for private use.

Regulations do not set the level of rates. A lot of our rate structures were inherited from a day of virtual monopoly of railroads in intercity transportation and certainly the movements of any great quantities of things. Now if we reach the day, and I think we will, when rates accurately reflect the cost of providing the service for the particular mode and carrier concerned, then I

believe competition will be in the quality of service rather than in the rate. The shipper will choose what kind of service and quality that he desires and needs for his particular movement. I don't think you can quarrel with the idea that in a competitive situation price should be very reflective of the cost of producing the service of the article whatever it might be and this has not been true in our rail rate structure. There have been a few cases recently that indicate a trend toward cost relating pricing which probably started with the Paint case several years ago. The Big John rates were largely cost oriented rates and unit train rates are largely cost oriented. I think this practice may be growing but it is not growing as fast as I would like to see. I think once we get to it the true objectives these carryovers of non-competitive rates of the past will end. This will cure place discrimination. You have it in North Dakota, we have it in Texas and also the eleven states of the Mid-America Governor's Conference Transportation Committee have it.

I think we are going to see major modifications of the rate structure. In fact, we have seen it, the comparative rates between wheat and flour rates areas. The impact of these adjustments upon location of flour mills is an example of the impact of adjustments in rates on production. Rate structures are not as sacred as some people would like to consider them. They have a habit of being changed from time to time and I think there are a lot of non-transportation factors which may have entered into some of this when these structures were built. We had a lot of home baking, neighborhood baking . . . flour moved for instance in sacks or barrels. Today it moves largely in bulk to big commercial bakeries and there is a demand for preblended flour to get the right protein content. These things may have nothing to do with transportation but they affect the transportation structure and they tend to move the milling industry in the direction toward the center of consumption. For instance, we have lost about 1/2 of our flour mills in Texas; about 1/3 of our milling capacity. Incident to this operation, Kansas has lost a lot of it, Minnesota has lost a lot of it so I don't think we can complain too much change when these changes in marketing and production practices fit into change consumers prefer, and in many cases in response to change in technology. Rate structures are not sacred. They didn't come down from the mountain in tablets of gold.

I think the rent-a-train concept is an experiment in a different type of service. I think it's come about because of the shipping patterns that have developed. If a user can profitably use a rented train, this is economically sound. I don't care whether you run a machine shop or a railroad, better utilization of equipment is the route to profit and idle equipment is nothing but an economic drain. Now if by committing a train to a service, you can get better utilization then certainly the price of that service should reflect the savings incident to this higher utilization. This gets back to the question of equipment utilization, and I think the same thing applies to the unit train that has come into being, particularly in the movement of coal. This transportation concept helps keep coal competitive with other fuels in the last few years. Where the rented train will provide greater efficiency it seems to me the experiment is justified.

Personally, I don't believe in agreed charges for common carriers that are based on a percentage of a shippers output of his shipping requirements. Contract rates are a different matter and it might well be that a unit train may be used as a form of contract carriage by common carrier. It was a heresy to mention a thing like that a few years ago. This might not be bad and personally I would be for trying anything. It seems to be economically sound. We can always retrace our steps if we enter into the thing on the basis of experimentation and I think there has been too little experimentation in this field in past years. Let's try it and see whether or not this creates serious difficulties.

There certainly is the possibility that a rented train or a unit train could serve more than a single origin as long as the second origin had loading facilities and a track. Certainly, you would have a different problem with grain than with generating a train load of coal. But this perhaps can be worked out and again it does increase the utilization of equipment and does reduce costs to the carrier and therefore, should provide lower rates to the shipper. It ought to be tried in my opinion and may be an advantage to only a few people but this is a fact of life. My great grandfather operated tow boats with mules on a canal and he went out of business, and he should have gone out of business because technology passed him by. It may be that some of the people who are disadvantaged by some of these newer ideas in transportation are going to individually suffer but the nation, the economy of the nation as a whole, in the long-run interest of the public will be better served and this I think is what we should be interested in. I think we have learned how to regulate a monopoly in this country and I am far less concerned with competition in the public utility field than a lot of people seem to be because I grew up in a town where they had two telephone companies. If you didn't have both telephones in your house, you had to make a long distance telephone call to talk to your neighbor who had the other system. Monopoly is not always bad. You don't want two water supply systems, you don't want two sewage systems, you don't want two garbage collection systems if you can avoid it.

We have learned how to regulate monopolies, but the thing we have failed to learn is how to regulate competition. Competition didn't work badly until the highways and trucks got good enough, the waterways were improved enough, and the pipelines started building, and the airlines came into the picture. Regulation didn't work so badly but today in the presence of this competition and because of different economic characteristics (the high ratio of fixed costs to total against the low ratio of fixed costs to total) and the different pricing philosophies between modes regulation caused us some problems today. I personally think we can change this by retaining competition where it is desirable and still permit a certain amount of unification of the structure of transportation to give us greater efficiency.

TRANSPORTATION PRICING IN THE 1970'S:
A MOVE TOWARD PRESENT REALITIES?

Roy J. Sampson*

In brief, my discussion compares demand-oriented and supply-oriented transportation pricing, argues that the supply-oriented approach, and a particular variation of that approach, is preferable under circumstances prevailing now and likely to prevail in the foreseeable future, and points out one possible and practical way to effectuate the pricing approach which I support.

By choice and by request, my remarks are directed primarily toward railroad freight pricing. Railroads now carry, and apparently will for a good many years, a far greater ton-mileage volume of freight than any other mode. Pricing in this mode has a longer history, more acute and controversial problems, and more clear-cut illustrations of the topics about which I am concerned, than is true of any of the other modes. Also, keen inter-modal competition for a substantial volume of traffic tends to foster attempts at price-meeting or price-beating. In short, if we can solve the railroad industry's pricing problems, we will have gone a long way towards solving the pricing problems in freight transportation generally. My general remarks and conclusions, of course, are equally applicable to all forms of carriage.

My arguments here are in part unavoidably repetitious of arguments that I have made earlier elsewhere. I attempt to keep repetition down to the necessary minimum, however. Those interested in my earlier comments along similar lines can find them in several sources.¹

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¹See Roy J. Sampson, "The Case for Full Cost Ratemaking," ICC Practitioners' Journal, March 1966; Verified Statement Before the Interstate Commerce Commission, Docket No. 34013 (Rules to Govern the Assembling and Presenting of Cost Evidence); Discussion of "Pricing and Resource Allocation in Transportation and Public Utilities," Papers and Proceedings, 75th Annual Meeting, American Economic Association, May 1963; "What's Wrong with Railroad Ratemaking?" in Current Problems in the Regulation of Utilities, Bureau of Business and Economic Research, State University of Iowa, Fall, 1959; "Railroads: Revenues and Deficits," The Business Review, Bureau of Business and Economic Research, University of Houston, January 1959; and reply to Professor Walter H. Kramer's criticism in "Concurring and Dissenting Views," ICC Practitioners' Journal, November-December 1967.

Pricing Goals and Environment

Any policy, including pricing, must be directed toward some goal or goals, and must operate within some particular environment which usually influences goals and the policies chosen to attain them. When environments and goals change, policies should be reevaluated and perhaps changed to accord with the new circumstances. In order to understand and intelligently discuss policy, then, it is necessary to understand the environment within which it operates and to define the goal or goals toward which it aims.

There is probably little current disagreement about general pricing goals among transportation economists and practitioners. Most of us, I think, agree that pricing, insofar as possible, should be designed to bring about the dual goals of the most efficient use of resources and the perpetuation of a strong and economically healthy, privately-owned, competitive system of carriage sufficient for our economic needs. Most of us, I think, likewise would agree that there are no inherent conflicts between efficient resource use and healthy privately-owned carriers. Some of us may differ on the specifics of these goals, however.

Basically, "efficiency" as used here means the least use of scarce resources in the whole economy in accomplishing a given task. Or conversely, inefficient allocation means that scarce resources are being diverted from more efficient to less efficient producers and that output consequently is smaller than it otherwise would be with the same consumption of resources. Inefficient allocation within the transport sector encourages misallocation in other producer sectors. Actually, the costs of misallocation in transport itself may be only a small part of the total costs of misallocation. Altogether, viewing the combined transport and other producer effects of such misallocation, it can result in wrong commodities, produced in wrong places, by wrong firms, being hauled by wrong carriers, over wrong routes, to wrong destinations.

I submit that a maximum volume of traffic movement is not and should not be included in our goals; if this is desirable it can be attained easily by making transportation a free good to its particular users and either subsidizing or nationalizing private carriage. Or if merely increased movement is desirable, it can be brought about by lowering rates overall or on particular movements until the desired volume is reached, again using subsidization or nationalization to the extent necessary. These actions, of course, would not be consistent with either efficient resource allocation or healthy private ownership.

By the same reasoning, there is no economic merit or consistency in protecting the traffic handled by any particular mode, modes, or firms, or movements over any particular routes, or the production of any given industrial firm or geographic region, or any customary trade channels or consumption patterns. The process by which resources are efficiently allocated under competition sometimes is harsh to individuals, but we either accept its philosophy or we do not.

I submit that our economic goals for carrier pricing today, set forth above, should be and are very different from the goals of a century ago. Our economic environment has changed. During the Nineteenth Century, we were striving to settle the West, politically unify our country, exploit our abundant natural resources, and build up an industrial economy. Our major allocative problem was that of making the greatest possible use of our cheapest resource, that is, our underutilized land and its natural endowments. Our need was not so much for low cost transport but for abundant and low priced transport. Hence, justifiably and necessarily in view of our goals, we subsidized railroads, the only form of transport at the time which could accomplish so much of our objectives in such a short time, and permitted or encouraged pricing policies consistent with the needs of the time.

We have now approached or attained our Nineteenth Century goals, our inland transportation system now is characterized by keen intermodal competition on a substantial portion of our traffic volume rather than by the monopoly of a single mode, and almost everyone agrees that the pricing system of our formerly dominant and still major mode, railroads, is in dire need of overhaul. There is not general agreement, though, concerning the nature of this required pricing policy revision.

Any economically realistic reevaluation and readjustment of our pricing policies must start afresh from where we are now. That is, we must take into account only our present transport plant and capabilities and our anticipated future needs and prospects, rather than looking back at how we got to our present situation. The dead hand of past theories, practices, and authorities, the result of responses to past environments and problems, should not dictate our future course unless and except that it can be demonstrated clearly that the past actually is pertinent to the future. Historical experience, uncritically accepted, is not an adequate substitute for logic, foresight, imagination, and courage.

Demand-oriented versus Supply-oriented Pricing

Before the advent of the New Economics it was fashionable to say that every economic question can be answered in terms of demand and supply. These overworked concepts still are pertinent for problems of transportation pricing.

Demand-oriented pricing, usually called "charging what the traffic will bear" or "value-of-service" pricing (which I prefer) has two cutting edges rather than one. It implies that if the value of the transport service is high to the user, the price can and will be high. But it likewise implies that if the user's evaluation of the service is low, the price necessarily also must be low. Under pure value-of-service pricing, the cost of performing the service is not a consideration. If carried to its logical conclusion, or rather, illogical conclusion, value-of-service ratemaking would mean that movements of zero value could occur at negative rates. This economically ridiculous result does not appear to be compatible with anyone's pricing goals.

Strictly speaking, of course, pure value-of-service ratemaking is administratively impossible. Consumers' surplus can be pictured neatly on a demand and supply diagram in an elementary economics textbook, but its measurement is difficult and its stability hopeless. The value-of-service of a movement is quite different from, and not necessarily related to, the value of the product moved. Numerous unmeasurable and constantly changing considerations determine the actual value-of-service of a movement even to a particular shipper. Successive shipments of identical products moving over identical routes from and to the same shipper and consignee may have quite different values-of-service. Additionally, every shipper faces different value-of-service considerations. Pure value-of-service ratemaking, then, might require different rates for almost every shipper of every given product between the same points, and often perhaps even different rates for successive shipments by the same shipper.

Everyone would agree that it is difficult to measure the cost of performing a given service, but it appears that the difficulties of measuring the values of services are infinitely greater due to the greater number and greater instability of the variables involved. At best, under the pure value-of-service approach, rates must be set by some more or less arbitrary and crude averaging process, with some estimated volume of traffic explicitly or implicitly in mind, and the rate itself then determines whether any given movement occurs. If this is what is meant by value-of-service pricing, the term is meaningless in any definitional or economic sense.

In actual ratemaking practice and theory, the value-of-service concept often is hybridized with the supply-oriented concept of cost-of-service. That is, it is said that value-of-service establishes a ceiling beyond which rates cannot go, and cost-of-service (however cost may be defined or determined) establishes a floor below which they should not fall. Between is a so-called "Zone of Reasonableness" within which the actual rate may be and is set.

This Zone of Reasonableness, however, is a legal not an economic concept. Even within the Zone, many rates must be too high or too low for attaining our pricing goals or any given goals. Complete or even approximate compatibility of any given rate with any given general pricing goal would be sheer coincidence, thus pricing by this method is equivalent in effect to pricing without any overall economic goals. In economic terms, the concept of "a little bit of value-of-service, a little bit of cost-of-service" is about on a par with the medical concept of "a little bit pregnant."

Certainly the Zone of Reasonableness idea, like many other legal fictions, has had considerable regulatory and managerial usefulness. It is administratively and legally workable, even if economically deficient. It has at least allowed rates to be set at some level, and to be adjusted upward or downward within certain ranges, with only vague approximations of actual values or costs of service. Its only real merit is that it is possible, which is merit only in comparison to the practical impossibility of pure value-of-service pricing. Economically, it is meaningless, useless, and even harmful, and its demise should be hastened.

If pure demand-oriented or value-of-service pricing, then, is both administratively impossible and economically absurd, and if hybrid demand-supply or value-cost pricing, though possible, leads to indeterminate results rather than toward purposeful goals, we are left only with the alternative of supply-oriented pricing; this, of course, is synonymous with cost-of-service pricing.

In reality, we have never had or seriously considered any other specific alternative during recent times. Even Zone of Reasonableness pricing, when and insofar as it actually does consider some version of cost as a floor for rates, despite its lip service to demand, is a tacit admission that when all the chips are down rates more nearly reflect cost than value of service. The real question, therefore, is not whether demand-oriented or supply-oriented pricing is most compatible with our goals of efficient resource allocation and economically healthy privately-owned carriers. Instead, it is the question of what form should supply-oriented pricing take. Ultimately, this boils down to the question of some version of full cost versus some version of less-than cost pricing. Here the real controversy begins.

Deficit Pricing versus Full-Cost Pricing

Note that I have used the expression "full-cost" rather than some one of several other terms such as "fully distributed cost," "fully allocated cost," "average cost," "average variable cost," "long-run marginal cost," or the like. It seems that every commentator on transport pricing has his own favorite terminology and definitions. I have no quarrel with any of these or related expressions as long as the definitions are clear and mutually understood. To some, however, all these terms appear to mean the same thing, while to others they do not. Also, some of these individual terms mean different things to different people. In the interests of effective communication, therefore, I will give my definitions for my terminology.

Definition of Full-Cost Pricing

By "full-cost" I mean no more and no less than the total of all direct or variable costs attributable to the performance of any given transport service, plus all of the indirect or fixed costs which will be incurred in the future as a result of the continuation of this service. Whatever "profits" are necessary to retain or attract the capital essential for continuing the service are included as an indirect cost, of course. A full-cost price, thus, is one which is neither higher nor lower than this full cost.

Note that sunk investments, or fixed costs arising from past investments, specifically are excluded from this definition. There is no economic necessity for recovering any part of any past expenditures unless and except that failure to do so may make it difficult, more expensive, or impossible to raise necessary funds in the future. The original cost of presently used facilities as such can be ignored. The only pertinent investment costs to be recovered are the replacement costs of the facilities

necessary to carry on future business. In other words, the pertinent costs are those, which in the language of the Hope Natural Gas Case (320 U. S. 591) will enable a firm "to maintain its financial integrity."

This cost definition can be considered as equivalent to long run marginal cost if considered on a future rather than an historical basis, if the "long run" actually is the economists' concept of a period of time sufficiently long for all resources used in an enterprise to be completely disinvested, replaced, or reallocated to other uses, and if the Average Total Unit Cost curve does not slope upward or downward. Because of these "ifs," and the various differing connotations often attached to the term long run marginal cost, however, I prefer and will use the term "full-cost" as defined.

For carriers using publicly supplied facilities, of course, full-cost necessarily includes charges sufficient to recoup future, but not past, public expenditures for these facilities. The collection and remittance of so-called user charges, however, is another controversial topic, and is outside the scope of the present discussion. The matter is mentioned here only for definitional completeness.

Definition of Deficit Pricing

As all transportation economists and rate personnel know, even more labels are applied to less-than-full-cost pricing than to full-cost-pricing. The terminology includes such expressions as "marginal cost," "short-run marginal cost," "very short-run marginal cost," "incremental cost," "out-of-pocket cost," "added traffic cost," and perhaps several others, often meaning different things to different people, and calculated in different ways for different purposes.

Again, for effective communication, I will use my own terminology and definition. Not wishing to coin another term, I have borrowed one from fiscal policy terminology which is brief, descriptive, and broad enough to include all the current less-than-full-cost expressions. This term is "deficit" pricing. By deficit price, or deficit ratemaking, I simply mean any price or rate lower than full-cost as defined above.

Brief History of Deficit Pricing Theory and Practice

Deficit pricing by railroads is supported by the weight of long history and impressive authority. This history and these authorities are so well known that a lengthy historical review is unnecessary. Those who challenge the practice, however, as I do, cannot avoid the past completely even if we should wish to do so. Fortunately, study of the past strengthens rather than weakens our case.

I do not know when the first railroad engaged in its first deficit pricing, but it is likely that the practice was born at least as early as the formal theory. It certainly is true that the practice was much more widespread than the theory during most of the Nineteenth Century. The

theory upon which such pricing is based was propounded by a French engineer, Dupuit, at least as early as the early 1840's.² Less than a decade later an English mathematician, Lardner, explained the theory as well as it has been explained since.³ Jevons, the leading early English marginalist, almost a quarter-century later, acknowledged the significant influence of Lardner's work in his development of marginal theory as an approach to economic problems in general.⁴

Finally, the marginal concept, which includes but is not limited to marginal cost pricing (or, in our terminology, deficit pricing) was adopted and expanded by the great English neo-classicist Alfred Marshall.⁵ Neo-classical marginal doctrine dominated Anglo-American economic thought for about two generations thereafter, and even the so-called "Keynesian Revolution" has only supplemented rather than replaced it. Thus, in effect, railroad pricing practices directly gave rise to a body of theory which entered the main stream of economic thought and was and is applied to economic problems in general.

A practical man's immediate response to this interesting historical sidelight be "so what." There is a point to this recitation, however. The point is that practice led rather than followed theory, and that practice was developed in and for a particular time and place environment. To the extent that this environment has changed, reexamination of practice and theory seems to be in order.

During the formative period of railroads in this country, the Nineteenth Century, temporary overbuilding was widespread; that is, supply preceded demand. Also, in most places during much of this period railroads had a virtual monopoly of long-haul traffic. Under such decreasing cost monopoly conditions, and in an era characterized by rapid economic expansion, short-run deficit pricing policies for low value of service movements certainly were sound and profitable from the viewpoint of railroad management. Revenues were obtained from the utilization of otherwise excess capacity at little additional cost, and charges far above full cost could be levied against high value of service movements.

These policies also were entirely in accord with the public interest which, as mentioned above, was concerned with land settlement, natural resource exploitation, political unification, and industrialization. Low value of service traffic was subsidized by high value of service traffic. Although in a narrow sense this could be called resource misallocation, it was socially justifiable and necessary misallocation if developmental goals were to be reached.

²Jules Dupuit, "De la mesure de l'utilité des travaux publics," Annales des Ponts et Chaussées, Memoires et Documents, Vol. 8, 1844, pp. 332-375.

³Dionysius Lardner, Railway Economy: A Treatise on the New Art of Transport. London: Taylor, Walton, and Maberly, 1850.

⁴William Stanley Jevons, Theory of Political Economy. London: Macmillan, 1871. Meantime, earlier and independently, H. H. Gossen, J. H. Von Thunen, Karl Menger, and Leon Walras approached or reached similar theoretical positions on the European continent.

The alternative would have been considerably more public subsidization, which probably would have been much less workable administratively and unacceptable ideologically.

Transportation pricing was recognized as a developmental tool by the first Interstate Commerce Commission members in a statement holding that it was in the public interest "to encourage the largest practicable exchange of products between different sections of our country." The Commissioners felt that this could be done only "by placing upon the higher classes of freight some share of the burden that . . . if service alone were considered, would fall upon those of less value."⁶

This deficit pricing technique, commonly if erroneously called value-of-service pricing, was questioned more as railroads and the economy as a whole became more mature. Taussig and Pigou, who could be labelled respectively "value of service" and "cost of service" advocates, at least were in accord on one item in their celebrated debate. This was that "value of service" pricing is somewhat more justifiable in a "sparsely populated" than in a "densely populated" country, or conversely, that "value of service" pricing is somewhat less justifiable as the "pioneer stage" is left behind.⁷

After World War I, the Interstate Commerce Commission gave more lip service to "cost of service" pricing than formerly. This may have been due to the legal implications of Smyth vs. Ames (169 U. S. 466), the Valuation Act of 1913, and the Rule of Ratemaking in the Transportation Act of 1920, however, than to theoretical arguments or any awareness of economic evolution. The Commission's concept of "cost of service," though, tended to fall considerably short of full-cost as defined above.

Professional economists as a group, like the general public, were more concerned with other economic problems than with railroad pricing during most of the 1920's and 1930's. It was not until publication of Professor Hotelling's famous argument for marginal cost pricing, shortly before World War II, that theoretical interest in this question substantially revived.⁸

The railroad profits squeeze following World War II, coupled with challenges to traditional railroad deficit pricing from competing motor and water carriers, has intensified the debate between advocates of various versions of deficit pricing and of full-cost pricing during recent years. This debate has been marked by considerable lack of consistency both in concept and definition.

⁶Interstate Commerce Commission, Annual Report, 1887, p. 36.

⁷See Quarterly Journal of Economics, August 1913.

⁸Harold Hotelling, "The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates," 6 Econometrica (1938), pp. 242-269, and "The Relation of Prices to Marginal Costs in an Optimum System," 7 Econometrica (1939), pp. 151-160.

For example, the Weeks Report supported a vaguely defined "director ascertainable cost" as a rate minimum.⁹ The Mueller Report advocated minimum rate levels at "long-run marginal costs," which it defined for immediate practical purposes as the Interstate Commerce Commission's "out-of-pocket" costs; it suggested that better cost finding methods are in order, however.¹⁰ The Doyle Report likewise recommended pricing based on "long-run marginal cost," which it interpreted as "not unlike fully distributed cost," but which it cautioned is not the same as long-run marginal or out-of-pocket costs as these are presently computed.¹¹ This recommendation is nearest my definition of full-cost pricing; in fact, if the qualifications and "ifs" that I have mentioned above are observed, the two become the same.

Apparently disturbed by increasing attacks on deficit pricing, the Association of American Railroads in 1962 sponsored a statement on the practice by ten "outstanding and disinterested economists" (quotes from the statement's Foreword), some of whom have had employment ties with railroads or the Interstate Commerce Commission, and most of whom have contributed extensively to transportation literature.¹² This statement is perhaps the most concise recent defense of deficit pricing. Although its content is little, if any, different from what many persons have said, before and since, the statement has become notable, or notorious, from the attention it has received.

Others have commented about particular aspects of this notable statement.¹³ I do not propose to add directly to the specific comments on this statement at this time, but I do have three questions about it which bother me a little.

⁹Revision of Federal Transportation Policy. A Report to the Presidential Advisory Committee on Transport Policy and Organization, April 1955, p. 11.

¹⁰Federal Transportation Policy and Program. U. S. Department of Commerce, March 1960, pp. 17-18.

¹¹National Transportation Policy. Committee Print, Preliminary Draft, Committee on Interstate and Foreign Commerce, U. S. Senate, by the Special Study Group on Transportation Policies in the United States, January 3, 1961, see especially pp. 410-411, and 440-444.

Many of the inconsistencies of our formal and informal transportation policies, are discussed in some detail in Roy J. Sampson and Martin T. Farris, Domestic Transportation: Practice, Theory and Policy (Boston: Houghton Mifflin Company, 1966), Chapter 22, "Conflicts in National Transportation Policy," pp. 362-379.

¹²William J. Baumol, et al., "The Role of Cost in the Minimum Pricing of Railroad Services," The Journal of Business, October 1962.

¹³For example, see the comments of Joseph R. Rose, J. W. Hershey, and Romney Robinson, and the ten economists' "Statement of Clarification" in The Journal of Business, July 1963.

First, I wonder why this "outstanding" group apparently required "several months of intensive study" (quotes from an Association of American Railroad cover letter distributing reprints) to agree on a statement of what has been in the literature and practice for more than a century. They must have been familiar with this literature and practice at least since their undergraduate days; in fact, most of them already had written extensively about it in text-books or articles.

Second, I wonder why they assumed and stated, without supporting argument, that "an indefinitely long-term view of incremental costs is not appropriate . . . to consider in setting a price floor." It seems to me that this is too important an assumption to be accepted as obvious economic truth.

Third, I seriously question the group's assumption, or statement of fact, that there is a chronic, persistent, and substantial problem of unutilized railroad capacity. This is true only under a peculiar definition of capacity, as I will point out a little later.

So many persons, past and contemporary, have made so many excellent contributions, pro and con, to the deficit pricing literature that even to name them all would exceed our available time. But without intending to slight anyone, I would like to mention the 1961 contribution of Professor Bonbright (one of the "outstanding" ten, incidentally).¹⁴ Although his definition of full-cost differs from mine given above, in that it is the traditional or historical one, his treatment of the full-cost versus the less-than-full-cost approach; including the evolution of ideas on both, is extremely well balanced. Further, his treatment is in terms acceptable to professional economists and understandable to non-economists.

But meantime, what has been happening back at the Interstate Commerce Commission? A 1959 Commission informational report (not necessarily adopted as official policy) maintained that ". . . value of service . . . will continue to have a place in the making of rates." Further, it stated that the increase of rates very close to, if not below, out-of-pocket cost ". . . might result in hardship to shippers and in loss of traffic to railroads."¹⁵

In other words, this 1959 statement supported the practices mentioned in the Commission's 1887 report. But the basis for this support was not the 1887 basis of encouraging the widest possible inter-regional exchange of products. Rather, it was to prevent shipper hardship and preserve railroad traffic. This reminds me a little of some of my university colleagues who allegedly keep asking the same questions on examinations but keep changing the answers.

¹⁴James C. Bonbright, Principles of Public Utility Rates (New York: Columbia University Press, 1961), especially Chapters XVII, XVIII, and XX.

¹⁵Interstate Commerce Commission, Bureau of Transport Economics and Statistics, Value of Service in Rate-Making, Statement No. 5912, November 1959, p. 365 and 363, respectively.

I am not attempting to be unduly critical of the Interstate Commerce Commission. Its recent support of fully distributed cost (as defined by itself) as a rate floor in intermodal competition cases, which might be viewed as a hesitant and transitional step toward ultimate true full-cost pricing, perhaps is as far as the Commission can be expected to go under present institutional conditions. Commission actions are bound by existing statutes and judicial interpretations, and such flexibility as it has is hampered by prevailing traditions and pressures. Rather than criticizing the Commission, what I am suggesting is the need for economists and interested groups to challenge tradition, resist pressure, and change laws if necessary to accomplish our twin goals of efficient resource allocation and healthy privately-owned carriage. One of the areas most in need of questioning is the assumption upon which deficit pricing is currently defended.

The Crucial Assumption of Deficit Pricing

At our present stage of carrier and general economic development, if we support privately-owned transport and reject the desirability of subsidy, any logical defense of deficit pricing must be based on an assumption of temporary or permanent excess capacity; that is, upon a decreasing Average Total Unit Cost curve. This assumption is of doubtful present validity. Considerable evidence indicates quite the contrary. Railroad excess capacity at present appears to be only a myth, although a well-established one, which, I fear, most of us have some guilt in perpetuating.

Whether or not excess capacity exists for providing a multi-input service or product depends on the availability or scarcity of all the necessary inputs. If one essential input is being used to capacity, even though others may not be fully utilized, no excess capacity exists.

In present-day railroading, rolling stock (freight cars) is the scarce input. In view of numerous legitimate shipper complaints, Association of American Railroad and Interstate Commerce Commission car service orders, investigations, legislative enactments, incentive rates for heavier carloading, and similar manifestations of the past few years, I cannot imagine any informed person being rash enough to argue seriously that we are blessed with any significant over-supply of railroad freight cars.

In my region, the Pacific Northwest, for example, at about the same time (early 1966) that the President's Council of Economic Advisers was recommending the encouragement of marginal cost pricing to utilize excess rail capacity, many of our large and small forest products mills were undergoing temporary closures, with consequent disruption of the region's economy, because of the unavailability of rail cars to ship products for which they had firm orders and not enough storage space to continue stockpiling. Many shippers in many parts of the country are very familiar with this problem of sharing the shortage.

Temporary spot surpluses of particular kinds of equipment arise from time to time, of course, and seasonality influences the degrees of shortages. At best, though, under the conditions of fairly high levels of employment and

production which our economy has enjoyed during the past several years, and with existing prices and shipper and carrier operating practices and limitations, it appears that overall equipment capacity is barely sufficient to meet demands during much of the year and very inadequate for the remainder.

Certainly some railroad inputs, as the services of track and terminal facilities, which represent sunk investments with a very long life (if properly maintained), may be underutilized in the sense that more freight cars could move over or through them than do. Even these relatively permanent facilities, which as they stand are "free goods" in the economic sense except for such expenditures as maintenance and taxation, however, would require expensive improvements, such as computerized and automated marshalling yards, Centralized Traffic Control, modifications of ruling grades and curves, and the like, to handle a greatly increased volume of cars which we do not have.

It is true that railroads could, and hopefully will, make better use of their existing rolling stock through individual line computerized operational controls, Automatic Car Identification and TeleRail Automated Information Network systems, better operating and interchange procedures, and incentives for heavier carloading and faster turnaround of equipment. It is equally true, though, that these improvements will not be without substantial costs.

In short, we have not had a condition of significant railroad excess capacity for a good many years, and given the financial situation of the railroad industry and the hard-headedness of its management in judging the potential returns of future investments, such a condition is not likely to occur again within the foreseeable future. Present capacity can be increased substantially only by expensive rolling stock additions or plant or operational improvements, or some combination of these. This does not support the assumption of a decreasing Average Total Unit Cost curve. Unless and until convincing cost information to the contrary is produced, it would appear safe, at best, to assume only constant costs. I suspect that the industry at present may even be characterized generally by increasing rather than decreasing short-run costs, but I am not prepared to argue this and it is unnecessary to do so for our present discussion purposes.

Since deficit pricing only has economic merit, for an individual firm or for our present society as a whole, if it does utilize excess capacity and thus decreases Average Total Unit Costs, its defense falls flat if excess capacity does not actually exist. But there are even further defects to this pricing system which make it economically undesirable from a long-run viewpoint regardless of the present shape of the short-run cost curve.

Defects of Deficit Pricing

Probably no economist would attempt to argue that less-than-full-cost pricing which at least covers direct costs of performance does not, as a principle, make economic sense during a short-run period when excess capacity exists. By the same token, though, when the excess capacity expires, the economic justification for deficit pricing also expires. If the service is to be continued, capacity must be replaced. But this replaced capacity must

be acquired at a full cost, not at a lesser cost geared to the revenues it has been bringing in.

It may be sound to use up an asset representing a sunk cost of \$20,000 in earning a \$10,000 revenue if the only alternative to such use is no revenue at all. It is not sound to replace the \$20,000 asset (probably at \$40,000 due to higher price levels), however, if rates are to remain at level which will bring in only \$10,000 during the replacement's lifetime. Short-run economic sense becomes long-run folly.

Railroads, however, are common carriers. Once they offer to haul any particular traffic they are legally obligated to continue to do so. Also, the regulatory process makes it difficult for carriers to adjust prices quickly, temporarily, and locally according to capacity. Movements originally undertaken at deficit prices, therefore, may be forced to continue at deficit prices almost indefinitely. This is a major cause of recent railroad financial problems.

Once profitable traffic, now unprofitable, cannot easily be discarded, nor can its rates easily be raised to profitable levels because of regulatory restrictions. Before the era of keen intermodal competition, of course, railroads could offset low rates on some traffic by rates considerably higher than full cost on commodities with high values of service. Now, however, most of this advantage is lost. At present, according to computations based on the Interstate Commerce Commission's costing method, it appears that not more than about one-third of our rail traffic pays more than its full costs of movement; if future costs rather than historical fixed costs were used in this computation, the picture would be even more dismal. This is a classic example of the application of short-run policies until the long-run eventually arrives.

That traffic which does not bring in revenues sufficient to cover its cost of movement must be subsidized by other traffic, government, or stockholders. If we reject government subsidy, and if intermodal competition or regulation prevent subsidies from other traffic, the long-run effect must be erosion of stockholders' equity, service deterioration, and eventual bankruptcy. This being so, it is hard to understand management or regulatory thinking which holds that a larger volume of unprofitable traffic is preferable to a smaller volume of unprofitable traffic.

Before bankruptcy occurs, however, deficit pricing carriers will attempt to charge more than full cost to such traffic as cannot escape. Also, more efficient carriers will be penalized by diversion of traffic which they are better fitted to haul, and less efficient producers and producing areas will be benefitted at the expense of the more efficient. One might question the morality of these results, but economics is not particularly concerned with morality. Economics properly is concerned with efficient resource allocation and utilization, however.

I will not further belabor this point here. It already has been expounded elsewhere.¹⁶ I will simply repeat and emphasize that under present and foreseeable future conditions deficit pricing is a long-run financial death-trap for railroads and clearly is incompatible with efficient resource allocation. This will force us sooner or later, hopefully sooner, to face up to the necessity for full-cost pricing.

Full-Cost Pricing: Pro and Con

Long-run efficiency can be measured only in terms of long-run inputs and outputs. Since all fixed costs disappear and all costs become variable, by definition, in the long-run, therefore, this means that long-run efficiency must be measured by full costs rather than less-than-full costs. No economic hocus-pocus can create a complete output without a corresponding full input; or, stated another way, there is no such thing as a free lunch. Comparison of the short-run characteristics of unlike carriers, that is, those with historically measured high-fixed low-variable cost structures and a very long "long-run" and those with low-fixed high-variable costs and shorter "long-runs," only creates confusion and multiplies long-run problems.

At least three principal arguments are advanced against full-cost pricing, the traffic and production disruption argument, the deficit pricing contribution argument, and the impossibility argument. Each of these has a counter argument, however.

It may or may not be true that full-cost pricing would lead to some total reduction in traffic volume, but it certainly would lead to some traffic shifts between modes and ultimately to shifts in producer location patterns and occupations. This cannot be considered undesirable. Traffic which cannot pay its own way should not move, carriers who cannot move particular types of traffic profitably should not attempt to move it, and producers who require subsidies in the form of less-than-cost rates should change their location or occupation. To mitigate the severe economic disruptions of abrupt change, of course, full-cost pricing could be instituted gradually, perhaps starting by not taking on any new deficit priced traffic.

It may be true also, to the extent that short-run excess capacity actually exists, that deficit priced traffic which more than covers its short-run direct costs may contribute something to short-run fixed costs and thus may permit lower rates for other traffic. This has been more asserted than demonstrated, however. As already indicated, it is doubtful if any significant excess capacity does exist, and even if it does it is even more doubtful that profits-conscious managers would graciously volunteer to decrease rates below what they can actually charge on one movement merely because another movement contributes something to overhead, or that regulation would effectively bring this about. In any event, under the best of circumstances, the misallocation effects of deficit pricing must be considered as an offset against any of its possible contributions.

¹⁶See the citations in note 1.

Finally, it is argued that because of the common or joint nature of some portion of total costs it is impossible to calculate the full cost of moving any particular traffic. It might be counter-argued that it is equally impossible to calculate the value of a particular service, or any of the versions of less-than-full-cost, and that full-costs are likely to be a much more stable target than any of the other versions of cost. Also, it might be pointed out that common or joint costs are not unique to transportation, and that thousands of other firms and industries do make satisfactory and workable cost allocations every day.

It would appear that the electronic computer, which is solving equations designed to send men on a round trip to the moon, could be useful in determining the total costs of hauling a carload of wheat for two hundred miles. Simulation techniques, even at the present state of computer capabilities, in all likelihood can reduce the purely unallocable costs of transportation to a level much lower than is commonly supposed. Any small unallocable residue could be arbitrarily allocated, as is done today, but with a supply rather than a demand orientation. I do not wish to minimize unduly the difficulties of allocating common costs and measuring full-costs, but we should recognize that these difficulties are not greater than others that we are accustomed to dealing with.

Actually, the "impossibility" argument is not an argument against the concept of full-cost pricing; rather, it involves a discussion of cost determination, which falls into the realm of accounting, cost finding, and computer experts. The proper role of economists in pricing is to furnish appropriate concepts. The techniques are for others to develop. If given the concept of full-cost pricing to work with, I have no doubt that the proper experts will come up with workable, even if not completely perfect, techniques of cost determination. From our present vantage-point, then, I believe it would be much more fruitful for economists to discuss the principles of how full-cost pricing can be established rather than continuing to reiterate the reasons why it cannot be established.

A Proposed Full-Cost Pricing Method: Equipment-Distance Rates

Various methods might be used to attain full-cost pricing. I have one method in mind which appears to be logical, practical, simple, and fairly easy to put into effect. My proposal might be called an "equipment-distance rate structure."

I do not maintain that this is the only feasible method, or necessarily the best method, of full-cost pricing, nor have I fully explored all its ramifications. Based upon my limited preliminary exploration, however, I do propose it as a serious contender, and one worthy of further research. Most, if not all, of the data necessary for this research are readily available, and the research could be accomplished and the system made operational, if feasible, within a very few years.

My brief outline of this equipment-distance rate proposal will be confined to rail carload traffic only, as less-than-carload traffic, where it still exists, is of small and decreasing importance. The concept can be extended to cover any type of movement by any mode, however.

A purchaser of carload transportation simply rents the space capacity of a particular type of vehicle for a certain distance, plus, at times, special services arising out of the needs of the particular commodity or movement. Basically, this is no different than renting a room in a motel. The motel rate is based on the size of the room and the quality of its furnishings, plus, of course, any special services desired. Unlike railroad rates, motel rates are not based on such things as the occupant's weight, hair color, occupation, bank balance, origin, destination, or direction of travel.

A rail equipment-distance rate would include a charge calculated to provide revenues sufficient to replace the particular kind of freight car used at the expiration of its useful life. The type and weight of the commodity involved would not be considered. This would require estimates of future replacement costs and mileage lives of various classes of cars, and an averaging to get mileage replacement costs.

To this would be added average equipment maintenance charges, also a function of the type of equipment and its mileage use. This would give a total equipment charge which my very crude estimates, based on current average car costs and recent published operations cost data, indicate would amount to an industry-wide average of about 35 percent of the total full cost of providing service.¹⁷

Other directly assignable expenses would be added to the basic equipment charge for each carload for each distance. Following the railroad expense nomenclature, not necessarily because it is best for our purposes but because it is familiar and convenient, we would next add charges for maintenance of way into our rate formula. These charges are largely a function of equipment use over the ways, and most or all of them logically could be assigned to individual car movements on an average mileage-used basis. My estimates show that this item would be about 13 percent of the total full cost.

¹⁷Percentage estimates, given for illustrative purposes only, in this and the following three paragraphs were calculated by the author based upon various information about the current prices of new freight cars and upon data published in Interstate Commerce Commission, Bureau of Accounts, Transport Statistics in the United States, Year 1966: Railroads.

Transportation expenses, which my estimates show as about 44 percent of total full costs, also could mainly be assigned on an individual per-car-mileage basis. Much of this item could be uniformly distributed among all cars, although some differential between types of cars might be appropriate. Some commodity differentials, based on required special services and loss-and-damage experience, would be necessary. These would be of minor importance, however, and directly assignable.

A considerable portion of traffic expenses, less than 3 percent of total full costs by my estimates, and even some of miscellaneous and general expenses, less than 6 percent of the total, also could be directly assigned in our formula. Thus, even when an allowance for necessary profits is included, the percentage of so-called unallocable costs would be very small--so small, in fact, if the cost finding is done with sophistication, that its distribution on an equipment mileage basis by a reasonable method probably would have a very insignificant effect on resource allocation.

This, then, is a brief outline of one method which would appear to be feasible in attaining full-cost pricing and consequently more efficient resource allocation and economically healthier carriers. This specific proposal is not as revolutionary as it may at first sound.

Somewhat similar pricing devices (that is, space or cube times distance rates) are widely used in water carriage, in motor and air rental, leasing, or charter arrangements, and even in the rail rent-a-train idea. Wider use of this device certainly has been advocated by others before today, although all of the earlier advocates may not have had in mind future rather than historical costs. (Incidentally, in my crude formula, substituting future equipment replacement costs for historical costs, I obtained a 1966 industry profit of about 1.5 percent instead of the reported approximately 4 percent.)

This technique would not necessarily mean straight mileage rates, of course. No doubt tapering rates, and even some blanketing, could be justified on a cost basis. Probably some of the very large blankets could not be justified, however. Also, it would not upset regional rate uniformity, as averaging would continue to be used, nor would it alter the mechanical processes of rate-making. Incidental results, though, would be the abandonment of much of the bulk and complexity of our present classifications and tariffs, as well as the encouragement of more efficient equipment use by shippers through heavier carloadings.

The tasks of railroad managements and rate-setters under this plan would not be greatly different than at present. Future traffic-flow demands, aggregate, modal, and particular, at various possible cost levels, would have to be estimated. Also, future equipment replacement costs and other costs, including possible price level and capital market changes, would have to be projected and constantly studied and revised. Rate changes, upward or downward, would have to be made when the projections indicate they are required, just as now, and probably no more frequently than now. The management of an individual railroad, of course, would have an incentive, as now, to make its own operations more efficient than the average--that is, to obtain a profits-payoff by beating the book.

I will now leave this proposal with the audience. I hope to explore its possibilities further, and I hope some of you will do likewise.

Summary and Conclusions

Time does not permit nor necessity require any detailed summary of my foregoing remarks. Briefly, I have argued, I hope with some logic and success, that our present railroad pricing system is obsolete and incompatible with general economic efficiency or carrier economic strength, and that it must and will be changed. Finally, I have proposed a general alternative which I am convinced is both economically sound and administratively practical, and a specific technique for applying that alternative which appears to be workable but which requires further study.

I believe my general alternative, and perhaps my specific technique, will be the pricing avenue of the 1970's and following years. Hopefully, this avenue will be followed by railroad management without undue regulatory pressures or changes, but if it is not then the necessary changes and pressures should be brought about--and I believe they will be. Railroad transport capability is such a vital national resource that it must be kept viable, in spite of its management if need be.

More research is needed, of course, to pinpoint the specific effects of this alternative, but at least some general evaluation is possible at present. Freight charges as a percentage of Gross National Product are not likely to increase, but rather are likely to decrease, under full-cost pricing. Some products will move more freely and some less freely, and some rates will be increased and some decreased. There will be some intermodal traffic shifts and changes in traffic-flow route patterns.

These and similar resulting changes will mean that some carriers, and some industries in some locations, will be harmed and others benefited--just as the present pricing pattern causes the same results. There is no such thing as a neutral freight rate, rate structure, or rate change. Perhaps for overriding social reasons it may be desirable to move gradually into the new policy, and even to give temporary adjustment assistance of some kind to those most harmed by it. The ultimate result, however, will be a more efficient economy, more efficient and more profitable carriers within all modes, and more of the good things of life for all of our people and even for people elsewhere in the world.

I am under no delusion that this transition will be an easy one. Some traditionalists and some with vested interests in the status quo will have to be hogtied and dragged screaming into the economic realities of the present and future world. Those advocating the change that I am proposing can expect sniping from some industry and carrier sources, and even aspersions concerning their professional competence from some of their professional colleagues. But I believe the cause is worth the battle.

Sampson in response to questions from the audience:

I believe that since the airlines are making 9, 10, 11, 12, percent on investment they are probably engaging in a little full-cost pricing. I would say it was a little more than full-cost pricing. Maybe we should start thinking about getting them back to full cost. I am taking an airplane back to the West Coast this afternoon, and I am sure there is going to be quite a few vacant seats on it. If I go up there and tell this nice gentleman at the gate, look you have 14 empty seats and here I am and it isn't going to cost you anything to haul me, why don't I give you a dollar and ride back, do you think they will let me ride back? So I like to think that the airlines are not engaging in marginal cost pricing.

Full-cost pricing does not necessarily mean that all prices have to be raised. Certainly if you lower prices you are probably going to increase traffic and it may be called for in many instances. I think the airlines probably are an example of that.

HIGHWAY TRANSPORTATION

I. E. Solberg*

In the latter part of the nineteenth century people all over the United States began to display a growing interest in better roads. The rapid expansion of the railroad network had promoted the growth of trade and industry in urban areas, which in turn was improving the status of urban population, but the benefits of improved transportation did not extend to the same degree to the rural areas still bogged down in the mud of nineteenth century highway policies. It has been said that the fundamental basis of the road reform movement lay in the effort to remove some of the disparities that existed between rural and urban life. The rural free delivery system, started in a small way in 1896, was a reflection of the desire to extend the benefits of urban life to rural areas, and its expansion necessitated better roads. Bicycle riding which had become a national craze also contributed to the demand for improved roads. But regardless of the origins of the demand, it was the low priced mass-produced automobile that really brought about the development of the modern highway system.

Better roads made necessary the employment of trained engineers and regular crews of skilled workers equipped with proper tools and machinery. Also, the greater distances covered by the automobile required that standards of construction and maintenance be uniform over fairly long stretches of road. All of this meant the abandonment of the old township road district method of highway administration and the substitution of a larger unit. At first the county was used for this purpose but as the use of the automobile expanded, state control was substituted, and one after the other the states established highway departments and assumed direct responsibility for the construction and maintenance of designated systems of state highways.

With the continued growth of automobile ownership, both motorists and manufacturers urged the establishment of an integrated system of highways on a national basis to promote interstate highway travel, and agricultural interests called for Federal participation in the construction of farm to market roads. Active participation of the Federal Government was initiated by the Federal Aid Road Act of 1916 which provided an appropriation of \$75 million to be used during the next five years under the supervision of the Secretary of Agriculture to aid the states in improving rural post roads. For every dollar contributed by the Federal Government the states were to contribute an equal amount, and the states or subdivision thereof were to be responsible for maintenance. Federal participation was limited to a maximum of \$10,000 per mile exclusive of the cost of bridges more than

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twenty feet long. An important provision of this act was the requirement that a state must create a highway department with adequate equipment and authority to cooperate with the Government and supervise actual construction. Those states which did not have such departments created them promptly in order to be eligible for Federal aid.

The Federal Highway Act of 1921 made certain important changes in the 1916 law. Federal aid was limited to a system of highways designated by the state, not to exceed 7 per cent of its existing mileage. The Secretary of Agriculture was to give preference to projects which would expedite the completion of an interconnected system of state highways, but not all aid was to be confined to such roads; and under certain circumstances Federal contribution could be increased to a maximum of \$25,000 per mile.

Throughout the 1920's Federal aid functioned to encourage the steady and orderly development of a system of interconnected highways, with funds about equally divided between main or primary roads and secondary roads serving local needs. This program of orderly development was cast aside during the 1930's, however, in favor of road building for relief and recovery purposes. Special appropriations were made to help the states match Federal funds, and large sums were made available for feeder roads without matching aid. In 1934 the limitation on the amount of money the Federal Government could contribute per mile of road was removed, and in 1936 Federal aid was extended on a matching basis for rural roads not in the designated Federal aid system. In order to discourage states from diverting motor vehicle tax revenues to non-highway use, a strong temptation during the depression, it was provided that such action would bring about a reduction in Federal aid funds.

For some years interest had been in the development by the Federal Government of a key system of highways designed to promote the National defense. In 1955 Congress passed the Federal Aid Highway Act which provided, among other things, for the designation of a National system of interstate highways not to exceed 40,000 miles which would connect as directly as practicable the principal metropolitan areas, cities, and industrial areas; suitable border points in Canada and Mexico; and serve the National defense. This law provided that if the construction of any additional mileage was found necessary, such construction was to be added to the Federal aid highway system without regard to any existing mileage limitations.

Although the Federal Government has contributed large sums of money for highway improvements, it has preferred to leave actual construction, maintenance, and supervision to the states; and the completed highways belong to the states in which they are located. Decisions of the Supreme Court suggest that Congress has power to establish a system of Federally-owned interstate highways, but there are advantages to the policy of public aid which has been adopted. In the first place, most of the highway mileage, of course, must be administered by the states and a substantial saving is affected by making the states also responsible for the relatively small mileage of primarily interstate highways. Second, it would lead to confusion if separate Federal and state highway systems were set up because of the

inevitable intermingling of interstate and intrastate that state authorities must establish adequate highway departments and conform with high standards in order to obtain Federal funds , contributes to a general improvement in the quality of all road building.

Most highway user tax revenue is spent for highway purposes. In fact, 28 states have specifically dedicated this highway user revenue to highway purposes by the Constitutional amendment process. These amendments have been approved by popular vote at margins ranging from 122 to 1 up to 7.6 to 1.

State motor fuel tax rates now range from five cents per gallon (in three states) to nine cents per gallon (in Washington). The great majority of States have either a six or seven cent rate. License plate fees range from a low of \$3 for passenger cars to a high, in at least one state, of over \$1,100 for five-axle truck-trailer combinations.

In some states, unfair burdens of taxation are placed on the truck and bus operator. These taxes--called "Third Structure" taxes because they are in addition to the fuel taxes and the license plate fees--take the form of ton-mile taxes, axle-mile taxes, weight-distance taxes and gross receipt taxes. Wherever these restrictive taxes are imposed, they adversely affect highway transportation by destroying reciprocity between states in the licensing and regulation of interstate vehicles and by placing an unequal tax load on those who must use their highways.

Added to the above levies are special highway user taxes imposed at the Federal level. These are a four-cent-a-gallon motor fuel tax and an annual truck and bus tax imposed at the rate of \$3 per 1,000 pounds of taxable gross weight on vehicles over 26,000 pounds. Revenue from these taxes, and from most of the manufacturer's excise taxes, are dedicated to the Highway Trust Fund which is paying 90 per cent of the cost of our 41,000-mile National System of Interstate and Defense Highways and 50 per cent of the cost of State primary and secondary roads and their urban extensions. Virtually every dollar of this "Federal-aid" is derived from special imposts paid by highway users.

Improvements made in our in our highway plant and facilities in the last decade or so have resulted in more economic utilization of motor transportation. The old "Ten Wheeler" so common to the food industry a few years back has been replaced by the semi-trailer truck and even by the double-bottom combinations used in many parts of the country. Gross weight limits have been liberalized and the five-axle truck-trailer combination - with a gross weight of 70,000 pounds or more - is common throughout the country. Faster delivery schedules, reduced accident rates and many other benefits are traceable directly to the modern multilane, controlled - access highway.

Motor trucks haul a large volume of farm products to market. In 1965, over 96 1/2 per cent of all livestock arrived at stockyards by truck. In 1966, over 66 percent of all shipments of fruits and vegetables to leading markets in the country were truck shipments. Of the six major farm products that were unloaded in 41 cities in 1965, trucks brought 76 percent of the apples, 90 percent of cabbage, 83 percent of green corn, 50 percent of oranges, 58 percent of potatoes and 82 percent of tomatoes.

Trucks in Rural America

In many respects the country is not "country" any more. Not from the standpoint of the goods and services, nor from the types of cultural and educational opportunities available to its residents. One of the features of country life used to be isolation. Not any more. Today, radio and television keep the rural citizen as well informed and entertained as his city cousins. More important, however, the modern miracles of highways and motor vehicles have opened up rural areas to the city and have also laid the city at the feet of rural America.

Motor transport has become the touchstone of our way of life. Perhaps no other factor differentiates the North American from his Latin American neighbor as does transportation. The key word is "mobility"--mobility of men, machines and goods--(and the finest ingredients of this factor are speed and efficiency).

Using our great highway system, the truck, a long farm handyman, now brings agriculture and industry together in rural America. It has become a wheeled workhorse in the marketing of farm products and manufactured goods and in the assembly of raw materials going into them.

Trucks haul over 75 percent of all farm goods moving to markets. They also are transporting a steadily increasing volume from manufacturers' and processors' plants established, in recent years, in rural areas having neither rail nor water service. Made possible by trucks, this shifting pattern of manufacturing and processing provides new opportunity for "surplus farmers" to obtain nearby off-farm employment. It builds up local communities and provides more business to the trucking industry.

The Changing Scene in Agriculture

Agriculture is, of course, the principal business in rural America; and it is a fantastic business over-all. It is our nation's largest industry, both in employment and value of production, and it is in the midst of a great producing and marketing revolution in which it moves ever nearer to industry

Agriculture's assets total \$256 billion, equal to about two-thirds the value of current assets of all corporations in the United States, or about half the market value of all corporation stocks on the New York Stock Exchange.

American agriculture has grown so fast in the last generation--in the last ten years, in fact--that not even the farmer himself has been able to adjust to the changes. Traditional patterns of production, harvesting and marketing--even tillage methods, cropping practices, pest and disease control, fertilization--have so changed that a middle-aged farmer who has not been in the midst of the change is out of date, and probably out of business. This has been the fate of millions who have not been able to keep up. They have left the land for the towns and cities of the country.

Thirty years ago there were seven million farms in the United States. Today, there are probably less than three million bonafide crop-producing farms. Within 15 years, this total could drop to two million farms.

Farm sizes will probably increase in the foreseeable future. Today, the average size is about 350 acres compared to 160 acres in the mid-1930's.

As a result of all these developments, today's more efficient American farmer produces all that we can consume at home, plus all that we can export.

Since World War II, this country has become a food basket of the world. As of June 30, 1966 our exports of agricultural products were valued at \$6.7 billion. We are shipping wheat to India and Pakistan, poultry to Western Europe and Japan, even lettuce and fresh fruits to Venezuela and rice to the Orient. The production of one out of every four harvested acres goes to other countries.

Our food and other farm products are helping to relieve hunger and to promote economic growth in the newly-developing countries of the world--a powerful force for world peace. Our wheat is providing an additional 17 billion loaves of bread a year for the people of India alone.

"We accept foreign currencies from countries that need our farm products but are short of dollar exchange," the United States Department of Agriculture reports. "We also barter or trade our agricultural products for goods and services needed abroad by AID and Defense, and for strategic materials--nearly \$2 billion worth in the ten years, 1955-1965.

Trucks and Agriculture

In this fast moving change in agriculture, trucks have played a significant part. In 1965, according to the Department of Agriculture, farmers received \$39.2 billion for the crops and livestock which they sold. The overall annual transportation bill for marketing these agricultural commodities was estimated at \$5 billion, of which \$3 billion or 60 percent went for truck movement. Trucks hauled an even larger portion, over 75 percent, of the farm products moving directly to markets. This vast transportation effort requires all the trucks owned and operated by the farmers in addition to all types of for-hire and other private trucking as well.

As far back as the Census of 1910, the Bureau of the Census reported 2,000 trucks "on farms", out of a total registration of 21,000 trucks.

In 1940 there were 1,047,000 trucks on farms out of a total of 4,590,000. In 1965, according to preliminary data, the figures were, respectively, 2,925,000 and 14,000,000 or 21 percent on farms. Most of these are light trucks but the Bureau of Census of 26,000 pounds gross weight or more, the type used predominantly for over-the-road trips.

While many of these larger farm trucks enter into marketing activities, it is the inter-city for-hire trucking industry which has done most to advance farm marketing. How many such for-hire trucks there are, no one knows, because when carrying unprocessed agricultural commodities they are under no economic control by the Interstate Commerce Commission. Operators may haul such goods anywhere in trucks owned or operated by anyone--farmers, farmer cooperatives, individuals, business firms (private carriers), regulated motor carriers and even railroads. They may charge any amount and change their rates from hour to hour. Mr. Jones may be billed one rate and Mr. Smith another on the same day. Under the Interstate Commerce Act exempt haulers have no obligation to serve all customers equally, and, at will, may serve or refuse to serve as for-hire operators.

Farmers, farmer cooperatives and other private carriers are free to haul their own goods. Cooperatives, under recent court decisions, may in addition haul for-hire any non-farm item if such business is necessary and incidental to their primary business as cooperatives and does not exceed 50 percent of their total transportation business.

These agricultural exemptions were written into the Motor Carrier Act of 1935 and clarified and changed in later legislation, including the Transportation Act of 1958. The declared purpose was to help farmers meet special conditions related to the transportation of their livestock and farm commodities.

The effect of these exemptions has varied. In the absence of economic regulation some regulated carriers have shunned the unprocessed agricultural business except for occasional backhaulers. However, specialized regulated carriers (notably refrigerated hauls) still transport heavy tonnages of exempt items. The largest volume of exempt agricultural commodities is trucked by motor carriers specializing only in such service.

The overall effect of the exemption has been to give farmers a large flexible pool of trucks eligible to haul their goods at negotiated rates. However, the supply in any given area is affected by demand from other areas. Rates also fluctuate according to the ratio of trucks available to demand. In the absence of regulation there is no check upon the financial status of exempt haulers. Farmers, nevertheless, believe that these exemptions are helpful to them and have vigorously fought their repeal or substantial amendment.

Trucking...Modern Business Barometer

Attempting to chart the future course of the economy is a particularly complex and important undertaking. This is true whether the projections deal with the local, statewide, regional or national scene, whether they

attempt to cover the immediate future or the long term.

The Federal Government, state and local governments, private businesses and business organizations such as chambers of commerce and trade associations spend millions of dollars each year on such efforts.

Changing Economic Relationships

Our economy is dynamic, however, and while historical data are important in forecasting, relationships do change over the years and the intelligent analyst is constantly on the lookout for such changes.

The relatively swift changes in our economy and way of living since World War II have made the development of new economic indicators imperative. Weekly rail freight carloadings had been for many years the primary economic indicator of freight transportation. The changing nature of transportation services, however, brought about a need for new and more sensitive measures of the movement of manufactured commodities and consumer goods. As motor carriers began to handle a larger portion of these commodities, particularly in less-truck-load movements, the potential of truck service as an economic indicator became apparent.

Modern trucks and highways have become the dominant form of freight transportation today, particularly for the movement of manufactured goods. In 1966, our nation's shippers spent more for truck service than for all other forms of freight transportation combined. Accordingly, measures of truck movements have become increasingly important.

Many industries are keyed to the kind of service that trucks have made possible rapid, reliable, flexible service, permitting operation with minimum inventories. Thus, there is a close relationship between current business levels and truck movements.

There are approximately 1,200 Class I and II intercity motor carriers of general freight operating under the economic regulation of the Interstate Commerce Commission. These carriers had aggregate gross revenues of more than \$5 billion in 1965, and transported more than 40 percent of the tons of freight of all types while operating more than 52 percent of intercity vehicle miles. As indicated, a large portion of the freight handled by these carriers falls into the category "manufactures and miscellaneous" with more than One-half of it in the small shipments less-truck-load category. Such goods are hauled for immediate use rather than for inventory and stockpile purposes.

Facts About Trucking

American Trucking - 60 Years of Growth

The growth of trucking as a partner in commerce and industry throughout North Dakota and the United States is reflected in the following table, which shows soaring registrations for trucks in use over the past 60 years.

Over the past ten years alone, the truck fleet has increased by 36.5% in North Dakota, and 44.1% in the United States.

<u>Year</u>	<u>Truck Registrations</u>	
	<u>North Dakota</u>	<u>United States</u>
1906	10	2,200
1916	400	250,048
1926	12,251	2,807,354
1936	29,650	4,001,464
1946	53,868	5,722,000
1956	98,012	10,217,427
1966	133,780	14,721,307

The 133,780 private and commercial trucks in North Dakota represents 32.9 percent of total registered motor-vehicles in the state during 1966. Trucks on farms are estimated at 88,429 in number, and constitute over 66% of total trucks.

At the national level, the 14,721,307 trucks registered in 1966 were only 15.6 per cent of total motor-vehicle registrations. Of the total trucks registered, 22.8 percent or some 3.3 million were farm trucks.

How Trucks Serve

There are many different types and models of trucks, and many different uses. Still, all have one thing in common--they are work vehicles. They are at the same time our "wheels of progress and prosperity" and lifelines of supply.

On the farm, trucks do chores that help the farmer produce, harvest and deliver to market the results of his labor.

In commerce, where shoppers buy and products are sold, almost everything comes, at least part of the way, by truck. You can count the examples--the grocery store, the department store, the pharmacy--even the bank and the filling station.

In industry, trucks have the unique abilities of a warehouse on wheels. They reduce inventory costs by daily delivery of parts and raw materials, reloading with finished products for far-flung markets. The result is cost saving efficiency that allows industry today to locate anywhere it chooses.

At home, the fuel delivery, the dairy service, the repairman, the building contractor, all serve you with trucks. We just forget how often.

Truck Ownership

Few people actually realize who owns the 133,780 trucks registered in North Dakota. Many are surprised to find that only two trucks in one

hundred are owned by for-hire motor freight carriers. According to the 1963 Census of Transportation, only 2.2 percent of the states trucks are in for-hire use, while 74.5 percent are in agricultural use, 7.5 percent personal, and the balance of 15.8 percent are owned by manufacturers, stores, and other private businesses.

Nationally, the Census' findings showed 5.9 percent of the trucks in for-hire use, 28.0 percent agriculture, 24.5 percent personal and 41.6 percent in other uses.

Trucking Helps Industry Grow

It was not very long ago that virtually all industry was located in town and on a rail siding. This is no longer the case. Today new industry is moving out to suburbs, small towns and rural areas-- and is using the motor truck to provide fast and efficient transportation. Only trucks serve all populated communities as well as every other point and place. Trucks have brought markets, employees and materials together in a new era of manufacturing.

A recent survey was made of new and expanded industrial plants in North Dakota, which demonstrates the greater reliance on the efficient and flexible service that can be provided by trucks. Here are the results:

Fact - Proximity to good highways was listed as one of the five most important location factors by 66.7 percent of the plants. Another 16.6 percent of the firms responding, while not considering good highways a major factor, indicated it was given prime consideration. Therefore, over 83 percent of the plants surveyed considered good highways, to some degree, before deciding on their plant site.

Fact - Confirming the importance of highways is the location of these new factories in North Dakota - 66.7 percent are in small towns or rural areas, and the remaining 33.3 percent are in suburbs.

Fact - These new plants in North Dakota are heavy truck users. This group reported that 91.7 percent of inbound freight was carried by trucks, while 71.7 percent of their outbound freight was shipped by trucks.

Thus, trucking is playing a key role in North Dakota's industrial expansion and economic growth, and makes it possible for its people to benefit from more and better jobs.

THE ST. LAWRENCE SEAWAY: DEVELOPMENTS AHEAD

Joseph McCann*

The St. Lawrence Seaway did not come into being in a vacuum. There were a number of economic developments that led to the creation of this waterway. I would like to show how the development of the Seaway and the economy of the nation are intertwined.

In 1954, a group of dedicated men cheerfully hailed the passage of Public Law 358. The St. Lawrence Seaway was a reality.

Actually, despite some enthusiastic press notices, I don't think the general public, or even the business community as a whole, understood what the Seaway was all about. Transportation, even in such great seaports as New York and London, is of little interest to most of the public. It is something you simply expect to be there.

In 1954, however, those who had worked toward the creation of the Seaway, had great reason to rejoice. A Toledo newspaper called the passage of the act "the arrival of a miracle." In Detroit, it was hailed as "one of the greatest achievements for the advancement of our nation."

Many politicians of the early 1950s in the Midwest regarded the Seaway like motherhood. They didn't really understand it, but they thought it was probably a good thing. Of course, in those days, few political leaders wanted to be the father. The railroads were dead set against the coming of the Seaway. Surprisingly, so were the Chambers of Commerce of many of our largest Great Lakes cities--a fact of some embarrassment today.

Nationally, on the other hand, Presidents from Taft down, had all favored the creation of this new seacoast. In fact, a waterway of the general description of the Seaway had been favored by George Washington.

However, by 1950, the subject was old hat. The Lakes ports were ill-prepared for overseas trade. Ancillary services were practically non-existent. Banking, for example, for the import-export business, was almost all located on the East Coast. Indeed, when the Seaway opened in 1959 there was still an acute labor problem in our ports. There were still shortages of banking, insurance, and other services.

However, there was a vague awareness in the early 1950s that large ocean liners might float up the river and anchor near the Penobscot Building in Detroit or the Loop in Chicago. Details, such as a draft limitation of 25 feet, and size limitation of 730-foot-length and 75 foot beams, were lost in the shuffle.

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Those who had pushed for a Seaway were so anxious to get it approved, that they were forced to compromise, and it must be admitted, oversold the Seaway's exotic charms. They glossed over the limitations and even offered to put on tolls in about as cheerful a manner as the ancients offered human sacrifices. They wanted the Seaway built. It could be improved upon later.

Despite their feverish activities, there remained one overriding prime motive for the construction of the Seaway. That was the economics of iron ore shipping. Previously, steel companies had never been particularly in favor of the Seaway. Rather, they generally opposed it. But, by 1954, the best iron ore of the Mesabi Range had begun to peter out. The use of taconite was just beginning, and it did not offer sufficient supplies or high enough quality to satisfy the needs of the steel mills. A new source of iron ore was needed or the steel companies would have to move and expand facilities to coastal points where ore could be imported directly from foreign sources. At the same time, the cost of iron ore from the Mesabi had increased tremendously (the cost per long ton delivered at-rail-of-vessel, lower lake ports, rose from \$5.29 in 1949 to \$10.05 in 1964).

Looking back, we can see this development reflected in iron ore production figures. The United States, in 1948, produced 101.0 million of gross tons. This increased to 118.0 in 1953, then fell to 67.7 in 1958. Canada, on the other hand, increased its production to 2.7 millions of gross tons in 1948, to 5.8 in 1953, and 14.0 in 1958.

Since 1950, more than \$1 billion has been invested in iron mining and handling facilities in Labrador and northeastern Quebec. By 1964, the net capacity of these mines shipped was more than 28 million tons, with 6.2 million tons of pellets, 10.6 million tons of high grade concentrate, and over 11.2 million tons of medium grade ore. These ores are shipped through the ports of Port Cartier, Pointe Noire and Sept Iles on the north shore of the St. Lawrence.

The development of this iron ore traffic through the St. Lawrence began in 1954 with the movement of 297,396 tons. By 1958, 1,526,109 tons were shipped upbound through the canals. This, of course, was the year before the Seaway opened. The ore was transhipped at Contrecoeur on to the so-called Canallers capable of navigating the old shallow draft canals. Today, the Seaway handles approximately 17 million tons of iron ore with shipments to steel plants on the Great Lakes.

In the early 1950s, the steel companies' decision to support the Seaway was undoubtedly the prime reason for the passage of legislation. While President Eisenhower probably had no real commitment to the Seaway, his Secretary of the Treasury, George Humphrey, ably represented the steel interests. I believe the President's support was enlisted for the project by discussion of the Seaway's defense ramifications.

In 1954, it was reported that the waterway would:

1. Shorten construction and delivery time of military vessels.
2. Provide better lines of supply for essential raw materials and increase availability of these materials, particularly iron ore.
3. Provide additional ports necessary during national emergency.
4. Save lives and shipping costs during wartime by shortening the open sea route to northern Europe by about 1,000 miles.
5. Add to the total transportation facilities of the United States.

In 1946, the Joint Chiefs of Staff recommended the construction of the Seaway for national security.

Of course, it must also be recognized that in the 1950s Canada was indicating it would build the Seaway alone. In September of 1951, an announcement to this effect was made following a White House conference between the two Heads of State. Later that year, the Canadian Parliament passed an act creating the St. Lawrence Seaway Authority, a corporation authorized to proceed with the Seaway project wholly in Canada, or on a participating basis with the United States.

In 1952, the United States committed itself to a joint effort with Canada to develop the power phase of the Seaway. Application was made to the International Joint Commission as required by Article 3 of the Boundary Waters Treaty of 1909. In the application, the Commission was advised that the Seaway itself would be a solely Canadian undertaking.

In 1953, Canada reopened the door for joint development. In fact, many thought it highly unlikely that Canada could afford to go it alone. It is left to history to decide whether Canada could really have built the Seaway with the United States. The cost of connecting channels, in addition to the locks, would have been tremendous for them to do alone.

Fortunately, bills were introduced in the United States Congress in 1954 to allow U. S. participation. At first, it was expected that the Government would provide for \$2 million in capital stock, with \$100 million to be raised through the sale of guaranteed bonds to private investors. This was later changed in favor of a proposal authorizing the sale of interest bearing bonds to the Treasury.

The first actual proposal for this kind of waterway was presented by Albert Gallatin, Secretary of the Treasury, in 1808. He proposed the creation of an inter-coastal waterway cutting short canals across four "necks of land" along the Atlantic, as well as a series of canals connecting the seaboard with the interior.

This objective was partially fulfilled in 1817 with the construction of the Erie Canal, which was completed in 1825. Gallatin had been influenced by George Washington who looked upon canals as offering a way to economically benefit the interior of our country.

The Seaway area is unique in all the world. Here, for the first time, the interior of a country developed greater production facilities than the coastal area. This once landlocked section became foremost in our country in agriculture, industrial production, employment and population. The rapid industrialization of the area crosses the Canadian border, which results in an international economy that is more inter-related, integrated and interdependent than are the members of the Common Market. This area contains approximately 1.3 million square miles with a population of some 61 million. Within these borders are produced approximately 29.6 percent of the North American personal income.

In agriculture, the region produces more than 85 percent of the North American flaxseed, 81 percent of the corn, 76 percent of the oats, 75 percent of the soybeans, 74 percent of the wheat, etc. These form the base for a rich livestock, dairy and poultry products output.

In manufacturing, this section produces 37 percent of the value added by manufacturers, 54 percent of transportation equipment, 51 percent of non-electrical machinery, 45 percent of fabricated metal products, etc. The latest studies in 1960 indicate that despite its location the region's exports (5.3 billion or 34 percent of the U.S. Manufactured exports) are higher than any other region or section of the United States.

Using Michigan as an example, we can get an idea of direct overseas exports from 1950 to 1963. In 1950, Michigan exported \$4,840,000. In 1954, this figure jumped to over \$15 million, and in 1958 to nearly \$28 million.

The opening of the Seaway in 1959 found Michigan's direct exports by water leaping to \$41 million, and reach approximately \$133 million in 1963. Although this is a dramatic increase, it amounted to only about 14.2 percent of Michigan's total overseas trade. The balance of well over \$820 million in 1963 still moves overland.

It is expected, however, that by 1975 direct overseas exports will probably triple, although still representing less than 20 percent of the value of exports originating in Michigan. A survey taken by Dr. Hazard of Michigan State indicated that the Seaway could expand its business in the state by providing more ocean liner services and lower rates, and offering more information on foreign markets and contacts.

Dr. Hazard points out that other major obstacles to increased Seaway utilization include company lack of control of routing decision, inadequate port facilities, high inland rates, inadequate intermediary services by banks, forwarders, etc., seasonality, and time in transit.

In his analysis, Dr. Hazard points out that:

1. Most companies in Michigan have come into the Seaway late and use it relatively little although they expect to use it a great deal more in the future.
2. Users have found the Seaway service economical and of high quality in all matters but regularity, frequency and aerial coverage.
3. Users have found the service far better than anticipated and both they and non-users expect to use it more.

On the other hand, according to this 1963 study, only 8.3 percent of non-electric machinery, a .9 percent of the miscellaneous manufacturers, and 8.8 percent of the transportation equipment moving to overseas markets used the Seaway route.

In Illinois, the Division of Export Expansion also analyzed the Seaway. It reports that more exporters use the New York port facilities than Chicago. While Chicago ranked second in importance, New Orleans was third, and San Francisco was fourth. The research showed that Chicago was not the most important port for Illinois business firms because it cannot be used year-round, it is not publicized, and in some respects, it does not have adequate facilities.

These reports can be considered a pessimistic appraisal, or we can optimistically think there is lots of room for improvement. I personally think that we have fallen down in selling the Seaway, although there is greater activity today than there ever has been. There are, however, no unified promotion efforts on the Lakes. There are some individual port activities, but individual lakes ports do not have sufficient budgets to go it alone. A combined promotional program would be theoretically advisable, but the specter of intra-lake competition makes this difficult to achieve.

The Seaway, however, had made some remarkable strides since it was opened in 1959. It was built to carry iron ore, and this it does with a vengeance. In 1965, more than 12 million tons were carried. In 1966, this figure was 15,480,000.

Agricultural goods are moving through the Seaway in even greater amounts than anticipated. In 1966, we moved 11,191,000 tons of wheat and 6,840,000 tons of other grains. Some experts indicate that wheat shipments may drop in future years as world production expands. I wonder whether the population explosion will ever allow production to catch up with demand. Certainly, in the years to come, grains such as corn, oats, barley, and soybeans will be moving from the Great Lakes in even greater amounts. At the present time, the Seaway service area, based on transportation rates now in effect, include the wheat belt in Eastern Montana, North Dakota, and Minnesota; the corn and soybean regions of South Dakota, Northern Nebraska, Iowa, Northern Illinois, Northern Indiana, and Ohio.

Since the United States is the only source from which it appears possible to meet the growing feed grain import needs of Western Europe, U.S. corn exports to Europe will increase to approximately 12 million tons in 1970. To date, U.S. shipments of corn to Western Europe through the Seaway have averaged less than 30 percent of the total movement. This percentage, however, is increasing.

It can be said that the Seaway has and will continue to help expand American exports of all agriculture products, particularly grain. This is seen in the reversal of the steady increase in transportation costs in pre-Seaway days. When the Seaway opened, costs began to fall. In fact, even when the Seaway may not have the competitive edge in some areas, it may be credited with forcing transportation costs down.

Let me give you an example of this. Before the Seaway, freight rates to the East Coast were soaring. However, in 1959, the export rate on grain from Central Illinois to the East Coast was reduced from 50¢ cwt to 37¢ cwt; soybeans from 72¢ cwt to 38¢ cwt. The single boxcar export rate on corn from Indianapolis to Baltimore has been reduced from a pre-Seaway rate of 46¢ cwt to as low as 30¢ cwt. Here, at a minimum rate of 55 tons per car, the single car savings amounted to \$176 per car. For the seven-year period, 1959 through 1965, the equivalent of 585,254 carloads of grain were exported through North Atlantic ports. Even at a conservative savings estimate of \$100 per car, the Seaway has already saved for the American public a minimum of \$58.5 million in transportation costs on grain exported through these Atlantic ports.

We begin to have some idea of the value of the Seaway. It does the following:

- (1) Helps maintain industry in the area by offering an inexpensive route for the import of raw materials, particularly iron ore.
- (2) Encourage the export of goods by lowering the transportation costs both directly and indirectly.
- (3) Provides port oriented jobs directly and indirectly.
- (4) Helps Lakes States to attract new industries, particularly companies have found it economically sound to locate in port areas.

The movement of general cargo was never expected to reach more than 10 percent of total traffic. However, these exotic cargoes are of more interest to the public and generate more revenues to the port areas. It is the general cargo that may provide the most jobs and new industry.

It seems likely, however, that general cargo in the future can assume greater importance than anticipated. I described some of the problems of generating this cargo. Despite these problems, tonnage has risen to approximately 5.5 million tons in 1965 and 1966.

While the Seaway is not yet generating its full and logical share of general cargo, it does have some appealing selling points--mainly it is cheaper. Several years ago, a Michigan auto company explained it was able to get a foothold in the Australian market because the Seaway helped reduce the cost of delivered cars. In Milwaukee, a study revealed shippers save from \$11.76 to \$26.38 a ton on the export of such items as tempered hardwood, paper making machinery, packaged lard, bottling machinery, and powdered milk.

As another example, one company saved \$25,000 by shipping a complete cement mill to Spain through the Seaway. Chrysler saved \$8,000 on 340 tons of machine tools.

Nearly 200 million pounds of Michigan navy beans were shipped last year through the Saginaw River to over 28 foreign countries. The export of Bing cherries was made possible through the Seaway.

A most interesting development is the shipment of cargo to and from the Far East. Imported steel can move from Japan over the inhibiting route through the Panama Canal and the winding Great Lakes to Chicago, one of the world's greatest steel making centers, at a rate of approximately \$1.10 per hundred. This helps explain why imported steel is so competitive with U.S. products. Other Japanese products, such as textiles, fabrics, china, machinery, vehicles, and animal products are moving in greater quantities into the Great Lakes from Japan.

The potential for 10 million tons of general cargo is there for the Seaway and undoubtedly we will reach it if we are able to cope with our problems of promotion, if we are able to extend our season, and if we prepare ourselves for the use of containerization.

To get a better idea of the ups and downs of Seaway Traffic, here is a description of the Port of Milwaukee in 1966. Before the season opened, predictions were made that every traffic tonnage and sailing record would be broken. However, in March and April, labor contracts created an air of uncertainty. Shippers were advised to route via Milwaukee at their own risk. General cargo terminals were, therefore, practically empty in March and April. Then two months of labor disturbances, strikes in Canadian grain elevators, a near-strike of Seaway lock workers, a British shipping strike, and finally a Canadian railroad strike, caused numerous voyage cancellations and re-routing through Eastern ports.

Seaway traffic in Milwaukee by July was 20 percent under 1965 levels. At the same time, shipments of food by our Government to recipient nations declined about 30 percent. Demand for dairy products, especially powdered milk, was so great that the Government was unable to purchase milk for its export programs and the Japanese government, which had scheduled large purchases in the Midwest, was compelled to buy most of its requirements from Australia.

Storage stocks of grain dropped so profusely, due to world-wide demand, that flour mills were unable to procure grain on the basis of which they could bid for Government export orders. As a result, there were large declines in shipments of powdered milk, flour, and other foodstuffs under the various Foreign Aid programs.

This sounds as though Milwaukee had a disastrous year. However, there were some off-setting factors--a large increase in the commercial of fats and oils--a new movement of frozen meats--a new import item of pig iron--a substantial increase in the imports of steel products. By the end of November, tonnage had decreased only 4.4 percent. It had achieved 730,635 net tons.

Running a port facility is like being involved in a real life "Perils of Pauline" serial. As you can see, every national economic development affects tonnage. One day you are up, the next day it is disaster. I can only take hope from the fact that 1966 was so good a year despite so many disasters. This bodes well for the future.

1967 has also had its share of disasters. Our tonnage will be below that of 1966. General cargo, however, will show an increase and could reach close to 6 million tons. This year, we have also extended the season until December 6 and hope within the next few years to add another week beyond that. Of course, we do have a problem with Eisenhower Lock. We expect to be spending the next five years repairing this lock at a cost of some \$13 million. The repair, however, will in no way interfere with the navigational season. Our construction crews will move in in mid-December and complete their operations in time to open the season in early April.

What is the future of the Seaway?

It is heavy movements of iron ore. It is increasing shipments of agricultural goods. It is the development of new cargo movements. It is the fluctuating growth of general cargo.

The future of the Seaway indicates that tonnage will grow in the 1970s to 65 million tons. Using all of industry's modern techniques, such as closed circuit television, computerized scheduling, etc., we cannot handle any more tonnage than that.

Indeed, by the mid-1970s, the Welland Canal, which is already overcrowded, will be unable to handle the new traffic. Therefore, the Canadian government is studying plans to build a new Welland Canal. The new Welland will be able to handle larger vessels, up to approximately 1,000 feet long, by 100 feet in beam, similar to the Poe Lock at the Sault. This will stimulate the need for larger vessels on the Lakes and improvements in port facilities.

The new Welland will, obviously, be followed by the construction of new Seaway locks of equal dimensions. The entire Seaway then, in the 1980s, will be able to handle 100 million tons of traffic.

The trend toward larger ships has been very noticeable these past five years. The small Laker or Canaller, capable of carrying 6,000 - 7,000 - or 8,000 tons, has all but disappeared. The large 730-foot Lake vessel that carries 27,000 tons or more than one million bushels of grain, or, in other words, the yield of more than 51,000 acres of prairie farmland, is becoming a regular feature of the Seaway route.

As some economic geography majors might understand, the Seaway points directly to Europe. The actual water distance from Cleveland to Northern Europe is approximately the same as from New York to Northern Europe. If you look on a global map, you can see this phenomena.

Another unusual quality of the Seaway is that it alone - in all the United States - is the only tolled waterway. It stands as an example of how a navigational project can pay for itself. Naturally, no other section of the country seems to have the desire to profit by this example. The Seaway, I believe, is marked to be the sole example of a water transportation improvement in the United States that is paying for itself.

Despite some sanguine headlines, the Seaway financial problems are minor. The Government holds Corporation bonds amounting to approximately \$140 million. Of this, approximately \$20 million is capitalized, or accrued, interest. The Corporation, through 1966, added an unanticipated \$8 million of deferred interest to its debt.

Seaway economics have been written up and re-hashed over and over again. Unfortunately, they have overshadowed the more important economics of the Seaway. Indeed, while people know the Seaway is in debt, few realize that we are reaching our capacity.

Few know that a new Seaway with increased dimensions is in the offing. Rather, attention is paid only to our balance sheet. We may certainly get less publicity now that we are beginning to operate in the black and to grow at a faster rate than anyone thought possible. It is interesting to compare the Seaway growth with that of other great canals. The Panama Canal, for instance.

At the end of the first full year of the Panama Canal operation in 1915, 4.9 million tons of cargo were handled. By 1920, traffic was up to 7 million tons. In 1930, more than 30 million tons of traffic were hauled, and in 1966, traffic amounted to more than 85 million tons. This is a remarkable growth but not nearly as remarkable as the Seaway's.

Our waterway grew from 20 million tons in 1959 to more than 49 million tons only seven years later. The five-year average rate of growth for the Panama Canal (1959-1964) was about 7 percent compared with 17 percent for the Seaway.

The Panama, and the Suez Canal before the present crisis, have been appropriately called the pulse of the world since they both connect major bodies of water and are world routes. Obviously, business cycles, economic

fluctuations, and tonnage figures on these canals would chart approximately alike. The question now is how well the Seaway is becoming an economic barometer for the area it serves. I think that the waterway began to establish itself as an economic barometer in 1964 when tonnage increased to approximately 39 million tons. Tonnage the next year jumped to approximately 43 million tons. Then, in 1966, traffic topped 49 million tons. The growth pattern exceeds 12 percent.

From the examples I have given concerning the Port of Milwaukee, the States of Michigan and Illinois, it is apparent that this growth is closely tied to the economic expansion of this area of Canada and the United States.

Thus, the waterway functions in the Midcontinent area as an economic barometer as well as an economic stimulant. We are still too close to the picture to see and to explain all the ramifications of the creation of this new seacoast. Part of its achievements have been hidden by the financial squabble. Some questions will never be answered and others we can only conjecture upon. For example, if steel factories had moved in greater numbers to coastal points, how would it have affected other industry?

There is a factory in Michigan that produces tractors. There is a similar factory in Belgium, and one in England. Sections and parts are sent from one factory to another by ship. No one factory produces the entire tractor. There are other factories using this type of operation in the region. Could they have existed without the Seaway? The great Canadian sales of grain have stimulated that nation's economy. Could they have been delivered without the Seaway?

Regardless of rail rates, could the increased shipments of goods these last seven years have been handled in this country without the Seaway?

Certainly the Seaway has served as a stimulus to modernize rail equipment but, even with today's modern equipment, we have been facing boxcar shortages. Would the Great Lakes contain the world's greatest traffic jam if not for the Seaway?

I feel the Seaway has been underrated, its contributions to the economy overlooked, primarily because it has not produced a dramatic settlement of new areas as did the Erie Canal; the construction did not involve a life and death struggle with mosquitos and the connection of two great oceans as did the Panama; the builder of the Seaway will never be immortalized in film played by someone like Tyrone Power, as happened with the Suez.

Rather, the Seaway - a limited access highway into the Great Lakes - has quietly and sometimes efficiently, turned our great inland cities into seaports. It has amazed old time sailors by establishing such strange routes as Yokahoma to Toledo, Duluth to Hamburg, and Cleveland to Amsterdam. It has overcome its handicaps. It has confounded many of its foes and surprised even its friends.

McCann in response to questions from the audience:

How many locks would we have to enlarge to accommodate the larger vessels and how do we propose to keep the seaway opened on a year round basis? The first stumbling block in the entire seaway system is, of course, the Welland canal with its eight locks, its old and small. Canada is now studying plans, and they haven't released any yet and proposals to modernize this system. Whether this will be another 8 locks or giant locks (possibly 4 or less) I don't know. We have two locks in the system that we undoubtedly will replace with one larger lock. We have no plans or proposals for keeping the seaway open year round basis, we are trying to sneak up on it. We keep open a couple days later each year and open a couple days earlier each year. If we can add two weeks to the present length of the season, we can give the overseas shippers a chance to make one more complete trip, I think now they can make 3½ trips. With two more weeks, they can make four trips. Their story is that it takes three trips to break even; the fourth trip is where they make their profit for the year.

To explain a little bit of the debt structure of the St. Lawrence Seaway--it is very hard to make most people, and when I say most people I include most of the members of Congress understand it. Members of the Executive staff realize the fact that in this St. Lawrence Seaway Corporation operation we are very junior partners. For each dollar that we have invested, the Canadians have over three dollars invested in this system. They have exactly the same situation as we have only three times as large. They borrowed from the treasury; they are paying back with interest to their treasury.

What is the comparison of the movement of traffic between the U. S. and Canada? I think it's rather hard to break down. As you know the American shipping industry has not fared too well in these last years. The large movement is Canadian in Canadian bottoms--over 85 percent of the traffic. As a matter of fact the statistic that we are not too proud of this year is that Russian vessels in the seaway system were over 3 times as numerous as American bottoms.

What percentage of grain exported to Japan moves through the St. Lawrence Seaway? We don't have those figures. The Canadian grain board determines the movements. We would guess about 20 percent but we have no way of determining that actually. Those figures are not released.

With the development of the new gigantic ships and super tankers, what is the future of the seaway? In my opinion all the talk we hear of the population explosion of the world indicates that we will need every avenue of transportation that we can get our hands on. We need to develop it as well as we can get it developed. I think in many of our cities now we are seeing freeways where we have two-lane roads. We now have to put four-lane roads when we could have put in the four-lane roads ten years ago at a tenth the cost. By the year 2000 we are going to need all the airlines, all the rail lanes, all the express lanes, and all the water lanes that we can get. Each one that we get before the year 2000 is going to cost one tenth of what it is going to cost by then. That's is one man's opinion.

DEVELOPING THE GREAT PLAINS RIVER SYSTEM

Howard E. Christian*

To introduce this topic I would like to first take a minute or two to orient our thinking about water. Good water has always been one of the critical natural elements and plays a major influence in the development of any region. Transportation by water goes back in time to when man first began his wanderings on earth. Man's needs forced him to follow and live with water. Areas where water is absent will find man absent. Its natural then, that as the United States was settled the waterways were followed and so to the Great Plains rivers came the pioneer. In these early days the pioneer's needs and his rich fur produce brought the Keel Boats and the Packet Boats into our vast central region. Fort Benton, Montana was a key river port for these craft and it took them four to six months to make a single round trip from St. Louis to the upriver ports.

Homesteads were established along the rivers in increasing number and pioneer towns began to grow in both size and number along the water courses. Unpredictable bank erosion and floods formed a constant threat to mans improvements. Yet, in spite of their treacherous nature the rivers, in their natural condition served the pioneers a major route of communication. This principle artery of travel faded as the machine age progressed and brought the faster more flexible railroads with more dependable and frequent schedules

As the region along the Missouri became more developed, the value of urban and rural land along the river increased rapidly, and with this increase came concern over the erosion patterns of the river. In its unimproved state, the Missouri wandered in numerous channels, full of shifting sand bars, shoals and debris. Continuously changing its course, it threatened cities, villages, bridges, industrial plants, municipal works and other property along its banks. Added to this, is the destruction of countless acres of rich farm land eaten away by the tremendous energy of the rivers flow. Studies indicated that 9,000 acres of good land was destroyed annually between Sioux City, Iowa and the mouth at St. Louis. Spot protection was constructed at many areas to protect a town riverfront, a nearby road, bridge or rail line. After many years of attempting local protection it became evident that the river was too powerful for piece-meal type protection to be completely successful and realization that to stop erosion the channel must be completely stabilized, brought about the first major step in the development of the Missouri River.

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Complete stabilization of the channel is a key to or ties in with other valley improvements, such as levees for flood control, renewal of commercial navigation, fixed irrigation points reclamation of adjacent low lands and recreational areas along the banks.

The primary theory of channel stabilization is one of shaping the river's course and contraction of its boundaries. The general design criteria for only bank stabilization is much broader than when a navigation channel area is included in the project's concepts. The alignment is developed into a series of concave bends to apply the hydraulic principle of the concentration of energy of flowing water. The fundamental law of river control which is to "Give due consideration to the character of the river and do not attempt to force the flowing water to a performance which is foreign to the nature of the individual river." This is best exemplified by the river's slope or more strictly its energy gradient. The slope gives the river its power and when considering long stretches it is desirable to maintain as much as possible the natural slope established by nature. However, short sections have very large variations in slope and these may be adjusted by the engineer as long as precautions are taken to minimize the total change on the overall long reaches. The alignment of the concave bends, previously mentioned, is into a series of reverse curves or bends which provide for a transfer of the force of the flow from right to left and back again repeating downstream. The areas between opposite curves are called crossings and are the most vulnerable locations where problems occur in obtaining navigation channel dimensions. In these crossing areas the objective is to prevent spreading or separating of the concentrated velocity flows by special control structure for maintaining flow concentration, a desirable depth along with sediment movement is obtained. Achieving a prescribed minimum water depth is one of the most difficult problems in river hydraulics for uniform sediment transport movement must be provided.

Structures used to develop the river's alignment are permeable dikes, revetments, chute closures and pilot canals. The description and use of these structures can best be presented in a series of picture slides. However, before the pictures, it will be of value to present some of the project economics and statistics for the Missouri River Bank Stabilization Project, Sioux City to the Mouth which demonstrate typical benefits of waterway improvement projects.

As most of you probably know, the Benefit to Cost ratio for a project must exceed a 1 to 1 ratio before Congress will authorize construction of a project. The B/C ratio for the Missouri River Project from Sioux City to Mouth is 1.9 to 1 which means benefits from the project will be almost twice the cost (which includes maintenance for the project life). The benefits are grouped into the following three general categories:

Benefits from Erosion Control	77.3%
Benefits from Transportation(Navigation)	17.8%
Benefits from Recreational Use	4.9%

Traffic surveys in 1950 indicated 4,000,000 tons are potentially available for commercial transportation on the Missouri River from Sioux City to the Mouth. This estimate was increased 25 percent to a total of 5,000,000 tons annually as allowance for future developments. The commercial operators have indicated that they believe that the results of this study are too conservative and that a minimum of 7,000,000 to 8,000,000 tons will be available annually after completion of the navigation project.

The project is only now nearing completion and this chart shows how one of the benefits, commercial traffic, which had wide spread regional effects, has begun to develop during the last 10 years:

<u>Year</u>	<u>COMMERCIAL TRAFFIC</u>		<u>Sioux City to Mouth Total Traffic</u>
	<u>Traffic Above Omaha</u>	<u>Traffic Below Omaha</u>	
1957	0	333,887	333,887
1958	2,076	796,019	798,095
1959	653	842,159	842,812
1960	1,023	1,439,962	1,440,985
1961	0	1,566,821	1,566,821
1962	0	2,209,858	2,209,858
1963	152	2,316,982	2,317,134
1964	46,709	2,504,854	2,551,563
1965	83,181	2,188,382	2,271,563
1966	124,298	2,431,702	2,556,000
1967	168,941	2,387,898	2,556,839

The increases in traffic above Omaha is an example of the trends that will prevail once a waterway is available. There are still skeptics who can't believe the rivers have another transportation future. They see the jets whiz overhead and the big semi-trailer trucks grind across the superhighways and do not consider that the river is like a pipeline. Once the flow of goods is established, the speed in movement of many commodities is less important than the cost-per-ton shipping charge, and the cost-per-ton by river is very low. A good example is the recent expansion of the Gulf Oil Corporation. During 1967 they constructed a 35,000 ton liquid ammonia fertilizer storage facility at Blair, Nebraska which is about 30 miles north of Omaha. Special barges called cryogenic ammonia barges, which keep the ammonia refrigerated to 28 degrees below zero, are used for transporting this commodity. These barges are the longest and widest plying the river at the present time. This liquid anhydrous ammonia will be shipped to the Blair Storage and Transfer facility from a new plant under construction near Baton Rouge, Louisiana and their present plans are to ship about 52,000 tons annually. As the navigation channel is extended upstream this type of facility will extend its upstream terminals into the Dakota Region. Benefits for justification of extending the Missouri River Project to Yankton, South Dakota indicates the average annual saving in fertilizer shipped into this area by water to be \$418,800 and the average annual savings of all commercial navigation into this region is estimated at \$1,142,200.

Further navigation developments above Gavins Point Dam on the Missouri River or on tributaries such as the James River will be dependent on the overall continued development of the valley area. Irrigation improvements are annually advancing the agricultural productivity of our region and as population increases, places larger demands on water conservation and land use. It is very probable that marine railroads will be constructed to portage the large mainstem dams to extend navigation into the Northern Region. Other rivers such as the James River will also be developed for multiple purpose use through construction of slackwater control systems. Such projects are in the picture for the future as soon as their construction is economically justified as a result of continued development of the Upper Great Plains Area.

Graham in response to questions from the audience:

How long has the river been open to Sioux City and what is the annual shipment of grain? In 1958, 2,076 tons; in 1959, 653; in 1960, 1,020; and zero in 1961 and 1962. So basically 1964 is when the major part of navigation started increasing in the Sioux City area. Now I can't give you the exact tonnage by commodity that was shipped on the river. The tonnages that we show are combined up river and down. The trade is generally fertilizer and salt upriver and grain downstream. Most of these towboat operators do have freight going both ways.

What is the time table for navigation above Yankton, South Dakota? We do not have a time table. Several projects have been studied. The one we mention on the James River was studied several years ago and as of now there is no active investigation of that development.

Does the development behind the reservoirs contemplate a series of locks to provide portage? We've had to take those possibilities into consideration. We have not as yet developed a plan for providing portage around the reservoirs. One of the alternate navigation schemes was to construct a series of slack water dams up the James River to Jamestown, North Dakota and then a canal and lock system from there over into the Garrison reservoir. Our preliminary studies indicated that this was a very expensive project in the neighborhood of a billion dollars and at this time it is not economically feasible. Once the area becomes developed and the need for it arises then this could be studied.

SETTING THE PACE FOR FUTURE TRANSPORT DEVELOPMENT

Harold F. Hammond*

Today's Transport Panorama

This is an exciting age we live in!

We are on the threshold of conquering the planets about us.

We marvel over the recent heart transplants and wonder what new heights man will reach next.

We are told the staggering fact that man's knowledge is doubling almost every ten years.

In short, we are part of a civilization where keeping up with the rate of change--let along the changes themselves--requires leadership and dedication of the highest quality within the business, academic, and government segments of our society. A blink of the eye, so to speak, could cause one to miss an important sequence from the scenario of developments now emerging from the minds of man.

Ten years from now we will be living in surroundings that may very well seem strange and outmoded by the standards of even today's era.

- . . .Men of authority tell us that the cure for certain dreaded diseases, possibly even cancer, will be an accomplished fact in ten years.
- . . .Trips to the moon probably will be a routine scientific achievement.
- . . .Great amounts of clean water needed in the years ahead will be met through low cost filtration and long distance piping of ocean water.
- . . .Man is soon expected to have the capabilities of extracting large quantities of foods and minerals from the seas.
- . . .We are told, that at last man will have control over certain weather conditions--a development that would have been the envy of the colorful but ineffective rainmakers of old.

And in the field of transportation, the panorama of changes awaiting us ten years hence is just as exciting.

- . . .Sonic boom or not, 1800 mph commercial jet transportation will be an accomplished fact within ten years.

*President, Transportation Association of America, Washington, D. C.

- . . .Trains capable of 180 mph are now being tested and these too will probably figure into short distance travel and the railroad picture ten years from now.
- . . .Truck-trains on separate highways under automatic control are likewise more than visionary ideas.
- . . .The experts also tell us that we can expect the return of the electric automobile for use in short distance travel within urban areas.
- . . .Experiments in the transportation of solid commodities by pipeline over long distances are now under way and the results appear promising.
- . . .Considerable progress is being made in the development of high speed vessels that will haul and handle automatically both containers and barges.
- . . .We will also see many so called hovercrafts or vehicles riding on a cushion of air. We thus may find a whole new family of land and water vehicles available for use in international as well as domestic water transportation.

All these developments represent man's drive to improve his lot--and progress means changes. Change is, in fact, the very essence of life. As Arnold Bennett said, "Any change, even a change for the better, is always accompanied by drawbacks and discomforts." And there are those experts, and many of you fit into this category, who have the responsibility of coping with the "drawbacks and discomforts" resulting from these changes. Therein lie the challenges of future transportation.

Change--Problems and Challenges

To better appreciate the challenges I am speaking of, we might consider for a moment just how important transportation is to us as individuals and to the nation as a whole.

Today's homemaker, although she may never stop to realize it, is completely dependent on transportation in the caring, feeding and clothing of her husband and children. The products of the farm and the factory which she needs for her family are literally brought to her doorstep--indeed into her very home as a result of the vast transportation complex serving the nation. The extent to which she and her family are dependent on this transport complex is driven home when a labor strike cuts off this transport service for any length of time.

As a nation, transportation outlays represent about 20% of the Gross National Product, or more than \$150 billion. That is how much was spent by U. S. citizens during 1966 for all transportation outlays, including private and for-hire freight and passenger service. That represents an average of about \$2,750 spent on transportation by every family in the United States during 1966.

Thus transportation is vitally important to us as individual consumers to us as a nation, both for civilian life and in defense. It follows, therefore, that it will require the keenest of minds, and the best of talents to cope with the impact technological changes are having on the transport panorama presently evolving into the transport system of the seventies.

What sort of changes am I referring to?

In the past, for instance, railroads hauled the great bulk of intercity passenger travel. With the introduction of the automobile and airplane this situation began to change. Today automobiles, airplanes and buses handle about 98% of all intercity travel, leaving the railroads only 2%.

The freight hauling picture has also changed. In less than two decades the rail share dropped from 76% to 39% (cut in half). Trucks, barges and pipelines were the reasons. Now the railroads are making a concerned effort to win back some of the traffic they lost. This of course is causing other modes, in turn, to develop the best possible competitive posture for their system by using the latest technologies available to them. Now with jumbo aircargo planes entering the picture the other modes of transportation will have to make still further adjustments and changes to remain competitive for the freight dollar. This process forms the basis for transport development and will go on as long as we are fortunate to have a privately owned and operated transport system functioning within the framework of sound government transport policies.

Today we find technological changes taking place in all areas of the transport spectrum. These new developments are having a salutary effect on the quality of transport service being provided--but they are also having a domino effect on every facet of the transport picture including government regulation, promotion and program administration. Transport technology developments have been short of fantastic within the past ten years. The future holds even greater surprises as we find two basic elements of transportation--size and speed--reaching unbelievable proportions in the immediate years ahead. With the introduction of bigger, faster--and safer--transport vehicles, a whole new set of related transport issues take shape--such as those relating to facilities expansion, density, distribution and travel patterns.

Add to these problems the ever present and pervasive population growth factor--intermingled with the newly emerging urban/rural growth patterns--and it can be readily seen that United States transportation development in the next ten years will provide many positive challenges to those willing and able to meet them.

Many Roads Lead to Washington, D. C.

The solutions to the problems growing out of the new technology introduced in the field of transportation involve many disciplines and sciences. But, as you know, the transportation carriers in the United States--the common carriers providing interstate service--are regulated by the Federal Government as to rates, routes, service and safety. Furthermore, the problems

and challenges of future transport development are becoming more and more intertwined with the Federal process as the role of government in this areas has increased. Thus, it is evident that in seeking solutions to these problems, we find more of the roads leading to Washington.

This fact was brought home with considerable force last year with the establishment of the New Department of Transportation. As many of you know, this department combined eleven separate government transport agency functions which are now being administered by a combined force of 100,000 employees who directly control various transport expenditures totaling about \$6 billion annually and indirectly control many billions more.

The Department of Transportation was established primarily to centralize direction of many transport activities located within the executive branch of the Federal Government. It is not supposed, except for the transfer of certain promotional and safety activities, to direct the various functions of the three independent transport regulatory agencies which are considered "arms of Congress." Furthermore, other transport activities within the Executive Branch--such as those in the Maritime Administration in the Commerce Department and the Federal Urban transport program in the Department of Housing and Urban Development--were not transferred to the Department of Transportation. In these two instances, however, there are now strong moves afoot to have Congress transfer these transport activities to DOT in 1968.

DOT will be celebrating its first anniversary on April 1 of this year. As you would expect, the first year was spent mostly in getting organized, laying down operating guidelines as set forth in the enabling act and establishing the mechanisms for program implementation while at the same time carrying out existing programs for which DOT was made responsible. Most of us would agree, I am sure, that its first year of existence would be no picnic, and I suspect many DOT officials would agree that has been the case.

One fact is certain, however, whatever posture it develops or whatever image it projects, the Department of Transportation will not be the alpha or omega of transport development in the United States. It was not charged with that responsibility.

DOT, however, can be the catalyst through which a progressive and realistic national transport policy can be formulated and implemented for the challenging years ahead.

Quite naturally, this will lead the new Department of Transportation into many facets of the nation's transport system, particularly in those areas where the impact of change is having pronounced effects. We know, for instance, that airport congestion will not get any better with the introduction of larger and faster jets unless bold action is taken through appropriate programming designed to keep pace with the new wave of technology. The same can be said of highway needs, and a host of other transport developments in intercity as well as urban transportation. Many of the answers to future transport challenges will invariably end up at the doors of Congress where, in the final analysis, many roads converge.

The Action Issues for '68

It is difficult now to say just what form the legislative issues of the future will take in the field of transportation. That they will become more intense and greater in scope seems almost certain. This year should provide some of the clues of what's to come.

I suppose, though, if we were to give '68 a Chinese-year designation, we could call it the year of the donkey/elephant--which means that national elections will be predominate. And because it is customary for the legislative analyst to qualify their predictions with the statement that "anything can happen in an election year" I would like to proceed on that basis and comment on several important transport issues likely to emerge this year.

Labor Disputes

Although it is hardly likely that in this election year Congress will face up to the crisis situations caused by the recurring severe strikes directed against the transportation industries, the fact is that more members of Congress think that some way just be found to solve a labor dispute before permitting the public to suffer the hardships of a crippling strike. The time has come when the public interest far outweighs those of the aggrieved parties and at least one prominent union head has hinted that a new mechanism for settling labor disputes should be found.

The development and implementing of new transport technology is related to the labor situation in many ways and the advances made by this technology could very well be negated unless a realistic approach is taken by transport labor. Just recently, for instance, the president of one of the nation's largest transportation companies said that the most serious problem his industry is facing is how to realize the increased productivity of labor which is now possible under existing technology but which cannot be achieved because of restrictions in existing labor agreements. And the startling fact, this president says, is that the industry could afford substantial wage increases over even the present levels if the industry were free to make corresponding increases in the productivity of its workers.

Illegal For-Hire Trucking Enforcement

Not all transportation problems are being handled at the Federal level. In fact, the ever-present problem of illegal for-hire trucking operations is one that will require even more state action in the future. In addition, highway enforcement will entail far more cooperation between the states and Interstate Commerce Commission (for highway economic enforcement) and the Department of Transportation (for highway safety enforcement). A law passed in 1965--with strong TAA support--authorized the state utility commissioners to establish standards for all to follow in dealing with enforcement in this problem area. It also authorized ICC-state (presumably DOT-state) cooperative agreements in highway enforcement. Forty-one states have already signed up. Possibly this technique could be followed in other areas where greater uniformity in state rules and regulations is desirable.

User Charges

The Administration is expected to make a strong bid in this Congress for passage of legislation designed to recoup a greater share of Federal funds expended on various Federal transport improvement programs. This will be especially true for more airway user charge to help pay for the Federally provided air navigation aids, where considerable industry agreement has been achieved through TAA channels.

There is also talk about increasing the air user charges to help pay for an expanded Federal aid airport program and aviation research activities. Features of this program will be strongly opposed by various interests.

Motor Vehicle Sizes and Weights

Continuing financial pressures on the Federal Government indicates a strong effort to boost highway user taxes, especially those on larger trucks. At the same time a legislative drive will get under way, with probably Administration support, to authorize states to increase motor vehicle size and weight limits on the 41,000-mile Interstate Highway System. This highway network connects the nation's key urban and industrial centers and is being modernized to handle at least 20 percent of the nation's rapidly growing highway traffic up through the year 1975. Washington information indicates that if increases are agreed upon in both areas--user charges and vehicle limits--the chances are good that some changes will be authorized.

Passenger Train Discontinuances

Here we have a situation where the realities of economics are having a devastating effect on the railroads. The nation's railroads lost a total of \$420 million last year on their passenger service yet efforts are being made in Congress which, if successful, would make it far more difficult for railroads to remove such costly services. The railroad, freight shippers and other groups, concerned about having to subsidize the unprofitable passenger service, understandably are opposing this more and can be expected to continue to do so.

Deregulation

Towards the latter part of the last session of Congress, legislation was introduced in the Senate which would, if enacted, liberalize regulations of certain rate restrictions on railroad rates. In effect, railroads would be free to reduce rates such more easily on bulk commodities, but would in turn become subject to general anti-trust restrictions. Needless to say, the proposal is a lively issue within the industry and marked differences of views can be anticipated from shippers and various carrier groups during the hearing that are expected to take place in this session.

Conclusion

These, then, are some of the transport issues currently standing tall before the transport business community which the Congress will probably

wrestle with this year. Prognostications as to the outcome would be futile at this point because much depends on the pace and mood of the Congress faced, as it is, with a national election in the fall. Yet they do set the stage for the many legislative challenges that will surface in the next ten years. Unfortunately, these are the challenges that cannot be met by push-button tactics. This is the point where technology leaves off and the human element must prevail.

The magnitude of the problems and challenges that lie ahead in the field of transportation may cause one to ask whether in fact we have it within our power to adequately deal with these matters. There is little doubt in my mind that these challenges can and will be met--provided, first of all, that the diverse industry transport leaders will continue to sit down in statesman-like fashion to tackle and resolve the fundamental national policy issues which confront the industry, and secondly, provided that the government transport establishment especially DOT--cooperates with industry to get the job done.

Such cooperation is the only sure way to keep the door open for continued transport development. The potential is there. Given the opportunity to adequately finance and apply new technology, all modes will be able to assure the public and shippers excellent transportation for the future--the best system in the world--the only free enterprise system in the world.

HIGHWAY TRANSPORTATION IN THE 1970's

E. Grosvenor Plowman*

This discussion will treat this important aspect of transportation as a whole, from four major angles or points of view. If you think of the WHAT, WHO, HOW, AND WHY of highway transportation in the 1970's, the following general topics of questions emerge, and these will be the basis for this presentation:

1. What will highway transportation technology, including the highway itself, be like in the 1970's?
2. Who will use the highways of our nation in the 1970's to generate miles of useful transportation?
3. How will the highway traffic thus generated be handled in the 1970's for safety, efficiency and economic goals?
4. Why will the 1970's see social aims other than economic enter into calculations of cost-benefit ratios?

The United States already has an excellent network of main, secondary, and local highways. By the mid-1970's this network will justify the characterization as superb. This does not mean that all of it will consist of limited-access divided highways. These are the main lines. They need the vast feeder system of local and secondary highways that assembles traffic for them and that distributes traffic from them.

The 41,000 mile system of limited-access divided highways will be completed in the early 1970's. What form its further development will take is already being studied by the states and the Federal Department of Transportation. There will be some additional end-to-end route miles to fill gaps and to recognize changes in the trend of population or industrial growth or to meet criteria not used in the original planning. The result by the end of the 1970's will be a main highway pattern similar to the main lines of the major railroads or the air routes between major cities.

Alraady the need for access roads is evident. Suburban shopping centers, industrial districts in new locations, and airports all generate traffic that wants to use the main-stem highways. The government thinking for years was that access roads were a local problem. The first break-through came with the suburb-to-downtown limited-access highway, which quickly became also an

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efficient route to and from the 41,000 mile highway in its by-pass location near but not through the heart of the metropolitan area. I am sure that in the 1970's the concept of access roads that tie in with the 41,000 main-line system of highways will broaden to cover airports, major shopping centers and industrial parks or districts and major recreational areas such as ocean beaches, lakes and winter sports areas.

Already the 41,000 mile system with its prospective and actual access or branch lines to and from major traffic generating centers is changing the concept of the automotive technology that will be needed in the 1970's. I refer to the mini-car or the electric vehicles of the 1970's for urban travel versus the intercity automobile capable of sustained high speed for long period of time. There will be mini-buses for urban uses and giant intercity buses. There will be urban trucks for local delivery and the small tractor with single trailer on secondary roads. The addition of access roads of high-standard will encourage the development of automobiles, buses and trucks that will spend most of their time and generate most of their miles on the pavements of the 41,000 mile system and its high-standard connecting branches.

Despite reliable and highly accurate signalling and other safety measures on railroads, trains still become involved in wrecks. There is no such thing as a completely safe design for a highway or for its vehicles. However during the 1970's there will be long steps towards safer highways and safer vehicles. This combination should result in death and injury rates as well as the cost of equipment and road damage to come down when measured against a fixed base such as per million miles of vehicle travel, thus removing the effect of growth in vehicle population.

As the number of high-speed vehicles on the main highways and their high-standard branches or access roads increases during the 1970's the need for devices not dependent on human eyes and brain reactions for spacing vehicles will become critical. The present three specialized lanes system is already proving inadequate under congestion and/or emergency conditions. My own thinking leads me to suggest a constant speed lane for automobiles and buses, a constant speed lane for trucks, a slow speed entry-exit lane used also by slow cars and/or trucks and a fourth emergency roadside parking space or lane. This plan would require some type of spacing control such as by means of a wire buried in the road surface that would prevent the constant speed vehicles from getting to close together. Naturally the point I am making is not to advocate a particular procedure or device, but to use my own thoughts to exemplify this need.

The wheel has had over 3000 years of usefulness as one of the foundations of civilization. Modern inventors and innovators seem determined to find substitutes and to make them practical, such as the air-cushion vehicle and the piston-like cylinder moved through a pipe-line. These experiments will continue throughout the 1970's, but in my belief will have little effect upon the role of the highway and its millions of wheeled vehicles

On the other hand, intermodal vehicles and off-street vehicles already are having their effect on the design and use of highway vehicles and of the

highway itself. Off-street giants carrying 40 ton loads at 20 miles an hour over primitive pathways certainly raise questions as to why public highways cannot carry heavier payloads at controlled slow speed in larger vehicles. Military movements of large and long items also raise questions as to the vertical clearance standards of so-called super-highways. I believe the 1970's will see progress towards at least one East-West and one North-South highway with unlimited vertical clearance.

The most important intermodal vehicle of the 1970's will be the container and its cousin, the highway trailer. The trailer can carry cargo between any origin and a railroad yard, but at the rail transfer point should shed its undergear and move as a container. Similar transfers can take place in any desired combination between highway and air or highway and water without transfer of lading and with through billing. Right now the container has had a boom type of growth, particularly for ocean movements. The reaction against overdoing may already have set in. By the 1970's this reaction will have run its course and the container will be well established as an intermodal vehicle.

The numerous kinds of automotive equipment now using the nation's rural highways all will continue in use during the 1970's. Many of them will increase in numbers. All of them will increase in usefulness as the result of highway improvements including closing of gaps that often are today's bottlenecks, and construction of access roads. The station wagon is the major example of a convertible vehicle today, useful at the same or different times for passengers or cargo. Quick-Change aircraft also now serve to carry passengers during the day and cargo at night when there are few passengers. Perhaps local delivery trucks will in the future double as school or rush hour buses. Of real importance to the rural highway and its role in the 1970's is the use of the tractor and single trailer combination for travel over secondary and local roads, including city streets, and the coupling together of trailers into trains for movement over the super-highways and their high-standard branches. The double-bottom or two-car train already is in common use and the triple-bottom has progressed beyond the experimental stage. If there is a constant speed truck lane on a super-highway in 1975, for example, I believe it will be used by truck trains with three, four or as many as six trailers hauled by a single powerful tractor serving as locomotive and crew quarters. At intervals along the highway there would also have to be truck yards, where trailers would be coupled together or would be uncoupled for movement as tractor-single trailer units.

At present two points may be made with respect to truck carriage of cargoes on rural highways. First is that the legal aspects of trucking have produced varied types of cargo carriage, from private operation to rather rigid and complete economic regulation, to which proliferating variety must be added intrastate and interstate definitions and regulations. Second is that this variety is permitting private, exempt, cooperative, grey area and illegal trucking to handle cargo in their backhaul direction that otherwise would move in common carrier railroad freight cars or common carrier trucks. Particularly hard hit by this trend is the intrastate common carrier by rail or truck. My explanation of this fact is that it is similar to the problem

of the urban bus that finds any fare higher than out-of-pocket costs of operating an automobile drives away traffic. Intrastate backhauls are normally relatively short and are today competed for down to 'gasoline money' levels.

By the mid 1970's, common carriers by truck may have come into balance with their traffic, by abandoning unprofitable intrastate service to small communities, by side-by-side and end-to-end mergers, and by soliciting and handling only the relatively large single shipments, for example by means of the cargo cage or the container, for relatively long distances. This trend has already wiped out much of the small community bus services because they could not compete with the private automobile on the one hand and often could not spare good equipment for profitable charter trips which could and were handled by large bus companies from their reserve pool of equipment.

The above discussion certainly suggests that the very nature of government management of highway traffic may change within the next ten years. Constant speed traffic lanes with very limited right to change lanes in order to pass other vehicles is an example already cited. Another change that may have begun in the 1970's is to restrict the highly efficient super-highway trucks to the super-highway type of road including branch or access roads that reach airports, truck terminals, or downtown bus stations. Local delivery would then require the use of urban types of smaller trucks, including trucks that would carry two 20 foot or one 40 foot container from road-haul truck to destination platform.

Driver logs and other paper records of truck movements have little value for today's enforcement officers. They may have been written up to conform with the regulations, not the facts. They may be thrown out by courts as inadmissible testimony. By the 1970's the development of electronic transmission to and from computers will have made it possible to substitute less uncertain records by providing at intervals along a highway little stations where the driver's card transmits information to a computer from the truck and activates the receipt of government or carrier company instructions or information for driver use.

Truck traffic is becoming less efficient because of the delays waiting for loads or waiting to unload. This type of inefficiency is only partly cured by leaving the trailer without its tractor at a plant or warehouse or terminal. Trailers then become more like freight cars, which have always spent most of each day standing still. This waiting time type of transportation cost hurts the pocketbook of the itinerant trucker who owns his own tractor and trailer and who moves from place to place carrying loads or hunting for loads. The long strike of the so-called steel haulers was, in my belief, the first step towards rigid and enforced waiting time penalties. In the 1970's this problem of today will have become a regulatory system. Whether such a system of waiting time penalties against the shipper and/or receiver will help the now ailing intrastate truck common carrier is still conjectural.

Cost benefit ratio is a pleasant sounding term for an estimate intended to prove that the benefits to public and/or private interests as a whole exceed the public outlays or costs. Since the computation often must be based on sampling of benefits and faulty projections into the unknown future, the results are inadequate subject to discount as statistically unsound. Nevertheless the technique is rather widely used in judging public expenditures for transportation projects, including highways. Statistical oddities that are common at present and that need correction, for example, compare present railroad freight rates with projected future freight rates attainable by the mode of transportation other than rail; or claiming as a benefit the increased valuation for tax purposes of property abutting a new highway without subtracting the losses of taxable value due to the shift of traffic away from the formerly used highway.

In the 1970's and as applied to Federal expenditures for highways, the availability of the computer and improvement towards use of sound statistical methods will, I believe have made the cost benefit ratio a more accurate and useful aid to decision-making by Federal and state highway agencies. This is important not only in terms of present-day largely economic criteria that enter into today's calculations of cost benefit ratios, but because of the additional and less tangible criteria that are being added. I conclude by stating these new social criteria in the form of questions. Their application to highway transportation in the future is indisputable.

1. One of the new social aims of highway designers is that they must be scenic, inherently attractive in appearance, and equipped with facilities such as camping sites to attract hunters, hikers and other vacation users. How can the cost benefit ratio of an additional circuitous mile of super-highway, planned thus for scenic reasons, be measured against the added operating cost to trucks?
2. Another social aim is to provide modern highway transportation facilities to open up 'backward' rural areas, thus making it possible for low-income families to find employment in relatively distant urban areas, or in new local industries made economic by the better highway and low-cost trucking. How can the cost benefit ratio of this 'catalytic' effect of modern highways penetrating backward areas be measured and justified?
3. It now seems to have been proved that no matter how many private automobiles there are in use, there is always a small group of citizens who do not have ready access to an automobile. These are older people who are entitled to Medicare, or young people unable to find work locally. Some of this type of problem is found in the 'shoestring' low-cost housing along rural roads. How can the cost benefit ratio involved here be calculated? Would a negative ratio mean that nothing should be done, or that subsidized transportation mobility must be provided?

Plowman in response to questions from the audience:

As for developing further there is no question but that TOFC will. I have no doubt whatsoever that the designers are going to find ways of separating the trailer body from the underchassis. It will be much less expensive than today's ways and that the trailer body in effect will become the freight car of the future. It will be the substitute for the boxcar, the substitute for present van trailers, and possibly also the substitute for gondola trailers. Whether it becomes a substitute for a flat bed trailer is a technical question that I have not heard adequately resolved as yet.

Most of the tollroads as I understand it are approved segments of a network at the present time. By an accident, a financing accident, they were not financed in the same way as the rest of the roads. I have heard and I am now talking completely heresay, I have heard two entirely viewpoints expressed with respect to tollroads. One viewpoint is that as quickly as possible the Federal government should find a way to pay the bond holders off. I am speaking now of those that have been approved as part of the 41,000 miles. Pay them off and make them truly part of the 41,000 miles. I also hear the opposite rumbling, and that is, that to the extent that the highway trust fund may be inadequate in any particular year or term of years for further construction; there may be a demand that the tollroad method is a quicker way to build a particular road. So I am between the devil and the deep blue sea. I don't know which way it is going to go. I can tell you that as an individual, I would rather have the Federal government pay the tollroad bonds off and put them all in the 41,000 miles and have only one system of financing. I know that in my part of the country the tollroads are in the 41,000 mile structure.

A large part of the 41,000 miles are now obsolete in terms of safety standards.

I do think we are moving in the direction of state uniformity between states and it is something that is so important. The poor truck driver who has the standards changed on him can scarcely be criticized for getting into trouble.

Any development of the highway trust fund into areas beyond A and to a very limited extent possibly into B would in my opinion be harmful at the present time. The very discussion that has taken place here indicates that in this very important subregion of the United States you are beginning to think about the necessity of suuding your own problem so as to have a viewpoint which is essentially non-political based on facts. I would much rather have the highway trust fund as far as possible in the group A activity.

I believe that with respect with group A type of highway that only qualified drivers and only qualified vehicles -- only drivers and vehicles that can conform to the standards will ultimately be allowed on the group A highways. With respect to group B highways, I feel quite different in that I think the problem there is primarily to driver education, but we are not going to have efficient use of the group A if we don't control them on the basis of entry.

INNOVATIONS IN AIR TRANSPORTATION: ECONOMIC
AND REGULATORY IMPLICATIONS OF THE 1970's

Gilbert L. Bates*

First, I want to thank the Upper Great Plains Transportation Institute of North Dakota State University, and specifically Dr. Nelson, for the opportunity on behalf of the Civil Aeronautics Board to participate in this conference. The Board is most anxious that members of its staff keep abreast of any knowledge or development which might directly or indirectly affect the air transportation industry. Attendance at and participation in conferences such as this are invaluable aids toward that end.

The subject assigned me "Innovations in Air Transportation: Economic and Regulatory implications of the 1970's" needs some expansion, in my opinion, particularly as to definition of the term "Regulatory". As many of you are aware I am sure, the CAB is charged with more than the regulation of air transportation in the best interests of the public. It also is charged with the promotion and development of air transportation. This promotional and developmental responsibility is one which is not shared by many other Federal quasi-judicial regulatory agencies. I am, therefore, expanding the term "regulatory" to include "promotion and development" as well.

At the outset, it should be clearly understood that there is a very close relationship between economic implications, on the one hand, and regulatory and developmental implications, on the other. When, in the first part of my talk, therefore, I discuss those innovations which carry with them certain economic implications, it should be recognized that almost invariably those implications include other implications for the regulatory, developmental and promotional processes of the CAB and other Governmental agencies. Similarly, and of equal importance, in my view, is the reverse of this statement, i. e. that almost any innovations which can be foreseen for the 1970's in the regulatory and promotional responsibilities of the CAB, and of other Government agencies whose actions may effect the air transport picture, will also carry with them significant implications for the economics of the air transportation industry.

An appreciation of the more significant innovations of the 1970's and their implications for the air transport industry, requires first, a knowledge of the principal characteristics of that industry as it has developed in the past. I assume most of you in this audience are familiar with the dynamic nature of our industry. This dynamism is apparent not only in the outstanding

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growth characteristics of the airlines, but also in the changing nature of various components of the industry.

The supplemental carrier portion of the industry resembles only remotely, in terms of number of carriers, equipment operated and nature of traffic carried, the supplemental carrier group of ten years ago. Similarly, the local air carrier industry, as created some 20 years ago was very little like the local or regional air carriers of today. Finally, the air taxi group of air carriers is increasingly active in carrying both commuter air passengers and air mail, roles which are a distinctly recent innovation.

Now as to some specifics of growth and trends in the changing nature of the carrier categories making up our air transportation system. The U. S. airline industry, for many years, has experienced a growth rate both in cargo and passenger traffic which has been several times that of the national economy. This growth rate has been at a very high level, both domestically and internationally, and in the past four years has shown a compound annual rate of more than 19 percent per year. In many ways this high growth rate is a real advantage. On the other hand, this growth carries with it many problems or growing pains, I assure you.

The certificated airline industry is currently generating almost \$7 billion in annual revenues, carries more than 130 million originating passengers and over 5 billion ton miles of cargo of which 1 billion is mail. Air transportation, without any question, at this point, is the major mover of people in longer haul journeys everywhere.

Accompanying this very high rate of growth have been changes in the roles played by various types of carriers. Significant portions of these changes have been made possible by the more or less continuous re-equipment programs of all our carriers. Introduction, for example, of the very efficient pure jet and jet-fan aircraft has enabled our supplemental carrier industry to achieve a reasonably sound financial status after more than ten years of rather chaotic development.

Ten years ago the supplemental air carriers were almost entirely dependent on the military for revenues and in general were not operating the most modern types of aircraft. In recent years their military dependence has diminished significantly as they have developed more and more civilian charter markets.

The availability of efficient, smaller jet aircraft to operate over relatively short hauls has enabled our smaller local service or regional carriers to reduce their dependence on Federal subsidy support and to expand their services into denser and longer haul markets. Most of these locals today carry more passengers, offer more service and are far larger in other respects than the large trunklines were 20 years ago. These regional carriers are becoming increasingly competitive with our trunk airlines.

The so-called air taxi type of operation, generally utilizing lighter aircraft, is becoming increasingly effective in serving the shortest haul markets, generally of the commuter type.

The airline industry, therefore, is in truth dynamic not only as shown by its near-explosive growth rate, but also by the changing roles of the carrier components making up the industry.

Many of the innovations which are foreseeable in the 1970's as having particular effect on the economics of the industry are at least implied in what I have said thus far concerning the characteristics of the industry's past growth.

First of all, in the opinion of most reliable forecasts, (including the ten year forecast published by the CAB staff three months ago) the 1970's will see a continued relatively high growth rate. Annual rates of increase of passenger traffic over the next ten years are forecast by many to average 10 to 15 percent each year, so that today's present passenger volume will approximate 400 million passengers by 1977, approximately a three fold increase. Most forecasters expect air cargo to increase at almost twice the passenger rate.

In addition, the current scheduled air carrier fleet of some 2,000 aircraft, including 1,000 which are turbine powered, is expected to total approximately 3,500 aircraft in ten years, virtually all of which will be turbine powered. Aside from the increasing fleet to be operated by the certificated airlines, the general aviation fleet, currently comprised of about 100,000 aircraft, will grow to a total of about 180,000 by 1980. Clearly then, high rates of traffic growth for both commercial and private air carriage will continue throughout 1970's.

Economic implications of this continued growth will vary, depending on the particular kind and location of operations. Inflationary pressures have existed for many years and have affected the unit cost trends of air carrier operations. It seems likely that such inflationary pressures on unit cost will be at least partially offset, as they have been in the past, by the operations of more efficient aircraft replacing obsolescent piston equipment. The new aircraft to be operated will be not only of the largest, longest haul variety, including the jumbo jets; but also will include more efficient short haul pure jets and turbo-fan equipment. Our air carriers will, to a greater extent than ever before, be offering services with equipment which has been designed for specialized missions-specialized in terms of both the haul and density of markets to be served.

The 1970's should see, in other words, greater operating efficiency resulting from aircraft operating at their near-optimum stage lengths and in optimum density markets as well. No one, in my opinion, can foresee, at this time, the precise net effects of the inflationary pressures, on the one hand, and the carriers' efforts toward greater efficiency, on the other, although one can be confident that the two factors will partially offset each other.

Another development of the 1970's which is an innovation, in one sense of the word at least, will, I am sure, be the continued expansion of our United States domestic and international route system. As additional routes

are certificated, more and more competition will result among the air carriers and more or less obviously, such new competition, both in extent and effectiveness, will have significant economic impacts.

Any discussion of innovations to take place in the 1970's having definite effects upon air transport economics, should include, of course, reference to air carrier mergers. There will, in my opinion, be more of these, although I anticipate no particularly sudden proliferation of carrier mergers in the future. In recent years there have been mergers involving the systems of some of our larger carriers, as well as those of our smaller carriers in the 48 contiguous states and Alaska.

Aside from actual carrier mergers there will, in my view, also be an increasing tendency toward joint maintenance and perhaps other kinds of joint operations by our air carriers. Because of the tremendous complexity and high cost of maintaining and operating the most modern aircraft now available and to come, two of our largest carriers have already agreed upon certain joint maintenance procedures. It is reasonable to expect, in my view, that we will see more of these in the 1970's.

I have mentioned earlier that the dynamic growth characteristics of the airline industry are by no means an unmixed blessing. This fact is demonstrated by the current airport congestion and access problem with its numerous economic implications. The problem, in its most serious aspects, is now largely confined to about half a dozen of our largest U.S. airports. Continued rapid growth of traffic and aircraft movements will, of course, extend this very serious congestion problem to many dozens of U.S. airports in the 1970's. A recent statement of our CAB Chairman, Charles S. Murphy, will serve to underline the seriousness of this problem.¹

The greatest threat to the continued healthy development of air transportation in the United States, is the prospective inadequacy of the airport system.

I do not believe that a satisfactory solution to the airport problem will be found until the Federal Government accepts the primary responsibility for getting the job done. This is more than a local problem or series of local problems. It is a national need--to provide a system of airports adequate to serve the needs of the interstate and foreign commerce of the United States. State and local authorities can and should continue to perform the major part of the job of constructing and operating airports--they can do this better than anyone else. Nevertheless, there must be a central responsibility for planning, encouraging, and assuring an adequate system of airports to meet national needs.

¹Statement of Charles S. Murphy, Chairman of the C.A.B. before the Subcomm. on Aviation, Comm. on Commerce, U.S. Senate, August 28, 1967, p.5.

Obviously, the future growth characteristics which have been mentioned - the re-equipment programs, the additional route certifications and intensifying competition, the mergers of air carriers and the problems of airport congestion and access - interrelate one with another, and each has direct and indirect economic implications for the 1970's. Just as obviously there are direct and indirect effects upon the promotional and regulatory work of the CAB and other Government agencies concerned with air transportation. If the promotional and regulatory effort is sufficiently enlightened and succeeds in anticipating future problems such as these which affect the industry, the traveling and shipping public, and the taxpayers, it can minimize, perhaps, the adverse economic impacts and insure the adequate handling of these difficult economic problems.

Numerous examples of this kind of advance planning and anticipation exist at the CAB. I shall attempt to touch upon only two of them before discussing a separate innovation which will profoundly affect government promotion and regulation of air transport in the 1970's.

In the area of new equipment acquisition by the industry, one of the most significant new types is the Boeing 747 fan-jet transport, scheduled to carry something like 360 passengers per plane beginning in 1969, and to fly faster than the most advanced subsonic transport now flying. The CAB is in the process of studying, now, approximately two years in advance of the arrival of these aircraft, just what the economic effects will be upon the operations of the industry.

This study will attempt to identify the domestic and international markets which will probably be served by this highly productive aircraft and will attempt to identify the principal operational and financial effects which such introduction will bring. The successful accomplishment of this study will require not only the best efforts of the CAB staff and other interested government agencies, but also the cooperation of the airline operators and at least the consulting help and advice of the aircraft manufacturers as well. Hopefully, in other words, the study will provide for the Board a picture of the principal problems posed by the introduction of this new aircraft type and provide as well helpful guidelines for solutions to those problems.

The CAB is attempting in a variety of ways to anticipate innovations through its new route certification program. In the last few years, routes have been certificated for local service carriers which will provide them with a viable operation for their new, highly efficient and productive jet aircraft. The supplemental carriers have been certificated to provide needed service for the public in low fare charter services both domestically and internationally. Although CAB is not directly responsible, in an overall sense, for the solution of the airport congestion problem, it has, in an effort to relieve the serious congestion problem at least to some degree, awarded some routes to specific airports other than those which are highly congested. Additional cases with this avowed objective, affecting various areas of the country are pending.

A recent innovation with definite promotional and regulatory implications for the 1970's was, of course, the creation in early 1967 of the Department of Transportation. Clearly the creation of this new Department will have significant effects upon air transportation and upon other transportation industries. For a perceptive discussion of such effects, I commend to you the talk "Possible Impact of Department of Transportation on Air Transport" given by Member Whitney Gillilland, of the Civil Aeronautics Board on October 17, 1967 at the 21st Air Transport Management Institute, American University. Member Gillilland pointed out that under the new Department of Transportation Act,

the bolts and nuts of the regulation of an air transportation system remain undisturbed in the Civil Aeronautics Board¹ The Board continues to have promotional duties,² and to be required from time to time to submit recommendations to the Congress for additional legislation.³

Nevertheless, the Secretary of Transportation is by statute made an advisor to the President, and to the Congress, in air, as in other transportation matter.⁴ In the exercise of such duties he can be expected to materially influence the course of implementation of policy, legislation, and appropriations. He is entitled to appear before the Board,⁵ and it is specifically made the duty of the Board, in subsidy matters, to consider standards and criteria prescribed by him for determining the character and quality of transportation required for the commerce of the United States and the national defense.⁶

1 Department of Transportation Act. P.L. 89-670, 89th Cong.

2 Federal Aviation Act of 1958. Sec. 102.

3 Federal Aviation Act of 1958. Sec. 205.

4 Supra, note 1, Secs. 2 and 4.

5 Federal Aviation Act of 1958. Sec. 1001.

6 Supra, note 1, Sec. 8.

Later on in his discourse, Member Gillilland stressed that aside from participation by the Department of Transportation in Board proceedings, the new Department will contribute substantially in other significant areas.

Valuable though such appearances before the Board and other agencies may be, it is scarcely in this fashion that the Department may be expected to assert its greatest influence upon air transport. It is rather to be found in the exercise of leadership in such matters as the planning, espousal, and conduct of programs related to the location, construction and operation of, and access to airports, the development of advanced types of aircraft, high speed surface transportation, modal coordination, and the like.

Other views quoted by Member Gillilland also stresses the significance of the creation of the Department of Transportation. Senator Monroney of

Oklahoma, had this to say before the Transportation Workshop at the Grammercy Inn in Washington, D.C. in June, 1967.

The influence of the new Department of Transportation will be great. The Department's contributions to aviation and its efforts to coordinate air and other modes of transportation will determine air transportation future. The Department will unquestionably play the dominant role in solving air transportation's ground problems. It will be responsible for the development of a cooperative and coordinated surface transportation system connecting large, far-out airports to downtown areas, whether it takes the form of express highways, monorails, or subways. Somehow the Department must find a way to tie the airport to the community. The Department will also be responsible for developing a system of fast ground transportation to compete with short-haul aviation. Its work on the highspeed railroad in the Northeast corridor is a prototype.

The broad gauge nature of the functions of the Department of Transportation was also stressed in the House Committee Report on the Department's 1967 Appropriation Bill:²

The primary role of the new Department is seen as that of better coordinating the fragmented and somewhat wasteful separate modes of transportation and of guiding and stimulating the growth of the transportation system to fill the transportation requirements of the numbers of people predicted to be in the country in the years ahead. The coordination must be achieved without the destruction of the inherent benefits in competition between different modes of transportation. Such competition has been responsible for many of the gains in transportation efficiency thus far. The role of the new department will be in the area of helping to channel and guide much of the competition into productive rather than wasteful programs.

You are aware, I am sure, that except for the transfer to the new Department of Transportation of its investigatory function in the area of safety, the CAB retains those broad promotional, developmental and regulatory powers over air transportation which it has had ever since 1938. The Department of Transportation, however, will have significant contributions to make, not only in its participation in CAB formal economic proceedings, but also in the planning and anticipation of such innovations as those I have mentioned as occurring in the 1970's.

² H. Comm. R. on Department Appropriations Bill, 90th Cong. 1st Sess. 3 (1967).

In conclusion, it would appear that even the innovations of the 1970's which I have mentioned are many and basic, and will affect both the economics of the air transportation industry and the promotion, development and regulation of that industry. I make no claim that the innovations I have mentioned comprise, in any sense, an all-inclusive list. I hope it is apparent from even my limited list, that the problems posed in the 1970's are going to be difficult from both the economic and regulatory points of view.

There are solid grounds for optimism, however, despite the multitude and complexity of the problems which we are facing. First a great variety of difficult problems, somewhat similar to those ahead, have been solved with considerable success in the past. I assume we would all agree that the air transportation system provided by U.S. air carriers in this country and abroad is second to none from the standpoint of service provided and the price paid for that service by the traveling public.

In addition to these past significant successes, additional grounds for an optimistic view of the future are the increasing availability of significant facts relating to air transport problems and the increased facility with which plans to deal with known future problems can and are being discussed by everyone involved. The air transport industry itself, government regulatory bodies, and leaders of the manufacturing and financial communities are increasingly making the relevant facts available and exchanging analyses and judgments designed to solve the problems.

The innovations of the 1970's have many varied and serious implications for the economics of air transportation and for its successful promotion and regulation. Continued access to the most significant facts, and unlimited opportunities for intelligent discussions of those facts and of their implications, however, augur well for the future, and provide ample basis for optimism that solutions in the best overall interest of the public will be found.

Bates in response to questions from the audience:

I think up to a point this thing of offering single plane service to entire United States points is a very good idea, and I am sure up to a point it would be encouraged by the Board. On the other hand, the history of aircraft changes in the air transportation business seems to indicate to me at least that this kind of service will be of only limited duration. Very recently one of our examiners of the Board came out with his recommendations in the so called United States-South America case. In that case one of the questions was whether existing interchanges between Chicago and other points to New York, Washington, and many points to South America by two or three carriers should be continued. The record which the examiner developed in that case was complete with evidence that the lack of single carrier responsibility for such annoying little matters as lost baggage, being charged the wrong amount on your ticket, and so on, created a tremendous problem. Therefore, the examiner gave the back of his hand in that effect to any serious consideration of a continuance of an interchange agreement. I would say the Board is aware of the fact that perhaps to an unfortunate extent, air transportation service internationally has been and is today still too much like the historic ocean service. Departure from New York is to the exclusion of many substantial significant interior point such as Minneapolis, Chicago, St. Louis, Kansas City, and the like. Rather than regard the Northwest proposal as something which will be a long term significance and practical, therefore, my guess would be that once the traffic from Minneapolis and the surrounding territory from which it would draw passengers develop to the point where single carrier, perhaps nonstop service would be a practical matter. The interchange would be discarded. In the meantime, however, the Board has in the past authorized two and three interchanges and I am certain I would look at this one very carefully.

I think it is pretty obvious that if you have one airplane carrying 350 people there is less congestion on the airways than if you had say four airplanes carrying 90 people apiece.

That holding pattern of problem and related problems is mentioned a hundred times for every once that the enroute problem is mentioned so of the two I would think that certainly the airport congestion problem as defined as to include holding patterns and so on is the more serious. This will have to be solved first. As to the second part, and I just want you to know that I too recognize that this is a hot potato should general aviation be removed from or not allowed to operate two airports. There are so many aspects of that that frankly, I am not going to answer that one positively. My thinking goes something like this. I don't think anyone can argue seriously that the needs of private flyers, including not only the vision that comes to my mind when I think of a private flyer which is somebody in a breech bonanza or a smaller aircraft basically on a pleasure hop. That person, it seems to me, cannot be regarded as much importance as the needs and requirements for prompt service for 350 people in an airplane. This is one of those difficult areas where the best is good for the greatest number or something like that. On the other hand,

some good friends of mine have assured me that a substantial part of this problem could be solved if the airport authorities were a little bit more aware of possibilities they have of accomodating general aviation aircraft on other than the main runways. Now I can't remember the specific runways but a friend of mine from the New York port assured me that they were taking care of lots of general aviation aircraft by simply having them land in what used to be an old taxi strip at LaGuardia and Kennedy. Part of the consideration of people who are working on this problem of airport congestion relates to having a different scale of airport landing fees than ones which have historically been the mode of the day in this country. In England and elsewhere there is no flat prohibition against general aviation aircraft landing at the London airport as I understand it. On the other hand, any private flyer who trys to land there has so many cost and operating certificate requirements to fulfill and abide by that as a practical matter (and there is a different scale of landing fees at peak rush hours than there is very late at night or in the middle of the morning) they have made the regulation tough. In other words that as a practical matter there is very little general aviation flying done at the London airport. This is one of the things that is being seriously considered, a sliding scale of landing fees, very high landing fees during a peak period of operation.

For the carriage of most mail and most mail moves by air, this includes both airmail and first class mail, the CAB does have the responsibility for setting the mail rate. The method of setting that rate has changed off and on over the last 20 years. As I understand it the yield to the carrier for the current rate per ton mile for the domestic trunklines is something like 28 or 29 cents a ton mile. As I am sure you are aware there is a two part element to this much for a lift for the mail and so much for the enroute part of the mail rate. It was formally so devised that between any two points all carriers receive the same rate bearing with the density of total tonnage at a particular airport. I am aware that recently the post office has substantially increased the number of carriers and the number of routes for the carriage of mail and in some cases first class as well as airmail. This is as I understand it, part of a planned program of the post office to finally reach that happy day, as most people refer to it, when all mail which can be expedited by going by air will in fact go by air. This has included, I believe, not only local service carriers, certificated by the Board, trunk lines certificated by the Board, and also some air taxi operators. The Board looks at it with the post office department and each one of these new rates are set by the post office.

I think the local air carrier subsidy will continue to decline. I think you will find that if you look at the release of the Board's, the subsidy has in fact declined more less steadily since the year 1963. It has not gone down as fast as the local carriers themselves would have liked it to have gone down nor as fast as Congress and the Board would like to have it gone down. It's been going down at the rate of 4 or 5 million dollars a year since that time. As for the future, I think it will continue to decrease unless all their estimates are off and off substantially. The reason I believe it will go down is that for the first time the local service carriers now are carrying a sufficiently dense type of traffic. So that now for the first time in the past 20 years of their existence they really efficiently operate modern aircraft. This circum-

stance together with facts that the manufacturers have made aircraft such as the DC-9 the 737 is about to be made available; 727 to a lesser extent because that is just a real big airplane in my opinion. For the first time the locals do not have to comprise and operate a single aircraft type which is good for just the lightest segments (such as the DC-3) but not worth a darn for their most heavily traveled segments. This has been a development which has taken place only in the last 3 or 4 years. Now because of that, I say what I do about subsidy continuing to decline.

The Board, as you may or may not be aware, is increasingly certificating the local service carriers into denser haul routes. Frontier with its Denver-St. Louis route and Allegheny-Pittsburgh-Philadelphia-Bonanza between Los Angeles, Salt Lake City and so on. The locals are finding that competing with the trunklines, is not an easy matter. If the markets that they are trying to penetrate and compete in are included among the top half dozen of a trunkline system. I do not believe that trunkline is going to lie down and roll over and say "be my guest", but because they (locals) have the equipment to do it with that I am convinced that all of them want to get off that the subsidy is going to go down. I don't believe that all of them (every place on their system) will ever be completely subsidy free. But rather than talk about 55 or 56 million dollars a year that we tax payers have to pay, I can very easily see that within the next five years it might be down to 20 or 25.

THE PUBLIC REGULATORY BODIES:
ECONOMIC FUNCTIONS AND POLITICAL FUNCTIONS

Murray Edelman*

The policies and the politics of regulatory commissions are usually studied, evaluated, and criticized in the light of the economic effects of their activities. We see Interstate Commerce Commission decisions regarding rates and services as grants to railroad carriers, for example, of some of the benefits they seek or as protections or denials of protection to passengers and shippers. It is now recognized by political scientists that regulatory commissions serve political functions as well, in the sense that they reassure large groups of anxious people that their interests are being protected and so help allay political restiveness and discontent. This paper, based upon some of my previous writings,¹ deals chiefly with these less widely recognized political functions and suggests some ways in which the economic and the political functions of regulatory commissions complement each other. Repeatedly, commission activity has served this political end even though it was much less clear that it had the promised impact upon price and upon the economic welfare of unorganized groups, such as passengers particularly and consumers generally.

To suggest this is certainly not to imply that government or management officials typically use regulatory commissions to mislead the public. On the contrary, these officials, being representative in some sense of their constituents, no doubt share their anxieties, expectations, and assumptions about organizational acts and tactics and are typically eager to prove to themselves as well as their constituents that their work is worthwhile. Because the causes, and even the extent, of economic changes are so difficult to know, it is natural enough to assume that the programs one has worked on have been effective. If they have brought few significant gains, it is always possible that they have prevented significant losses that would otherwise have taken place. Regulatory activity can be explained only if we understand the role it plays in the larger political process.

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¹The paper consists largely of excerpts and paraphrases from the following: Murray Edelman, The Symbolic Uses of Politics (Urbana: University of Illinois Press 1964), Chap. 2, 3; Murray Edelman and R. W. Fleming, The Politics of Wage Price Decisions (Urbana: University of Illinois Press, 1965), pp. 308-311.

A clue to the political functions of regulatory bodies can be found in a number of recent studies that have detected a distinction between instrumental and expressive political acts.² These studies deal with different fields of public policy and do not use a uniform terminology to describe their findings, but they agree on some basic conclusions that help clarify the problem posed here. These can be summarized briefly. Some political actions demonstrably win tangible benefits for interest groups: money or other resources. Other actions, just as strongly supported politically, bring symbolic or intangible benefits: assurance that a group has social status, or reassurance that a group is being protected by the state from a widely feared threat. When a relatively small group pursues concrete political objectives and is organized to exert sanctions as a means of achieving them, it is likely to win tangible benefits. When a large mass feels threatened by developments over which it has little or no influence, it is likely to be easily manipulated and to be placated by gestures that bring little tangible benefit but do serve as reassurance.

In areas characterized by or believed to be characterized by oligopoly or monopoly, interests in symbolic reassurance are especially strong and especially easy to satisfy. There are fears that those with high concentrations of economic power will exploit those who are not organized. The mass public therefore looks avidly for acts of public officials that promise to protect their interests in these unchartable and hazardous waters. Because they are anxious and because it is so hard to know what the real influences upon rates and services are, they will usually interpret ambiguous acts and gestures as promising to give them the benefits they want. It is a long-established principle of psychology that in an ambiguous situation, men supply their own perceptions to suit their interests and psychological needs.

If the regulatory process is examined in terms of a divergence between political and legal promises on the one hand and resource allocations and group reactions on the other hand, the largely symbolic character of the entire process becomes apparent. What do the studies of government regulation of business tell us of the role and functions of that amorphous group who are affected by these policies, but who are not organized to pursue their interests? The following generalizations would probably be accepted by most students, perhaps with occasional changes of emphasis:

(1) Tangible resources and benefits are frequently not distributed to unorganized political group interests as promised in regulatory statutes and the propaganda attending their enactment.

²Harold D. Lasswell, Psychopathology and Politics (New York: Viking, 1930); Ulf Himmelstrand, Social Pressures, Attitudes, and Democratic Processes (Stockholm: Almqvist and Wiksell, 1960); Murray Edelman, The Symbolic Uses of Politics, op. cit.

This is true of the values held out to (or demanded by) groups which regard themselves as disadvantaged and which presumably anticipate benefits from a regulatory policy. There is virtually unanimous agreement among students of the anti-trust laws, the Clayton and Federal Trade Commission acts, the Interstate Commerce acts, the public utility statutes and the right-to-work laws, for example, that through much of the history of their administration these statutes have been ineffective in the sense that many of the values they promised have not in fact been realized. The story has not been uniform, of course; but the general point hardly needs detailed documentation at this late date. Herring,³ Leiserson,⁴ Truman,⁵ and Bernstein⁶ all conclude that few regulatory policies have been pursued unless they proved acceptable to the regulated groups or served the interests of these groups. Redford,⁷ Bernstein,⁸ and others have offered a "life cycle" theory of regulatory history, showing a more or less regular pattern of loss of vigor by regulatory agencies. For purposes of the present argument it need not be assumed that this always happens but only that it frequently happens in important cases.⁹

(2) When it does happen, the deprived groups often display little tendency to protest or to assert their awareness of the deprivation.

³E. Pendleton Herring, Public Administration and the Public Interest (New York, 1936), p. 213.

⁴Avery Leiserson, Administrative Regulation: A Study in Representation of Interests (Chicago, 1942) p. 14.

⁵David Truman, The Governmental Process (New York, 1951), Chap. 5.

⁶Marver Bernstein, Regulating Business by Independent Commissions (New York 1955), Chap. 3.

⁷Emmette S. Redford, Administration of National Economic Control (New York, 1952), pp. 385-386.

⁸Bernstein, op. cit.

⁹In addition to the statements in these analytical treatments of the administrative process, evidence for the proposition that regulatory statutes often fail to have their promised consequences in terms of resource allocation are found in general studies of government regulation of business and in empirical research on particular statutes. As an example of the former see Clair Wilcox, Public Policies Toward Business (Chicago, 1955). As examples of the latter see Frederic Meyers, "Right to Work" in Practice (New York, 1959); Walton Hamilton and Irene Till, Antitrust in Action, TNEC Monograph 16 (Washington, D.C., GPO, 1940).

The fervent display of public wrath, or enthusiasm, in the course of the initial legislative attack on forces seen as threatening "the little man" is a common American spectacle. It is about as predictable as the subsequent lapse of the same fervor. Again, it does not always occur, but it happens often enough to call for thorough explanation. The leading students of regulatory processes have all remarked upon it; but most of these scholars, who ordinarily display a close regard for rigor and full exploration, dismiss this highly significant political behavior rather casually. Thus, Redford declares that, "In the course of time the administrator finds that the initial public drive and congressional sentiment behind his directive has wilted and that political support for change from the existing pattern is lacking."¹⁰

Although the presumed beneficiaries of regulatory legislation often show little or no concern with its failure to protect them, they are nevertheless assumed to constitute a potential base of political support for the retention of these statutes in the law books. The professional politician is probably quite correct when he acts on the assumption that his advocacy of this regulatory legislation, in principle, is a widely popular move, even though actual resource allocations inconsistent with the promise of the statutes are met with quiescence. These responses (support of the statute together with apathy toward failure to allocate resources as the statute promises) define the meanings of the law so far as the presumed beneficiaries are concerned.¹¹ It is the frequent inconsistency between the two types of response that is puzzling.

(3) The most intensive dissemination of symbols commonly attends the enactment of legislation which is most meaningless in its effects upon resource allocation. In the legislative history of particular regulatory statutes the provisions least significant for resource allocation are most widely publicized and the most significant provisions are least widely publicized.

¹⁰Redford, op.cit., p. 383. Similar explanations appear in Herring, op. cit., p. 227, and Bernstein, op.cit., pp. 82-83. Some writers have briefly suggested more rigorous explanations, consistent with the hypotheses discussed in this paper, though they do not consider the possible role of interests in symbolic reassurance. Thus Truman calls attention to organizational factors, emphasizing the ineffectiveness of interest groups "whose interactions on the basis of the interest are not sufficiently frequent or stabilized to produce an intervening organization and whose multiple memberships, on the same account, are a constant threat to the strength of the claim." Truman, op.cit., p. 441. Multiple group memberships are, of course, characteristic of individuals in all organizations, stable and unstable; and "infrequent interactions" is a phenomenon that itself calls for explanation if a common interest is recognized. Bernstein loc.cit. refers to the "undramatic nature" of administration and to the assumption that the administrative agency will protect the public.

¹¹Compare the discussion of meaning in George Herbert Mead, Mind, Self and Society (Chicago, 1934), pp. 78-79.

The statutes listed under Proposition 1 as having promised something substantially different from what was delivered are also the ones which have been most intensively publicized as symbolizing protection of widely shared interests. Trust busting, "Labor's Magna Carta" (the Clayton Act), protection against price discrimination and deceptive trade practices, protection against excessive public utility charges, tight control of union bureaucracies (or, by other groups, the "slave labor law"), federal income taxation according to "ability to pay," are the terms and symbols widely disseminated to the public as descriptive of much of the leading federal and state regulation of the last seven decades, and they are precisely the descriptions shown by careful students to be most misleading. Nor is it any less misleading if one quotes the exact language of the most widely publicized specific provisions of these laws: Section 1 of the Sherman Act, Sections 6 and 20 of the Clayton Act, or the closed shop, secondary boycott, or emergency strike provisions of Taft-Hartley, for example. In none of these instances would a reading of either the text of the statutory provision or the attendant claims and publicity enable an observer to predict even the direction of future regulatory policy, let alone its precise objectives.

Other features of these statutes also stand as the symbols of threats stalemated, if not checkmated, by the forces of right and justice. Typically, a preamble (which does not pretend to be more than symbolic, even in legal theory) includes strong assurances that the public or the public interest will be protected, and the most widely publicized regulatory provisions always include other nonoperational standards connoting fairness, balance, or equity.

If one asks, on the other hand, for examples of changes in resource allocations that have been influenced substantially and directly by public policy, it quickly appears that the outstanding examples have been publicized relatively little. One thinks of such legislation as the silver purchase provisions, the court definitions of the word "lawful" in the Clayton Act's labor sections, the procedural provisions of Taft-Hartley and the Railway Labor Act, the severe postwar cuts in grazing service appropriations, and changes in the parity formula requiring that such items as interest, taxes, freight rates, and wages be included as components of the index of prices paid by farmers.

Illuminating descriptions of the operational meaning of statutory mandates are found in Truman's study and in Earl Latham's The Group Basis of Politics.¹² Both emphasize the importance of contending groups and organizations in day-to-day decision-making as the dynamic element in policy formation and both distinguish this element from a statutory language as such.¹³

¹²Truman, op.cit., pp. 439-446; Earl Latham, The Group Basis of Politics (Ithaca, N.Y., 1952), Chap. 1.

¹³I have explored this effect in labor legislation in "Interest Representation and Labor Law Administration," Labor Law Journal, Vol. 9 (1958) pp. 218-22

We are only beginning to get some serious studies of the familiarity of voters with current public issues and of the intensity of their feelings about issues; but successful political professionals have evidently long acted on the assumption that there is in fact relatively little familiarity, that expression of deep concern are rare, that quiescence is common, and that, in general, the congressman can count upon stereotyped reactions rather than persistent, organized pursuit of materials interests on the part of most constituents.¹⁴

(4) Policies severely denying resources to large numbers of people can be pursued indefinitely without serious controversy.

The silver purchase policy, the farm policy, and a great many other subsidies are obvious examples. The antitrust laws, utility regulations, and other statutes ostensibly intended to protect the small operator or the consumer are less obvious examples, though there is ample evidence, some of it cited below, that these usually support the proposition as well.

The federal income tax law offers a rather neat illustration of the divergence between a widely publicized symbol and actual resource allocation patterns. The historic constitutional struggle leading up the Sixteenth Amendment, the warm defenses of the principle of ability to pay, and the frequent attacks upon the principle through such widely discussed proposals as that for a 25 percent limit on rates have made the federal tax a major symbol of justice. While the fervent rhetoric from both sides turns upon the symbol of a progressive tax and bolsters the assumption that the system if highly progressive, the bite of the law into people's resources depends upon quite other provisions and activities that are little publicized and that often seriously qualify its progressive character. Special tax treatments arise from such devices as family partnerships, gifts inter vivos, income-splitting, multiple trusts, percentage depletion, and deferred compensation.

Tax evasion alone goes far toward making the symbol of "ability to pay" hollow semantically though potent symbolically. While 95 percent of income from wages and salaries is taxed as provided by law, taxes are actually collected on only 67 percent of taxable income from interest, dividends, and 15 fiduciary investments and on only about 36 percent of taxable farm income. By and large, the recipients of larger incomes can most easily benefit from exemptions, avoidance, and evasions. This may or may not be desirable public

¹⁴See Lewis A. Dexter, "Candidates Must Make the Issues and Give Them Meaning," Public Opinion Quarterly, Vol. 10 (1955-56), pp. 408-414.

¹⁵Randolph E. Paul, "Erosion of the Tax Base and Rate Structure," in Joint Committee on the Economic Report, Federal Tax Policy for Economic Growth and Stability, 84th Congress, 1st Session, 1955, pp. 123-138.

policy, but it certainly marks a disparity between symbol and effect upon resources.

These observations offer a basis for understanding more clearly what it is that different types of groups expect from government and under what circumstances they are likely to be satisfied or restive about what is forthcoming. Two broad patterns of group interest activity vis-a-vis public regulatory policy are evidently identifiable on the basis of these various modes of observing the social scene. The two patterns may be summarized in the following shorthand fashion:

(1) Pattern A: a relatively high degree of organization--rational cognitive procedures--precise information--an effective interest in specifically identified, tangible resources--a favorably perceived strategic position with respect to reference groups--relatively small numbers.

(2) Pattern B: shared interest in improvement of status through protest activity--an unfavorably perceived strategic position with respect to reference groups--distorted, stereotyped, inexact information and perception--response to symbols connoting suppression of threats--relative ineffectiveness in securing tangible resources through political activity--little organization for purposeful action--quiescence--relatively large numbers.

It is very likely misleading to assume that some of these observations can be regarded as causes or consequences of others. That they often occur together is both a more accurate observation and more significant. It is also evident that each of the patterns is realized in different degrees at different times.

While political scientists and students of organizational theory have gone far toward a sophisticated description and analysis of Pattern A, there is far less agreement and precision in describing and analyzing Pattern B and in explaining how it intermeshes with Pattern A.

The most common explanation of the relative inability of large numbers of people to realize their economic aspirations in public policy is in terms of invisibility. The explanation is usually implicit rather than explicit, but it evidently assumes that public regulatory policy facilitating the exploitation of resources by knowledgeable organized groups (usually the "regulated") at the expense of taxpayers, consumers, or other unorganized groups is possible only because the latter do not know it is happening. What is invisible to them does not arouse interest or political sanctions.

On a superficial level of explanation this assumption is no doubt valid. But it is an example of the danger to the social scientist of failure to inquire transactionally: of assuming, in this instance, (1) that an answer to a questioner, or a questionnaire, about what an individual "knows" of a regulatory policy at any point in time is in any sense equivalent to specification of a group political interest; and (2) that the sum of many individual knowings (or not knowings) as reported to a questioner is a cause of effective (or ineffective) organization, rather than a consequence of it, or simply a

concomitant phase of the same environment. If one is interested in policy formation, what count are the assumptions of legislators and administrators about the determinants of future political disaffection and political sanctions. Observable political behavior, as well as psychological findings, reveal something of these assumptions.

There is, in fact, persuasive evidence of the reality of a political interest in continuing assurances of protection against economic forces understood as powerful and threatening. The most relevant evidence lies in the continuing utility of old political issues in campaigns. Monopoly and economic concentration, anti-trust policy, public utility regulation, banking controls, and curbs on management and labor are themes that party professionals regard as good for votes in one campaign after another, and doubtless with good reason. They know that these are areas in which concern is easily stirred. In evaluating allegations that the public has lost "interest" in these policies the politician has only to ask himself how much apathy would remain if an effort were made formally to repeal the anti-trust, public utility, banking, or labor laws. The answers and the point become clear at once.

The laws may be repealed in effect by administrative policy, budgetary starvation, or other little publicized means; but the laws as symbols must stand because they satisfy interests that are very strong indeed: interests that politicians fear will be expressed actively if a large number of voters are led to believe that their shield against a threat has been removed.

More than that, it is largely as symbols of this sort that these statutes have utility to most of the voters. If they function as reassurances that threats in the economic environment are under control, their indirect effect is to permit greater claims upon tangible resources by the organized groups concerned than would be possible if the legal symbols were absent.

To say this is not to assume that everyone objectively affected by a policy is simply quiescent rather than apathetic or even completely unaware of the issue. It is to say that those who are potentially able and willing to apply political sanctions constitute the politically significant group. It is to suggest as well that incumbent or aspiring congressmen are less concerned with individual constituents familiarity or unfamiliarity with an issue as of any given moment than with the possibility that the interest of a substantial number of them could be aroused and organized if he should cast a potentially unpopular vote on a bill or if a change in their economic situation should occur. The shrewder and more effective politicians probably appreciate intuitively the validity of the psychological finding noted earlier: that where public understanding is vague and information rare, interests in reassurance will be all the more potent and all the more susceptible to manipulation by political symbols.

We have already noted that it is one of the demonstrable functions of symbolization that it induces a feeling of well-being: the resolution of tension. Not only is this a major function of widely publicized regulatory statutes, but it is also a major function of their administration. Some of the most widely publicized administrative activities can most confidently be

expected to convey a sense of well-being to the onlooker because they suggest vigorous activity while in fact signifying inactivity or protection of the "regulated."

One form this phenomenon takes is noisy attacks on trivia. The Federal Trade Commission, for example, has long been noted for its hit-and-miss attacks on many relatively small firms involved in deceptive advertising or unfair trade practices while it continues to overlook much of the really significant activity it is ostensibly¹⁶ established to regulate: monopoly, interlocking directorates, and so on.

Another form it takes is prolonged, repeated, well-publicized attention to a significant problem which is never solved.

The most obvious kinds of dissemination of symbolic satisfactions are to be found in administrative dicta accompanying decisions and orders, in press releases, and in annual reports. It is not uncommon to give the rhetoric to one side and the decision to the other. Nowhere does the FCC wax so emphatic in emphasizing public service responsibility, for example, as in decisions permitting greater concentration of control in an area, condoning license transfers at inflated prices, refusing to impose sanctions for flagrantly sacrificing program quality to profits, and so on.¹⁷

The integral connection is apparent between symbolic satisfaction of the disorganized, on the one hand, and the success of the organized, on the other, in using governmental instrumentalities as aids in securing the tangible resources they claim.

Public policy may usefully be understood as the resultant of the interplay among groups.¹⁸ But the political and socio-psychological processes discussed here mean that groups which present claims upon resources may be rendered quiescent by their success in securing nontangible values. Far from representing an obstacle to organized producers and sellers, they become defenders of the very system of law which permits the organized to pursue their interests effectively.

Thurman Arnold has pointed out how the anti-trust laws perform precisely this function:

¹⁶Cf. Wilcox, op cit., pp. 281, 252-255.

¹⁷Many examples may be found in the writer's study entitled The Licensing of Radio Services in the United States, 1927 to 1947 (Urbana, Ill., 1950).

¹⁸For discussions of the utility of this view to social scientists, see Arthur F. Bentley, The Process of Government (1908; New York, reprint 1949); Truman, op. cit.

The actual result of the anti-trust laws was to promote the growth of great industrial organizations by deflecting the attack on them into purely moral and ceremonial channels. . . every scheme for direct control broke to pieces on the great protective rock of the anti-trust laws . . .

The anti-trust laws remained as a most important symbol. Whenever anyone demanded practical regulation, they formed an effective moral obstacle, since all the liberals would answer with a demand that the anti-trust laws be enforced. Men like Senator Borah founded political careers on the continuance of such crusades, which were entirely futile but enormously picturesque, and which paid big dividends in terms of personal prestige.¹⁹

Arnold's subsequent career as chief of the anti-trust division of the Department of Justice did as much to prove his point as his writings. For a five-year period he instilled unprecedented vigor into the division, and his efforts were widely publicized. He thereby unquestionably made the laws a more important symbol of the protection of the public; but despite his impressive intentions and talents, monopoly, concentration of capital, and restraint of trade were not seriously threatened or affected.

This is not to suggest that signs or symbols in themselves have any magical force as narcotics. They are, rather, the only means by which groups not in a position to analyze a complex situation rationally may adjust themselves to it, through stereotypization, oversimplification, and reassurance.

There have, of course, been many instances of effective administration and enforcement of regulatory statutes. In each such instance it will be found that organized groups have had an informed interest in effective administration. Sometimes the existence of these groups is explicable as a hold-over from the campaign for legislative enactment of the basic statute; and often the initial administrative appointees are appointees are informed, dedicated adherents of these interests. They are thus in a position to secure pertinent data and to act strategically, helping furnish "organization" to the groups they represent. Sometimes the resources involved are such that there is organization on both sides; or the more effective organization may be on the "reform" side. The securities exchange legislation is an illuminating example, for after Richard Whitney's conviction for embezzlement, key officials of the New York Stock Exchange recognized their own interest in supporting controls over less scrupulous elements. This interest configuration doubtless explains the relative popularity of the SEC in the thirties both with regulated groups and with organized liberal groups.

¹⁹ The Folklore of Capitalism (New Haven, Conn., 1937), pp. 212, 215, 216.

Politics always involve group conflicts. For the individual decision-maker group conflict means ambivalence, and ambivalence can be described in behavioral terms as the concomitant taking of incompatible roles. Here is the key to the "game" theory of law enforcement just discussed. Enforcers and "enforced" alike assume both the role of the potential violator and the role of his victim. Out of their responses to such mutual-role-taking come the rules as actually acted out: the specification of the loopholes, penalties and rewards that reflect an acceptable adjustment of these incompatible roles. We know how "acceptability" is determined from many empirical studies of policy-making. It is a function of the sanctions available to the groups involved. Where one of the groups is organized, the rules as enforced, are likely to be rigged so as to favor it disproportionately. Those who administer the rules in such cases become in effect part of the management of the organizations they regulate, through role-taking.

Once the pattern of role-taking is established within an administrative agency it becomes self-fulfilling and self-reinforcing. This result occurs through the operation of a number of devices that students of organization have often observed; but they can be seen now as tied together through their joint function of maintaining the organization's course in line with its established role. First, there are clear value biases in hiring, in job applications, and in staff separations. This practice need not be deliberate, as it was in the TVA and NLRB of the thirties, both of which quite explicitly used adherence to the philosophy of their respective programs as a screening device. Many staff members voluntarily left the NLRB after the enactment of Taft-Hartley because of restiveness over the new promanagement role of the agency. Civil libertarians and criminologists interested chiefly in the rehabilitation of offenders are unlikely to apply for jobs at the FBI, or to be accepted or advanced if they do apply. Richard Nixon left the wartime OPA at one stage of his career because²⁰ he was uncomfortable in the liberal climate that prevailed in its offices, and many liberals sought or accepted jobs at OPA for the same reason.

A second consequence of the establishment of a clear pattern of role-taking is value contagion within the agency. Each staff member who works on a case is strongly tempted to emphasize or to soft-pedal premises in line with what he knows will please or displease the people scheduled to get the docket after him. This tendency of the group to encourage conformity has been established in experimental research,²¹ and it is observable in the agencies themselves as well by every employee or observer sensitive to it.

²⁰ See William Costello, The Facts About Nixon (New York, 1960), pp. 29-30, 39.

²¹ Muzafer Sherif, The Psychology of Social Norms (New York, 1936); Ralph M. Stogdill, Individual Behavior and Group Achievement (New York, 1959), pp. 78-81.

A certain number of staff members of every agency can expect to end their careers as employees or officers of the firms they are regulating, and the possibility occurs to every staff member. In some agencies, as in the FCC, government service is recognized as probably the best and most common training ground and channel for some kinds of private employment in the industry. Such an expectation is of course wholly compatible with the role-taking we are discussing, and inevitably reinforces it.²² Not only is the individual likely to assume the role of the group into which he eventually hopes to graduate; in a section or bureau in which such expectations are widely held, the work group will further encourage conformity to the group's values.²³

The status dysfunctions Barnard has catalogued and analyzed²⁴ contribute to the same pattern. The major consequence of these dysfunctions for decision making is that they lead subordinates to hesitate to call attention to premises that suggest the advisability of change in established policy. As the specialists most familiar with the relevant facts are likely to be hierarchial subordinates, the result is a bias in favor of continuing to apply established policies. Anxieties of superiors stemming from their awareness of their growing incompetence as specialists may lead them to ever more rigid insistence upon uncritical adherence to the roles and policies they know.²⁵

New premises disturbing to established roles may also be screened out by time consuming routine. When every staff member finds his day taken up in checking case dockets for routine problems and premises, there is likely to be no place in the organization as a whole for innovation. March and Simon refer to this phenomenon, familiar to every bureaucrat in an old-line agency, as a Gresham's Law: ritualistic routine minimizing the likelihood of energetic search for more satisfactory solutions.²⁶

Backing up all of these organizational supports of accepted roles are the agency's constituencies. We may take it as the key feature of any constituency that it can cripple or kill an agency. A congressman's constituency can fail to return him to office. Similarly, every administrative agency is at the mercy of specific groups which, given sufficient provocation,

²²See Henry W. Ehrmann, "French Bureaucracy and Organized Interests," Administrative Science Quarterly, Vol. 5 (March 1961,) pp. 534-555.

²³Stogdill, op. cit., pp. 59-119. Peter M. Blau, Bureaucracy in Modern Society (Chicago, 1956), pp. 53-57.

²⁴Chester I. Barnard, "The Functions of Status Systems," in Robert K. Merton and others, Reader in Bureaucracy (Glencoe, Ill., 1952), pp. 242-254.

²⁵Victor A. Thompson, Modern Organization (New York, 1961).

²⁶March and Simon, op. cit., p. 185.

can hurt or scuttle them. Occasionally, a private group is formally given such power; labor and management organizations showed that they had it by using it several times against the War Labor Board and Wage Stabilization Board. More often Congress, the President, and the courts are the only formal constituents of administrative agencies, and it is a rare bureaucrat who does not bear the fact constantly in mind.²⁷ Once he has found a pattern of action which is not disturbing to these constituents and lets them turn their attentions elsewhere, he will vigorously resist any change in the pattern, for he knows where survival lies.²⁸

Administrative agencies are to be understood as economic and political instruments of the parties they regulate and benefit, not of a reified "society," "general will," or "public interest." At the same time they perform this instrumental function, they perform an equally important expressive function for the polity as a whole: to create and sustain an impression that induces acquiescence of the public in the face of private tactics that might otherwise be expected to produce resentment, protest, and resistance. The instrumental function of administrative agencies, as defined here, has been observed, demonstrated, and documented by every careful observer of regulatory agencies.²⁹ This literature has nonetheless never successfully been used to challenge the widely held view and remains an esoteric facet of the study of economics and political science. The expressive function has received less attention from scholars, though the quiescence of masses in the face of demonstrable denial of what is promised them clearly calls for explanation.

Few if any norms are more deeply embedded in our culture, as verbal abstractions, than the two repeatedly cited as guiding administrative refereeing of conflict: that the weak should be protected from the strong and that conflict should be settled peacefully. Yet administrative surveillance over rival groupings commonly facilitates one of two quite different results: (a) aggrandizement by an organized group in the wake of symbolic reassurance of the unorganized; or (b) an alliance of the ostensibly rival groupings at the expense of "outside" groups. In neither case does the regulatory agency restrict claims backed by sanctions or referee a conflict. In both cases it becomes a psychologically and organizationally effective part of a political constellation which possesses potent private weapons already. Specifically, it becomes that instrument of the constellation whose function it is to allay outside political protest: to provide a setting of stability and predictability within which the organized groups involved can use their weapons with minimal anxiety about counterattack. It can perform this function better than any "private" group can do it because, as a public agency, it inevitably manipulates and evokes the myths, rituals, and other symbol attaching to "the state" in our culture.

²⁷Murray Edelman, "Governmental Organization and Public Policy," Public Administration Review, Vol. 12 (Autumn, 1952), pp. 276-283.

²⁸Truman, op. cit., pp. 467-478.

²⁹See Notes 3-8.

Implicit in this formulation is the view that the creation of an administrative agency in a policy area signals the emergence of a changed relationship between the groups labeled as adversaries. The agency, the regulated groups, and the ostensible beneficiaries become necessary instruments for each other while continuing to play the role of rivals and combatants. Careful examination of the nature of the change in their strategic positions clarifies the sense in which this proposition holds true. The establishment of a National Labor Relations Board, Interstate Commerce Commission, Federal Communications Commission, Office of Price Administration, or utilities commission constitutes assurance that none of the groups directly involved can push any temporary or permanent bargaining advantage to the point of eliminating the other. Certain messages are implicitly but clearly conveyed by the very creation and continued functioning of the agency, and the messages are solace for very anxious people. Unions will continue to exist as part of the American economic scene. Radio stations, railroads, airlines, and utilities will not be nationalized. Negroes will be protected in their use of economic and other weapons. Consumers are assured that the majesty of the state will protect them from the threat posed by powerful economic concentrations and sellers. In short, existing institutions are legitimized, permitting them to utilize their bargaining weapons to the full, if they have any, and to survive and comfort themselves if they have not.

To see vividly this function of an administrative agency it is helpful to consider the alternative: the situation prevailing before an agency is established in a policy area, or the situation that would prevail if an existing agency were magically abolished. We have had enough case studies of the political origins of regulatory agencies to be well aware of what is involved. A group with oligopolistic or other economic weapons at its disposal maximizes its gain, testing to learn how much the traffic will bear. This strategy creates adverse interests and anxieties: tensions and a need for their resolution on the part of both the predatory group and of its victims. Both need a definition of the situation: a legitimizing act which will remove uncertainty and the more serious anxieties in precisely the fashion I have just posited that administrative agencies do.

If the Interstate Commerce Commission, for example, were suddenly abolished, its function of maintaining and raising rates and legitimizing mergers and abandonments of service would have to be performed by the private carriers themselves. Potential customers would fear sudden and substantial changes; and the carriers themselves would fear strong public protest. Anxieties on both sides and anticipatory protest would create a degree of instability and tension that would have to be eliminated, very likely by the creation of an agency much like the ICC.

The assurance that all involved groups are legitimate and can participate at will in a joint ritual (more of administrative action as ritual shortly) constitutes a demonstration of symbiosis rather than bitter-end rivalry or parasitism. If one of the groups involved is unorganized, this is as far as the symbiosis goes. For the unorganized group the benefits are partly psychic and partly a guarantee of survival. They have the consequences for mass behavior already discussed.

For the unorganized the administrative activity brings a change from the role of potential victims to the role of the protected: ostensible shares with the regulated industry in the economic benefits together with a powerful showering of symbols suggesting that the new role is secure.

For those not immediately involved the same meaning is conveyed. Once it is assumed that an agency assures service and fair rates for consumers, protection of the industry against loss or destruction becomes a tactic in the protection of the industry's clients as well. A rate increase that would be rather obvious exploitation of these clients in a setting of economic infighting unrestrained by government is magically converted into help for the customers as well as the industry. Where the agency's functioning constitutes legitimizing of a claim on the national product, the same functioning symbolically involves both adversary parties as supporters of the claim. The commuter or airline passenger needs his transportation, and, by definition, the industry cannot now exploit him.

Administrative activity is effective in inducing a measure of wide acceptance of all the objectives symbolized by the agencies only because the mass public that does the accepting is ambivalent about these objectives. Its responses to events and speeches manifests both a recognition of the value of each function and anxiety about the self-seeking and predatory intentions of the economic groups profiting from them. The personification of the elements in such psychic tension, and resolution of the tension through an acting out of the contending hopes and fears, has always been a common practice in both primitive and advanced societies. To let the adversary groups oppose each other through the workings of an administrative agency continuously resolving the conflicts in "decisions" and policies replaces tension and uncertainty with a measure of clarity, meaning, confidence, and security. This is precisely the function performed in more primitive societies by the rain dance, the victory dance, and the peace pipe ceremony, each of which amounts to an acting out of contending forces that occasion widespread anxiety and a resolution that is acceptable and accepted.

The forms benefits take also focus attention on a widely approved function rather than on the distribution of benefits to organized economic groupings. The administrative proceedings is so structured that benefits are perceived in relation to a symbolically potent and widely shared abstract objective and not in relation to their very material recipients. What we have here is a fascinating application of a well-known psychological phenomenon: that we screen percepts and interpret them in relation to a pre-conceived organization of reality. In administrative activity the organizing conception is very plainly presented and reiterated. It is given first in the very name of the agency. More important, it is reiterated and continuously emphasized as both proponents and opponents of specific policies justify their positions in the name of the same objective or organizing principle: a smoothly functioning transportation system or power system or communications system, rendering maximum service; the most effective defense posture; equality of management-labor bargaining power; fair trade practices; and so on.

The organizational and psychological embrace of the industry around the regulatory commissioners go hand in hand. To be part of the organization in the sense of incessant exposure to its problems and decisional premises is to come to share its perspectives and values. This is not "pressure"; it is absorption. It explains the inevitability of a bias in choosing value premises: a bias which has been consistently observed by students of administrative regulation. The grant of benefits in these instances has the form of elaborate due process, involving complicated and drawn out inspection of data, both in the agency's offices and in formal hearings. But the screening apparatus through which decisional premises must pass is supplied by the organizational setting and can be counted on to grind out its fore-ordained result regardless of the awesomeness of the procedures. The latter serve quite another function: not so much to build rational calculations of the consequences of alternative decisions, as to legitimize what finally is announced by emphasizing the care with which it is related to the agency's symbolic objective. Occasional decisions slapping the industry but not altering the major trend further bolster the symbolism, for the commissioners themselves as much as for the mass public.

The administrative system, seen in this perspective, involves considerably more than the ministerial mechanics or statics of the common view. It mirrors, reinforces, and sometimes helps realign the major interest groupings of society and by the same token mirrors deep ambivalences in all of us.

All the activities of an agency taken together, and not any one pronouncement or act, perform these functions. Conflicts among group interests and within individuals find a reflection in an on-going series of verbal declarations, actions, resource allocations, and other symbols. Each of these supplement, reinforce, legitimize, qualify, and rationalize the others in a never-ending search to reflect current group alignments. So it is the sum total of the behaviors of a public agency--procedures, decisions, dicta, past policies and reputation, anticipations of future policies, dissents--that constitute the response to interest interplay, and not any one of these.

Dissent is especially revealing in this respect. The view just stated implies that dissenters on administrative commissions and courts serve a necessary function in the sense that if they do not exist, they are created, and perhaps even in the further sense that if their dissents were the majority policy, they would not necessarily take the same position. The dynamics of this process are impossible to see, and it must therefore remain a speculation; but we have probably been undervaluing some evidence that suggest it. It cannot be sheer chance that there is almost always one, and almost always only one, FCC Commissioner who chronically dissents from the decisions of his colleagues that vest highly lucrative rights in the public domain in established licensees. There always is an Irwin Stewart, Lawrence Fly, Clifford Durr, or Freida Hennock; but the function of these people is to voice a politically feeble protest against the dominant pattern, not to make policy, and above all not to gain much support.

There is no reason to suppose that any single pattern of administrative acts-plus-symbols is the only one that will adequately reflect group interest

interplay at a particular time. It can be taken for granted, however, that a change in any of the facets of administrative action necessitates some change in the other facets in order to retain a configuration or transaction that is socially and psychologically adequate.

Edelman in response to questions from the audience:

When I talk about tangible resources, I talk about any kind of administrative policy that results in a group getting something tangible that it wants e.g., more money or a subsidy or the use of public domain. Sometimes the resource is public as when it is a subsidy from the public treasury and sometimes it is a decision that determines how much various private resources are going to go to this group rather than that group.

I think that the common picture that I find in my student classes all the time really overstates both the selfishness of private industry and the government. What I am suggesting is that there is a sense in which private industry must take into account public reaction. Its predictable that if it doesn't it will be penalized in various ways and the public organ helps it take into account. It isn't selfish in the sense it will in the short run charge what the traffic will bear because that will kill its chances in the long run. The whole transaction, the close relation I talked about between the private groups that needs something tangible and the public group that gives it some or all of what it wants, really is a kind of useful definition of functions for both of them. The fact that we try to combine these two kinds of functions are simply one more kind of demonstration of the validity of looking at them in the way I have suggested. Its especially apparent I suppose in the transportation field when you have one agency that has historically been closely tied to railroad interests and another agency which for a shorter period of time has been tied to airline interests and each of them sees it as part of their function to promote the industry whose interests it reflects as well as the one it is supposed to regulate and we get a nice example of the kind symbiosis that I mentioned.

I think regulation as a pattern of government involvement is likely to continue in the U.S. in those areas in which private operation is and remains profitable. I think the government taking over the industry is not likely in such areas. I think, however, that in the case of this history that where industries become losing propositions that the pattern that is evolving in Europe is more likely to occur here, that is government ownership.

THE 1970'S: CHALLENGE TO RAILROADS

Ray H. Smith*

I am delighted to be here today and to have the opportunity of participating in this two-day conference on "Transportation: The 1970's." I think this conference, sponsored by the Upper Great Plains Transportation Institute, must be regarded as a milestone from which events in the future affecting transportation will be measured. The formation of the Upper Great Plains Transportation Institute in itself was a milestone reflecting and formalizing as it did recognition by the citizens of the Upper Great Plains area of the uniqueness of this area's dependence on transportation and the need for that kind of transportation which is possessed of vitality and creativity. I believe that conferences of this very type, as we attempt to look into the future, in themselves, bring about the creativity so necessary to transportation in the Upper Great Plains area.

I am honored to have been invited to speak at this conference and, beyond that honor, I am humbled at finding myself associated with the quality and eminence of the speakers, guests and participants which this conference has brought together.

Some of you may have noted from your program that my talk, up until at least yesterday morning, was without a title. I don't know whether Dr. Nelson's failure to insist on a title at the time the program was printed was to give me the latitude of all subjects which had thus far not been discussed, or whether it reflected some lack of confidence in my ability to discuss any specific subject. In either case I do appreciate the latitude I have been afforded in choice of subject, but keeping in mind the theme of our conference, "Transportation: The 1970's," I do want to discuss with you the decade of the 1970's as posing a critical challenge to railroading, not a new challenge, but a continuation of the intense competitive pressures which have challenged railroad management for the last twenty years. I would also like to review with you the technological developments which emerge through the 1970's and, lastly, to reflect on just how these technological changes will bring new capabilities to railroad will be implemented and how they will shape our transportation product of the 1970's.

Before attempting to look into the future, it seems to me that we must establish where we are now and that also we must look backwards to see where we have been. If I had appeared here ten years ago at a similar conference, attempting to forecast the railroad position during the decade of the 1960's, my viewpoint would have had to have been very pessimistic, perhaps even predicting the early demise of the railroad industry. For ten years ago, many economists and business analysts had already written the railroad industry off as an anachronism in our economic community and as the canal roads, pony express and the stagecoach had outlived their need in the past, so the railroads were approaching that same period in their existence. And there were some rather impressive statistics to support these forecasts,

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patterns of consistent decline in all of the indices used to measure transportation and its profitability as an enterprise in this country.

For instance, from what in general had been war-time or post-war highs, all indices of the railroad competitive position had deteriorated, with sporadic interruptions, through the 1950's to a low year of 1961. Rail ton miles, operating revenues, net railway operating income, rate of return and net income reflected the same deteriorating situation and perhaps even more alarming, the period of time which these statistics covered was such as to reflect a real trend, not short-term adjustments which might conceivably be reversed. Perhaps one of the most meaningful indices of railroad activity during this period of time in relation to the general economy is reflected in shares of the domestic intercity ton mile market. This index, from 1946 to 1961, showed a decline without any interruption from 66.61% of the market in 1946 to 43.51% in 1961--a decline in market share of 23% in 15 years. 1961 found the railroad industry moving 95% of the ton miles that it handled 15 years previously in 1946. On the other hand, ton miles transported via highway were 362% of that which moved via that mode in 1946. The inland waterways had increased their ton miles from 1946 to 1961 by 169% and the airways, although still hauling an almost insignificant portion of the domestic freight ton miles, had already exhibited their capabilities by moving almost 10 times as much air cargo in 1961 as they did in 1946.

Now against that background, the decade of the 1950's, I do not have to review with you too much the dramatic turn-about which the railroad industry did accomplish during the first six years of the present decade. It arrested its declining share of market and has stabilized market shares of all modes, with the railroad industry holding at about its 43% level. During this same period of time the industry has kept pace with the growing gross national product and, by doing so, established in 1966 a 32% growth in freight ton miles from 1961. This even exceeded the peak wartime year of 1944. The rail industry in 1966 also established an all time high in operating revenues and achieved a net income nearly equal to the post-war record high year of 1955.

In forecasting the railroad position during the decade of the 1970's I believe it is helpful to consider the reasons for the turn-around that occurred as between the decade of the 1950's and the 1960's and to analyze whether those factors responsible for that turn-around might again be present as we move through the transition into the 1970's. Or are those factors no longer of assistance? Are they no longer valid, and if not what changes must the railroad industry make so as to maintain or improve its share of market as we move into the 1970's?

I could prepare a list of fifty reasons accounting for the railroad industry's recovery in the 1960's but on close study, I think they are all the result of two very fundamental changes.

1. First of all, and perhaps properly ranked number one, management philosophy on almost every major railroad in this country changed dramatically as we moved from the 1950's into the decade of the 1960's. Philosophy switched from defensive to offensive. There was

an increasing recognition of the marketing concept, of shaping the industry's product according to the demands of the market rather than what the industry preferred to produce. In other words, we found that we could not sell 1940 transportation in the 1960 market. This recognition of the marketing concept by management in itself, I believe, is responsible for the changes to higher horsepower locomotives, to centralized traffic control, to larger freight cars, to customer-tailored cars, to piggyback, and to microwave, computers, welded rail, track maintenance machinery, and all the other technological changes which came into existence during the past six or seven years. It was this change in management attitude that demanded and spurred technological changes. And the introduction of new technology resulted in product upgrading and improvement--a 1960's product for the 1960's market.

2. The Transportation Act of 1958 clarified and provided a changed regulatory climate for the railroads. This changed climate, accompanied in many cases by a new breed of marketing managers generated the sophisticated, imaginative and competitive techniques of pricing marketing and selling our freight service which have emerged during the 1960's.

I said earlier that I believe that the multitude and diversity of change which has occurred during the sixties in producing and selling railroad transportation can be summarized in these two basic developments. For it has been basically management's grasp and interpretation of the marketing concept which has led to an appreciation of the necessity of producing a better product more efficiently and with this has come the larger power unit, the larger freight cars, automated tract maintenance, computer techniques, hot box detectors, ad infinitum.

The marketing man has been given a product produced at more efficient levels, great versatility in equipment and product flexibility ranging from piggyback to unit trains. And from all of this the railroads have molded a product appealing enough to the nation's shippers so as to produce a 32% increase in ton miles over a six-year period.

Will these two basic changes which brought us from the 1950's thus far into the 1960's stand by us in good stead and safely assure our passage into the 1970's? Or will even further changes be necessary to insure a continued vitality of the railroads through the decade of the 1970's? I would answer that question this way: "Yes, but, if---." Here are the challenges of the 1970's.

Management, as we move into the 1970's, must become even more market-oriented, be more concerned with market strategies than they have been. The industry must apply even more diligently its efforts to produce more and more efficient transportation. Research seeking such efficiencies must be accelerated. The rate in technology change must maintain a growth consistent with that of our competitors. There have been dramatic breakthroughs in technology over the last few years and it has been these breakthroughs which

have permitted us to produce a transportation product more efficiently. This efficiency in turn has permitted more competitive pricing.

For instance, average ton mile revenues of the nation's railroads have declined by 14% since 1958, while the consumer price level at the end of 1966 was 14% higher than in 1958. This increase in efficiency, together with realistic pricing, is also reflected in a steady growth since 1961 of both gross revenue and ton miles for the railroad industry, but during this same period of time a steady decline in the revenue per ton mile. In other words, on the average, it now costs less to ship by railroad than it did six years ago, but despite this reduction in price both gross revenue and net revenue have increased. This is a trend that certainly we traffic officers in the railroad industry would like to see maintained; declining prices accompanied by increased gross revenues, increased ton miles, and most important, increased net revenue. This trend can be maintained only with the help of a constant stream of technological change accompanied by a management philosophy that remains oriented on the market and harbors a keen respect for the capabilities of our competitors.

Technological change cannot be accomplished without the continual injection of new capital monies and the industry will not be able to obtain capital investment money unless its earnings record warrants such investment by the money market. Although we might like to look at less mundane objectives, management cannot escape its responsibility either now or in the 1970's to generating the net income each year which makes capital investment attractive and which in turn permits the production of more and more efficient transportation.

Assuming that the industry will maintain the trend thus far in evidence during the sixties of generating net income and attracting outside capital necessary to implement new technology, I think we will see the following major technological breakthroughs as we move into the decade of the 1970's.

1. A dramatic and intensified use of computer and communications technology. Some analysts believe that this change in itself may hold the greatest promise for capital and operating savings since dieselization. So-called "real time" information will not only introduce efficiency in our production of ton miles, but also present an appealing concept to the shipping public and a competitive tool to the industry in its continuous attempt to customerize its service.
2. Power units will become larger and more efficient. One might say that since the post-war dieselization period, we are now in our third generation of diesel locomotives and certainly during the decade of the 1970's we will be using the fifth and sixth generation. Experiments are now being conducted with turbine powered trains. Modified jet engines being used on these turbine trains are very light weight in relation to the horsepower they are capable of developing. These are aircraft type power units and if they can prove themselves in the demanding atmosphere of railroad service,

the present application of diesel power through either hydraulic or electric transmission will certainly find a new competitor in the field. The potential of lower cost electrical energy produced by nuclear units has caused some lines to restudy electrification as a power sources potentially more efficient than the diesel engine.

3. The railroads have found efficiencies in using bigger freight cars and I believe this trend will continue into the 1970's. I don't know just where we will encounter a runout on the scales of size, but certainly that point is not visible yet. In tank cars, for instance, we've moved from the 4,000 gallon tank car as the standard unit to 8,000, then 10,000, a leap to 20,000 gallons, to 27,000, to 33,000 and now on the drawing board is a huge monster with a 60,000 gallon capacity equipped with four 4-wheel trucks, the equivalent of 16 wheels. Similarly, the covered hopper car has moved within a few years 2800 cu. ft. of capacity and known in its time as a jumbo hopper, to current standards of 4400 to 4700 cu. ft. and an available car with 5800 cu. ft. of capacity. I perhaps do not have to point out that it has been the higher capacity of equipment that has permitted pricing on an incentive weight basis and with such pricing and equipment has, in many cases, prevented the diversion of tonnage to intermodal competitors.

The acquisition cost of today's modern equipment and of equipment which will be further innovated to meet the 1970's market is high. Its purchase can be justified only on the basis of intensive utilization. Computer oriented operations and automated terminals will vastly improve utilization by rail carriers, but shippers will also have to recognize a responsibility toward high utilization. In the absence of such responsibility, carriers may have to assess punitive detention charges against the inefficient shipper to encourage utilization.

There will be a continuation of the liaison between shipper and carrier in the design of equipment. Both will jointly seek designs which are compatible with industry material handling procedures, and which become, in effect, part of the assembly line.

4. A railroad is seldom any better than its roadbed. Maintenance of way expenses consistently absorb about 30% of railroad revenues. And so the trend in automating maintenance of way will continue and probably at an even more accelerated pace than in the past. For if the railroads are to qualify for a position in the 1970's, higher train speeds will have to be offered and roadbeds will not only have to be constantly renewed, but will, in fact, have to be upgraded. There will certainly be computer-programed maintenance. A technique which is now being studied provided for magnetically coding the work schedule into the track. As the track machine moves along the rail, it is instructed by the magnetic coding. Contrast this almost totally automated maintenance with the section gang and foreman of a few years ago.

6. There will probably be in the 1970's even more emphasis on terminal construction, modifications and improvements than on roadbed. Yards and interchange facilities will be automated, subjecting terminal operations to computer control. The great majority of railroad service defects now occur, not in line haul operations, but in the terminals. It is here that research is being directed and where substantial capital investment will be made.

Probably of greatest interest to present railroad users, to potential users and also to our intermodal competitors would be a review of the changes that will occur to the face of our product during the decade of the 1970's. How will it be packaged? How will it be priced? How will transit time, and even more important, reliability of transit time, compare with intermodal alternatives? Even assuming continuing advances in the efficiency at which railroad transportation is produced, such advances are meaningless to the public unless they are attractively packaged, competitively priced and aggressively marketed. I personally, as a pricing officer, look forward to the decade of the 1970's because I see great opportunities for the entry of the railroads into markets which have either been historically held by our competitors or which were wrested away from the railroad industry during the dark decade of the 1950's. I see an expansion in marketing opportunities, for example, through the use of unit trains. The unit trains concept, by itself, did not represent a technological breakthrough. Railroad people have known for years that certain operating efficiencies attach themselves to achieving a high rate of equipment utilization through use in a dedicated service and through avoidance of normal terminal costs which accrue to single-car shipments. But it took marketing people to assert these operating efficiencies and apply them to meet specific competitive conditions whether on coal, or grain, or petroleum products, or on any commodity involving large tonnages and a repetitive movement. With larger power units, larger cars, improved track maintenance and track capacity, better communications through the use of computers, I believe we are going to find expanding opportunities for the use of this concept and further that we are going to be aggressively looking for new markets for unit train applications. In other words, and in the grain marketing field, for example, I believe we are going to shift substantially certain present truck-barge or truck-lake grain distribution patterns to all-rail movement by asserting in our prices the strengths and efficiencies and capabilities that the unit train concept brings to the railroad industry.

I believe that one of the greatest opportunities for railroading in the 1970's is to truly customerize its service, that is to get out of the mass transportation business, at least to the extent necessary, and to somehow sell transportation on a single-car basis with pricing and service competitive with highway alternatives. Industry had done a lot of talking about customerized service and about the attention the traffic of its patrons receives, but let's not delude ourselves, we are basically a mass transportation industry. When the Soo Line, for instance, moves one of its time freights from Minneapolis to Chicago with 120 cars on that train, the car in which one particular shipper is interested receives no better or no worse treatment than the adjacent car. Regardless of what we might do, his car inevitably can receive no better service than we can deliver on a 120 carload train from Minneapolis to Chicago.

It runs the same risk of interchange delay at Minneapolis, for instance, whereby it may not even make the particular train in question. It runs a risk of encountering some delay right within the Soo Line terminal in not making the train in question, or it may be the victim of an overcapacity train whereby some tonnage is left behind. Even assuming that it does make the train in question, it in turn becomes subject to the risk of the same delays once it reaches the terminal in Chicago. Declassification in the Soo's yard, delivery to connections, etc. The railroad industry at this point in its history is still simply not able to guarantee, under the mass transportation concept, siding-to-siding transit times which will compete with highway alternatives. Perhaps we will never be able to make that guarantee in terms of comparing absolute transit times, siding-to-siding, but even more important, I believe that we must find a way to establish and build into our service a reliability in industry-to-industry transit time which will be consistent with the tight inventory control practices of modern industry. Incidentally, a practice which will apparently not abate as we move into the decade of the 1970's.

How will the railroads in the 1970's again find a place in that transportation market which demands reliability in service? The use of computers in automating terminal operations and "real time" information will, of course, be of great assistance in establishing more reliability. These will be of particular help in assuring reliable performance of terminal-to-terminal operations, but this still leaves us with one problem, getting no better or worse service than the 119 cars on the particular train involved. How can an industry-to-industry or siding-to-siding schedule actually be guaranteed? Some railroads are experimenting with smaller trains with more frequent departures. This offers promise, but seems to run counter to the efficiencies introduced by bigger power units and longer and heavier trains. Perhaps, however, to guarantee the reliability of siding-to-siding transit time, smaller trains with more frequent departures with the payment of premium over the price of conventional transportation will be the answer. One major trans-continental railroad is already testing this particular reliability market by establishing a piggyback train on passenger schedules from Chicago to Los Angeles, limited to 16 flatcars on 32 trailers and priced at premium levels. The obvious thrust of this experiment is toward high-rated commodities now moving via motor carrier or air freight.

This sector of the transportation demand which we might call the reliability market, is huge, and with industry using more sophisticated inventory control techniques and giving increased attention to the cost of inventories and inventory failures, will no doubt grow into the 1970's. I believe that a primary challenge to railroading in the 1970's will be imposed by this reliability market and that the railroad industry, to insure continued growth, must find a way to enter it. I find interesting and incidental to a comparison of services offered under the mass transportation concept versus the unit train concept, the strange irony whereby we perform more consistent, more reliable year-around transportation, with unit trains than we perform in connection with conventional services involving traffic shipped on a single-car basis. Yet, the unit train for competitive reasons is priced far below single-car service in conventional service. We must find a way of

bringing closer together this paradoxical situation where consistently reliable transportation in unit trains is priced substantially below service encountered when shipping in single car lots in conventional service.

I am going to complete my remarks with the suggestion that not only will the 1970's be a challenge to railroading, but also the railroads in adjusting to distribution patterns and marketing methods of the 1970's, will make some changes which will pose challenges to various sectors of our economy. I am suggesting that the railroad industry, to maintain its viability during the decade of the 1970's, will have to cast aside many of the traditional roles it has played in the marketing of this nation's resources and establish, and encourage with new price structures, transportation flows which will fundamentally affect the way many industries do business today. Since we are in North Dakota, the nation's number one producer of spring wheat, durum wheat, rye, flax and barley, let me explain this observation in terms of grain marketing. The classic method of marketing grain and one which has endured since the North Dakota prairies were first opened up to grain production in the 1880's, involves a movement from producer, first, to country elevator, at one time by horse and wagon, and now by truck. Then movement by rail on a system of gathering rates from the country elevators to the terminal markets, in the case of North Dakota the terminal markets being either the Twin Cities or the Twin Ports. At these terminals, grain has found its price through the pricing mechanism of markets such as the Minneapolis Grain Exchange and the Duluth Board of Trade. The functions of risk assumption, storage and merchandising are performed at these markets with ultimate movements spread over a 12-month period to processors of grain located throughout the United States.

This classic form of grain distribution is beginning to deteriorate. The importance of the market function, I believe, is declining. This is evidenced by a general trend over the last 20 years of decreasing amounts of grain traded across the trading floors of the Minneapolis Grain Exchange and the Duluth Board of Trade. More and more grain is being traded around the market. Grain which moves by motor carrier to Minneapolis for barge disposition down the Mississippi River or which moves by motor carrier to Duluth for lake disposition beyond to important milling centers such as Detroit, Cleveland or Buffalo, does not see the light of the trading floor at either Minneapolis or Duluth. Thus, a significant portion of North Dakota's grain production has found that it does not need, at least, the historical mechanism of the market.

Yet, up until this time, at least, the railroads from the standpoint of the service they offer, that is, hold points for inspection, intermediate transit privileges and a system of intricate gathering rates all oriented on the terminal markets, have remained locked in, in the traditional form of grain marketing, but have seen increasing amounts of grain which they once hauled moving without the benefit of the marketing mechanism and moving in many cases via truck-water to points well beyond the terminal markets and really representing the ultimate markets of North Dakota's grain production. The railroad industry cannot stand by and watch more and more of its grains erode to intermodal competitors who have found new marketing channels and in most cases more efficient marketing channels. The railroad industry must be

responsive to grain marketing changes which are occurring and which in some cases have already been introduced by its competitors. The industry must be prepared to cast aside the part it has played for almost a hundred years in the marketing of grain and to strike out boldly on its own initiative in introducing, providing the service, and pricing realistically new grain marketing patterns which will bring efficiencies to both the railroad industry and to the grain oriented economy of North Dakota.

There is no question but that this would be a painful adjustment for certain segments of the grain economy. There may be branch line abandonments. There may be a phasing out of some country elevator capacity and replacement of that capacity by large subterminal operations. Some of these changes are already occurring, simply because North Dakota's grain must find, and will find its most efficient distribution system at costs which will assure a continued ability to compete in this nation's markets and overseas with both domestic and foreign grain production. The railroads are reluctant to accelerate these changes or to add any emphasis to them. But on the other hand, failure on the part of the railroads to recognize the availability of grain distribution systems via intermodal competitors more efficient than the traditional channels in which the railroads now participate, makes for a decreasing share of grain traffic for the railroad industry and will deprive the Upper Great Plains of that vitality in rail transportation which they so badly need. We all like the comfort of living with familiar things and certainly the old, traditional grain marketing system is something we would like to cling to because of that familiarity. But neither the railroads nor the people of the Upper Great Plains can afford the luxury of holding railroading in its classic posture when such a stance inevitably weakens the railroad system on which they depend.

The 1970's, yes, a challenge to railroads, but also a challenge to the economy of the Upper Great Plains, a challenge to its flexibility in reacting to bold new concepts which must be advanced by the railroad industry so that you will continue to hear across the plains of North Dakota the diesel engine whistling for a crossing as it moves through a small country town at midnight.

INNOVATIONS IN TRANSPORTATION:
IMPLICATIONS TO CHANGE IN THE 1970'S

John R. Felton*

While economic self-sufficiency may promote independence, self-reliance, and a host of other virtues, it is not without some counterbalancing deficiencies. The low output associated with completely unspecialized economic activity makes it unacceptable as an alternative to the personal and territorial specialization of economic function upon which high productivity depends. It was almost two centuries ago, now, that Adam Smith observed that the division of labor increased output by fostering the acquisition of greater skill, reducing the time lost in passing from one operation to another, and encouraging the substitution of machinery for human effort.¹ The feasibility of employing large-scale techniques of production, however, is not determined solely by the nature of existing industrial technology, but depends fundamentally on the size of the market, as Smith was also careful to point out.² Although the market may be restricted in some cases because of a limited demand for the product, for example, buggy whips, the crucial factor, historically, has been transport costs.

Thus, innovation in transportation, by reducing the resources required to effect the movement of persons and goods, can expand the geographic scope of the market. Improvements in railroad transport, in particular, in the latter part of the nineteenth century, laid the foundation for the industrialization of the post-Civil War era. The magnitude of this transformation can be judged by the fact that the average manufacturing plant in 1920 had 26 times as many employees and more than 37 times as much capital as the corresponding establishment in 1850.³ No doubt the invention of new machines and new chemical and mechanical processes, the discovery of new sources of power, and the development of new materials were a necessary, but not a sufficient, condition for the spread of the techniques of large-scale production. Innovation in transport was clearly the sine qua non of geographic specialization. Increased transport efficiency add newly achieved economies of scale more than offset the costs of assembling raw materials and shipping finished goods over an ever-expanding area.

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¹Adam Smith, An Inquiry into the Nature and Causes of the Wealth of Nations, (New York: Modern Library, 1937), p. 7.

²Ibid., p. 17.

³J. W. Jenks and W. E. Clark, The Trust Problem (Fifth edition; Garden City: Doubleday, 1929), p. 17.

Innovation and Other Components of Increased Productivity in Transportation

Between 1869 and 1953 output per worker in transportation increased by slightly more than 10 times and, as a consequence of a substantial reduction in the average number of hours of work per week, output per manhour increased by almost 15 times.⁴ Admittedly, not all of this increase in output per worker or per manhour was necessarily attributable to innovation. Output can increase from an increase in the capital/labor ration, as well as from improvements in technology or organization of work processes. If such an increase in the capital/labor ratio occurred between 1869 and 1953, however, the data on inputs and outputs do not reveal it. The number of persons engaged in transportation increased by 424 percent during the period while the capital employed in transportation increased only 322 percent.⁵ As a consequence, the capital/labor ratio declined by almost 25 percent between 1869 and 1953. By way of contrast, the capital/labor ratio for the private domestic economy as a whole increased by 287 percent during this period.⁶

On the basis of these computations one might be led to the conclusion that the change in output per total factor input in transportation understated, rather than overstated, the influence of innovation upon real output from 1869 to 1953. Such a conclusion, however would be of dubious validity. Intertemporal comparisons of capital inputs in transportation are rendered hazardous because of the changing proportions of private and public capital committed to these industries. In 1869, the great bulk of the capital devoted to transportation was privately owned. In 1953, on the other hand, very extensive public investment in highways, waterways, airways, and airports supplemented the private capital inputs. As a result, output per unit of (private) capital input in transportation increased by a colossal 1,265 percent during this period. The contrast with the private domestic economy as a whole is again very marked, where output per unit of (private) capital input increased by only 115 percent.

How large an upward bias in output per unit of reported capital input may result from the failure to include public capital is difficult to say. Inasmuch as total real output of the private domestic economy increased by some 1,594 percent during this 84-year period and the capital/labor ratio by 287 percent, it would suggest that the increase in capital input per worker had accounted for about 18 percent of the increase in output.⁷ If the increase in the private and public capital/labor ratio in transportation between 1869 and 1953 approximated the increase in the private capital/labor ratio in the private domestic economy as a whole, then output per worker in transportation increased more than eight times as a result of productivity increases and somewhat less than twofold as a result of increases in the amount of capital per worker.

⁴John W. Kendrick, *Productivity Trends in the United States*, NBER General Series No. 71 (Princeton: Princeton University Press, 1961) Table G-I, p. 540.

⁵Loc. cit.

⁶Ibid., Table A-XXV, p. 342.

⁷Loc. cit.

There are several lesser difficulties in identifying an increase in productivity with innovation. Cyclical fluctuations and the trend of industry output, as well as innovation, can influence factor productivity. Nevertheless, Terleckyj's study of the causes of changes in productivity has demonstrated the primacy of innovation.⁸ In addition, Kendrick found a correlation of +0.62 between the rate of increase in total factor productivity between 1948 and 1953 and ratios of research and development outlays to sales by major industry group in 1953.⁹ In the absence of significant changes in the proportion of private to public capital, then, "innovation" and "increase in productivity" can be used interchangeably without any substantial loss of precision.

Given the overriding importance of innovation to the increase in output per worker, how does the increase in productivity in transportation compare with that in other sectors of the economy? What differences in the rates of productivity increase can be found among the various modes of transport, and what inferences can appropriately be drawn from such differences in rates of productivity increase? It is to these matters which we shall now turn.

Productivity Increases in Transport: The Historical Record

Owing to the upward bias in the capital input/total output ratio in transportation, as previously noted, increases in labor productivity are probably a better measure of innovational activity than are increases in total factor productivity. In the following section, therefore, output changes will be related to changes in the input of labor resources alone.¹⁰

After an unspectacular average annual increase in output per unit of labor input of less than 1 percent during the period from 1899 to 1909, the transportation sector enjoyed a substantially greater rate of increase in labor productivity. For the entire period from 1899 to 1953, the average annual increase was 3.4 percent. This compares favorably with farming, 1.7 percent; mining, 2.5 percent; manufacturing, 2.2 percent; communications and public utilities, 3.8 percent; the residual sector of the economy, 1.4 percent; and the private domestic economy as a whole, 2.0 percent. Even the railroads,

⁸Nestor E. Terleckyj, Sources of Productivity Change: A Pilot Study Based on the Experience of American Manufacturing Industries, 1889-1953, (Unpublished doctoral dissertation; New York: Columbia University, 1959).

⁹Kendrick, op. cit., pp 182-183.

¹⁰With minor exceptions, average annual rates of productivity increase reported in this section have been computed by the compound interest method. In a few cases, however, the rate has been determined from the slope of a least-squares linear regression line of the logarithms of the annual labor productivity indexes.

which are widely regarded as a technologically backward industry, increased labor productivity 2.8 percent per year on the average between 1899 and 1953, a rate of increase significantly in excess of that enjoyed by mining and manufacturing.¹¹ Thus, it is not true that the relatively high rate of increase in productivity in transportation this century is attributable almost exclusively to the newer modes of transportation, highway and air carriers.

The rate of increase in productivity has accelerated, rather than slackened, in the two decades since World War II. The average annual increase in output per worker in transportation as a whole between 1947 and 1965 was 4.4 percent.¹² This growth rate exceeds substantially the contemporaneous rate of 3.1 percent for 27 manufacturing industries.¹³ Only petroleum refining (5.4 percent), beet sugar processing (5.1 percent), and primary aluminum smelting (4.9 percent) were able to achieve higher annual rates of productivity increase per worker than the transportation industries. Four mining industries recorded a rate of 5.8 percent annual increase in output per worker and three public utility industries, a rate of 7.2 percent.¹⁴ In agriculture, where output increased by more than 35 percent and employment decreased by almost 45 percent between 1947 and 1965, the average annual increase in output per worker was 5.1 percent.¹⁵ Nevertheless, despite the superior performance of the public utility, mining, and agricultural sectors, the average annual increase in output per person in the private domestic economy for the period 1947-1965 was about 2.6 percent,¹⁶ a rate well below that in the transportation industries.

¹¹Kendrick, op. cit., Table 40, pp 152-153.

¹²U. S. Department of Labor Bureau of Labor Statistics, Indexes of Output Per Man Hour: Selected Industries, 1939 and 1947-65, (Washington: Government Printing Office, 1966), Table 1, p. 6, and Table 22, p. 27; American Trucking Trends, 1965, (Washington: American Trucking Associations, 1965) p. 8; American Trucking Trends, 1966, (Washington: American Trucking Associations, 1967), p. 8; and U. S. Department of Labor, Bureau of Labor Statistics, Technological Trends in Major American Industries (Washington: Government Printing Office 1966), p. 207.

¹³U. S. Department of Labor, Indexes of Output, Tables 28 through 85, pp. 33-90.

¹⁴Ibid., Table 2, 5, 8, 14, and 16, pp. 7-24.

¹⁵Economic Report of the President, (Washington: Government Printing Office, 1966), Table C-20, p. 232, and Table C-31, p. 245.

¹⁶Loc. cit.

The average annual rates of change in output per employee in the various transportation industries in recent years are set forth in Table 1. It will be noted that, during the period 1929-1937, labor productivity in intercity motor trucking and airline transport far exceeded that in the other transport industries. Both industries were in their formative years during this period, however, so that spectacular increases in productivity are understandable. Neither of these industries has been able to maintain such high rates, with the trucking industry, in particular, suffering a great decline in the rate of increase in labor productivity. On the other hand, the older modes of transportation, railroads, inland waterways, and pipelines, have in recent years increased significantly the average annual increase in labor productivity. There has, however, been a difference in the pattern of productivity rate change in the older modes. Pipelines have enjoyed a more or less steady increase in the rate of annual increase in labor productivity, while inland waterways achieved a remarkable increase in rate in the period from 1937-1948 and the railroads did not attain anything approaching their present average annual rate of increase in output per employee until the last decade.

Table 1. Average Annual Rate of Change in Output Per Employee in Transportation, 1929-1965.

<u>Mode of Transport</u>	<u>Average Annual Rate of Change in Output Per Employee for Various Periods, 1929-65</u>			
	<u>1929-37</u>	<u>1937-48</u>	<u>1947-57</u>	<u>1957-65</u>
Railroad	2.4	4.2	2.1	6.7
Motor Freight	25.1	10.0	2.7	3.8 ^a
Inland Water	0.7	5.6	4.5	6.7
Airline	14.2	9.0	9.0	7.6
Pipeline	5.1	6.0	6.7	7.6

^a1957-64.

Sources: John W. Kendrick, Productivity Trends in the United States, Tables G-II, G-III, G-IV, G-VIII, G-IX, G-X, and G-XI, pp. 541-556; U. S. Department of Labor, Technological Trends in Major American Industries, pp. 201, 207, and 220; Department of Labor, Indexes of Output Per Man-Hour, Selected Industries, 1939 and 1947-65, pp. 6-26; ICC, Statistics of Railways in the United States for 1947, Tables 174 and 176, pp. 222-223; ICC, Transport Statistics in the United States for 1957, Part V, pp. 7 and 13, Part VI, pp. 2-3; ICC, Transport Statistics in the United States for 1965, Part V, pp. 7 and 12, and Part VI, pp. 2-3; Statistical Abstract of the United States, 1950, pp. 516-517; Statistical Abstract of the United States, 1959, p. 575; and Statistical Abstract of the United States, 1967, p. 349.

What, however, are the prospects for the decade ahead? Does the widespread adoption of new techniques, equipment, and methods now available or available in the near future, promise to maintain the current high annual rate of productivity increase in rail, water, airline, and pipeline transport and accelerate the rate of increase in highway transport? What are the implications for the distribution of traffic among the various modes of transport? Last, but certainly not least, what are the implications of future improvements in transport efficiency upon the location of industrial activities? Let us consider these issues?

Innovation in Transport: The Prospects

Time does not permit any detailed account of recent and prospective technological developments and their implications for the various modes of transportation. Broad trends and tendencies may, however, be worthy of mention.¹⁷

The continued automation of activities which are to some extent repetitive and in which the variables are not too numerous should assist all modes of transportation in maintaining a reasonably high rate of annual productivity increase. All modes, for example, can affect economies in terminal operations through additional mechanization and the utilization of new equipment and techniques. Computer-controlled railroad freight classification yards and mechanized loading and unloading of bulk commodities transported by rail and water are obvious examples. Also, all modes of transportation should benefit from the computerization of freight tariffs which the Battelle Memorial Institute recently characterized as "technically feasible within limits."¹⁸ On the other hand, the railroads, owing to the greater scope of their operations and the far greater number of vehicle units would appear to have most to gain from automatic systems of car identification. Furthermore, owing to the fixed relationship of the vehicle to the way, the possibilities of automatic train control are considerably brighter than automatic control of highway, water, and air carriers.

Increases in the size and speed of transport vehicles are clearly in evidence. A few years ago, 100-ton covered hopper cars seemed large indeed, but currently the Southern Railway Company is experimenting with jointed hopper cars of 260-ton capacity. A merchant fleet of nuclear-powered trailer-ships, 1,000 feet long, each able to carry 1,500 containers has recently been proposed by American Export Isbrandtsen Lines. New Great Lakes ore carriers having a 50,000 deadweight ton capacity, twice the capacity of any existing ore carriers, will be available by 1970. Towboats capable of developing 12,000 horsepower and pushing up to 60 barges are now under consideration. The Boeing 747, which will probably be designed to carry 350 to 360 persons, will be dwarfed by the C-5A whose passenger version could transport 700 to 1,000 passengers. The C-5A can carry a payload to 250,000 pounds compared to

¹⁷Much of the material on recent developments in transport technology in this section has been gleaned from recent issues of the Transport Association of America's bi-weekly bulletin, What's Happening in Transportation.

¹⁸Transport Association of America, What's Happening in Transportation (September 6, 1967).

85,000 or 90,000 for the largest current cargo jets. While the size of highway carriers is controlled by state weight and size limitation, the limits have moved steadily upward as improvements in vehicle and road design increase the optimum size of tractor-trailer combinations. The "triple-bottom" truck, which Robert S. Reebie recently declared to be the goal of the highway travel,¹⁹ has even more recently been authorized for certain Oregon highways. Finally, a 42-inch diameter pipeline capable of transporting 1,000,000 barrels of crude oil a day from the Gulf Coast to Chicago is now in the planning stage.

As to speed, the 156 miles per hour achieved by a four-car electric train on a special 21-mile track in New Jersey recently was overshadowed by an experimental French "hovertrain" which attained a speed of 215 mph. Furthermore, the funds for the development of a "tracked hovertrain" capable of traveling speeds as high as 300 mph were recently approved by the British Ministry of Transport. The Interstate Highway System and more powerful engines for hilly terrain are increasing the speed of intercity highway transport. Even though the supersonic transport plane must undergo several years additional development before it will be operational, the Air Force has already awarded study contracts to three aircraft companies to investigate design concepts for hypersonic, i.e., over 3,500 mph, aircraft. Finally, three companies are to submit design study contracts to the Department of Commerce and the Navy Department early this year on the feasibility of 5000 ton surface-effect ships which can traverse up to 6-foot waves at 80 to 100 knots per hour.

Improvements in the way, as well as the vehicle, might also be noted. The increases in traffic density which can be effected through mergers of parallel railroad routes should make economically feasible further reductions of track curvatures and grades. The divided, multi-lane, limited access super highway has greatly reduced the transit time of inter-city highway carriers. Finally, river channels are regularly deepened, and the instrumentation of the airways improved.

The respective role of each mode of transport in the future cannot be deduced, however, merely from a listing of present and prospective innovations. Just as new equipment and techniques promise to reduce transport costs, so increasing congestion, especially in the vicinity of terminals, higher cost of acquiring and maintaining a way, and the social burden of air pollution and noise threaten to offset a substantial portion of the gain. Furthermore, these potential diseconomies do not affect all modes equally. Increasing congestion would appear to be a negligible problem for the pipelines, a minor one for water carriers, some what more serious for railroads, and monumental for air and highway carriers. A new computerized collision avoidance system which is expected to be operational in 1971 will assist in overcoming the problem of airway congestion, and regional airports, such as the one to be established in the Dallas-Ft. Worth area, and highway carrier terminals on the

¹⁹Robert S. Reebie, "Highway Equipment Innovation for Improved Public Service and Carrier Profits," Papers, Eighth Annual Meeting, Transportation Research Forum (Oxford, Indiana: Richard B. Cross, 1967), p. 188.

periphery, rather than near the center, of cities should assist in relieving traffic congestion. Nevertheless, the problem of metropolitan traffic congestion is so acute that a higher priority to the vertical and short take-off and landing aircraft than to the supersonic or hypersonic plane would certainly seem to be appropriate.

The higher costs of acquiring and maintaining a way would appear to fall most heavily on the land-based transport industries. For the pipelines, an expanding industry, the effect is most direct and obvious. For the railroads, where line abandonment substantially exceeds new line construction, the higher costs are represented, in large part, by the increased opportunity costs occasioned by the rise in the value of adjacent land, as well as by increases in property tax levies. Higher land acquisition costs affect highway carriers as these higher costs come ultimately to be reflected in highway user charges. Not only does the creation and maintenance of a way probably involve a smaller proportion of the total cost of air and water transport, but also this cost is borne only partially, if at all, by these modes.

Cost-transference in the form of congestion, air pollution, and noise is also an offset to increased transport efficiency and is an indictment with varying degrees of applicability to the different modes. Highway carriers contribute to all three of these social costs and air carriers, even without the sonic boom which will accompany supersonic and hypersonic aircraft, already eliminate conversation periodically in the vicinity of airports. Since compensation of the victims of such transference is generally not feasible, laws requiring abatement of the nuisance in some manner would seem the most appropriate solution.

What consequences, in sum, do prospective economies and diseconomies foretell for each of the various modes of transportation? For the railroads, centralized traffic control, automated classification yards, containerization, unit and integral trains, automated maintenance of way, continuous welded track, and large and specialized freight cars would appear to provide the technological foundation for the recapture of some portion of the traffic previously diverted to truck and barge. Mergers of smaller rail lines, especially those of low traffic density, and the adoption of a non-discriminatory commodity rate structure should give added impetus to such recapture.

In intercity highway transport, despite increases in the cubic capacity, length, and number of trailers per tractor; despite the possibilities for the substitution of gas turbines, electric storage batteries, nuclear reactors, or fuel cells for gasoline and diesel engines; despite improvements in the efficiency of pick-up and delivery operations; and despite improvements in highway design, it seems to me that the highway carrier's role in long-distance intercity transport will decline markedly before the conclusion of the 1970's. This assessment is not based solely on the highway carrier's relatively low average annual rate of increase in labor productivity in recent years, but also on the far lower line-haul costs of rail transport, the further development of piggyback transportation, the service improvements which should accompany the Association of American Railroads computerized national rail data center, and the progressively brighter prospects that

reductions in rail transport costs will be reflected in reduced rail rates. Professor James A. Constantin of the the University of Oklahoma has predicted that, within a decade, motor carrier hauls of 400 or more miles will virtually disappear.²⁰ I am inclined to agree.

Although the air carrier's rate of increase in both passenger-miles and ton-miles has been spectacular, the airlines still accounted for only 1/8 of 1 percent of the total ton-miles of intercity traffic in 1965.²¹ Increasing real per capital income, a continuing increase in average commodity value-to-weight ratios, and reduced air transport costs associated with increases in aircraft size should provide the airlines with an ever-rising share of intercity freight traffic, however, even though that share is relatively small. Despite the increases in aircraft size, the airplane remains a relatively poor weight carrier. Even the projected C-5A will have a payload of only 250,000 pounds with its gross weight of nearly 1,000,000 pounds.

Water carriers apparently have established a niche in the transport system from which they will not be dislodged by prospective innovations on the part of other transport modes. Even though railroads have been able to effect unparalleled reductions in the rates for the transportation of bulk commodities through the unit-train technique (an example is the 1½ mill per ton-mile rent-a-train tariff issued recently by the Illinois Central Railroad Company), water carriers should be able to increase efficiency with sufficient rapidity to suffer only minor deterioration in their relative position in the transportation system.

For several reasons, pipelines should be able to improve their share of the total ton-miles of inter-city freight movement in the coming decade. Pipelines apparently enjoy unending economies of scale with increasing pipe diameter. As a consequence, the growth of markets, induced by a high income elasticity of demand for petroleum products and by continued population growth, should yield further economies in petroleum pipeline transportation. Moreover, the range of pipeline products is subject to continual increase. Chopped sugar cane, molten sulphur, crushed phosphate rock, coal, limestone, gilsonite, wood chips, oxygen, ethylene, acetylene, nitrogen, and even wine are currently being transported by pipeline. For the last six or seven years now the Research Council of Alberta has been studying the feasibility of transporting encapsulated solids in pipelines. While many of the engineering problems have been resolved, extensive commercial application still seems to be some time away. Peter J. Manno of Stanford Research Institute has noted that, at the present time, solids pipelining accounts for only about 100 million ton-miles per year and that, even though the total rises to 8 billion ton-miles per year by 1980, this will still represent only about 2 percent of the total ton-miles of mine and forest products transported in the United States and Canada.²²

²⁰Information, Public Relations Office, Association of Western Railway, (July 1967).

²¹American Trucking Trends, 1966, (Washington: American Trucking Associations, 1967), p. 8.

²²Peter J. Manno, "Outlook for Pipelining Solids," Papers, Eighth Annual Meeting, Transportation Research Forum (Oxford: Indiana: Richard B. Cross, 1967), p. 380.

The general relationship between innovation in transportation and the geographic specialization of economic activity has already been noted. The Great Plains states can, perhaps serve as an example of the potential effect of technological change upon industrial location. As an exporter of bulk commodities, particularly grains, to distant markets, the Great Plains states should be primary beneficiaries of such innovations as the unit grain, larger barge tows, and mechanized loading and unloading equipment. Thus, innovations which reduce the costs of transporting bulk agricultural commodities may well increase the percentage of national agricultural output accounted for by the Great Plains states in the coming decade. Such a trend is entirely consistent with the tendency for agriculture to contribute a decreasing percentage of the total income of the Great Plains since agricultural income has been declining as a percentage of national income.

On the other hand, in the absence of significant interregional differences in production costs, innovation in transportation can increase the number of "footloose" industries, i.e., industries for whom the sum of production and transportation costs are not markedly different in a number of alternative locations. Under such circumstances, an increasing number of footloose industries might locate in the Great Plains region, not because improvements in transport efficiency will have eliminated entirely locational disadvantages, but because urban blight has rendered the more industrialized sections of the country progressively less habitable. The conclusion is that the Great Plains states may become more industrialized at the same time that they are generating an increased share of the nation's agricultural income.

Innovation in Transport: The Needs

Technological change, important as it is to the reduction of transport costs and to improvement in the quality of transport service, is not the sole determinant of efficiency in transportation. Owing to the pervasiveness of governmental activity in providing transportation facilities, in aiding and assisting various modes of transport, and in regulating their rates and service, possible innovations in the regulatory system also merit attention. Rather than assess the prospects for regulatory innovations, however, it would seem much safer merely to catalog the needs.

The effectuation of a rational allocation of resources in transportation presupposes rate structures based on the avoidable costs of transporting goods and passengers by the various modes of transport. Such rate structures can be approximated if there is effective competition. If competition is deficient, regulation can serve as a substitute, provided that a rational allocation of resources is a primary goal of the regulatory authority. Unfortunately, the preservation of the status quo in terms of services provided, areas served, and traffic distribution among the various modes has frequently superseded economic efficiency as a desideratum of the regulatory process. The result has been internal subsidization, increased carrier costs, and the diversion of increasing amounts of traffic to private carriers.²³

²³See John Richard Felton, "Commodity Rate Discrimination in Railroad Transport," in Jack R. Davidson and Howard W. Ottoson, ed., Transportation Problems and Policies in the Trans-Missouri West, (Lincoln: University of Nebraska Press, 1967), pp. 59-60 and 69.

The first regulatory innovation for which a need exists is the elimination of minimum rate controls. Industry fears of "excessive" intramodal competition should no longer compel us to lend the support of government to a system of cartel pricing in highway and air transport, in particular. Furthermore, predatory intermodal competition against highway carriers on the part of the railroads would appear to be most unlikely in view of the inherent ease of entry, short-lived capital assets, and geographic mobility of the highway carrier enterprise. Under any circumstance, the Sherman and Clayton anti-trust laws and the Federal Trade Commission Act should provide whatever additional protection against predatory competition proves to be necessary.

If cartelization is to produce profits in the long run, industry price fixing and minimum rate controls must be supplemented by limitations on entry. This is, of course, the primary function of certification requirements for entry into the common carriage of non-exempt commodities by highway, water, and air. Even then, however, non-price competition in the form of more frequent schedules and promotional outlays may eliminate pure profits by increasing carrier costs. A recent study by Richard N. Farmer on the comparative per ton-mile costs of exempt highway common carriers of agricultural products and of regulated highway common carriers of general freight has underscored the adverse effects of entry restrictions. Regulated carriers of general freight were able to achieve average loads of only about 70 percent of the average loads of agricultural common carriers. Furthermore, despite the fact that the revenues of the regulated carriers were more than two and one-third times as great per ton-mile as the revenues of the exempt carriers, the costs per ton-mile were two and one-half times as great!²⁴

In the absence of entry controls into highway, water, and air transportation, maximum rate control is also rendered unnecessary. Freedom of entry will insure effective intramodal competition, economic efficiency as a condition for survival, and cost-oriented rates. It seems clear that consumers will be much better served by freedom of entry than by the maximum rate controls made necessary by entry, commodity, and route restrictions.

On the other hand, intramodal competition is either non-existent or virtually so in rail and pipeline transportation, and intermodal competition is inadequate in many circumstances. In pipeline transportation maximum rate control needs to be exercised more vigorously than it has in the past, and, even in railroad transportation, improvement in earnings prospects should be accompanied by the enforced reduction of rates on traffic for which the railroad enjoys a clear cost advantage over its competitors.

Differences in the effectiveness of intramodal competition from one transport industry to another would seem to require corresponding differences in merger policy. The rigorous application of Section 7 of the Clayton Act to industrial mergers has been justified on the ground that internal expansion is always an alternative to acquisition. Therefore, the invalidation of an acquisition. Therefore, the invalidation of an acquisition need never prevent a firm from realizing all potential economies of scale so long as growth through internal expansion is possible. A competitive policy for highway, water, and

²⁴Richard N. Farmer, "The Case for Unregulated Truck Transportation," Journal of Farm Economics, (May, 1964) p. 402.

air transport, therefore, should include the abolition of all immunities which intramodal mergers in these industries now enjoy. Henceforth, all such mergers should be subject to the criteria of Section 7 of the Clayton Act and this provision should be enforced by the Anti-trust Division and the Federal Trade Commission rather than the Interstate Commerce Commission and the Civil Aeronautics Board.

Railroads and pipelines require a different merger policy. The presence of very significant economies of scale dictates a monopoly, duopoly, or concentrated oligopoly market structure as a condition of economic efficiency. Thus, internal expansion, at least internal expansion which increases the number of rivals in a particular market, might well militate against the realization of potential scale economies. Furthermore, since intramodal competition is typically absent altogether or of very limited significance, the effect of a proposed rail or pipeline merger upon economic efficiency can be the controlling criterion for approval.²⁵

While the foregoing re-orientation of regulatory policy should facilitate the achievement of cost-based rate structures, the objective of a rational allocation of transportation resources requires also that private costs be made consonant with social costs. This will require the institution of user charges for publicly provided facilities, including imputed taxes and imputed interest on capital.

The same logic which argues for termination of governmental subsidization also supports the elimination of enforced internal subsidization. A federal law which permitted carriers to abandon service or facilities at will and declared state limitations on abandonment by carriers engaged in interstate operations to be a burden on interstate commerce would accomplish this result. Then, whenever, despite the deficiency of private revenues, special circumstances might justify the continuation of a particular service, the appropriate governmental subdivision could always preserve the service by supplementing private revenues with public ones.

Conclusions

The transportation industries have enjoyed a rate of productivity increase in the past that compares favorably with other major sectors of the economy. There is no reason to believe that innovation will be less significant a force for the enhancement of transportation efficiency in the future. On the other hand, recent trends and the potentialities inherent in emerging techniques and equipment would seem to foretell a larger role for airline, pipeline, and rail transport and a somewhat diminished one for highway and water transport.

The institution of the regulatory reforms discussed earlier would in some cases reinforce and in other cases weaken the tendencies indicated by technological change. The imposition of full user charges would exert the most adverse effects on local service air carriers and river traffic. The relaxation

²⁵Cf. Michael Conant, "The Myth of Inter-Railroad Competition," Land Economics, (August, 1962), p. 255.

of minimum rate controls would benefit railroads at the expense of highway carriers, but the elimination entry, route, and commodity restrictions should enable highway common carriers to divert a substantial amount of offsetting traffic from private carriers.

Rates of return in the transportation industries have not generally been excessive. On the contrary, with the exception of the pipelines, they seem to have lagged rather badly behind manufacturing industries and public utilities.²⁶ Hopefully, prospective technological changes and needed regulatory innovations will improve the earnings of depressed transportation industries, particularly the railways, and at the same time enhance economic welfare generally.

²⁶M. J. Peck and J. R. Meyer, "The Determination of a Fair Return on Investment for Regulated Industries," *Transportation Economics*, (New York: National Bureau of Economic Research, 1965) pp. 223-238.

Felton in response to questions from the audience:

I think that there will be a progressive increase in the amount of less-than-carload traffic which in the future will move by piggyback. I expect that the truck will continue to play even a larger role here than in some other shipments. I know the railroads have been abandoning less-than-carload lot shipments rather fast in recent years, no doubt this has given an opportunity for the highway carriers to enjoy increases in traffic of this nature. I think that for movements of substantial length, the piggyback system has some advantages over either railroad movement by carload or less-than carload lots of highway shipment.

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Voigt, R. D.	Upper Midwest Research and Development Council, (Minneapolis)
Wahl, J. A.	General Mills, (Minneapolis)
Winge, Ralph	(Minot, North Dakota)
Wold, Lawrence	Minot Farmers Elevator, (Minot)
Wulff, Charles H.	Farmers Union Grain Terminal Association, (Minneapolis)
Zimmermann, H. W.	R. E. A. Express, (St. Paul)

Program Moderators

Dr. Dale G. Anderson, Department of Agricultural Economics, University of Nebraska, Lincoln, Nebraska

Mr. John O. Gerald, Transportation Research Group, Competition and Pricing Branch, Marketing Economics Division, U.S. Department of Agriculture, Washington, D.C.

Mr. Hoy Richards, Texas Transportation Institute, Texas A & M University, College Station, Texas

Dr. Charles Rust, Department of Economics, Montana State University, Bozeman, Montana

Dinner Master of Ceremonies

Mr. Fred P. Brandt, Director, Economic Development Commission, Bismarck, North Dakota

Mr. R. C. Crockett, Executive Vice President, Greater North Dakota Association, Fargo, North Dakota

Mr. Bruce E. Hagen, Commissioner, North Dakota Public Service Commission, Bismarck, North Dakota