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ISSUES IN PUBLIC TRANSPORTATION

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The members of the committee selected to organize the conference and to supervise the preparation of this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project.

Responsibility for the selection of the participants in the conference and for any summaries or recommendations in this report rests with that committee. The views expressed in individual papers and attributed to the authors of those papers are those of the authors and do not necessarily reflect the view of the committee, the Transportation Research Board, the National Academy of Sciences, or the sponsors of the project.

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NOTICE

CONTENTS

In the early seventies, public transportation began to receive increased attention as more and more public officials acknowledged that it would have to accommodate a greater share of travelers in urban areas. They also began to realize that they needed more knowledge on the causes of the failure of public transportation to maintain its once-dominant role in urban transport and on the kinds of services that are best suited to both the current urban setting and that of the future.

The Engineering Foundation in cooperation with the Highway Research Board, therefore, sponsored a 5-day conference on Public Transportation in Urban Areas. The conference, which was held in Henniker, New Hampshire, in June 1972, was planned and developed by the Board's Task Force on Urban Mass Transportation. Members of the task force included Kenneth W. Heathington and James Scott, chairmen, and Leon M. Cole, James C. Echols, Ronald J. Fisher, F. Norman Hill, Donald A. Morin, Thomas B. O'Connor, Charles C. Schimpeler, John B. Schnell, and Edward Weiner.

During the general sessions of the conference, invited speakers made presentations that were grouped into 5 topical areas. During the evening, 4 seminar sessions ran concurrently.

At the first general session, discussions focused on problems in the entire field of public transportation, including taxicabs, and the use of technical, political, and social measures to solve them.

At the second session, which was on the topic of financing public transportation, speakers addressed the effect of subsidies on the collective bargaining process, deficiencies in present subsidy efforts, importance of fare-box revenues in the financing plan, interrelation of service cost and the quantity and quality of service, role of the various levels of government in setting standards and in providing and administering funds, ownership of the transit operation, and importance of non-fare-box revenue.

On the topic of operating standards, speakers at the third session discussed the standards that are now used in the design and operation of services, the development of standards, and their appropriateness to current conditions.

Speakers at the fourth session on marketing sought to answer the following questions: How does the amount that the transit industry budgets for marketing compare with the amount budgeted by other industries that provide public services? Can marketing be a positive force in attracting riders to transit? How can information on successful innovative transit services be made available to other transit operators? Is it important to wait until better transit products are available before marketing efforts are made? What are good marketing practices, and how can they be applied to public transportation?

INTRODUCTION

In their discussions during the fifth session on implementing public transportation programs, speakers concentrated on the role of the professional in the development of alternative strategies and his relation to the administrative decision-maker.

Evening seminar topics included planning (How can planning solve urban transportation problems?), research (What are the high-priority research areas, and who should perform the research?), education and training (How can people be attracted to careers in public transportation?), and legislation (What local, state, and federal laws are needed or not needed to enhance public transportation?).

Approximately 75 officials and professionals from government, industry, and academic institutions participated in these sessions and seminars. This report contains the proceedings, and its organization generally follows that of the conference itself. An introductory chapter by the conference chairmen is followed by chapters for each of the 5 general sessions and 4 seminars.

Within the past few years, increasing attention has been given to public transportation in all urban areas. Financial resources have also increased; money is now available for planning and for capital improvements. Although many argue that the amount of money available is not nearly enough, it is, nevertheless, substantially more than what has been available for many years.

Many factors have contributed to this increased interest in public transportation. In most large urban areas, traffic congestion has nearly immobilized travelers and created heavy air pollution concentrations. Recently, the shortage of fuel has created another crisis.

The new interest in public transportation must be directed toward achieving real gains. Interest in a particular subject or area does not necessarily in and of itself lead to real gains. Consumer acceptance and utilization of public transportation are indications that significant progress has been made.

The role of public transportation has changed little during the past 50 years. The role has almost always been that of serving only those people who have no other way to travel. This is especially true in small- and medium-sized urban areas. The role of public transportation and the requirements for maintaining that role must be well defined if there is to be a meaningful evaluation of public transportation services.

THE EMERGING ROLE OF PUBLIC TRANSPORTATION

In large urban areas, public transportation generally contributes to the reduction of traffic congestion, strengthens the central business district, and carries a small number of captive riders. Large cities such as Chicago would have difficulty functioning without their public transportation systems. The level-of-service ratio between automobile transportation and public transportation in Chicago, for example, is good. Automobile traffic is heavily congested, travel times are long, parking is inadequate and expensive, and driving creates maximum stress and strain. At the same time, headways on the rail rapid transit system and the public bus system are short, sometimes as low as 3 minutes in the peak periods and only 5 or 7 minutes in the off-peak periods.

The role of public transportation in Chicago is certainly different from that in many other urban areas. It provides good service to and from the Loop area, although service for cross-flow traffic is not nearly so good. Thus, the major role of public transportation in large cities seems to be to strengthen the central business district and to maintain its prominence in the urban area; providing general travel seems to be a minor role.

In small urban areas, public transportation is used quite differently. It has

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Kenneth W. Heathington and James A. Scott

only a slight effect on traffic congestion or the strength of the central business district. Because almost all riders are captive (60 to 80 percent of the total ridership), the public transportation systems become a social responsibility rather than a transportation requirement.

The level-of-service ratio between public transportation and automobile travel is not nearly so good in small urban areas as in large urban areas. In the small urban areas, trip lengths are shorter, traffic congestion is low, travel time is short, and parking is adequate and at a low cost. At the same time, headways on transit vehicles are quite long, and many portions of the urban area are not served at all.

Whether traditional public transportation systems in small- and medium-sized urban areas can ever be designed to compete effectively with the automobile is questionable. Most of the small urban areas have low densities that permit the effective use of the automobile as long as air quality standards are met and fuel is available.

The geographic location of an urban area influences the dependency on public transportation. Older cities that developed in the north and northeast long before the advent of the automobile have high densities and street patterns that are not conducive to automobile movement. Car ownership is lower in these areas than in other parts of the country. Cities in the south and southwest, in general, expanded after the advent of the automobile and have lower population densities. Thus, these cities are more automobile oriented and dependent and generally have no single prominent area such as a central business district.

The objectives for public transportation will clearly vary depending on the size of the area and the geographical location. A system providing transportation to a highly oriented CBD may not provide service for the old, young, and handicapped who have no other way to travel. At the same time, a socially successful system operating in a small urban area may not contribute to the reduction of traffic congestion or aid development. Objectives must be defined for the specific area if public transportation is to have a significant role in improving the form and operation of urban activities.

MARKETABILITY OF PUBLIC TRANSPORTATION

In defining the role that public transportation should play in an urban area, one may usefully look at roles that other businesses play. Generally, businesses can be classified as being either product or consumer oriented. A product-oriented firm is one that attempts to sell a product or service even though it may be totally unrelated to consumer needs or desires. A consumer-oriented firm is one that attempts to determine what the consumer desires and needs and then to develop a product or service that meets those desires and needs. A review of historical economic data in the United States reveals that most product-oriented firms have not been able to remain economically viable for very many years but that consumer-oriented firms have continued to prosper for long periods of time (1, 2, 3, 4).

Many product-oriented firms believe that, as population grows, demand for their product will grow. This assumption is completely false and has proved to be so many times as the following examples show.

1. The demand in the United States for kerosene lamps ceased almost entirely when electricity became available to light homes, businesses, and other facilities.
2. Recently the dry-cleaning business began to decline not because people do not desire to remain as clean as they once did but because the new fabrics do not need to be dry-cleaned.
3. In the 1930s, some executives of the big chain corner grocery stores thought that the consumer would never drive for miles to shop at supermarkets and sacrifice the personal service of the neighborhood store.

All of the economically failing industries appear to have moved in a self-deceiving cycle of large expansions and unrecognized decay. Four conditions lead to this cycle (3, 4):

1. The belief that growth is assured by an expanding and more affluent population.
2. The belief that there is no competitive substitute for the industry's major product.
3. Too much faith in mass production and in the advantages of rapidly declining unit costs as output rises.
4. Preoccupation with the product that lends itself to carefully controlled scientific experimentation, improvement, and manufacturing cost reduction.

An industry should be concerned that its process remains a consumer-satisfying process and does not become product oriented. A business venture should begin not with a raw material, a product, or a selling skill but with the customer and his needs.

Most public transportation systems are really product oriented. The objective has been to simply produce more of the same in the belief that as the population grows the demand for the product will grow. The few innovations that have been implemented have been oriented toward specific technology or equipment, i.e., the product, and not toward the consumer. The following examples illustrate this point.

1. A very large and expensive public transportation system is being developed in Atlanta (5). To attract new ridership to the system, fares were reduced from 40 to 15 cents and some improvements were made in service. As a result, ridership increased only 23 percent and the deficit increased about 40 percent. (In the field of public transportation, one needs an increase not of 23 percent but of 2,300 percent.)
2. In Rome, free public transportation was provided for a short period of time (6). Ridership increased approximately 23 percent. The number of automobiles in the downtown area remained the same, but those who had previously walked 2 or 3 blocks used transit because it was free. Thus, the average trip time became shorter, but the total amount of traffic congestion remained the same.
3. Free transportation was promoted by the San Antonio Transit System and also had approximately a 23 percent acceptance.

These examples indicate that the reduction of the unit price does not greatly increase the demand for the product. Although a small increase in ridership was attained, one could well argue that simply reducing the fare or reducing the cost of the product that a consumer does not desire will not lead to the purchasing of that product in any great quantities.

The BART system in San Francisco seems to be oriented more toward improving technology than toward satisfying consumers (8). True, the subway stations are more attractive and the ride is more comfortable. However, many question whether BART has determined or will meet specific consumer desires.

The Shirley Freeway project in the Washington, D.C., area is consumer oriented (9). Usage of this public transportation system has substantially increased, and automobile traffic in the peak periods along the same corridor has decreased.

Generally, the total number of passengers carried by traditional public bus systems has substantially decreased. Demand-responsive transportation systems, however, have had increased ridership and continue to have increased demands for service. Systems in Haddonfield and Toronto are examples of this type of transit, which is altogether consumer oriented (10, 11).

TECHNOLOGY AND PUBLIC TRANSPORTATION

Whether technology is the answer to the many problems in public transportation is certainly questionable. The consumer wants and buys service, not equipment. Thus, technology that yields new equipment and, perhaps, lower operating costs does not necessarily ensure an increase in demand for the service. This is not to say that technology is not important. The environment in which a person travels (i.e., the inside of the bus, the subway station) is important, of course, but not of primary importance. Of primary importance is service.

THE FUTURE OF PUBLIC TRANSPORTATION

If the automobile is permitted to continue to freely compete with public transportation, public transportation will continue to lose. The automobile is so consumer oriented and so meets the desires and expectations of motorists that it now has no competition. Regardless of traffic congestion, air pollution, fuel crisis, or whatever, the automobile has the market, not just a share of the market.

Conferences such as this one bring together many professional people who must establish, direct, or redirect, where appropriate, public transportation policy and operations. They must view that task within this context.

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Edward Weiner
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The problems in public transportation and the perceived solutions are somewhat a function of one's point of view. Further, the difficulty in solving these problems is increased when the perception of problems and solutions differs among the parties involved because it becomes more difficult to agree on a course of action.

Those involved in different aspects of public transportation must be brought together for the purpose of explicating these points of view and identifying where they agree and disagree. Disagreement, on either the problems or the solutions, should be resolved through an open communication process in which all concerned parties participate. Courses of action can then be plotted and implemented.

Speakers at the conference expressed 5 points of view on public transportation problems and solutions: the urban area, the taxicab industry, the transit industry, labor unions, and regulatory bodies.

Their papers, which follow, addressed the following specific questions:

What are the more severe problems in your area of public transportation at the present time?

What are the more severe problems in your area of public transportation that will exist in the next 10 to 20 years?

Can these problems be resolved through technological, political, or social expertise?

What should be done to alleviate these problems?

Who should take the initiative in resolving these problems?

William J. Ronan
New York Metropolitan Transportation Authority

At a time when society is trying to come to grips with the problems of urban America and the elusive question of providing mobility for people and goods, we witnessed not long ago 2 products of our society, John Young and Charles M. Duke, tooling along the rills and plateaus of the lunar landscape in their Moon Rover a quarter of a million miles away. While hundreds of millions of people throughout the world watched the spectacle live on TV, the astronauts engaged in the most awe-inspiring "dig" in man's history. Despite the barren and alien conditions of space, the exploration of the moon's secrets proceeded with nonchalance.

The drama is almost gone as routine nudges adventure aside. Conquering the moon technologically appears too easy. The conditions confronting us there are alien—but they are not hostile and, increasingly, they are predictable. Imagine the resurgence of public interest in moon exploration if, as we watched the astronauts at work, some moon urchins stole into the picture, stripped the Rover of its hubcaps and vital parts, and with magic markers and spray cans composed pointless but indelible lunar graffiti.

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I guess these wild speculations ought to bring us back to earth—and to the point I am making. By contrast, the technological challenge of public transportation on earth is ever so much more complex than moon junkets because out there we must only adapt man and machine to a given set of natural phenomena and down here we must attempt to persuade man and adapt machine to an unpredictable and irrational set of variables that are in a constant state of flux.

The aerospace industry has already had a traumatic introduction to transit facts of life. In the New York region and elsewhere throughout the country we have tossed the aerospace technicians some of our earthbound problems, and they have learned quickly that the cruel environment in which our transport operations must function is a ruthless destroyer of quick-and-easy solutions and an impossible confounder of super-sophisticated, complex approaches as well.

The dynamics of technological planning and development for moving people is an area of knowledge far less charted or understood than the physiognomy of the moon. Historically, public transportation facilities advanced technically only far enough to permit us to make-do with the immediate problems at hand. In the railroad industry, the immediate problem always seemed to be movement of goods as a priority concern over the movement of passengers. As a result, the design of rail passenger equipment for the ordinary traveler had often been an accommodation to the operator—not the consumer.

The American rail industry has had a fundamental technical shortcoming that has had a deleterious effect on public transit. It never engaged in basic research. The industry had, through the years, learned to cope with its technical problems—but it never tried to master them. It was satisfied to deal with the peculiarities of a particular situation without gaining the broad scientific and technological wherewithal to deal easily with growth and change.

The railroad industry's failure—despite all its power and wealth—to comprehend the need for scientific and technological mastery of its functional role in a modern world has hurt the industry, not to mention the modern world, and especially the urban world, which is strangling in its own immobility.

The role I speak of transcends the know-how to make machines move more efficiently. Public tastes and standards today relating to travel, comfort, speed, and reliability have escalated at a rate disproportionate to our current ability to satisfy them technically. Unfortunately, the public now expects a lot more from science than science can currently deliver. In this respect, moon shots have spoiled us.

However, the technological needs of the transit industry are neither so vast nor so complex that they cannot be met within a realistic range of fulfillment. I speak of a range (rather than absolutes) because the public can be an insatiable and sometimes contrary creature in terms of public service demands. Try, as an example, to develop a temperature control system that will satisfy all the passengers in a rail car.

Recognizing the frailties of seeking perfection in our transportation pursuits, let us consider what can be done and is being done in this crucial industry.

To begin with, the new transit technology must abandon the somewhat provincial and expedient approaches to its problems and accept a broadened and more comprehensive role in the planning and development of transport systems. The concept of total transportation planning, which, I am pleased to note, was adopted here in this region with the establishment of the MTA by the state of New York, is essential if we are to design systems and facilities that can do more than cope with a few immediate and highly localized problems. Systems design—the packaging of mobility so to speak—must take cognizance of the liberated and mobile urban dweller who must be offered combinations of workable travel modes if he is to survive.

This means making the realistic assessments of what modes will operate most effectively and be acceptable in a given setting and set of circumstances. This means building subways where they make sense and establishing other modes of travel where they do not. This means recognizing where intercity air travel has the decided advantage over intercity rail—and vice versa—and thus avoiding the costly duplication of public effort in self-defeating and wasteful enterprises. This means developing the

the necessary linkages and connection points to tie together air, rail, subway, bus, and private automobile travel into logical systems rather than competitive modes. This means departure from our long-established national practice of encouraging—if not demanding by law—competition between modes.

Within this broadened systemic context, the criteria for design can be classified as they relate to transportation's 3 major clients: the consumer, the operator, and the community.

The consumer has been the forgotten client in transportation. That role has changed drastically in the past 5 years as new emphasis has been placed on "humanizing" transport systems. But the dead hand of neglect, impoverishment, and deterioration that has stultified the transit industry for decades still has its negative effects on our older existing operations. Putting into ancient systems the creature comforts that are expected of modern operations not only is expensive but often is technically overwhelming.

A case in point is ventilation, which is the subject of a major study carried out with federal assistance by the Institute for Rapid Transit. The $2.8 million study will attempt to establish standards and guidelines for new and existing systems. This type of investigation, long overdue, will help us shape the design of new systems and introduce technological changes to improve our existing ones. Clearly, however, the task is not a simple one.

Similarly, we undertook a study in New York on the problems of noise and vibration as they affect new and existing subway lines. The cacophony of New York's subways is legend—and it was tolerated as part of the New York scene for about 70 years. With the new sensitivities regarding noise pollution, the subways have to be looked at in terms of modern standards of acceptance. Here, too, the task is formidable because of the difficulty of applying traditional approaches to acoustical shielding to the subway environment.

Undoing the past is understandably difficult. Yet it is very much part of the urban transportation technology that had been put to the test to create the quiet, air-conditioned, and aesthetically pleasing new rolling stock on MTA's subways and commuter lines. The result—in the sleek Metropolitans on the LIRR and Penn Central and the R44s, the new car on the subways—is encouraging, but it was not reached without much blood, sweat, and buckets of tears.

A significant part of the problem of dragging our transit industry into the second half of the twentieth century has been the difficulty implicit in designing for the passenger-oriented operator who must provide reliable, moderately priced service on an intensive basis. Reliability of equipment is the backbone of any good service. Yet it is in this crucial area that we have found the greatest pitfalls. This dilemma is by no means isolated in public transportation. From pop-up toasters to 8-cylinder hardtops, the lapses in production and design quality have become commonplace.

But in public transportation, design lapses and production shortcomings inconvenience not one consumer but millions. The need for design to facilitate maintenance and repair is of paramount importance. This factor has been heightened in recent years by the changes in the labor pool—changes that find us with less experienced maintenance and shop workers who must be trained to deal with highly sophisticated Rube Goldberg devices that are difficult to get to and sensitive to adjust.

Designing to maximize the versatility of our systems is another significant need. Here, the federal government has played a role in seeking standardization of facilities as much as possible. In our MTA systems we inherited 83 different varieties of rolling stock. And we are working toward reducing that number and thus reducing costs of inventories, shop time, tools, and so forth.

Another key to versatility lies in our ability to move the same piece of equipment throughout the system without regard to the propulsion requirements in different sections. In this region, as you may know, only electrically propelled rail cars are permitted through the tunnels to Manhattan. This means that trains operating in nonelectrified areas must discharge passengers short of the river crossings or terminate their runs at points outside of Manhattan.

To overcome this, MTA has been experimenting with a gas turbine-electric propulsion

system that will offer great versatility in this region. A federal grant of $7.4 million will help us to purchase two 4-car trains—one from Garrett Corporation and the other from General Electric as prototypes to be tested in passenger service.

Once in use, these high-speed cars will help this region immeasurably in shortening the length of longer commuter runs and in bringing outlying facilities such as Stewart Airport into easy commuting range of the center city.

Still another design consideration to improve operations centers about power savings. In New York, MTA uses about 11 percent of Con Edison's total output. With the purchase of more sophisticated electric equipment and with air-conditioning and other power demand features, we must find ways to make the most of our power usage.

In another federally aided project—also involving Garrett Corporation—we are going to test an experimental power-storage flywheel on 2 conventional subway cars. If successful, this device could dissipate heat caused by braking (achieving an environmental goal) and employ this stored energy to generate electricity to help get the trains moving again.

The conservation of power is not merely an operator's concern but a serious community concern as well. Here again, design for public transportation must consider its largest and most vital client—the community at large.

The urban transportation industry has moved full circle from the public-be-damned slogan (which was coined, of course, by a railroad mogul and implemented with vigor in the heyday of the railroad barons). The transport industry, once the villainous threat to our cities, has now become their hope for survival. And in this new context, we must recognize the needs of the overall community, which in turn must commit itself to help support our systems.

Accordingly, the economics of design play an important role. The utility of equipment in terms of operational cost, maintenance, power demand, useful life, and all of the other concomitant cost inputs has real significance to the taxpayer who must ultimately help pay for it.

Aside from economics is the matter of environmental impact. Sound system design calls for minimizing pollution and other negative impacts such as excessive noise and heat generation.

In still another area of transport, we are waiting patiently for bus design to catch up with modern urban requirements. We are still living with a box on wheels, which is nothing more than the stagecoach or the horse-drawn trolley—only self-propelled. In both body design and propulsion methods, the urban bus is still awaiting a technological breakthrough. Rail rapid transit is not the substitute for bus service—both have distance functions and are not interchangeable. And yet, at this stage, our technological progress seems to be moving ahead more rapidly on the rails.

The tracked linear induction propulsion systems, combined with air-cushion or magnetic suspension devices, are well on their experimental way in France, in Germany, and more recently in this country. By comparison, electric or battery-operated buses are lagging behind experimentally, still awaiting longer lived, lightweight battery components. And, in coach design, easy curb level access for bus passengers is still a gleam in the eye.

The research and development field obviously is wide open to all comers who can apply old technology (as in the case of linear induction engines) to new uses or who can innovate and pioneer new ideas for the new urban society that we are helping to build.

Of course, there is another side to the technology coin: the need to find the funds to bring about major improvements and expansion of public transport systems—not to mention merely maintaining such services.

The transit facilities in this country are among the urban fixtures that, for the most part, were created years ago and have long since been taken for granted along with utilities, communication lines, water supply systems, and sewers. In each case, we literally or symbolically buried these facilities underground and promptly moved on as a society to supposedly more sophisticated urban problems that soon consumed most of our municipal and state budgets.

Not until the beginning of this past decade did we begin to find that the maintenance

of our so-called infrasystems and the fundamental housekeeping responsibilities within our cities were vastly neglected. We also began to realize that the deterioration of these basic services and facilities went to the heart of problems such as poverty, housing, safety, middle-class exodus, flight of business, and other issues that are identified as part of the modern urban dilemma.

Now that society has defined urban transportation as one of the key elements in working our way out of our current difficulties, we find that it has been rendered too feeble to come to the immediate rescue of strangling cities. The past partnership of private neglect and public apathy has taken a devastating toll.

Until we can provide a major infusion of dollars, equipment, and skills to aid public transport operations, we can at best merely hold these beleaguered outposts against the relentless ravages of deterioration and financial erosion. It is clear that there is an urgency to the needs of these systems; and it is also clear that we cannot find the funds to do the job in the passenger fare box alone. The stakes go much beyond the provision of a service to a rider. The whole community, region, and nation benefit from these facilities and, rightfully, should share in some of the costs.

At this point, I believe we have reached that milestone locally and nationally where the public is willing to declare war on urban transportation inadequacies and provide the necessary resources to wage that war and win it. It has become apparent that new urban society is prepared to make a commitment to improved public transport, and that commitment is being translated into positive actions in city halls, state houses, and in the halls of Congress. The shift toward transportation sanity—toward a more balanced set of policies and a more equitable distribution of the transportation dollar—has been very much in evidence in recent months in Washington.

What has happened in our Capital would have been deemed impossible by the experts only a few years ago. Who would believe 5 years ago that Congress would enact in 1970 a $10-billion capital improvement program for new bus, subway, and commuter rail projects? More surprising, who would have guessed that in 1971 the Senate would vote by an overwhelming margin the funds to provide $400 million in operating assistance to bus and urban rail lines that are hard-pressed to maintain services without continually resorting to self-defeating fare increases? Still other surprises have surfaced. Who would have guessed that the transportation secretary would recommend to use funds from the once sacrosanct Highway Trust Fund to assist public transportation operations?

Although I have referred to these events as surprises, please be assured that they did not just happen. The coalition of urban leadership and transit operators—which grew out of this new transportation commitment—has been a prime force in finally bringing to the surface the problems that had suffered in agonizing silence for too many years. As a member of this coalition team (in fact, an issue of the National Journal identifies me as one of the ringleaders), I can assure you that the growing nationwide movement by municipal and state leadership to opt for transit improvements was a deciding factor in influencing legislators who until recently considered this to be an isolated "big-city" problem.

It is apparent that the concentration of federal funds—as demonstrated by the billions spent on the moon shot—could move millions on earth as easily as those 2 passengers on the moon. I do not want to minimize the technology achievements of space exploration when I discuss the seemingly mundane problems of public transportation. Our space program stands as an outstanding example of what can be achieved by underwriting man's genius with vast monetary outlays and buttressing it with strong public and political support.

I recall the lyrics to an old romantic ballad that began, "The moon belongs to everyone. The best things in life are free." Today, in a less innocent world, we have discovered that the moon is far from free and that only a massive administrative, scientific, and financial effort could bring it within man's grasp.

So it is with the achievement of good public transportation in our programmatic world: Only through a combination of improved technology, adequate administrative mechanisms, large financial outlay, and strong public commitment can we begin to address the problem of urban mobility. These are the ingredients of success in our

venture. Without these realities, all we can expect is more of the same: empty rhetoric and pointless technical polemics, leading to what Thomas Huxley called "the great tragedy of science—the slaying of a beautiful hypothesis by an ugly fact."

George A. Avery
Wald, Harkrader and Ross

Until my escape to the private practice of law a few years ago, I had been involved in problems of regulating urban transportation for 5 years as chairman of the Washington Metropolitan Area Transit Commission. I will give a brief history of the course of events during that time and in the year following with regard to transit fares for D. C. Transit System, Inc. (now the Washington Metropolitan Area Transit Authority), the principal carrier in the District of Columbia. This will be useful as a factual background for the somewhat philosophical analysis that I have evolved out of my experience and is the focus of this paper.

When I joined the transit commission in November 1966, a D. C. Transit rate case was in progress. The basic cash fare was then 25 cents; tokens were sold at the rate of 4 for 85 cents or 22¼ cents each. Fifty-seven percent of fares were paid with tokens. In fiscal 1966, the system carried 137,771,403 riders. We granted the company a fare increase in the case that was pending when I joined the commission. By the time I left the commission in 1971, the company had applied for fare increases 4 more times. Each time, a clear showing was made that costs were outstripping revenues and it was necessary to grant an additional increase. Hence, when I left the commission, after 5 years and 5 rate cases, the basic fare had reached 40 cents and there was no longer a token discount. By 1971, the number of riders carried by D. C. Transit had declined to 101,965,573, a drop of more than 26 percent.

Nor has the pressure for higher fares abated. In the year after my return to private practice, D. C. Transit again applied for a fare increase to 50 cents. In May 1972, the commission, while finding that costs would again exceed revenues, refused to grant an increase until D. C. Transit reformed its capital structure. By the time of that decision, the ratio of D. C. Transit's debt capital to equity was a staggering 18 to 1, and the commission felt that about $6 million of equity funds should be invested. The commission made it clear that, if this were done, a fare increase of some magnitude would be granted. At this juncture, the entire matter was appealed in the courts.

Although D. C. Transit, the principal carrier in the Washington area, is the focus of this account, its situation is by no means unique. The other 3 major carriers serving the D. C. suburbs at that time were also caught in the same vicious cycle. Indeed, this same picture can be seen throughout the urban transit industry nationally.

Between 1965 and 1971, the average fare nationally increased more than 43 percent, from 21 to 30 cents. In this period, base fares increased 100 and 80 percent in New York and Chicago, and these 2 cities account for a substantial portion of total revenue passengers in the entire nation. Numerous other major cities have seen increases of 50 percent and more. In Cincinnati, the fare was 25 cents in 1965 and 50 cents in 1972. Meanwhile, to complete the cycle, ridership has fallen sharply; 17 percent fewer total passengers were carried in 1971 than in 1965 and 19 percent fewer revenue passengers.

Coping with the problems of constantly increasing fares and declining ridership in any effective way as a regulator proved to be enormously frustrating. This was basically because the tools for dealing with the root causes of the problem were simply not available to a regulatory agency. Such agencies were not set up to deal with sick companies in a generally declining market. Rather, they have their historical roots in the public utility field, where powerful monopolies provided essential services to the public and the need was to protect customers against the extraction of excessive profits.

Thus, the basic thrust of the powers granted to a regulatory agency is the review of operating costs toward the end that only reasonable costs be charged to the ratepayer. Little thought was given to situations in which the reasonable costs themselves produce rates or fares that are counterproductive or socially unacceptable. Again, regulation was historically concerned with limiting profits to a reasonable level. It does not function well where a carrier is hard put to earn any profit in competition with a heavily favored and extremely attractive alternative form of transportation. Although powers are vested in the agency to control service standards, such as routes and schedules, it was not understood that those powers are of little avail where the carrier is so preoccupied with maintaining basic viability that seeking to extract innovation or a bold approach to risky new ventures is completely unrealistic.

As the shortcomings of public regulation of private transit companies have become more and more apparent, the most common reaction has been to eliminate both the regulator and the regulated carrier by converting the transit operation to public ownership. Four percent of all public transportation systems were publicly owned in 1959 and 14 percent in 1971. More important, between 1960 and 1972, New York, Philadelphia, Los Angeles, and 18 other urban areas with populations of more than 250,000 went "public," with the result that the 151 publicly owned systems accounted for at least 83 percent of all revenues, revenue passengers, and number of employees. Indeed, the trend is so strong that the transit regulator is a disappearing breed.

Public ownership has much to offer, particularly in making it easier to achieve the proper kind of public financial support for transit, a subject I will discuss shortly. However, clearly public ownership does not solve the basic problems of urban transit. Publicly owned systems throughout the country face the same problems of increasing fares, decreasing ridership, and deteriorating service that gave rise to public ownership in the first place. Moreover, the conversion to public ownership costs the public certain advantages and protections found in regulation of private utility enterprise. For instance, it insulates transit management from the independent scrutiny that exists when a private operation is regulated by a government commission. For instance, many publicly owned operations can set fares on the basis of determinations, not subject to review, by those who themselves conduct the transit operation. I submit that the independent scrutiny and the opportunity for review in an adversary setting, which are characteristic of rate regulation of private utilities, first, provide a desirable restraint on the interest of management in higher revenues and, second, give an incentive toward efficiency and economy.

This might manifest itself most obviously in the labor relations of a transit operation. Although I have never been a party to a transit labor negotiation, I would hazard a guess that the private operator places heavy emphasis on the difficulty of obtaining the fare increases that a given wage demand would generate. I would further suggest that the public operator, who both negotiates the wage agreement and controls his own fare level, cannot argue this point so convincingly at the bargaining table.

As I have already indicated, increasing public ownership seems largely inevitable. I point out these difficulties not to argue against it but to suggest that the continuing problems encountered under public ownership call for a more penetrating analysis of the transit problem, a subject I will address in a moment. In addition, I think these public ownership problems should be recognized in the hope that the structure adopted for a given public ownership might find a place for the independent scrutiny that exists in the regulatory role. This might be distasteful to the public operator, but its benefits for the public would outweigh the pain he might be caused.

Accepting the premise, then, that urban transit problems do not have their root causes in the shortcomings of regulation, as demonstrated by the failure of public ownership and control to solve those problems, I think that any useful analysis of the role of regulation in urban transit must look to the basic causes of rising fares and declining ridership.

This is a subject that has been much discussed and some of what I say may be already well known. I believe, however, that solutions to the transit problem will be made easier if a broad understanding of the matter is fostered. Hence, I think it is worth

going over some basic ground. Moreover, much of what I have heard and read does not carry the analytical process far enough. For instance, it is easy to find statements that the decline of public transit is caused by its failure to respond to changing patterns of demand and by its failure to provide the comfort and convenience that attract and retain patronage. I think the more interesting and basic question is, Why did transit fail to do this? The technological means to create urban transit systems that avoided these problems either exist or could have been created. We certainly have the resource base to bring such a system into being. It seems to me it did not happen because, without fully realizing what we were doing, we turned our attention elsewhere. I would like to spell out what I mean in some detail. I think we should begin by achieving a clear understanding of the real causes of the constant upward pressure in transit fares and its attendant decline in ridership levels.

In my own community and in many others, the anger and frustration that these constant fare increases generate give rise to the suspicion that they are caused by the greed or incompetence of the transit owners and operators or the venality or stupidity of those who regulate them. Not surprisingly, this is not a view that I hold. Immersion in the problems of transit quickly teaches that the constant upward pressure in fares is the product of (a) the basic economic characteristics of a transit operation and (b) the deeply ingrained social and cultural forces at work in our society.

Taking up, first, the economic factors, I will start by emphasizing the labor-intensive aspect of urban transit. According to 1971 statistics, industry payroll was 68 percent of operating expenses (including depreciation) without consideration of pension and other employee benefit costs. When all labor-related costs are considered, this component of expense can reach as high as 82 percent (e.g., in Detroit). The intense inflationary pressures in the late 1960s and early 1970s have constantly exerted an upward pressure on this labor component of operating costs. In many cases, the effect was automatic because of cost-of-living escalator clauses in labor contracts. In almost all instances, where labor contracts came up for revewal, significantly higher wage rates were sought and obtained. This is neither surprising nor reprehensible. The transit worker is entitled to seek protection from the effects of a general inflationary trend.

Transit management, however, is seriously limited in its ability to absorb the impact of increasing labor cost. Labor expense is such a large component of total operating costs that there is little chance of significantly offsetting cost reductions in other areas. An illustration should make this point clear. Assume that a transit operation has total annual operating costs of $10 million, 70 percent of which is labor cost. If labor expense rises 10 percent, or $700,000, it could be absorbed in the nonlabor component of cost only by offsetting reductions of more than 23 percent. Reductions of this magnitude are not possible to obtain. Moreover, in the labor component itself, there are few opportunities for automation or increasing productivity. There must be one driver for each bus, and the driver's operating schedule is largely controlled by factors of distance and traffic conditions. The same number of persons could be carried by operating larger buses less frequently, but this would be regarded by the patron as a deterioration in service.

The opportunities for coping with increased costs are limited, then, on the cost side. Equally severe restraints exist on the revenue side. For reasons that I will develop in detail shortly, public transit is a culturally and socially disfavored element of society. If we look for the moment only at symptoms and not at causes, the indicia of decline in the transit industry abound.

I have already discussed the rising fares-declining passengers syndrome. Other indicia, equally familiar, are the decline in employees, the decline in vehicle-miles operated, and, most important, the industry's ever-increasing after-tax operating income deficit, which, according to the American Transit Association's preliminary statistics, was $411,400,000 in 1971!

The transit operator, then, finds himself in a terrible squeeze: He is faced with significantly increasing costs and neither can find a way to absorb them through operational changes nor has available additional revenues from a growing market to offset

them. Again and again, he must seek additional revenues from his existing ridership through fare increases. Each time he does, the ridership decreases further. At the transit commission, we estimated that, at the 20- to 30-cent fare level, each 10 percent increase in fares would result in a 2.5 percent decrease in passengers. Others say the decline is closer to 5 percent. At the 40- to 50-cent level, the statistics, when developed, will likely show a greater decline, unless the last round strips the industry of all passengers save those whose circumstances force them into ridership no matter what the cost. Reluctance to add to the economic burden through service innovations, with attendant costs and risks, and additional capital investment, with its attendant costs, adds to the general declining trend. Eventually, in many places, transit has become a skeletal service of last resort, used only by the young, the poor, the aged, and those who, for other reasons, are without any alternative. The dismaying thing about this fact is that, although these persons dependent on public transit are not sufficiently numerous to support an adequate level of service of acceptable fare levels, they do constitute a significant portion of the urban population. According to one estimate, 25 percent of the urban population does not have ready access to private transportation.

Are we condemned to this depressing cycle of decline and decay? Must we watch our public transportation systems become a decreasingly important element in the urban environment at a time when the need is greatest? There are those who would argue that these social and economic forces should be left undisturbed—that public transit should simply find that level of fare and service that the marketplace will support. Those holding the sounder view, however, recognize the full social implications of this short-sighted approach. They recognize that transit fares have already reached levels that are counterproductive to sensible transportation planning and broad social goals. They know, for instance, that these fares drive people off the public transportation system and into the automobile, exacerbating the problems of urban living. They know that these fares impose an ever-increasing burden on those persons who can least afford it—the urban poor who are totally dependent on public transportation. Those who recognize these problems are seeking to evolve a new transportation policy and a new transportation program to deal with them.

It is in these new transportation policies and priorities, and not in the adjustments that are possible through traditional regulation, that the solution to the urban transit crisis will be found. Again at the risk of covering ground that may be familiar to some, I should like to discuss the nature of the transportation policy we have been pursuing and its effect on urban transit and to indicate the lines along which that policy should be reshaped.

To understand our transportation policy of the last several decades, we must begin with the role of the automobile in our society. The broad availability of this incredibly convenient and personal form of locomotion has been a profound force. Although it is fashionable today to dwell on its evils, we should at least initially recognize that it is one of the most liberating inventions of the twentieth century. It provides a degree of freedom and mobility that we tend to take for granted but that would be a source of wonder to anyone viewing it anew.

Because it offers so much, the automobile has profoundly affected our society and shaped our urban development patterns. It has drastically affected our travel patterns, both in intercity travel and within our own communities. It has set a standard of convenience and comfort by which the public transportation system is judged. Most pertinent to my present subject, this love affair with the automobile has deeply affected public policy concerning the allocation of resources to transportation systems. Particularly since World War II, the overwhelming portion of public funds expended for transportation systems have been spent on facilities for the automobile.

Federal outlays for the Interstate Highway System alone amounted to $44.8 billion through 1971. Another $16 billion or so is estimated as needed to complete the system by 1977. Of course, there are other annual highway outlays by the federal government and by state and local governments as well. Taken together, these amount to tens of billions of dollars since 1945. In comparison to these staggering totals, federal grants

for public transportation through 1970 totaled $735 million. The 1972 budget appropriated $600 million for public transportation; the 1973 budget, $1 billion.

This resource commitment to the automobile is also reflected in land use patterns. In most cities, substantial land areas have been set aside for streets, highways, and parking facilities for automobiles. Several studies have estimated that approximately half the land in the central business districts of major cities is devoted to these purposes.

This preoccupation with the private automobile, in my judgment, has dried up the incentive of transit management to make the investment and the technical change necessary to keep transit a vital and growing element in the overall transportation picture. A standard of convenience and comfort was set that transit could not easily meet. A dispersion of travel patterns and demands was created that could not be conveniently served by conventional transit systems. Meanwhile, enormous sums of both public and private investment were being poured into systems and facilities designed to accommodate the automobile. Little was left over for the public transportation element. Even a status consciousness came into play. One indicia of success was the assigned parking space, and escape from dependence on public transit was a step on the ladder upward.

Much of this commitment of resources to the automobile has taken place without awareness, much less analysis, of the fact that an allocation was being made between competing systems. Rather, policy-makers were simply observing the fact that we were, by the millions, acquiring more and more automobiles and relying on them more and more. It seemed obvious that facilities had to be provided for their use. Thus, the post-World War II period saw an accelerating pace of development of superhighways, parking facilities, regional shopping centers, and other automobile-oriented forms of investment.

Not until the 1960s did the drawbacks to our ever-increasing reliance on the automobile clearly emerge. Some persons began to see that this marvelous machine has a voracious appetite, particularly in the urban setting. Its ever-increasing use for work-home commutation was creating peak demand that called for facilities that destroyed vast areas of our cities. Moreover, these facilities never seemed to be enough. Their very creation generated new levels of demand, new problems of congestion, and further destruction of neighborhoods. The impact of these millions of internal-combustion engines on our air quality also became apparent—naturally enough in California first. At the same time, the deterioration of public transportation systems (the basic causes for which, in my judgment, are the forces created by the automobile) reached a point where their shortcomings became more and more painfully obvious not only to their users but to those responsible for formulating public policy.

These increasing insights into the impact of our reliance on the automobile have evoked a response. First, the whole question of transportation policy became a matter of increasing concern in academic circles and to government officials. Second, the resultant examination of such policy created an awareness that we had been committing the largest proportion of resources to the automotive sector of the overall transportation system. From this awareness has flowed a determination to allocate more resources—of money, of talent, of governmental time and attention—to the public transportation sector. The results of this reordering of priorities can easily be traced.

Until 1965, no federal money was spent for public transportation. In February of that year, the first "capital assistance" grants under the 1964 Urban Mass Transportation Act were approved. By the end of 1970, $735 million in federal funds was committed for grant projects. Another $66 million was devoted to capital loans and technical study grants. The scope of federal involvement increased dramatically in 1970 with the passage of the Urban Mass Transportation Assistance Act, which envisions a a 12-year, $10-billion program of aid. Since there were nearly $4.5 billion of grant applications pending at UMTA and since estimates of capital needs for the remainder of this decade are in the range of $20 billion, the $1 to $2 billion of annual federal expenditures contemplated by the 1970 act are certainly not out of line.

I am not suggesting that we have now evolved a sound urban transportation policy that is bringing into being the kind of total transportation system that best serves the

public interest. Far from it. As the dollar figures just cited demonstrate, formulation and implementation of a sound overall policy are still in early stages. I should like to discuss briefly where we are, where we should be going, and the implications of these facts for transit regulation.

Where are we, then? First, we still have a basically sick urban transit industry. The threat of fare increases continues; new equipment is not being purchased, and average bus age is lengthening; unscheduled cuts in service are becoming more frequent; there are discussions and formal requests to cut back on routes and schedules.

Where should we be going? The first order of business, it seems to me, is to break the vicious cycle already discussed and stabilize the situation of existing transit service. This is vital for a number of reasons. First, riders lost as a result of further deterioration in service or increase in fares will be difficult to regain. Hence, commitment to the goal of revitalizing transit implies stemming losses now. Second, fares have already reached levels that are socially counterproductive. Third, existing inadequacies of public transportation are of serious proportions and should not be exacerbated. Finally, the lead time required for the creation of any significant new public transit facility will be substantial.

If the analysis of the basic economics of transit operations that I discussed earlier is valid, and I believe it is, this objective of stabilizing existing transit service cannot be achieved through conventional regulatory means. It cannot, in other words, be achieved by bringing fare-box revenues in line with cost of service. A source of financial support other than the fare box must be found. I must emphasize that this is not necessary simply to achieve stability of fares. As long as transit systems are financially ill and generally declining, the kind of innovation and risk-taking needed to increase demand for transit service will almost certainly not be forthcoming.

For these reasons, I have been convinced for some time that, as a first and immediate step, subsidization of transit operating costs through public funds is an absolutely essential element of any program to make a basic revision in our public transportation systems. It appears that this need has been recognized. There are already a number of operating subsidies being provided at the local level. Most significantly, a bill that would provide $400 million in operating subsidy funds passed in the Senate.

The case for operating subsidies is not one-sided. They do create problems. For one thing, the required level of support is beyond the capability of most local communities, particularly given the competing demands on their tax base. This leads to a pressure for support from the federal level. This, in turn, creates a whole range of problems, ranging from the political—a reluctance at the federal level to become involved in every local transit fare problem—to the highly technical—the need to devise a means for allocating federal funds among local jurisdictions on a basis that is equitable and acceptable to the diverse forces at work in the Congress.

The very concept of public support raises some basic problems. A means must be found to retain an incentive for efficiency of operations. In addition, there is fear that providing subsidy funds will make available an essentially bottomless pocket to which labor can look in pressing its wage demands. The whole subject of subsidy could occupy the space allotted to me here, and I will not attempt to develop these areas in detail. It is my own firm belief, however, that, given the economics of urban transit, its problems cannot be solved so long as user charges, i.e., fare-box revenues, are its sole source of financial support. Hence, if we are to reorder our transportation priorities, I think that the provision of support from public funds for transit operating costs is essential.

The provision of such financial support will only start the task of bringing the role of public transportation to its optimum level in the overall urban transportation system. To accomplish long-term results, the priorities that have guided our past transportation policies must be reordered to the end that a public transportation system is created that is a truly viable alternative to the private automobile. We must increase our investment, in both the public and private sectors, in public transportation systems. In addition, we must seek out and put into effect bold and innovative programs to give the public transit system the kind of travel times and comforts that will make it competitive

with the automobile.

One such program has demonstrated the tremendous potential in giving priority of movement to public transportation. The Shirley Highway project in the Washington area is perhaps one of the most encouraging developments in public transportation in recent years. On that highway, a main arterial to the south of Washington, conditions of extreme congestion have existed for many years. Additional limited-access, reversible lanes have been added in what was the median strip. Those lanes are reserved for buses during the morning and evening peaks. In addition, a temporary roadway for buses has been built from the point where the permanent lanes now end to the Potomac River. As a result, buses now travel the 9-mile length from the start of the reserved lanes to the river in about 10 minutes. Automobiles, traveling in the congested regular lanes, take about 40 minutes for the same trip. Proportionate time savings are made from intermediate points. The results have been startling. Bus ridership has more than quadrupled, an almost unbelievable climb. Perhaps most amazing, before the project started, 27 percent of total persons moving on the Shirley Highway during the morning peak were on buses. In 1972, that figure was 54 percent (more than half the peak-hour travelers on public transportation!), and the number of automobiles moving on the highway in that peak period had been reduced by 2,400, a reduction of 30 percent. This project has clearly demonstrated that providing priority movement for public transportation, so that it is competitive with the automobile in travel time, can significantly increase demand for public transportation service.

This raises, as a matter of fact, an extremely interesting question of transportation policy. New rail rapid transit systems are under construction today in San Francisco and in Washington. A number of other cities either have already decided to do the same or have such a decision under serious consideration. In part, these decisions to attack the problem of urban transit with a rail rapid system are caused by the same unquestioned assumptions as to the primacy of the automobile that I was discussing earlier. A primary objective of a rail rapid system is to give the transit element of the transportation system its own exclusive rights-of-way on which to carry high-volume traffic at high speeds. This same objective could be achieved by reserving all or portions of existing roadways, or creating new ones where necessary, exclusively for transit vehicles. I am told that both the carrying capacity and the operating speeds possible through such roadways compare favorably with rail rapid systems.

The decision to go to rail systems, with their attendant heavy capital investment, is caused in part by a reluctance, deliberate or unthinking, to infringe on the priority given to the private automobile in the use of the existing street and highway systems. I do not want to push this point too far. Rail systems have other advantages that I have not touched on. Moreover, in terms of achieving the public acceptance and political support necessary to substantially improve the capabilities of transit, it may be necessary in some instances to take the dramatic step of building a rail system. However, I would suggest, at least, that the question I have raised should be considered when alternative high-capacity systems are under consideration.

Turning now from this digression on questions related to priority of movement for transit vehicles to my principal theme, I had said that solutions to the problems of urban transportation call for a reordering of priorities as between private and public transportation. This process is now going on to some degree. Already, under the transportation acts of 1964 and 1970, substantially increased federal involvement in urban transit problems has occurred. Substantial additional steps are currently under consideration. These include legislation providing operating subsidies, legislative efforts to provide federal funds for the construction of rail rapid transit systems, and the continuing examination of the question, Should the Highway Trust Fund be used in some measure for transit purposes? For anyone interested in these matters, I recommend a series of articles that appeared in the National Journal (1). The net result is that the level of public investment in public transportation systems has already increased significantly and will likely increase further.

This reexamination and restructuring of transportation priorities is a slow and, at times, a painful process. It has, in some cases, produced very real improvements

on the streets of our cities. It has clearly been a boon to the paper and printing industries. Anyone who undertakes to keep abreast of activities in the urban transit field cannot fail to be impressed by the vast reams of reports, proposals, and analyses that flow in from all sides. Unfortunately, the effort put into these studies is all too often not equaled by visible and concrete action by transit operators.

It is my own opinion that one reason that more concrete results have not been widespread is a lack of clarity as to the objectives that are being sought. There is a certain amount of confusion as to precisely the function that a revitalized urban transit system should perform. There are those, for instance, who would like to see the complete disappearance of the automobile as a significant form of transportation.

I would suggest that a somewhat more realistic goal is preferable. I think it is much too late to have any realistic expectation that the American public will be weaned from the automobile entirely. I would suggest that the objectives of public transit be shaped by an appraisal of the best way in which to minimize the harm done by the automobile in the urban setting. To me, this means that a primary objective of public transit should be to reduce the peaks of automotive demand. There should be, in other words, a system with a high-volume capacity to carry persons on their work-home commutation at speeds and comfort levels that equal or exceed those of the automobile. This should be augmented by a base-day system tailored (a) to provide a high quality of service focused on the central business district and (b) to meet the general travel needs of those who through age, economic circumstance, personal choice, or other reasons do not have an automobile available to them. Frankly, I do not have the technical expertise to know what this base-day objective implies in terms of a specific transportation system or what the relation of that base-day system is to the peak-hour service. It does suggest to me that somewhat different kinds of systems may be required for these separate purposes, perhaps the base-day system being demand-responsive in some way.

I should make it clear that restoring the public transportation system to its optimum role does not simply involve investment in exotic new systems or in the provision of substantial new facilities dedicated exclusively to public transit. Although this process is going on, the capabilities of existing transit systems must be exploited more vigorously than they have been in the past. Once the pressure for simple survival is removed through the provision of public support, transit management should be urged, prodded, and forced into positive efforts to increase ridership. Among the efforts that could be explored are express service, exclusive lanes, collector-distributor minibus services, and aggressive marketing techniques.

One interesting aspect of this objective is the human element. Although recognizing there are exceptions, I think it can safely be said that more than 25 years of general decline has had an impact on the quality and the attitudes of transit management. It is not easy to find transit managers willing to make bold and aggressive efforts to seek out new business and to undertake the risks involved in experimental service. There are ingrained attitudes that their business is declining, that effective means of competition with the automobile are not available, and that any new investment is pointless because no return on it will be forthcoming. Moreover, the transit business is not one to which the more talented young people are naturally attracted. For these reasons, in addition to all the other problems that must be dealt with, means must be found to attract aggressive new talent into transit management.

Pulling together some of these diverse thoughts, I would suggest that the problem of regulating urban transit today is that the basic causes of transit's problems are beyond the reach of regulatory powers. I have tried to suggest a policy that would get at these root causes. Basically, it involves a recognition that we have for many years overcommitted our resources to the automobile as the basic unit of our transportation system. We must reorder our priorities to bring the public transit element of the urban transportation system to its optimum role. This means, first, stabilizing the situation of transit by providing operating subsidies. At the same time, we must increase our investment in transit systems, and we must be willing to commit more community resources such as roads and terminal facilities to transit in preference

to the private automobile. Essential to all of this is a heightened public awareness both of the nature of transit's problems and of the objectives being sought as a solution to those problems. This, in turn, implies that policy-makers themselves must reach a clear-cut decision as to what they want to accomplish with transit.

This entire process has started. There are hopeful signs that we are moving toward the commitments needed to restore public transportation systems to a role that is obviously beneficial to the entire community. To complete the task, however, will require searching inquiry and continuing concern by government officials at all levels as well as by those elements of the private sector who can contribute toward a solution.

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1. National Journal. Vol. 4, No. 10, p. 393; No. 12, p. 484; No. 13, p. 525.

Richard V. Gallagher
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It would be a most unfortunate oversimplification to describe the current ills of the taxicab industry as being directly related to the urban crisis in the United States. This, however, is substantially the situation. The taxicab industry has observed, with considerable interest, developments in bus and rapid transit operations. The taxicab industry believes that the bus and rapid transit problems today are its problems tomorrow.

The immediate problems facing the taxicab industry are (a) the inability to increase the productivity of the taxicab driver and service personnel, (b) the inability to control the increased cost of doing business, and (c) the inability to increase revenue sufficiently to offset higher costs.

A 1972 report by the U. S. Department of Transportation effectively summarizes the conditions in the urban taxicab industry. It states that the demand for taxicab service has been relatively stable since 1963. This is a gentle way of saying we are not a growth industry. The number of taxicabs and the employment within the industry have not changed substantially in the past 20 years.

Historically the years for prosperity in the taxicab industry were during World War II and the immediate years thereafter, when the automobile industry had not met the demand for private passenger vehicles and the 2- and 3-car family was not a significant factor in providing personal transportation. To many operators those were the great days of the taxicab industry. In fact every time a government installation opens, both civilian and military, we have instant cab companies. The individuals that form these companies are usually taxicab drivers with long memories and limited business abilities.

Current estimates place the taxicab industry's vehicle population at 162,000. Approximately half of these are in the major metropolitan areas. The industry employs approximately 150,000 taxicab drivers at any given time. In one year, approximately 600,000 individuals will have driven a taxicab. This high rate of turnover of taxicab drivers is one of the major problems in increasing productivity. This driver population includes employees, independent contractors, and independent drivers in local associations.

In 1948, the taxicab industry discovered and used an invention that increased productivity by 50 percent. This was the 2-way radio. Since that time, the industry has been unable to make any sizable increase in driver productivity, and the figures used in the Department of Transportation report have remained stable during a number of years.

The report states that a typical trip length for a sample survey was 5.8 miles, of which 2.95 (49.45 percent) were paid miles. The number of passengers per trip was 1.3 persons, and the receipts per trip were $1.95. Eighty-eight percent of the trips originated by telephone orders. On an hourly basis, the typical taxicab driver takes in about $4.13, of which he receives $1.79 (43 percent) plus tips, which in an urban area is approximately 15 percent or more, or about 60 cents per hour.

Cost analysis studies by some of the major taxicab companies and research by the International Taxicab Association show that, under the present rate structures, a company must achieve approximately 60 percent paid-mile/operating ratio to remain profitable. Total driver benefits in taxicab operations now total about 66 percent of the gross revenue. All other expenses pertaining to services, maintenance, and cost of equipment must come from the 34 percent remaining. It is now estimated that we need approximately 1 service person for every 3 drivers.

Of even greater importance to the taxicab industry is the dealing with unknowns. The greatest unknown is the cost of doing business imposed on the industry by the governments—local, state, and federal. A completely inconsistent pattern of tax levies has been imposed on the taxicab industry. In some states and cities, we have a sales tax; in other communities, we have gross revenues; in almost all communities and states, we have licensing taxes; in some communities and states, we have special vehicle taxes. The tax that is considered most oppressive and unfair by the industry is the gasoline users' tax of 4 cents per gallon imposed by the federal government. Local transit authorities are exempt from using this tax in bus operations. The taxicab industry established that, at the time of the passage of this tax, approximately 85 percent of its total miles were on local, municipal streets.

If the impact of the government on the taxicab industry were limited only to taxes, perhaps the industry could reasonably appraise the cost. However, the appearance of new government agencies, the extension of authority of other existing government agencies, and, in some cases, the making of new administrative law have radically altered government-taxicab industry relations. The federal government has moved into the fields of health, safety, and environmental pollution. To a limited extent, the local governments had exercised some authority in these fields and continue to do so in the taxicab industry. Driver regulations, inspection of vehicles, storage of fuel, and sanitary requirements of facilities have all long been controlled at the local level.

In general it is the opinion of the industry that the establishment of uniform regulations at the national level on many phases of the taxicab industry will be beneficial. However, the industry recognizes the natural and historical reluctance of government agencies to relinquish authority and thus the possible continuation of the problems of dual regulations and attendant increased cost.

Overregulation and underregulation by government damage the ability of companies to perform efficiently. In some cities performance requirements exceed the demand for service. Municipal authorities demand 24-hour service from companies that are franchised or that operate under convenience and necessity clauses with the threat of losing other services, and often there is little or no demand for taxicab service during many hours. Strict meter testing requirements often fail because of lack of on-the-road enforcement in the use of meters, allowing "gypsy" operations to flourish in communities on the basis of service they provide to the "poor." The poor will learn a very expensive lesson if they are unfortunately involved in an accident in one of those vehicles and find that there is no insurance coverage or that the insurance coverage is void because the vehicle is not licensed to carry passengers for hire.

At the present time there are an estimated 7,200 fleet taxicab operations in the United States. Of those, approximately a fourth, or 1,800 companies, operate 10 taxicabs or fewer, mainly in suburban and rural areas. These operations are economically unfeasible.

Twenty years ago an operator of 10 taxicabs could earn an income of $10,000, which was considered quite good. Today the profit potential of 1 taxicab is still $1,000. Therefore, in a 20-year period, the taxicab industry has not increased its profit per vehicle but has had continuing increases in costs. It is better to be a taxicab driver

at $10,000 a year than a taxicab operator who has 10 taxicabs, faces business complexities and economic risks of a $30,000 to $40,000 investment, and realizes only $10,000 return on both time and investment.

The phase-out of the 10-car operations in smaller communities is so gradual that it is practically occurring without any noticeable concern by the public. As with the bus service that gradually decreased in many of the small communities and eventually faded away, people find other modes of transportation, mainly in private vehicles. Once a service has ceased, there is little possibility of regenerating the need for it.

In the large taxicab operations that have fleets of 25 and 50 vehicles, operators usually have had some higher education, are engaged in other business activities, but primarily manage the company. Operations that have 100 or more vehicles have sophisticated management and professional staff including lawyers, engineers, and college graduates who are second generation in the taxicab business. These operations are usually the pacesetters for the industry.

In most of the major cities of the United States, the taxicab industry consists of large companies, in some cases a single company with a franchise, or 2 or 3 major companies operating under a convenience and necessity clause. These companies are usually efficiently operated and have experienced professional management. They are the companies that provide the economic justification for the rate structure in the taxicab industry.

A study of the 28 largest cities in the United States, according to population, revealed that rate increases are granted by the governing authorities approximately every 3½ years. To keep up with the national economy, the rate increase would have to be approximately 12 to 15 percent each time. We need not dwell on the complexities of planning, preparing, presenting, and waiting (an average of 18 months) for the granting of a rate increase. It is a familiar experience for all operators of urban transportation.

Taxicab industry estimates for the past several years indicate that there is a 3 percent decrease in passenger trips each time a new rate is put into effect. The purpose of an association is to seek solutions to problems and to look for new opportunities to improve and develop an industry's full potential. The International Taxicab Association has a long-range planning committee that is charged with the responsibility of analyzing and planning the future of the industry on a 5- and 10-year basis. Let us consider that program.

Several years ago, a study was undertaken on the productivity of the driver and dispatching personnel in taxicab operations. Computerized dispatching offers the most immediate opportunity to increase productivity in the taxicab industry. A proposal has been made to the U. S. Department of Transportation for a research and development grant for a project in which 1 large company and 10 small companies in an urbanized area would share computerized dispatching services. Of additional importance to the industry, the project would provide statistical and economic data that have not been available through the limited resources of the industry. The program is designed so that similar application could be made in most metropolitan areas of the United States.

Reduction in personnel turnover has long been of great concern to the taxicab industry. One of the immediate benefits of a computerized dispatch system is that we believe we can increase the number of trips per man-hour from 2.15 to 2.75 with an attendant increase in revenue of approximately 15 percent. If this can be accomplished, we immediately improve the economic remuneration of the driver and provide the company with additional resources to meet operating expenses.

The industry also feels that there will be improvements in the traffic conditions of urban areas. Restrictions of private vehicle traffic in certain areas and the increased use of special lanes by buses—and, we hope, taxicabs—can improve service and productivity. The granting of additional federal funds to bus and rapid transit provides for a healthier urban transportation industry. The taxicab industry believes that a healthy mixture of bus, rapid transit, and taxicabs is necessary to maintain public ridership. The loss of any single service affects the whole.

To be able to adequately forecast the cost of doing business would certainly solve

a significant portion of this problem. The taxicab industry will not seek, nor does it desire, government subsidies for capital improvements or operating costs. The industry does believe, however, that the federal government has an obligation to exempt taxicabs from the 4-cent per gallon gas tax from which it receives no direct or indirect benefit.

The taxicab industry also believes that the federal government's various agencies that are engaged in seeking solutions to urban transportation, health, and safety problems should provide research and development funds and use the industry members to seek answers of mutual benefit for the public, government, and industry.

The industry recognizes that there is a limit in the rates that the taxicab industry may charge its passengers. The current trend in the industry is for 60 cents for the first sixth mile, 10 cents for each additional sixth, and $7.20 for each hour of traffic delay or waiting time. To avoid the trauma experienced by both the public and the taxicab owners when a 47 percent increase was instituted in New York City after some 5 years' delay, the industry has proposed a new plan. Instead of petitioning the regulatory agency every 3 years for a rate increase, several companies have sought and received a nominal rate increase for an extended 3-year period, increasing the rates approximately 5 to 7 percent each year. It is believed that this plan will avoid the attendant ill will, interminable delay, and substantial rate jumps that have occurred.

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1. Economic Characteristics of the Urban Public Transportation Industry. U. S. Department of Transportation, Feb. 1972.

John M. Elliott
Amalgamated Transit Union

I should preface my remarks by stating candidly that my only expertise in transit matters was acquired, first, as a bus driver and trolley operator and, then, through many years, as a union representative. As an otherwise unschooled and self-appointed expert without diploma, I should like to share some thoughts distilled from my experiences with what might be called the "facts of life" in the transit industry.

In terms of finding adequate answers to meet the needs of our members, the most difficult problems confronted by the Amalgamated Transit Union have almost always traced back, directly or indirectly, to the depressed and declining state of the transit industry. When it was suggested that I discuss the problems in transportation labor unions in urban areas, I knew that I would have to discuss the underlying economic realities that may well have never been thought of as labor union problems.

Nevertheless, now that the transit industry has adopted our exact-fare solution to the problem of robberies and assaults on the urban bus driver, our most critical problem as union representatives of the city transit worker is to find ways and means of rejuvenating public transportation as an economically viable institution in urban areas.

After all, a city transit worker is looking for something we all want—a secure job and earnings adequate to provide a decent standard of living. The transit industry has all too often failed to fulfill either of these 2 basic human goals. In the depression years, a job in this industry was considered a good job because it offered steady work at a time when so many were irregularly or totally unemployed. More recently, however, as one transit system after another has shut down or cut back to a shadow of its former self, the number of our members terminated or laid off from their employment has reached shocking proportions. What can any labor leader really do for any union

member who is suddenly confronted by a total and permanent loss of his employment at a time of his life when his chances of finding a new job in some other industry are, in most cases, very slim?

It has sometimes been suggested that the answer to that problem is for all the workers on the system to accept lower wages so that there will be more jobs, shared by more workers, but with less pay. We disagree with those who suggest that the way to solve the problems of the transit industry is to reduce wages or to keep compensation at the lowest possible level at which an adequate supply of manpower can be retained to operate the system. We do contend that the inability of the transit industry to provide steady jobs paying proper and adequate wages and providing adequate pensions, health and welfare benefits, and other conditions of employment is one of the most serious problems confronted by our membership today.

For years we of transit labor have been wrongfully accused of causing the industry's economic decline. It has often been said that our wage increases, if and when we get them, are the starting cause of the whole vicious cycle, producing ever-increasing fares, ever-worsening and reduced service, and loss of ridership and leading to reduced revenues and further fare increases. This is a gross distortion of what is truly the transit industry's economic problem. Of course, the cost of labor will climb most rapidly in an inflationary era and have greatest impact in a labor-intensive industry such as transit. This does not mean, however, that the transit worker should forgo wage and benefit improvements that other workers receive. This would merely require the transit employee to subsidize transit operations whose true costs neither the employer nor the community as a whole has been prepared to pay.

The real cause of the industry's worsening economic position is not increasing labor costs but declining productivity of labor and equipment caused by the ever-decreasing number of passengers that are carried for each mile or hour of service operated. Obviously, the fewer the passengers are who ride the vehicle and the slower the speed of travel is, the more the fare or other charge must be in order to meet the operating and capital costs of maintaining the service.

We in the ATU are firmly convinced that we could be of no greater service to our membership than to help the industry and our elected officials at all levels of government find an answer to this key problem: How do we increase productivity? How do we get more riders on the bus or other vehicle? How do we expedite and improve the service so that it will be available and used by the entire metropolitan community and not just those few captive riders who do not have an alternative means of private transportation?

Just as we struggled for years with the robbery problem before we finally found a satisfactory solution in the form of exact fare, so we must come to grips with this problem of declining productivity. We have been frustrated, especially in the years since passage of the Urban Mass Transportation Act of 1964, by what we consider the failure of government policy-makers and industry management to respond dynamically and effectively to this challenge. During all these years, hundreds of millions of dollars of taxpayers' money have been spent in highway building and in providing parking facilities, both of which encourage urban sprawl, dispersed trip origins and destinations, and more and more reliance on the automobile in direct competition with our industry. The automobile, in turn, not only competes with public transportation but causes the traffic paralysis that stalls public transit vehicles in daily traffic jams. Meanwhile, the federal transit assistance program receives but a small fraction of the money spent on highways, and these funds may only be used for capital improvements, which, experience has shown, will not of themselves reverse the downward trend in transit ridership.

After careful study based on our earthworm's view of the industry and much concentration born of bitter hardship, low earnings, and lost jobs, we believe we have an answer to this problem of declining productivity. We think there is only one really workable means of attaining the dramatic increase in transit ridership that urban areas urgently require to combat congestion, pollution, unemployment, and other economic and social ills. We propose that public transit be operated everywhere in America on a completely fare-free basis and that the costs of providing such transportation be

prepaid by the taxpayer. This will offer to every urban citizen an efficient, convenient, and attractive public transportation alternative to the use of his private automobile. In other words, this would be a new form of universal public transportation supplied by and for the entire community served by the system at absolutely no user charge to the passenger.

We are very hopeful from the letters we have received from members of Congress and the secretary of transportation and from the proposals made by others, such as the mayor of Atlanta and the management of the Chicago transit system, that a very real ground swell is developing in support of this form of no-fare prepaid transit. In fact, we are perhaps now on the very threshold of a dramatic restructuring of our industry to provide sufficient financing to make transit one of the most effective tools we have for the solution of urban problems.

As a society and as an industry we are, indeed, late in casting off the misguided notion that transit must be entirely supported by the rider, who must not only pay for his ride and provide a profit to the system owner but also contribute his share of the taxes levied on the industry and, in addition, subsidize the automobile owner who does not fully pay his way. Such outmoded and inequitable concepts have plagued our public transit operations and their riders long after such principles have proved to be unworkable.

The hard economic facts of public transit with which the worker in the industry has become all too familiar are that increased fares will never produce enough revenues to permit the transit system to cover its costs and at the same time provide the same or improved services to the community. Fortunately, many have now expressed a different concept of "public service," which is the underlying philosophy of the prepaid system of transit espoused by the ATU. As stated by former transportation secretary John Volpe, "These services are considered so important that the entire community must agree to share the burden of supporting them."

Many states and localities have, in fact, already moved in the direction of tax-supported transit as a public service. According to a 1971 report by the U. S. Department of Transportation, "During the decade from 1961 to 1971, the number of municipalities that provide operating assistance to transit systems increased nearly 300 percent (from 21 to 81)." In 1972, the Wall Street Journal reported that the number of systems receiving subsidies had reached 128, with 35 more in prospect.

In the past 10 years, the acute financial crisis in transit has created a strong movement toward public ownership and operation of essential transit services. By the end of 1970, the public sector already included 141 publicly owned systems, producing 80 percent of all revenues, operating 68 percent of all vehicle-miles, carrying 81 percent of all revenue passengers, employing 82 percent of all transit employees, and owning 66 percent of all transit vehicles. The cycle is continuing and will soon be close to 100 percent.

Under public ownership, urban transit systems need no longer be operated to make a profit for a private owner. Under existing enabling legislation, the system often need not even be self-sustaining. If sufficient tax funds are provided, it may even be legally permissible without new legislation for some cities to do away with the fare box altogether. In any event, under public ownership, the old theories of public utility pricing and profit-making private enterprise can give way to a higher concept of true public service. Thus, in the Amalgamated Transit Union, we are firm in our conviction that revitalization of our industry should be based on better service to the public and equitable cost sharing by all those who benefit from transit. We want to go beyond fare stabilization or even fare reduction to a totally different theory of publicly financed transportation in metropolitan areas.

At our convention in September 1971, ATU delegates from all parts of the country adopted a resolution supporting no-fare transit operated under public ownership and supported entirely by public funds. The delegates also urged improved service through means such as express bus lanes and demand-responsive doorstep service. The delegates did not support public ownership as an end in itself, but merely recognized that public funds are seldom made available to privately owned transportation systems.

In Sacramento, California, a 2-day test of a 1-cent fare produced a 216 percent increase in ridership with all available equipment pressed into service and filled to capacity. The city of Rome, Italy, terminated a second experiment with a no-fare program during morning and evening rush hours because of lack of equipment to accommodate increased users.

Experience with no-fare transportation and studies on this subject, including those in opposition to the concept, agree that no-fare transit will produce greatly increased ridership. This, in turn, permits much more frequent service at lower unit cost. Removal of the fare-box charge alone creates a substantial financial incentive to the passenger to make regular use of the service. In addition, the prepaid, tax-supported feature of fare-free operation builds in a natural desire on the part of every taxpayer to make maximum use of the services he has already paid for.

Increased ridership inspired by this different service structure enables transit labor and equipment to become much more productive measured in terms of the number of passengers carried per vehicle-mile and cost per ride. In our national economy the average annual productivity improvement factor usually ranges between 3 and 4 percent. Yet in Atlanta, in the first 2 weeks of a reduced-fare operation (from 40 to 15 cents per ride), the public system achieved a 26 percent increase in productivity with no increase in total labor cost.

Substantial operating economies are also possible in the operation of any permanent fare-free transit system in that all money handling, security, and accounting procedures inherent in the fare-collection process can be eliminated. These direct and indirect costs incidental to collecting fares range anywhere from 7 to 15 percent of total industry revenues according to the best estimates we have been able to obtain.

Substantial operating efficiencies will also flow from institution of a no-fare system. Trip times will be significantly shortened, headways will be lessened, and overall system speed per hour and mile of operation will pick up. If no fares are collected, vehicle configurations can be adjusted to permit maximum speed of passenger ingress and egress. Vehicle seating capacity can be enlarged. We see more use of the double-decker bus and introduction of new bus-train systems and other innovations and improvements under a no-fare system.

In our judgment, a fare-free method of transit operation has the best chance of reversing today's pattern under which it is estimated that 94 percent of all daily passenger trips in large urban areas are made by automobile and only 4 percent of all others are made by bus and rail transit.

Not only will increased system speed under a no-fare system permit more service to be provided with the same equipment and operator, but, as traffic congestion eases and more rush-hour trips are made by bus and rail, providing more express bus lanes in and out of central districts will be feasible.

A no-fare policy, coupled with service improvements such as the express bus lane, will reduce the number of cars on the streets, promote greater mobility, lower air pollution, cut traffic deaths and injuries, slow highway and parking lot construction, and generally revitalize the central business sections of our communities. We fully anticipate that no-fare transit will provide to each affected individual more than enough savings on expenses and travel time to offset any tax levies and charges that will be necessary to make no-fare a financially practical operation. This will even be true of the private automobile owner who chooses to continue to use his own transportation in preference to the public system.

Of course, a tax-supported transit system offers special advantages to the poor and the disadvantaged. For this group in particular, a new freedom of movement will permit travel within the metropolitan area at any time and for any purpose. With this unrestricted mobility, all segments of society should partake more fully of the activities and opportunities offered by our cities. We see no-fare transit as a public service, concerned with people rather than with profits. It should help tear down ghetto walls and make all our citizens less angry and frustrated.

How do we get the taxpayer—the ones who do not use public transportation—to agree to pay the costs of such a program? If no-fare transit is to be instituted, the taxpayer

must be persuaded that it is to his advantage that public transit be financed as a public service.

The ever-growing number of states and communities already providing public funds in aid of transit are proof that it is not impossible to win tax support. Among the financing mechanisms already in use throughout the country today are a cigarette tax in Massachusetts; higher gas and electric rates in New Orleans; a sales tax on gasoline in California; a millage rate on the property tax in Toledo, Oakland, and Boston; dedicated parking meter revenues in Baton Rouge; a payroll tax in Portland, Oregon; a householder utility tax in Seattle and Spokane; a wheelage tax on motor vehicles, replaced after litigation by a millage tax, in Minneapolis-St. Paul; and increased bridge and tunnel tolls in New York City and Camden, New Jersey. It is just a step from the 15-cent fare now charged in Atlanta and New Orleans to a totally fare-free system. Other cities may have farther to go, but many are already moving to reduce fares.

A persuasive argument can be made that it is more equitable for the entire community to share in the support of the transit system through taxes levied on all those who live, work, and do business in the area than for the poor, the aged, the infirm, the young, and other captive riders to shoulder the entire cost of a bare-bones transit service from which the whole community benefits. It is clearly the user charge and not a general community tax that is inequitable.

Another strong argument in favor of this form of equitable tax financing is that no-fare transit provides more transportation at less cost than any other system. Moreover, the total cost per household should be no more than the present fare most cities charge a rider using public transportation to go to and from work on the basis of a 5-day week. In New York City, for example, according to Robert Abrams (2), it should be possible to "eliminate the charging of a fare on all public mass transit by substituting a $3 weekly payroll tax that would not exceed—and in many cases would be less than—the present average weekly mass transit cost to the wage earner. Business and industry would pay the balance of the bill via a 1.8 percent tax on profits."

In the Washington, D.C., metropolitan area, the total private and public employment is approximately 1,110,000. A weekly payroll tax of $4 per employee (the equivalent of a 40-cent basic fare, 2 daily trips, 5 days a week) would generate approximately $231 million annually. (A portion of this amount could appropriately be assessed against and paid by the employing entity rather than the employee.) The gross revenues generated by the 4 transit companies in the Washington, D.C., area in 1972 were approximately $50 million annually. Accordingly, the revenues from a $4 weekly payroll tax would permit something in the order of a fivefold expansion of transit (which would be necessary because of greatly increased utilization of the system) and no increase in cost to the present rider. This proposal would actually reduce an average household's total transportation cost because the entire family could use no-fare transportation at a cost to the family not exceeding the fare now paid by the individual worker. We recognize, of course, that as long as public transportation continues to be provided by private enterprise, subsidization of transit, except possibly on a temporary emergency basis, is not likely to be forthcoming.

Those who oppose any system of tax support for the operation of transit often do so on the grounds that such subsidies would become a "bottomless pit," that they would tend to perpetuate poor management and uneconomic services, and that they would lead only to a bonanza for labor at public expense. Obviously we would not be supporting no-fare transit if we did not fully expect that such a program would provide transit labor with better job security and the potential for greater earnings. Although we would oppose any system of no-fare transit or other operating subsidy program designed to deny the worker this chance for improved wages, benefits, and working conditions, our interests, as well as those of the community, dictate that any such program include safeguards for economic and effective use of the tax resources provided. We do not argue that fare-free transit should be established on a cost-plus basis with all deficits, no matter how large, simply prorated back to the overburdened taxpayer. A no-fare transit system will only work if it is properly preplanned, budgeted, and managed efficiently and the costs of its operation are collected in regular installments from the tax-

payer on a pay-as-you-go basis. It is only sound to insist that a no-fare public transit system operate within a definite financial budget not exceeding the anticipated amount of tax funding available. System management should be expected to operate within budget and policy guidelines and to provide only the amounts and kinds of transportation that the local community desires and is willing to finance. A suitable system of incentives and penalties should be devised that would ensure effective management. If this is done, there is little chance that undesired service will be operated or that labor costs will grow disproportionately to the services provided.

We are similarly unimpressed with the argument against no-fare transit that its cost would be beyond the resources of our hard-pressed cities to provide. We are well aware that, if we look at the country as a whole, some $2 billion would be required annually just to replace the revenues collected by existing systems from the fare box. It is also true that the increased ridership induced by the free fare will generate increased costs of operations due to the maintenance of a larger work force and equipment, much of which cannot, under present circumstances, be effectively utilized during off-peak hours. What, then, are the alternatives, and are they any less or more expensive?

Broadly speaking, the only alternatives suggested as a long-run solution to the economic problem of transit are manpower-reducing techniques calling for massive expenditures for new capital equipment, automated rapid transit systems, people movers, and the like. The proponents of the capital-intensive approach would have us believe that, since as much as 80 percent of all transit operating costs at present are labor costs, the only way to solve the industry's economic problem is to eliminate labor.

Really, when one analyzes the situation, one quickly realizes that subways and people movers are not reasonable solutions to the problems of any urban area already suffering from extreme traffic congestion, pollution, and lack of an adequate public transportation system. We already know from experience with the San Francisco Bay Area Rapid Transit System and with the Washington Metro system that, from the time fixed-rail systems are first planned until they are operational, at least 10 to 12 years will have elapsed.

In addition, any fixed-rail system operates in only a very narrow corridor and provides service only to a portion of the total community. Most present metropolitan areas lack the high-density development required and the clustered trip origins and destinations justifying a fixed-rail system.

But perhaps the most important point to consider is the astronomical cost of constructing such systems. In Washington, D. C., for example, 1972 cost figures show that it will take no less than $3 billion to build a 98-mile rail system that can serve but a small portion of the entire metropolitan area even if adequate feeder service and downtown distributor systems are provided. It is obvious that the $31 million per mile average cost of constructing such a system is prohibitively expensive. When the $2.4-billion net interest cost of floating revenue bonds is added, the effective construction costs of Metro are $5.5 billion, or $56 million per mile. To build just one rail rapid system in this single city will cost $2\frac{3}{4}$ times the industry's total annual operating revenues, country-wide.

We express no objection to the expenditure of public funds for the construction of new rail rapid and fixed-guideway systems if they can be justified in terms of cost effectiveness and if adequate safeguards that protect employees against automation are attached. The point we wish to make is that, in terms of immediate availability, lesser cost, and greater potential for making all citizens more mobile, no-fare transit is a far more effective replacement for the private automobile than any other alternative now under consideration. The continuing decline of ridership even on rapid transit systems under the present fare structure is adequate proof that fixed-rail and -guideway systems will not of themselves bring about an immediate, significant, and permanent upturn in transit ridership and reduction in the use of private motor vehicles in urban areas.

We are hopeful, therefore, that one or more major cities will give this form of prepaid, tax-supported transportation a fair trial. We know it will work and, if it

does, that it will spread across the country just as did the exact-fare system that was instituted in Washington, D.C., in 1968 and was in use throughout the nation within 4 years.

If this should happen, a new era will have come to transit and we of transit labor will have solved many of our most pressing internal problems because we will have provided better job security for our members and an opportunity for greater earnings by making the transit worker and the industry itself far more productive in their joint task of providing an essential public service.

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Ronald J. Fisher
Urban Mass Transportation Administration

It is widely recognized that insufficient funds are being generated by the users of urban transit systems to cover operating expenses and capital improvements. Unless additional outside sources of funding are developed, urban transit systems will gradually disappear. If there is justification for continuing the existence of urban transit systems in American cities, mechanisms are needed for implementing an operating expense subsidy. A combined federal and local funding program already exists for subsidizing capital improvements for transit.

Some of the foremost issues addressed in the following papers involve whether the federal government should also be involved in the operating expense and how deeply it should be involved. The fact that local governments are in a severe cost-revenue squeeze is generally recognized by all authors, but one takes the position that it still makes more economic sense for transit financing to compete with all the other local needs.

Specific topics discussed in the papers include management postures associated with federal programs and their delivery systems; role of state and local governments in setting standards, funding, and administering a subsidy program; effect of subsidies on the bargaining process with labor; deficiencies in present subsidy efforts; interrelation of the service cost and the quantity and quality of the service; and public versus private ownership.

Robert H. McManus
Urban Mass Transportation Administration

The subtopics suggested for discussion under the general subject of financing public transportation are varied and permit some choice of favorite topics by the authors. I will discuss in general terms some of the administrative issues associated with major federal public transportation programs and their delivery systems; what objectives, standards, and management postures are appropriate and can be effectively applied; and the role of the states with respect to the administration of the programs. Let me first cite the programs of the Urban Mass Transportation Administration, in the order in which they were authorized by legislation:

1. A research, development, and demonstration program providing grants to develop, test, evaluate, and demonstrate new ideas and techniques for the improvement of transit services and equipment;

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2. Capital grant and loan programs to help finance new equipment, construct facilities, and advance land acquisition to improve transit service in urban areas;
3. A technical studies grant program to assist local authorities in financing engineering, architectural, and managerial studies necessary to plan transit systems and improvements and to develop transportation policy options for local authorities to consider;
4. Grants to public agencies to provide fellowships for up to 1 year of advanced schooling for persons employed in managerial, technical, and professional positions in the urban public transportation field, the purpose being to improve the competence of this labor force; and
5. A program of grants to nonprofit educational institutions to assist in establishing or carrying on comprehensive research and training programs in urban transportation, the purposes being to encourage progress in basic research and to create a number of transportation centers that will tend to induce young people to choose the transportation field as a career.

There is as yet no program of federal assistance for public transportation operating costs, but during the session of Congress in 1972 the following action was taken:

1. The Senate passed a housing bill with a provision authorizing an operating subsidy grant program at a level of $400 million per year for fiscal years 1973 and 1974.
2. The House Banking and Currency Committee reported out a housing bill with a similar provision.
3. The House passed a general revenue-sharing bill that provides at the outset $5.3 billion to state and local governments to be used for 3 functions: public safety, environmental protection, and transportation (including public transportation operating costs). The local government share remains at $3.5 billion per year for 5 years; the state share increases from $1.8 billion to $3 billion during the 5 years, the increase being intended to reward fiscal effort encouraged by the bill.
4. The administration's special revenue-sharing bill for transportation, introduced in the Senate April 29, 1971, permits the use of resources in its general transportation element for transit operating costs, if local authorities so desire.
5. Though not permitting the use of funds for transit operating costs, the administration's Federal-Aid Highway and Mass Transportation Act of 1972, introduced in Congress in April 1972, permits use of Highway Trust Fund resources for public transportation capital costs at local option and is akin to the revenue-sharing philosophy.

This recitation of legislative proposals makes it clear that the question has ceased to be whether federal dollars should be used for transit operating costs. The question is, Under what conditions and by what delivery system should federal dollars be made available?

Sometimes, of course, exaggerated claims are made for programs. It was said that the Urban Mass Transportation Assistance Act of 1970, which essentially provided a quantum increase in resources for capital grants, alone would alleviate traffic congestion and air pollution, increase property values, promote business activity, stop community decay, and ensure access to jobs, schools, medical care, and recreation for millions who are too old, young, poor, or handicapped to drive cars. The political process happens to be quite tolerant of such statements. To begin with, there is the hope that they will turn out to be correct, and the problems will in fact be solved.

Notwithstanding such tolerance and statesmanship, let it be said that federal programs are always on trial for their lives, particularly in the appropriations process. The hearing cycle for the program manager, within the executive branch and before legislative committees, is almost continuous. And the favorite questions of review authorities are those related to purpose.

This has been so from the inception of the federal government's role in the transit function in 1961; but, when it became apparent that there was apt to be a quantum increase in resources in 1970, interest heightened in the objectives of the program and

UMTA's management approach. The recurring questions of review authorities and the policy cross currents they represent were contained in an assignment to UMTA to undertake a special study on the criteria and objectives of its programs, focusing on the capital grant program.

The subject at hand was in fact the basic approach to managing the UMTA programs—not just development of a statement of purpose. Some of the points at issue were

1. The relative emphasis to be placed on commutation in peak hours, mobility for captive riders, and use of transit to support desired development patterns and improve environmental conditions;
2. The optimum program level and financial plan to meet such objectives; and
3. The application of the results of the research, development, and demonstration program to the capital grant program.

The UMTA report concluded that the overriding issue in considering criteria for its programs was whether the program was to be viewed primarily as providing financial assistance in response to local requests or as one operating toward specific ends. This polarization of philosophies gets expressed in different ways and with varying degrees of vehemence. The argument can take place solely within the context of the categorical grant system, or it can be enlarged to set off the categorical grant delivery system against the revenue-sharing system, for we can fairly characterize the categorical grant system as more prescriptive and involving more federal intervention than the general or special revenue-sharing systems.

The report was developed within the framework of the categorical grant system, but the revenue-sharing proposals came on the scene as the implementation of the report's recommendations was being considered. Being involved in development of the transportation special revenue-sharing proposal as well as in the UMTA study, I found myself becoming an intellectual eunuch of sorts—still living with the categorical grant system and trying to make it work better and also fully supportive of the President's special revenue-sharing proposals that would inter the categorical grant system.

A management system that hews to either pole—prescriptive or demand-responsive—is mistrusted by those at the opposite pole. I happen to advocate a management posture near the middle, taking the position that management style is a force in itself, apart from literate statements of purpose. This approach is mistrusted by those at both poles. Too much depends on the actors, it seems. And people die. They get fired. They find other opportunities for themselves.

The advocates of the objective-oriented approach are largely those concerned with the appropriations process in both the executive and legislative branches. Their questions are: What are we buying? What is happening with respect to the problems to which this program is addressed? What are you doing through management of the program to ensure some results? Dealing with applications on a first-in, first-out basis will not satisfy them.

I have suggested that the political process is tolerant of limited results. But it is intolerant of little or no efforts to ascertain results or to ensure some results. This observation applies to federal programs regardless of the delivery system—either categorical grants based on individual applications or general and special revenue-sharing by formula. But it applies more pointedly to the categorical grant system.

The proponents of an objective-oriented management approach view financial assistance as the leverage to accomplish objectives determined by the federal government. One hears much more frequent mention of federal "clout" and "muscle" among proponents of this management posture than among those who prefer the demand-responsive approach. (What some view as federal whips, others tend to view as wet noodles.)

The objective-oriented approach is characterized by an emphasis on the judgment and values of federal program managers concerning desired purposes rather than on those of the local applicant. Associated with this emphasis is substantial skepticism about the vigor and relevance of the local planning process. Such skepticism is not unwarranted, but the real question is, What will be required for planning to succeed?

rather than, Has it succeeded?

Also characteristic of the end-oriented approach is the absence of doubt (or at least fewer doubts) that prescriptive strategies are feasible and operative. This is accompanied by some disdain for the abilities of local authorities, and with confidence in the ability of the federal executive establishment to manage administrative control problems and to be effective in implementing prescribed strategies in dealing with local authorities when they enlist federal allies in the legislative branch, gubernatorial support, and other assistance.

The advocates of an objective-oriented approach to program management within the federal establishment find allies in private corporate management. This becomes very clear in seminars with corporate executives studying the federal government as White House fellows and in association with political appointees from private industry. At the last Federal Management Improvement Conference in October 1971, it was suggested that the general impression among corporate executives that the federal government was not "well managed" stemmed from the poor articulation of organizational objectives, the absence of a clear intent to maximize some goals rather than just satisfy demands. The absence of ways to measure results was also cited as a major difference between the public and the private sectors.

So much for the prescriptiveness. At the other pole are those who view the program basically as one of financial assistance designed to stimulate investment in a neglected function in keeping with locally determined needs. Those holding this view tend to be the federal program managers and their clientele, state and local authorities. They want to help. For starters, they question the authenticity of the resource allocation issue and would argue that the political process itself can settle this.

Then they would argue that there are no discernible national policies anyhow, that part of the problem of public administration is that objectives change, unlike private interest objectives, which basically do not. They advocate acceptance of local values about needs and priorities instead of the prescription of values to be recognized in the application process.

Finally, the demand-responsive school has a basic skepticism that prescriptive strategies are feasible and operative. They like the following statement from the August 1970 report of the President's Task Force on Model Cities:

> Now that billions instead of millions are being appropriated, the system simply will not work as it used to; Congress and the Federal bureaus cannot possibly regulate and supervise the details of hundreds of programs operating in thousands of cities. It is necessary either to give local governments vastly greater freedom in the use of Federal funds or else in effect to replace them with a much enlarged Federal and State bureaucracy. We have no doubt whatever as to which alternative is preferable.

It seems to me that under the categorical grant system when programs reach a certain size—as has happened to the public transportation program with an annual program level of $1 billion—the management approach requires more than the use of threshold conditions to determine legal eligibility for projects. The federal program manager, just to be competent and credible in the political arena, has to entertain the notion that choices may have to be made. And he has to have an explainable basis for making them. This is especially so when the program is characterized by large individual grants that have much political visibility. This, of course, is the nature of the capital grant program. Grants can range from several million to several hundred million dollars.

We are not able to emulate the highway program by defining a system (i.e., the Interstate System) to be supported in the national interest by programmed grants; nor can we devise a formula for getting money to the right places in the needed amounts (the ABC system). This, in fact, is the problem we have had with the special revenue-sharing and single urban fund proposals. We need to have a relatively large discretionary fund, allocated on a project application basis rather than by formula, to deliver sufficient resources to permit construction of major metropolitan systems, or exten-

sions to them.

I have been describing the opposing philosophies for administering the UMTA programs, and to some extent the so-called "lumpy" problem of the capital grant program, which in itself affects the approach to program management. I want to add to this background a statement of 3 principal objectives for UMTA programs that emerged from the special study, after consultation with state and local authorities and transit industry representatives. Then I hope to outline the directions currently being advocated for the capital grant and the research, development, and demonstration programs and with respect to the operating subsidy issue so that some judgments may be formed about how things are being sorted out. The objectives are a distillation of purposes appearing in the legislative history of the program. They vary in importance with the size and nature of urban areas, the perceptions of the public, and their political representatives at any point in time.

1. To reinvigorate public transportation in order to provide service that will attract new riders regardless of their social or economic group or the purpose of their journey. The aim is to increase transit use relative to automobile use. A special aim is to attract the automobile commuter on his journey to and from work. This objective is addressed to what always has been the perceived problem—the quality of facilities and service and traffic congestion.
2. By providing better general service and developing special services, to provide greater mobility for substantial groups of people who are totally dependent on public transportation. This objective became particularly prominent in the administration of our programs at about the time of the riots in the cities in 1966-67 and has been a fundamental concern since then. It was reinforced and broadened somewhat by the so-called Biaggi provision in the Urban Mass Transportation Assistance Act of 1970, calling for special attention to problems of the aged and physically handicapped.
3. To promote transit as a positive force in influencing and supporting desired development patterns in urban areas and in improving environmental conditions. Such objectives are only pious hopes unless they can be made operational in program management. How is this to be done with respect to the programs, and what is the net effect on management approach?

CAPITAL GRANT PROGRAM

A revised edition of the information booklet on the capital grant program is being used in administration of the program as of July 1, 1972. It contains a new section, "Guidelines for Capital Grant Project Selection," that incorporates a number of existing administrative requirements and priorities—but in the context of the above statement of objectives about the program—and outlines additional guidelines.

In developing the new guidelines, we conferred in particular with the leadership of the American Transit Association, the Institute for Rapid Transit, the U.S. Conference of Mayors, and the National League of Cities. There has been publicity about this subject by ATA, and a working committee composed of industry and city representatives is to be formed to advise UMTA on the further content and timing of the use of the guidelines. This in itself says something about management posture.

First of all, to ensure fair distribution of program resources, applications will be grouped by size categories. Applications in each group size will be considered with reference to one another rather than to the entire case load of applications. The group sizes are urban areas with SMSA populations under 250,000, urban areas between 250,000 and 1,000,000 population, and urban areas with 1,000,000 population or more.

At present, the case load is split into 2 group sizes: those under 250,000 population and those 250,000 population and more. The existing priority of projects intended to prevent cessation of service will continue. In addition, for cities in the medium and large categories, priority will also be given projects designed to affect traffic congestion in conjunction with the Federal Highway Administration's TOPICS program. In

the medium and large categories, a priority will also be given to projects that are part of programs demonstrating current or proposed use of noncapital means by which to affect congestion and modal choices. The means include regulating the supply and pricing of off-street parking, staggering of work hours, automobile-free zones, and pricing adjustments to vehicular facilities (such as bridges and tunnels) in order to encourage transit riding. The legal and institutional obstacles to the positive actions just typified are fully recognized. It is also recognized that some of the actions would be politically unacceptable without the precondition of improved transit. For these reasons, this guideline is not a precondition to the selection of projects, but a basis for giving priority to projects in areas showing attention to the subject.

The same is true of service improvements. The intent of the guidelines is not to exact service improvements per se as a condition for project approval. The intent is to assign a priority to projects specifically associated with service improvements.

Apart from the priorities, which themselves are related to objectives, the guidelines describe in general terms a number of analyses, or factual presentations, geared to objectives. Many of the analyses are current requirements, though frankly a number of those reviewing the guidelines did not recognize them in their new form.

I believe the guidelines should be viewed constructively. They basically call for improvements in the urban transportation planning process that will enhance consideration of transit as an alternative to private transportation. But it will take time to have the desired impact on local plans, which will be well supported by the UMTA technical studies grant program.

RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM

UMTA has adopted an aggressive posture for management of its RD&D program. It will be planned rather than demand responsive. And although unsolicited proposals will be accepted, they will be acted on only if compatible with UMTA's planned efforts.

It is my opinion that an aggressive stance by UMTA in RD&D program management, unlike aggressiveness in specifying urban development objectives and transportation service strategies, will be well understood and accepted by local authorities. They will readily concede that in the area of technology the federal government is more aware of and more alert to possibilities than are other levels of government and that it is the logical repository of financial and managerial resources for this function.

Local authorities, though interested in RD&D, tend to have an interest in specific projects that they perceive as a service to the community or to a resident industry or institution or as a source of prestige useful in economic development of the area. They are not apt to be primarily interested in the research design of a project or the transferability of outputs to other places. Furthermore, political reprisals for failure are a severe constraint to innovation at the local level. So-called "negative results," still useful and constructive in an organized RD&D program, are not well understood in local affairs. This means essentially that a demand-responsive posture for RD&D program management (i.e., one responsive to applications from local governments) is not apt to be fruitful.

UMTA wants to affect in a positive way the development of new industry standards as to both hardware and software. Its ability to do so under the categorical grant system for capital assistance is relatively ensured. Under a revenue-sharing system for allocating capital assistance resources, by contrast, the federal government's leverage to induce innovation would be lessened. This need not be true of air pollution control and other environment-related improvements, which could be required outside the framework of the revenue-sharing system. But it would be true of most state-of-the-art improvements.

The RD&D program itself will be financed outside the revenue-sharing program and managed separately. So in this respect there would be no change in the federal role. The change would occur in implementation of results on a broad scale—or so it would seem. There would certainly be a much higher premium on an expanded information

clearinghouse role for the federal government with respect to the state of the art.

OPERATING SUDSIDIES

With respect to making operational the objectives cited earlier, it seems clear that those associated with service improvements could be better addressed through an operating subsidy program than through a capital investment program. In our studies within the Department of Transportation, we concluded (with some dissenting opinions) that a formula could be devised to get the money where the needs are greatest, without being open ended or creating perverse incentives or necessitating intense administrative oversight of local operations by the federal government. But positive motivation to change local operating policies and practices, if desired, would have to be established by means of specific conditions to accompany the formula. Then the problem would be to select the policies and practices that might be universally appropriate. And this no one has been able to do.

The motivational element we tend to settle for is a locally initiated plan, meeting criteria established by the transportation secretary, covering service and fare levels, operating policies and practices, noncapital actions, and so on. Subsequent grants are to be contingent on satisfactory implementation of the plan.

So much for management posture for such a categorical grant program. The fact is that the administration has taken the fundamental position that it is strongly opposed to the provision of Title VII of the housing bill, which would authorize a new categorical grant program for operating subsidies, and it has urged passage of the general revenue-sharing legislation as a more appropriate answer to the problem. This was done in a letter from the secretary of transportation to the House Banking and Currency Committee in June 1972.

It seems clear that the objectives cited earlier cannot be attained just by capital investments in transit or by transit service improvements, however financed. They cannot be attained, to be sure, without such investments and improvements, which in effect are a base-line condition. But the perception is taking hold that money alone will not win the day. We see many indications of this growing perception. In a report of a research project on the subject "Urban Transit Regulation: An Institutional Evaluation," these comments appeared in the summary and conclusions:

> In the city of tomorrow, transportation regulation must be construed to include every action and policy of metropolitan government which acts, reacts or interacts with urban transport services by any mode. It is no longer sufficient for transit to be regulated in isolation, while decisions are made and actions taken elsewhere on such matters as traffic signals, vehicle flow patterns, parking availability and pricing, zoning, or land use planning. Local governments will have to devise organizational structures, mechanisms and procedures by which transit operation and planning may be upgraded and treated as an integral part of the total circulatory system of the community.

Institutional formation and actions of the kind and scale needed, according to the report, are in fact within the purview of state and local authorities rather than that of the federal government. And the federal government can rightfully ask about state and local performance with respect to them in considering its own role. Even so, the federal government and its numerous grant programs are not completely blameless for the jurisdictional tangles of state and local governments. Federal grants have tended, for example, to induce the proliferation of special districts.

To round out this picture, there are provisions in the proposed legislation for both the administration's Transportation Special Revenue Sharing Program and its Single Urban Fund Program, which positively encourage development of institutions able to program as well as plan and, therefore, are consistent with the direction in which changes must occur. For establishing such an institution, the special revenue-sharing bill provides a bonus of 10 percent of the shared revenues that would normally flow to a metropolitan area. And the SUF legislation provides that, if within 4 years a state does

not enact enabling legislation permitting formation of such institutions by voluntary local action, 15 percent of the funds available for SMSAs in that state will be withheld by the transportation secretary and used for urban public transportation projects in any state. Legislation for other domestic programs is calling for attention to the same issue of institutional competence. And public interest groups, particularly the National League of Cities and the U.S. Conference of Mayors, are deeply involved in such developments.

ROLE OF THE STATES

We share a concern that has been expressed about the need for a clearer understanding of the relation between the Urban Mass Transportation Administration and state agencies with respect to the management of financial resources under the Urban Mass Transportation Act. There are misconceptions, not confined to state and local authorities, about what is now possible under the act. We encounter this frequently in discussions within the U.S. Department of Transportation.

Although most grant recipients of UMTA resources are local municipal corporations and planning agencies, we are able to make grants to the states and have done so under the capital grant, technical studies, and RD&D programs. The New Jersey Department of Transportation, for example, has been an applicant for capital grant assistance for commuter railroad improvements and for the acquisition of a fleet of buses to be leased to several local operators throughout the state. The same department is the sponsor for the Haddonfield dial-a-ride demonstration project. Other examples can be given.

Where we seem to encounter confusion in our charter to assist states is with respect to the technical studies grant program. The states would like to develop a program planning and technical assistance staff resource with the use of this program, but we are confined by statutory language to financing studies that relate directly to programs for specific urban areas. In this respect our legislative authority is different from that of the Federal Highway Administration. We, in fact, think that the development of a technical assistance resource at the state level assisted by UMTA funds would be a good idea. But it will require an amendment of the law.

In viewing the flow of highway funds directly to states and the flow of transit funds to urbanized areas, it is sometimes concluded that this is modal separation and that it tends to promote the lack of intermodal planning and programming at all levels of government. I do not agree that this is so. The basic factor impeding intermodal planning and programming is the lack of institutional competence at the metropolitan level to do intermodal planning and programming. The states cannot be absolved from responsibility for continuation of this institutional incompetence—they have simply stood aside and conveniently used the state highway bureaucracy as the basic vehicle for affecting transportation programming. I do not believe that simply by flowing transportation funds through the states we would bring about intermodal planning and programming. Such a delivery system might in fact make matters worse, unless the states were constrained to induce the formation of competent metropolitan institutions.

At the present time, most states do not even have enabling legislation to permit the formation of the kind of institution needed at the metropolitan level to do the things that need to be done with respect to intermodal planning and programming. The Single Urban Fund Program recognizes this; so on the face of it does the department's pilot effort with intermodal field planning groups in its 10 regions (i.e., the goals of this effort concentrate on institutional formation). And so does the administration's transportation special revenue-sharing proposal.

Some have suggested a pass-through program for delivering capital grants to urban areas under a certain size (e.g., 250,000 population) by way of state agencies. If the states provide significant financial assistance for the transit function, they can readily develop their own procedures for allocating of such resources among urban areas in the same way in which they have developed such procedures for the highway program. It is our opinion that, when the states in fact begin to "buy in" to the transit program in the

same way in which they have for highways, we will begin to see much of the confusion about the role of the states in transit programming disappear. What we have really been encountering is a call by the states for financial assistance to help them set up a capability to deal with the transit function, and this we have not been able to deliver.

We see no apparent reason for the state to act as our agent or as a designated authority to carry out projects, but neither do we object to the states' developing such a role—especially following commitments to "buy in," as in the highway program. We think it prudent to give heed to local mores in the appropriate development of state and local roles in relation to UMTA.

There is one exception: When states approach the 12½ percent limitation for receipt of capital grant assistance, they clearly should have a determining voice in further allocation of resources within the state. The states indeed provide a perspective often lacking at the metropolitan level and can help balance off conflicting claims over a wider area. But even this role is available, to an extent, within the A-95 process, buttressed by the provision of the Urban Mass Transportation Act calling for comments of governors.

The planning clearinghouse commentary can, of course, be just a ritual. In fact, we receive very few substantive comments. This can mean that some projects are adjusted locally before formal clearinghouse comments are made or that area-wide agencies do not want to (or as a practical matter, cannot because of the way in which they are supported) jeopardize the flow of federal dollars to the area. In the latter case, local and state authorities may consider themselves in league vis-à-vis the federal government.

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The perennial subject of financing is so broad and deep that we must subdivide it before we analyze it. The first question is obviously whether financing should include government assistance of some kind.

Generally, those most interested in public transportation have come to assume, almost without questioning, that government assistance is absolutely essential, but the rural electorate and the automobile clubs do not generally agree. These are important factors in the representative government process. Transit proponents, like myself, cannot expect government aid simply because we demand or need it.

The need for aid is not universal. In downtown Philadelphia, for example, there is a 15-cent loop bus line that uses city streets to serve 9,000 rides a weekday and grosses $1,350 on 7 buses that put in 76 service-hours. The rate of revenue is $17.75 per bus-hour. The full cost of bus operation, with capital recovery, does not exceed $13 per hour at Philadelphia's wage scale. The profit margin is handsome. Private enterprise could do the job without any kind of help except provision of the city street.

Similarly, in 1955, the Chicago and Northwestern Railway decided that its steam train commuter service with museum-piece rolling stock did not have to be a severe deficit operation. Management borrowed $50 million on shaky credit, bought air-conditioned gallery coaches (double deckers), revamped schedules, and set out to earn a series of profits with no government help. The success was broken only temporarily by the opening of the parallel Kennedy Expressway until Congress voted to give railway employees a 42 percent wage increase. The quality of service has been superior. There were years when freight deficits were mitigated by commuter earnings. Why should such success stories be clouded by bureaucratic oversight that might be more expensive with less quality?

With this introduction, let us look now to the question, How can urban public trans-

portation give mobility to those that need it and at the same time divert motorists from expensive overcrowded highways?

To give mobility, transit must offer ubiquitous service at costs less than those for automobile use. To divert motorists, transit must offer service that is no more costly than driving and equally expeditious or is less costly than driving and almost as fast. These facts have been determined and verified by so many independent transportation studies that I will take them as axiomatic. As soon as relations with the automobile are considered, the proper determination about government aid comes into focus. Private capital will no longer enter into the urban transportation business on a scale anything like the need. This is self-evident. Even the Chicago and Northwestern Railway was "spun off" by its stockholders. It now belongs to the more aggressive of its employees who obviously lack the capital to build new systems. Because transit must live side by side with the automobile and because the automobile not only has its taxes sequestered for its own benefit but also enjoys a direct taxpayer subsidy of nearly $4 billion per year, it is not possible to finance and operate a parallel transit system on a laissez-faire basis. Any attempt to leave urban public transit to private auspices will, all too often, result in situations such as those in Minneapolis, Los Angeles, Dallas, Scranton, and Portland, where Gresham's law applies to management as well as money.

To give mobility requires ubiquitous service. By that, I mean 2-way schedules all day long at least 6 days per week and some evening service for shift workers. The lines must intersect with other lines so that trips can be made in more than one direction. Express bus service, particularly like that on the Shirley Highway, does not qualify as ubiquitous service because it is too limited. The fare for ubiquitous service should not exceed 25 cents for short rides; that is 15 cents plus 3 cents per mile or 8 cents per passenger-mile in the average city. To charge more is to far exceed the incremental cost of automobile operation. So many commercial and industrial activities subsidize free parking for automobiles that it is not possible to charge full cost for alternative transit. In fact, non-automobile-owning transit riders must pay retail prices to support free parking they cannot use. At 25-cent fares, routes and schedules must be laid out to serve 4 directions (east-west and north-south, for example) and to avoid both overloading and empty buses. Proliferation of direct service routes in all directions is to be avoided not only because cost is too great but because frequency of service suffers to the point of general inconvenience. Scheduling skill must be substituted for special purpose services that usually fail, even when dubbed successes by the public relations experts.

To divert motorists from crowded streets and to save central cities from debilitating decay, electric rail transportation on private rights-of-way is essential. Any new device that can do the same job faster at less cost would, of course, qualify, but I have not seen one yet. Monorail patents have been around for a century. Helicopters were promised for bus service a generation ago. The linear induction air-cushion train is too expensive but otherwise would qualify to meet my definition.

To avoid the criticism of being dogmatic, let me explain my recommendation of the electric railway. Obviously, it is pollution-free in the congested area. If powered from hydro or nuclear sources, it is largely pollution-free overall. Several large coaches can be operated by 1, 2, or 3 people, depending on trade-offs of investment versus operating expense. Even a 3-man train can move 500 seated passengers at speeds equal to anything yet proposed for urban travel, if a private right-of-way is available. It would take 20 bus drivers to do the work of the 3 train operators because of vehicle size and speed restrictions. True, buses can be operated on exclusive rights-of-way, but the question here is to divert motorists to public transportation. Research and field experience show that modal split is nearly 50 percent higher for rail than for bus, other factors being equal. When the bus must maintain its own right-of-way, it ceases to be economical. In Philadelphia, old-fashioned commuter rail service costs 8½ cents per passenger-mile, but bus service costs 12 cents. The Lindenwold rapid transit line operates for 5.7 cents per passenger-mile, with full cost at 16 cents including the capital cost. If the bus service had to similarly carry even half that

capital cost for an exclusive bus way, which was considered, the cost might reach 20 cents without full pollution and traffic relief. Remember, we must not devise a system more costly than the automobile itself if we are to solve this problem. In the Lindenwold corridor, automobile costs approximate 17 cents incremental and 25 cents fully allocated.

Lest I leave the wrong impression, I am all in favor of improving bus service by any means feasible as long as in so doing a better solution is not bypassed. There have been far too many simplistic pronouncements of late on urban transit solutions that have not had benefit of competent analysis. The world of reality is often left behind.

The federal-aid program is a case in point, at least so far. Congress, even now, is considering corrections. Anyone seeking to construct a new facility can, if qualified, obtain a federal grant for two-thirds of the cost. Demands on these funds are in the billions. But suppose an urban area already has the rudiments of a necessary facility, but needs operating expense assistance to support it. In that case, the service must be refused aid. Billions are provided to build, but nothing to save what we have. This is most unfortunate. Existing commuter lines can be saved and improved with federal aid of only 3 cents per passenger-mile if the 2-to-1 matching formula is followed. The new and successful Lindenwold line did not have federal aid; but if it had, it would have been eligible for 6 cents, twice as much as the cost of preserving existing service. The taxpayer cannot afford to treat past capital investments like Kleenex.

This leads, I think, into the series of questions assigned to us. What should be the mechanics of providing these subsidies?

Because of the income tax and the other aid programs, the federal government must, to be equitable, provide both operating and capital grants. Neither should be provided unless it is less costly than the other for a given service. To qualify would require that standards of simplicity and service at expected quality be met. The federal share should be stepped up to 75 percent because of tax sources. The local share must be required to ensure responsibility, but a tax on fare receipts should be permitted to prevent parochial jurisdictions from refusing aid and disqualifying their area. The states can and should assist with the local share; but many states are not urban oriented, so local input is important.

In Pennsylvania, we match whatever the local areas provide for capital grants, and we provide 2-to-1 matching funds for operating expenses. With federal participation, we would go 50-50 with the local areas, according to current thinking.

There must be a limit, of course. Most automobile trips enjoy a 10-cent 1-way parking subsidy, plus a $40 a year subsidy from local tax sources. If the urban transit rider were given the same, he would be entitled to $90 a year or 18 cents a ride. On a 4-mile average, that would be 10 cents plus 2 cents per mile, or 6 cents plus 3 cents per mile. Beyond this, urban public transit must look to the fare box, or the local voters. In many congested areas automobile costs are much higher than average; in these areas, transit aid should likewise be higher to cope with pollution, congestion, and economic problems. A trust fund type of source should be established out of a proration of general revenues so that transit does not go to the precipice at the turn of each fiscal year. This is tremendously important. No organization can enter the next budget period without knowledge of what its budget will be.

Other specific questions that were assigned relate to the following areas.

1. Subsidies could have an unfortunate impact on collective bargaining. To avoid this, the criteria suggested above must be applied to establish limits. Voluntary compulsory arbitration should also be reestablished in more areas. New York and Boston have suffered gravely where added subsidy, without criteria, has been used to finance collective bargaining agreements. This turns taxpayers against transit.

2. The deficiencies in present subsidy efforts have already been alluded to. Capital grants should be equal to and not have priority over operating assistance. Automobile subsidies should not exceed transit subsidies on a per trip basis. Standards must be applied to limit subsidies and ensure quality of service.

3. Incentives to earn subsidies are essential. However, the suggested compensation

per passenger basis is upside down and backwards. With enough passengers, no subsidy is needed. Longer lines cannot operate on the same passenger payment as short lines. With every region now having a comprehensive planning process, the reimbursement must be on a study-determined, passenger-mile basis with a ceiling at 25 percent over average costs. Management quality, however, is the only real answer to this question. It must be developed.

4. The fare box must remain the keystone of the financing plan. It not only produces revenue but also measures and arbitrates demand. With the theoretical subsidy of 18 cents a ride, the fare box would have to produce about 30 cents per ride, 25 cents on short rides and as much as 60 cents or more on longer lines. Transit is too expensive to provide except on some basis related to revenue.

5. Transit costs do not necessarily relate to quantity or quality. I want to dispute any absolute relation between spending and results. The best system, in my opinion, is a low-unit cost producer of superior quality and quantity, except at the peak of the rush hour. Some of the poorest systems have the highest unit costs. Good maintenance costs less per passenger than shoddy maintenance. More passengers cost less to carry per unit than fewer passengers. Capital investment is necessary for both quality and quantity and, if measured on a passenger-mile basis, should reduce costs overall. High investment costs, even high vehicle costs, are often related to low per passenger unit costs if management is doing a superior job.

6. Thomas Jefferson insisted that "government that governs least is best"; but, when federal, state, and local transit support is needed to keep abreast of other aided forms of transportation, funding as discussed previously is essential. Standards must be set to ensure achievement of objectives and to permit equitable distribution of public funds among the many transit agencies. Once standards are met, higher levels of government must leave the administration to the closest point to the actual operation that can handle it. Neither state nor federal government can adequately administer local transit. Neither can local government. Transit is an operating organization and must be administered in the same manner as a private utility if costs are to be held down and service standards kept up. The integrity and authority of the chief executive officer are paramount.

7. In spite of what I have said, public operation should be avoided wherever private operation is reasonably feasible. Ownership is another matter. Private capital is seldom available, but private operation is, or can be, preferred. Long Beach and San Diego have created nonprofit corporations to handle transit, and both are doing an exemplary job. Because the surest way to short-term profit is to raise fare and cut service, growth and dividend-seeking private corporations can only decimate transit; but nonprofit corporations and management contractors for public authorities have a very real place where the organization is structured for them.

8. Discipline, lines of authority and responsibility, and promptness of action all commend the private form of operation that must live by its wits and is free to act accordingly within reasonable limits. Public authorities range from excellent to the opposite extreme, but the check and balance element does not function so well as it does privately. Accordingly, the board of direction and the management of public transit authorities must be selected with unusual care, insight, and discretion. This has not always been the case.

9. Supplementary sources of transit revenue are not worthy of policy determination, except in the smallest operations, but they are sources of revenue that can reduce tax support as much as 25 percent. Cards and advertising seldom generate 1½ percent of revenue, but, judiciously handled, not only raise a little money but also give the vehicles a livelier appearance. On the other hand, these traveling billboards may well give transit such an offensive connotation that revenue would suffer from discretionary revenue passengers. Social acceptance has been the theme and watchword of North America's most successful system. Charter service is not only a service to community groups but also a source of revenue and added earnings for hard-pressed drivers. It should always be operated at a profit. Not only is a loss unfair to other transit operators, but it is unfair to the taxpayers and fare payers. Vending machines, newsstands, snack

bars, and other concessions are a distinct problem. The Shaker Heights Rapid Transit Line converted its affluently located prime suburban car-stop shanty into a creditable food service activity and waiting room with plaudits all around. On the other hand, boarded up newsstands, leaking drink machines, and litter are evidence that simple rentals from these claptraps are insufficient to justify them. It is a matter of proper discretion, management, and supervision. The last 20 lean years for transit may have eliminated too much management and supervision from the ranks. The overhead of North America's most successful system is higher than that of most of the other systems, even though its cost per passenger is lower.

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In analyzing potential transit riders, we must recognize that there are 2 types of people: those with access to the automobile and those without such access. The former group can be expected to choose transit only when the service being offered, in terms of all of its aspects, is superior to that available from the automobile. To compete with the automobile for a particular trip, transit must provide a product that is superior in the eyes of the consumer. Each trip is a discrete occurrence in time, and a person who chooses to use the bus, train, or automobile for a particular purpose, such as to go shopping, will not necessarily make that same choice for another purpose, such as to go to work or to visit relatives.

The other group presents an entirely different type of problem. Those persons do not have alternative means of transportation and are unable to drive an automobile by reasons of age, income, or personal handicap. They must look to public transportation for mobility, and they are finding that their mobility is declining. If there were no public transportation network, a substantial portion of the population would be deprived of the means to travel to workplaces, shopping areas, medical facilities, and places of recreation. Many people also find it more economical to use public transportation than to maintain an automobile solely for occasional trips.

Because transit serves 2 basic markets, the questions are, How do we keep viable the systems that we have? How do we improve them? Should we expand them or, where appropriate, build new systems? To proceed with any of these courses presumes a public policy decision that some form of public transportation is a desirable or essential service for urban areas.

For approximately two-thirds of our nation's history we have had public transportation services in our cities. These have included horse-drawn omnibuses and rail cars, cable cars, electric streetcars, trackless trolleys, gasoline and diesel buses, subway and elevated trains, and even monorails. Transit has been around for as long as 145 years and has frequently shaped the development of cities.

Public transportation throughout the nation has declined, however, since the early post-World War II period. The decline actually began as early as the 1920s and 1930s, when transit companies recognized that they were losing their monopolistic position with increasing automobile ownership and rapid development of paved streets and highways.

During World War II, the high level of industrial activity and the shortage of automobiles, tires, and gasoline for civilian use forced people to return to public transportation in large numbers. Despite shortages of equipment, parts, and personnel, the transit industry was able to mobilize its resources to meet the demands for service. Most of the transit operations were privately owned during this period, and most operations were profitable and remained so for several years after the war ended.

The trends that affected the role and use of public transportation in the prewar period

emerged again after the abnormal effects of the wartime economy and immediate post-war readjustments stabilized. In most metropolitan areas, the period from 1948 to the present is characterized by a continuing downward trend in the use of public transportation. The rate of decline varied from one area to another. In a few instances, individual companies showed increases in riding for one or more years. From about 1950, however, none of these increases has been more than short-term interruptions in a general downward trend.

Transit usage nationally has declined from 13.8 billion passengers in 1950 to 5.5 billion in 1971, a loss of well over 50 percent, according to figures collected by the American Transit Association. Not only has the usage declined but the industry is no longer profitable. On an industry-wide basis, losses have occurred each year since 1963; nation-wide losses were more than $400 million in 1971. These continuing losses have accelerated the trend toward public take-over of existing private bus operations as a means of preserving these services for the public.

Thus, until comparatively recently the transit industry was generally viewed as another branch of America's capitalistic tree—as a business rather than as a social service. The transit industry, however, has moved from a once highly profitable monopoly with large capital investments and relatively small labor costs to a highly competitive, labor-intensive industry that, in many instances, has become unprofitable and has been taken over by public agencies because it serves a basic need of the people. In 1972, more than 150 of the 1,000 or so transit systems were operated by local or state agencies. These publicly owned systems carry approximately 85 percent of the 5.5 billion revenue passengers.

Our fundamental problem, however, is not the trend toward public ownership but the amount of the operating deficits whether ownership is public or private. In 1971, according to the American Transit Association, urban transit systems lost some $411 million. My understanding is that, when suburban railroad losses are included, the total exceeds $500 million. Without the money to pay the bills, the buses and trains will stop rolling. If this happens, a few may be able to travel by automobile and a few even by bicycle or foot; but the rest will be denied the mobility needed to survive economically in our society.

State and local government efforts to subsidize public transportation are substantial and have existed for many years. A U.S. Department of Transportation report (1) stated that the known deficits of a sample of transit properties with local financial assistance programs were $205 million in 1970. Although the aggregate local effort is probably considerably more today, the greatest deficiency of the present subsidy efforts is certainly the inadequacy of funds. State and local governments are notoriously hard-pressed to find funds for the full spectrum of public programs and yield to demands for transit subsidies only after the emergence of a crisis that threatens intolerable service reductions and fare increases. Typically, such subsidies constitute a "bare-bones" approach and fall short of the total revenue needed to maintain good service. The programs are often viewed as stopgap solutions to an emergency, to be replaced by a longer term program. This is especially the case where subsidies are given to privately owned operations, where the intent of the program is to buy sufficient time in which to work out a more permanent arrangement.

The federal government has recognized its responsibility to assume a major role in a program for renewing, improving, and expanding the physical plant and equipment of public transportation systems in urban areas. Thus, it is now an established national policy that continuation of public transportation services is essential for the welfare of urban regions. The federal role, however, has been limited primarily to capital outlays for purchase and improvement of public transportation systems; and, although that is welcomed, it arrived late in the history of the decline of the industry. The operating expenses, however, are now the critical problem because they are increasing and causing deficits that are getting beyond the amount that state and local governments can handle from their own resources.

The experience of New York City with financing transit during the past 2 decades has been dramatically summarized in testimony to Congress (1) in support of a federal pro-

gram of operating subsidies, which I believe is worth noting at this point:

> When the New York City Transit Authority was created in 1953 the State Legislature mandated that its operations, except for capital cost, be on a self-sustaining basis. Direct operating subsidies were prohibited by law.
>
> In that year the fare was increased from ten cents to fifteen cents. The next fare increase of five cents was put into effect in July 1966. The twenty cent fare lasted three-and-a-half years. In March 1968, the Metropolitan Transportation Authority became the corporate parent of the New York City Transit Authority. The law also was changed to permit municipal subsidy for transit operators.
>
> In January 1970 rising costs forced an increase in the fare by ten cents to thirty cents a ride, fifty per cent above the prior fare.

In 1971, the projected deficit of the New York City Transit Authority for 1972-73 was about $440 million. Without subsidy, fares on the transit system would have been increased by 5 percent to 45 cents and fares on the Long Island Rail Road and New Haven commuter services would have also increased by 50 percent. In response to this crisis, the mayor, the comptroller, the leaders of the city council, and the chairman of the MTA formed a committee that, with the cooperation of the governor and the legislature, developed a program to keep the increase on the rapid transit lines to 5 cents and on the Long Island Rail Road to 16⅔ percent. This program involved doubling tolls on the bridges and tunnels of the Triborough Bridge and Tunnel Authority, producing $50 million a year—$25 million for the transit system (in addition to money already being provided) and $25 million for the commuter lines. The city agreed to subsidize the MTA's operations to the extent of $200 million during the next 2 years, despite the fact that it did not have funds in its budget for this purpose! The city would use temporarily $100 million out of its sinking funds, and the state agreed to lend the city $100 million in 1973. This program, however, was recognized as a stopgap measure to meet a crisis until such time as a long-range solution to the critical financial difficulties facing the city's public transportation system could be found.

The pattern of rapidly rising operating costs has been the same elsewhere in major urban areas throughout the nation, and in some cities fares have risen to 45 and 50 cents with drastic effects on the use of transit services. But it is not only a big city problem. The suburbs are also facing a crisis in maintaining essential public transportation services. Nassau County has reached the point where fare increases and service reductions alone cannot maintain our bus operations. The 3 largest bus operators have been receiving public subsidies since the beginning of 1972. The subsidies do not, however, provide for any improvement of services; they buy time during which a program can be developed to cope with the problem. Experience here has also shown that capital grants to assist the carriers in the purchase of new equipment have not relieved the bus companies of sufficient operating burdens to enable them to continue to sustain their operations from passenger revenues. Accordingly, Nassau County called for take-over of the 10 privately owned operators by a public agency in order to maintain and improve the services. Public take-over will not, however, eliminate the need for operating subsidies, which are expected to cost the county $500,000 to $1 million each year.

Several mechanisms have been proposed by various people in the transit industry for implementing a federal program of assistance for operating expenses. My preference at this time, based on analysis of various proposals and my experience in the administration of state and local subsidy programs, is for a federal-aid formula that is relatively simple to administer, egalitarian by its very nature, and responsive to the productivity of the system in carrying passengers, which is the principal function of the public transportation industry. Accordingly, I propose that the federal funds be distributed through state and local agencies on the basis of the number of passengers carried. I do not say that there are no other possibilities, but the alternatives that have been proposed require data-reporting mechanisms that do not exist on a regular basis for many operations and would be costly and time-consuming to implement.

I cannot overemphasize the need for an administratively workable program. If the distribution of federal subsidy were to be based on actual cash losses or some definition

of operating deficits, whole armies of auditors would be needed to ascertain the figures, not to mention the monumental job of redesigning the "uniform" accounting system or establishing one. I think we have to accept the fact that the needs are real, that the operations are losing money, and that in most instances the managements are operating their systems as frugally as possible.

The report by the U.S. Department of Transportation (2, p. 4) recognized that "extensive standards and controls would be extremely difficult to administer and could generate a great deal of friction and conflict with local officials." But, then, it went on to say that "granting funds without any performance standards would provide no assurance that they were being used effectively or even distributed equitably."

Not only do I take issue with the last sentence but I find a major inconsistency with the next:

> Certainly, some form of general revenue sharing would undoubtedly be a more effective way of providing financial assistance to hard-pressed State and local governments since the funds could be used to meet any local need, including transit, without having to favor transit activities in order to qualify. Furthermore, a relaxation of restrictions on the rigid categories of Federal funds currently allocated for transportation purposes would also increase State and local ability to respond flexibly to their own concepts of need and priority. In the meantime, public transit needs must be met in one form or another if it is to survive this transition period.

The concept under the department's recommendation for general revenue sharing is one of total absence of controls or restrictions over the expenditure of funds granted to state and local governments. What is the need for performance standards at the federal level if funds are granted to state and local governments for the specific purpose of financing public transportation services?

The opportunity exists right now for the federal government to share in the financing of local transit systems at a time when the need to preserve the services is most critical. Certainly, it would be better to get started immediately and adjust the program guidelines as experience deems necessary rather than to allow cessation of services and exorbitant fares to erode the traffic before some utopian program is designed and implemented. When we embarked on an interim emergency bus subsidy program in New Jersey in 1969, we set out to restore several lines that had been discontinued prior to passage of the subsidy legislation as well as to maintain those operations that were threatened with termination. Our experience with the restored services indicated what might be expected: The longer the period of time was that the service was lost, the fewer was the number of former passengers regained. Although that program was admittedly and purposely designed to preserve the status quo and included no appreciable service improvements, it accomplished its purpose in stabilizing what had been a rapidly deteriorating situation, thereby providing time in which a more permanent program might be devised.

In my view, the most desirable immediate mechanism for implementing an operating expense subsidy is one that recognizes the subsidy effort that is already being made by state and local governments. The $400 million subsidy program that the Senate passed represents a small portion of the transit industry's $2.5 billion annual operating costs. It is also less than the present operating deficit so that the federal government is not being asked to shoulder the entire burden. If we project the total transit operating deficit, including commuter railroad services, at an annual level of $600 million, the $400 million of proposed federal funds will constitute two-thirds of the total deficit; existing state and local effort will cover the remaining one-third. There is, of course, a precedent for this matching share ratio in federal-aid programs for urban transit, and I suggest that this might be mandated in the program as an integral part of the financing mechanism, as it was in the Senate-passed version of the subsidy legislation. In this way, localities that seek federal funds to finance new or expanded transit services would have to match the proportionate effort that is being expended by other state and local governments to support existing services.

Several critical questions have been raised concerning the operating subsidy. One involves incentives to perform under a subsidy, and I believe this is closely related to 2 other topics: (a) the interrelation of service cost and the quantity and quality of service and (b) the role of local, state, and federal governments in setting standards, funding, and administration.

First, we should note that federal subsidy—in the magnitude of 7 or 8 cents per passenger—is not going to encourage transit system managements to provide unnecessary services just to get federal funds. Increased services will be provided to the extent that the increased patronage generates sufficient revenues through fares, local support, and federal payments to equal or exceed the direct marginal costs. In simple terms, no one is going to seek a loss of 10 cents per passenger in local funds to gain an 8-cent federal payment.

As to the matter of the fare level versus the level of service provided, I believe that the proposed program will lessen the pressure for fare increases and service curtailments. After all, one feeds on the other. With relatively stable fares, traffic will tend to stabilize, encouraging service improvements and attempts to seek new patronage. This becomes, therefore, an incentive to attract new patronage rather than to discourage passenger utilization, which is the case when fares must be increased and services curtailed in order to live within overly stringent operating budgets.

I believe that the most effective supervision would be at the state and local levels and that the federal role should be limited to that of distributing funds to these public agencies on the equitable and easily auditable basis of the number of passengers carried. Where local agencies are already organized and prepared to administer the program, particularly in the larger cities but also in many suburban areas, the administration should be at that level. Where no local agency is already involved or prepared to do the job, then the administration would be solely at the state level. These are the units that can supervise the operations under subsidy without creating an unreasonable and unnecessary set of standards and controls that would constitute a cumbersome and costly bureaucracy if applied uniformly throughout the nation by a federal agency. Such standards and controls would be a poor substitute for good management and administration at the local level.

I would propose one restriction, however, and that concerns those instances in which a privately owned transit service is earning a profit. These companies usually enjoy a franchise that allows them to operate one or more routes where traffic is unusually heavily concentrated and are not required to service other, unprofitable routes in the area, as would be the case in a unified system. Although it is doubtful that this would be permissible under the intent of the federal legislation or that any local agency would want to spend its available funds unnecessarily, having the restriction clearly stated at the federal level would avoid any controversy.

I believe that the Department of Transportation's report recognized the desirability of providing funds to state and local agencies without major restrictions in the recommendation for general revenue sharing. I suggest that the same concept be applied here, only in an immediate functional program that will ensure the adequacy of funding that is needed now in order to maintain present levels of fares and service.

Another question that has been raised is the effect of the subsidy on the collective bargaining process. Subsidy will not change the basic ground rules of the collective bargaining process. The position has already been established that it is management's job to find the funds to meet labor's legitimate demands. The wage levels have gone up in relation to the general economy, not in relation to the profit or loss status of the transit industry. I do not foresee the availability of federal funds to cover a fixed amount of existing deficits as a stimulant to clearly unreasonable demands by labor.

Fare-box revenues will continue to be of the greatest relative importance in the financing of transit operations and will increase with increasing patronage even though fares are kept stable. The industry is calling not for a major rollback of fares or free rides but for fare stabilization. Other non-fare-box sources of revenue, such as charter, other special operations, and miscellaneous revenues, are not very significant in the total picture but can vary widely among individual systems. For example, char-

ter and other special operating revenues are practically nonexistent on commuter railroad operations, rail rapid transit systems, and some large municipal bus operations. On the other hand, these revenues amount to approximately 9 percent of the total revenues of the nation's largest privately owned public transit system, Transport of New Jersey; about 20 percent of New Jersey's second largest operation, Inter-City Lines; and almost that much on the 10 privately owned bus systems in Nassau County. These revenues can be quite significant to a specific locality that is contemplating assistance to, or direct operation of, its public transit system. Accordingly, I believe the choice should be left to the state or local agency as to whether it will expect to include continuation of charter service and other special operating revenues in its financing plans. The local agency is in the best position to know local competitive conditions and to determine the economic nature of the operation with or without such service.

Finally, there is the question of public versus private ownership and operation of public transit services. As I noted earlier, publicly owned systems are dominant in terms of the number of transit passengers carried but not in the number of systems operated. The issue, with respect to operating subsidies, is usually not whether operating subsidies will be required but how much the amounts will be. If the subsidies are designed as a permanent program and calculated to make the private operator whole, this includes depreciation and an adequate return on his investment. It becomes a matter of subsidizing a private profit with public funds and agreement on depreciation policies. The alternative, of course, is for the public agency to acquire the property and calculate subsidy needs based on operating needs, with or without a capital replacement charge. With most of the major transit systems now under some form of public ownership, and the trend apparently continuing, I do not view this as a major issue in the debate over implementation of a program of federal operating assistance for public transportation systems.

The immediate problem is just that—implementation of a program that will get the funds where they are needed quickly.

REFERENCES

1. Feasibility of Federal Assistance for Urban Mass Transportation Operating Costs. U.S. Department of Transportation, Nov. 1971.
2. Ronan, W. J. Statement to the Subcommittee on Housing, House Committee on Banking and Currency, Feb. 23, 1972.

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By almost any measure, the urban transit industry has been in a decline for at least the past 20 years. Employment, fleet size, and number of passengers carried have all fallen. Although gross income has remained roughly constant in the recent past, this appears to be due largely to fare increases just offset by the decrease in number of passengers. The conventional wisdom is that the industry is sick and needs substantial subsidy in order to survive.

As part of the Urban Mass Transportation Assistance Act of 1970, Congress ordered the secretary of transportation to study the "feasibility of providing Federal assistance to help defray the operating costs of mass transportation companies in urban areas." The study conducted under that mandate turned up a number of interesting facts about the industry, some of which (a) are at considerable variance with the conventional wisdom and (b) raise serious issues about the federal role in urban transit. This paper reports

on some of the findings and issues of that study.

The sections that follow discuss the conceptual issues involved in the subsidy problem, analyze the "industry deficit," describe several possible subsidy mechanisms, and evaluate those mechanisms. The final section discusses the conclusions reached in the study submitted to Congress and suggests directions for further work.

CONCEPTUAL FRAMEWORK

The report to Congress (1, pp. 51-52) listed a number of possible objectives of an operating subsidy program. (Throughout this paper, the term "operating subsidy" refers to a subsidy specifically intended to relate to costs of transit operation. This is in distinction to the UMTA Capital Grant program, which subsidizes the capital costs of transit operation.) The objectives were

1. Mobility for urban populations,
2. Mobility for nondrivers,
3. Help for the poor,
4. Maintenance and improvement of transit services,
5. Stabilization or reduction of existing fares,
6. Stimulation of ridership,
7. Reduction of congestion,
8. Preservation and improvement of the environment,
9. Improvement of the quality of urban development,
10. Help for financially burdened cities and states,
11. Offsetting of subsidies for the automobile,
12. Reduction of the deficit, and
13. Achievement of income redistribution.

It is significant that only objectives 4, 5, 6, and 12 refer directly to the condition of transit firms and that the majority of objectives are more directly concerned with the condition of transit riders and urban areas. This reflects the opinion of those involved in the study that the deficit itself was not the problem but a symptom of a problem. For purposes of this paper, it is suggested that the objectives outlined above may be condensed into the following definition of an ideal type of subsidy: one that would assist the improvement of mobility for people in cities, without distorting economic efficiency in resource allocation either within the transportation sector or between the transportation and other sectors of the economy.

Improving Mobility

It should not be automatically assumed that preserving existing transit service will improve mobility of people in cities any more than it should be assumed that providing more highways in urban areas will achieve the same objective. A major cause of the "crisis in transit" is the fact that urban travel demands today are substantially different from what they were several decades ago, yet the urban transit services available today are substantially the same as they were several decades ago. With a few notable exceptions, they offer people mobility and access to about the same subset of destinations today as they did just prior to World War II. Any mechanism proposed for subsidizing transit should be tested against its ability to assist in providing increased access to a variety of different destinations.

Allocating Resources

Clearly, most if not all potential subsidy mechanisms are incapable of satisfying all the criteria of the ideal type of subsidy. For example, consider one common defense

of transit operating subsidies: Because urban transportation markets have already been distorted (at least in terms of local decision-making) by the availability of federal funds for highway construction and by implicit subsidies to all-day parking in congested areas, transit subsidies are needed in order to overcome the existing distortion in favor of highways. Accepting this argument results in advocating subsidies for both modes, which in turn is very likely to result in too many resources being devoted to transportation as contrasted with other urban needs. If the transport mode choice is "rigged," it does not follow that the only remedy is to institute an operating subsidy program for transit; many other devices are available to alter the relative prices and levels of service of the competing modes. Using an operating subsidy program may in turn rig choices in favor of transit and against other urban public goods.

In addition to the goals of mobility improvement and efficient resource allocation within cities, the study of operating subsidies highlights some other issues of general importance in the area of federal-local relations. Two of these issues are discussed below.

Classes of Grantors

As with many other proposed federal programs, the fiscal-imbalance argument was advanced in defense of operating subsidies. In general terms, this argument states that the federal government has the broadest tax base and hence the best ability to provide the funds for programs and the local governments are best able to decide local priorities. This, in fact, is the thrust of the many revenue-sharing proposals that have surfaced during the past few years.

The fiscal plight of the cities has been the subject of many a paper and speech. It can be argued, however, that the extent of a locality's willingness to tax itself for transit improvements (or even mere maintenance of basic service) should be taken as the measure of the priority assigned to transit service by residents of that locality. It is not clear that higher levels of government are better able to judge the levels of service that a given city should be interested in having. Obviously, offering subsidies will influence the ranking of local priorities. But, if the interest does not exist a priori at the local level, should it be imposed from above? Yes, if there exists clear evidence of externalities extending well beyond the boundaries of the urban area involved. It remains to be shown that this is the case for urban transit.

If programs financed at the local level run the risk of being undernourished, programs funded by higher levels of government run the risk of being unresponsive to local needs. A subsidy from the federal level implies some set of rules to be applied uniformly across the country in determining eligibility for subsidy payments and amounts to be received. It is by no means clear that the urban transportation problem is similar in all parts of the country (2). Yet establishment of any given level of subsidy payments, taken together with local decisions about fare levels, and given existing patronage levels will determine the levels of transit service that a firm can afford to provide, just as revenues determine the amount of service that can be provided without subsidies. The very fact that various states and cities have chosen to deal with the problems of urban transit differently—or not at all—suggests that the problem is not perceived to be the same all over the country. Any federal operating subsidy program, in particular, that provides the "right" amount of aid for firms in one state is very likely to provide too much aid for some other states and not enough for the rest. Similarly, a state-level program, in a state whose cities have widely different characteristics and problems, may not be able to deal responsively with the problems of all areas within its jurisdiction.

Classes of Recipients

Conceptually, transit operating subsidies could be given to any or all of a number of

classes of recipients. Who gets a subsidy depends on the real goals of the subsidy program and the administrative difficulties involved in distributing the subsidy. Subsidies from the federal government might be paid to the transit operating firm, to a state or local government, or to any of a number of classes of riders. Although the outcome of making payments to any of these classes is somewhat conjectural in light of the limited experience we have had with transit subsidies, it is possible to outline the most likely outcome of each type of payment.

Payments to Firms

Payments to firms offer the potential of the greatest degree of control over the operations of the firm, if the subsidy grantor is willing to exercise the necessary administrative control. Should it be desired, payments could be very closely keyed to deficits, operating expenses, patronage, or any other measure of the firm's activity.

This approach has several disadvantages to offset the advantage of tight control. For one thing, it would be all too easy for the subsidy grantor to eliminate any incentive for transit management to use its judgment. The tighter the control exercised is, the greater this danger is. Another problem is that offering the subsidy to the firm eliminates the possibility of looking for trade-offs between subsidies to transit, for example, and subsidies to industry or housing developers to locate where the need for transportation would be minimal. A third difficulty is the tendency of such a payment mechanism to further institutional rigidities and eliminate the possibility of innovative corporate forms of transit being attempted.

Payments to Other Governments

This approach has the appeal of enabling most of the administrative burden, as well as the decision-making process about what is optimal for a given area, to be brought closer to the area involved. A requirement for local matching funds could be employed to help ensure that local priorities would not be too badly distorted by the availability of federal aid. States or localities could even be encouraged to evaluate trade-offs between aid to transit and other ways of easing the transportation burden, if the grant terms were sufficiently flexible.

This approach also has its drawbacks. States could, in theory, allocate funds to various cities in ways that the cities would feel to be grossly inequitable. If the subsidy formula did not specify a limit on the aggregate amount of funds to be spent on the subsidy program, it would be impossible to predict from one year to the next what the total subsidy bill would be. If the formula did specify a limit, it would be impossible to secure an equitable distribution of funds that would meet the needs of all cities.

The requirement for a matching share may also subject the local decision-making process to further distortion. The example currently in vogue is that a city can spend a million dollars in local funds to get $10 million worth of new highways or $3 million worth of new transit facilities. It would be difficult to specify any level of local participation that would not influence the intermodal trade-off one way or another.

Payments to Users

Proponents of free enterprise have argued that the best form of subsidy is one that is not tied to any particular mode of transportation but rather enables various classes of riders to choose via the market mechanism the mode that best suits their needs. Subsidizing riders has the appeal of enabling the subsidizer to target the payments to specific groups according to their needs. For example, if aid to low-income riders were the goal, transportation stamps could be issued in a manner analogous to the present food stamp program. Or, to broaden the scope, transportation vouchers could

be issued that would enable an individual to choose transit or taxi service according to his needs and the availability of service. Ideally, this should create more competition among the modes and result in a more optimal allocation of resources.

This technique also has drawbacks. Given the current pressure for welfare reform, it seems extremely unwise to advocate yet another categorical grant program. There is also a danger of creating a black market in vouchers or stamps and some antipathy to any program involving a "means test." Nor is it clear that such a program would have the desired result in terms of rationalizing service offered by various public modes. And, of course, such a program does nothing to encourage trade-offs between transportation and location decisions.

Administration

The discussion in the preceding section leads naturally to the final conceptual issue to be discussed: the administrative problem. The ideal type of subsidy would, of course, have no administrative cost. In the real world, however, the trade-offs between administrative cost and subsidy effectiveness must be considered for each proposed subsidy mechanism. The ranking of objectives to be achieved by a subsidy will influence administrative cost.

Consider, for example, a subsidy mechanism whose primary objective is to improve mobility for people without access to automobiles. To maximize mobility improvement, subsidy administrators ought to know the following: where people want to go; what alternative modes are now available, and at what costs; and what new alternatives might be offered, and at what costs.

Let us assume for this discussion that it has been decided to give the subsidy to a provider of transit service rather than to the potential users. If a specific target set of travel demands can be identified, there is still the problem of ensuring that the subsidized provider does in fact provide the desired service. The ultimate administrative arrangement in this circumstance is perhaps the contract-for-services approach used in several state transit subsidy plans. Whatever the merits of such a program may be at the state level, it seems highly doubtful that such an approach would be workable at the federal level. Two alternatives appear in this approach: The providers might contract directly with the federal government, or the federal government might reimburse the states for their expenditures on such a program. Neither alternative is particularly palatable. The first substitutes federal for local judgment about the level of service to be provided; in effect it puts the federal government in the local transit business. The second has the effect of dictating to the states the way they should relate to cities and transit firms. Not only do both alternatives raise all sorts of states'-rights issues, but the sheer weight of regulation necessary to administer such a program would probably stifle the very kinds of innovation that ought to be encouraged. For administrative convenience, dealing with one large firm will probably be preferred to dealing with several smaller ones. But there is no evidence to indicate that scale economies exist in urban bus transportation; indeed, there is some evidence to the contrary (3). Jitney operations, neighborhood cooperative transport services, and similar innovative experiments would likely not be encouraged under a subsidy-regulatory scheme of the kind discussed in this section.

The levels of information required to properly administer the more detailed, contract type of subsidy arrangements simply do not exist for many transit firms today. It would be extremely difficult, for example, for the typical transit firm to give an accurate estimate of the average and marginal costs of providing a vehicle-mile or a vehicle-hour of service. And if cost statistics are bad, demand statistics are totally lacking. A contract type of subsidy, optimally, should relate subsidy payments to travel demands; as of this date, no one in or out of the transit industry really knows what the demands are for existing services let alone for innovative new types of service. A well-designed, highly detailed contract type of program would incur substantial costs for base-line and ongoing data collection.

Some Criteria

Based on this discussion of the issues, some objectives for a subsidy program can be outlined. These objectives may then be converted into criteria to use in evaluating specific subsidy mechanisms. It should be clear from the preceding discussion that the evaluation will have to be somewhat subjective; at best, an objective ranking of various proposed mechanisms may be made with respect to the various criteria. But even if this is done, a "voting paradox" situation is likely to result wherein no one mechanism emerges as a clear winner and the most positive assertion to be made is that some mechanisms are clearly dominated. A later section discusses this matter with reference to various proposed mechanisms.

The criteria to be applied to a proposed subsidy mechanism are as follows:

1. How much can it be expected to increase mobility? (Will it at least preserve existing service and fare levels?)
2. Will it distort resource allocation? How efficient is it? How equitable is it in terms of its impact on different groups of travelers in one city? In different cities? (For example, how well would the proposed mechanism do at enabling ghetto residents to travel to job sities? Is this mechanism the most efficient way of providing for that type of travel demand? Will it work equally well in, say, Philadelphia and Phoenix?)
3. Will it encourage or discourage innovation?
4. How much will it cost to administer?

This list is not intended to be exhaustive. For one thing, it pretty much ignores the political implications of various types of pass-through mechanisms that might be employed as well as the local prerogatives issue, except to the extent they impinge on innovation or other criteria. Of course, the reader is free to add his own list for use in testing the proposed mechanisms. But for economic analysis, the 4 touchstones of mobility-firm solvency, efficiency-equity, innovation, and administration are the primary evaluative criteria.

OF TRANSIT DEFICITS

Before analyzing the impact of subsidy mechanisms, one must know the current financial state of the industry. At this point we begin to look rather sharply at the "conventional wisdom." The data in the following discussion were furnished by industry trade associations from data provided by member firms.

For purposes of analysis, it is useful to distinguish among 3 types of firms providing urban transit service. By far the largest number of such firms provides service by motor bus only; according to the American Transit Association, there are on the order of 1,150 such firms in the country. They are called bus-only firms in this paper.

Fewer than 20 transit firms provide service by rail rapid transit on separated right-of-way, surface streetcar, trackless trolley, or other modes. Those firms are concentrated in less than a dozen cities. They are referred to here as multimodal firms, even though some of them provide rail service only.

A third category of urban transit service is provided by railroad commuter operations. There are 16 such firms, omitting the Staten Island Rapid Transit Operation that was taken over from the B&O by the Metropolitan Transportation Authority in New York City. Commuter operations are confined to operations around hubs such as Boston, New York, Philadelphia, Washington, and Chicago; a small amount of service is offered in the Pittsburgh, Los Angeles, and San Francisco areas. These firms are called commuter rail operations.

The total reported deficit from urban transportation operations included in the sample used for the study was about $276 million. In 1969, allowing for the fact that firms included in the sample carry approximately 85 percent of the passengers transported in urban transportation in the United States and assuming that nonreporting firms ex-

perienced losses proportional to the number of passengers carried (a relatively conservative assumption, as the discussion below will make apparent), it is quite plausible to assert that the 1969 "transit deficit" was on the order of $320 million. Reported surpluses were about $15.8 million; based on the same reasoning, they might have been as high as $18 million for the industry as a whole.

The above figures are not very revealing by themselves. Far more interesting is the breakdown by industry sector for sample firms, as given in Table 1.

Bus-Only Firm Deficits

Although 47 firms in the sample reported deficits in 1969, 3 of those firms accounted for more than 49 percent of the reported deficit of $15.2 million, 9 for 75 percent of the deficit, and 20 for well over 90 percent.

Deficits were not closely correlated with city size; dividing reported deficit by SMSA population yielded figures ranging from well under 10 cents per person to well over $3 per person among the 20 cities with the largest deficits. Largest reported deficit for a bus-only city was approximately $3.65 million in 1969; average deficit for those cities reporting deficits was $323,000.

The other 50 firms in the bus-only sample reported break-even or profitable operations in 1969. Total reported profits were approximately $10.6 million; the total reported deficit was $15.2 million. The bus-only sector of the industry was thus by no means entirely a red-ink operation as of the end of 1969, although it could hardly be regarded as thriving.

Multimodal Firm Deficits

Of 12 multimodal firms in the sample, 8 reported deficits totaling $166.5 million. The other 4 showed a total profit of about $3.5 million. The New York City Transit Authority, of course, showed the biggest loss by far—just under $100 million and well over 50 percent of the reported losses in the sample. Boston's MBTA reported a loss of about $44 million, amounting to a little more than 25 percent of the reported deficits of multimodal firms. None of the other firms reporting experienced individual losses of more than 7.5 percent of the total.

The comparison of deficits and urban populations is even more interesting for multimodal than for bus-only operations. Of course, most of the multimodal firms are in very large cities, so the distributional implications of the reported deficits (as between large and small cities) cannot be inferred from the multimodal data in any case. Comparing deficits with SMSA populations, though, one notes that the range goes from 22 cents per person for the Philadelphia operations (combining SEPTA and DRPA) to about 40 cents for Chicago and then jumps sharply to about $8 per person in New Orleans, $9 per person in New York City, and an amazing $16 per person in the Boston area. By comparison, deficits among bus operations are trivial.

Commuter Rail Deficits

Rail information was reported by the industry association on a road-by-road basis instead of a city-by-city basis, so comparisons are difficult. Total reported deficit for 1969 was about $95 million for 15 roads; the Penn Central alone accounted for more than a third of the losses.

Calculations for 1970, from another source and on a somewhat different basis, indicated a total deficit of approximately $86 million for commuter rail operations in 5 urban areas: New York, Philadelphia, Chicago, Boston, and San Francisco. Not surprisingly, New York and Philadelphia account for about 85 percent of the total deficit.

The relative importance of rail facilities may be of interest. According to one

source, about 1 revenue passenger in 15 travels by rail in New York City, 1 in 9 in Chicago, 1 in 5.8 in Philadelphia, 1 in 32 in San Francisco, and 1 in 44 in Boston. For New York and Philadelphia, at any rate, it seems fairly clear that rail operating deficits are disproportionately high relative to the volume of traffic served.

Defining the Deficit

The purpose of this paper is not to establish the plight of the transit industry, nor to assess its cost-effectiveness in terms of reported costs and numbers of passengers carried. Nor should the data presented in preceding sections be taken as definitive. Rather than dwell at length on the significance of the specific numbers presented, we turn now to a discussion of the theoretical concept of "the deficit" in an attempt to better understand just what is happening in the transit industry.

The Deficit as Reported

The deficit figures used in the discussion above came, as noted, from industry sources. They were calculated, in all cases, by summing operating and nonoperating revenue from transportation services and by subtracting from the total thus obtained the total costs reported. This is essentially the approach used by the industry itself in assessing its condition. Unfortunately, it raises several conceptual issues of major consequence, which are discussed below.

Depreciation

The deficit figures used in the discussion include the depreciation figures as reported by the individual firms to their industry associations. There are 2 problems here. The first, and most serious in terms of magnitude, is that some publicly owned firms carry no depreciation account at all, following an old tradition of governmental accounting that involves an operating budget and a capital budget but no allowance for depreciation. There is no consistency among firms in this regard; among the largest cities, New York does not calculate depreciation but almost all others do.

The second problem is that, even among those firms that do report depreciation, the uniformity that exists is more likely to reflect Internal Revenue Service guidelines than the true rate of wear and tear on assets. The underlying issue in any case is, What is the true value of capital resources used up in producing a year's supply of transit? The answer, unfortunately, is simply not obtainable from reported accounts. As a result, it is impossible to tell whether the reported deficits include the cost of maintaining the capital stock in constant condition, whether the capital stock is being worn out, or whether it is in fact being built up.

Other Services

Although less common than in former times, and largely limited to the biggest cities, arrangements involving transit firms in payments-in-kind still exist and obscure the profit-and-loss analysis. There are nontransit services that transit firms are forced to provide to cities under the terms of a franchise, and there are transit services that cities provide to transit firms. An example of the former is snow removal by the transit firm along streets carrying transit routes; an example of the latter is the provision of purchasing services provided by a municipality to its publicly owned bus firm. In both cases, the transit operation's reported costs reflect something other than the full cost—and only the cost—of providing transit.

Local Subsidies

Finally—and most important of all—there is the entire range of state and local subsidies provided to transit operations under a wide variety of arrangements. In many cases, these subsidies are not reported as income to the transit firm; the books are balanced after the firm computes its operating loss for the year. In other cases, some of the subsidy—such as reimbursement for discount fares—is reported as income, but there may remain a net deficit to be offset by the general treasury.

In the end, the deficit reported by the industry for its own purposes is best thought of as the shortfall between operating revenues and operating expenses, with the reported figures being somewhat distorted by differences in accounting and reporting systems. To say this is not to say that the deficit is fictional—far from it. The difference between fare-box revenues and costs is real and substantial. The price that users are willing to pay for the service is significantly less than the cost of producing the service for a large number of firms carrying by far the majority of total transit riders. In analyzing the specific subsidy mechanisms discussed below, however, one must keep in mind that a considerable portion of the shortfall is already being covered, in one way or another, by existing subsidy mechanisms.

SOME SUGGESTED SUBSIDY MECHANISMS

The report to Congress discussed a variety of possible ways of allocating subsidy to transit firms. This section briefly describes the allocation mechanisms proposed and indicates the approximate dollar cost of each mechanism. Evaluation of the various mechanisms is the topic of the next section.

Ten mechanisms were presented in the report to Congress. For discussion purposes, They are organized into 4 groups: deficit-related subsidies, cost-related subsidies, output-related subsidies, and demand-related subsidies.

Deficit-Related Subsidies

Perhaps the simplest subsidy, in concept and administration, is one that simply pays the difference between total costs and total revenues for transit firms incurring deficits. Such a subsidy mechanism would have cost the federal government approximately $276 million in 1969, based on the sample discussed above. Aid would have gone to 47 bus-only firms, 8 multimodal firms, and 15 commuter railroads in the amounts of $15, $167, and $94 million respectively. All reported deficits would have been offset and no windfalls created.

Cost-Related Subsidies

A family of mechanisms related to capital costs was investigated, as was a family of mechanisms related to operating costs. Capital-cost-related mechanisms were pay total fixed costs; pay depreciation; pay interest payments on debt; and pay maintenance, garage, and equipment costs for bus firms and maintenance of way and structures for multimode and rail properties. The outcome of these mechanisms is given in Table 2 (1).

A number of operating-cost-related mechanisms were considered during preparation of the report. Three options were presented in the final version: pay 5 percent of total costs, pay 20 percent of total costs, and pay 5 percent of variable costs (administrative, maintenance, and operating costs). The outcome of each of these mechanisms is given in Table 3 (1).

Output-Related and Demand-Related Subsidies

Two other mechanisms discussed in the report to Congress were classed as output mechanisms—a grouping with which this writer disagrees. The mechanisms were payment of 5 cents per vehicle-mile operated and 5 cents per passenger carried. The 2 mechanisms should be conceptually separated because they have different effects: the relation between vehicle-miles operated and costs is far more direct and clear-cut than the relation between passengers carried and costs. Referring to payments on a per passenger basis as a "demand-related" mechanism, in contrast to payments per vehicle-mile as an "output-related" mechanism, may help to keep the distinction in mind. Nonetheless, the outcome of both types of mechanism is given in a single table (Table 4) primarily for typographic convenience.

An Explanatory Note

The figures given in the tables describe the impact of the respective subsidy mechanisms on sample firms only. For each mechanism, the subsidy payments and impact could only be calculated for those firms that had provided the relevant data to their industry associations. Hence, the size of deficit and subsidy and the number of firms are not strictly comparable for all mechanisms discussed. Nevertheless, the figures are indicative of the type of results to be expected; the percentage calculations are more revealing than the absolute dollar amounts. Firms in the sample did include most of the major city transit firms and about 85 percent of total transit ridership as noted above.

ANALYSIS OF MECHANISMS

In this section, each of the classes of subsidy mechanism described above is evaluated in terms of the 4 criteria of mobility (subsuming firm solvency), efficiency and equity (the welfare issue), innovation, and ease of administration.

Deficit-Related Subsidies

The impact of a pay-the-deficit subsidy with regard to mobility will depend in part on whether an upper limit on funding for such a program will be imposed, and at what level. If no upper limit were imposed, firms could clearly maintain their existing levels of service; survival would no longer be at stake. However, in light of the fact that a $275-million program in calendar 1969 would escalate to a $475-million program in 1970, an unbounded deficit subsidy appears highly unlikely. Unfortunately, imposing an upper limit on the program might actually consign some firms to bankruptcy. How would the decision be made as to which firms should be kept in operation and which permitted to go out of business?

Deficit-related subsidies are more or less neutral with respect to welfare. To the extent that they permit firms to continue operations at their present levels, they represent a net gain to those dependent on public transportation; a similar gain is realized if the availability of subsidy forestalls fare increases. However, there are many more efficient ways of ensuring that the cost of transportation does not become an excessive burden to the young, the old, the poor, and the handicapped. For example, the payments-to-users devices discussed earlier are a class of more efficient ways to achieve the welfare goal.

Deficit subsidies are slightly positive with respect to innovation, to the extent that they do not penalize a firm attempting to offer new services. (If such services incur a loss, presumably the loss will be covered as part of the subsidy payment.) However, the program provides no positive inducement for firms to try new ways to make the

Table 1. Surplus or deficit position of firms in transit sample by sector.

Sector	Deficit		Surplus	
	Amount (dollars)	Number of Firms	Amount (dollars)	Number of Firms
Bus only	15,150,000	47	10,570,000	50
Multimodal	166,460,000	8	3,460,000	4
Commuter rail	94,816,000	15	1,799,000	1

Table 2. Effect of capital-cost-related mechanisms.

Item	Pay Total Fixed Costs or $109.1			Pay Depreciation or $68.6			Pay Interest on Debt or $40.4			Pay Other* or $150.3		
	Bus	Multimode	Commuter Rail	Bus	Multimode	Commuter Rail	Bus	Multimode	Commuter Rail	Bus	Multimode	Commuter Rail
Subsidy, dollars	35.1	57.5	16.5	26.3	29.5	13.0	9.0	28.0	3.5	46.4	80.0	23.9
Initial deficit, dollars	15.2	166.5	59.5	15.2	166.5	59.5	15.2	166.5	59.5	11.2	158.0	59.5
Deficit after subsidy, dollars	6.7	139.9	47.6	7.9	159.8	49.4	12.1	143.4	57.3	3.1	84.5	35.4
Decrease in deficit, percent	56	16	20	48	4	17	20	14	4	72	47	41
Initial surplus, dollars	10.6	3.4	1.8	10.6	3.4	1.8	10.6	3.4	1.8	7.6	—	1.8
Increase in surplus, percent	252	870	225	180	637	154	56	143	71	503	—	68
Use of subsidy, percent												
Reduce deficits	24	48	72	28	25	76	34	82	64	17	92	67
Increase surpluses	76	52	28	72	75	24	66	18	36	83	8	13
Number of firms												
In sample	97	12	15	97	12	15	97	12	15	78	9	15
Receiving subsidy	93	11	13	91	10	13	73	8	9	75	8	14
Originally with deficit	47	8	14	47	8	14	47	8	14	37	7	14
Moved out of deficit after subsidy	22	3	2	19	3	2	9	1	0	23	2	1

Note: All dollar amounts are in millions.

*Maintenance, garage, and equipment costs for bus firms and maintenance of way and structures for multimode and rail properties.

Table 3. Effect of operating-cost-related mechanisms.

Item	Pay 5 Percent of Total Cost or $88.9			Pay 20 Percent of Total Cost or $354.6			Pay 5 Percent of Variable Cost or $82.1		
	Bus	Multimode	Commuter Rail	Bus	Multimode	Commuter Rail	Bus	Multimode	Commuter Rail
Subsidy, dollars	20.9	50.6	17.4	87.2	197.9	69.5	20.3	46.0	15.8
Initial deficit, dollars	15.2	166.5	94.8	17.7	158.1	94.8	17.7	166.5	94.8
Deficit after subsidy, dollars	8.4	131.4	77.7	11.6	31.5	32.2	10.8	135.2	80.7
Decrease in deficit, percent	45	21	18	91	71	66	39	20	15
Initial surplus, dollars	10.6	3.4	1.8	14.7	—	1.8	14.9	3.4	1.8
Increase in surplus, percent	134	450	53	465	—	214	89	381	38
Use of subsidy, percent									
Reduce deficits	32	69	89	18	64	85	34	71	92
Increase surpluses	68	31	11	82	36	15	66	29	8
Number of firms									
In sample	97	12	16	100	9	16	103	12	16
Receiving subsidy	97	12	16	100	9	16	103	12	16
Originally with deficit	47	8	15	49	7	15	50	8	15
Moved out of deficit by subsidy	19	3	1	37	3	3	21	3	1

Note: All dollar amounts are in millions.

Table 4. Effect of output-related and demand-related mechanisms.

Item	Pay 5 Cents per Vehicle-Mile or $75.0			Pay 5 Cents per Passenger or $235.3		
	Bus	Multimodal	Commuter Rail*	Bus	Multimodal	Commuter Rail
Subsidy, dollars	24.5	40.5		80.9	140.9	12.5
Initial deficit, dollars	15.2	166.5		14.5	163.7	91.8
Deficit after subsidy, dollars	7.4	138.6		2.6	52.4	81.3
Decrease in deficit, percent	51	17		82	68	12
Initial surplus, dollars	10.6	1.1		10.2	0.2	1.8
Increase in surplus, percent	159	1,184		674	15,800	125
Use of subsidy, percent						
Reduce deficits	32	69		15	80	82
Increase surpluses	68	31		85	20	18
Number of firms						
In sample	96	11		92	9	16
Receiving subsidy	96	11		92	9	16
Originally with deficit	47	8		44	7	15
Moved out of deficit after subsidy	21	3		31	2	1

Note: All dollar amounts are in millions.

*Not available.

service responsive to current travel patterns.

A deficit-related subsidy could be the easiest of all to administer. Unfortunately, the lighter the administrative hand is, the greater the potential for abuse in the program will be. Management would lose most if not all existing incentives to control costs if full deficits were underwritten by subsidy. But the alternative to this outcome requires regulation and audit of allowable costs, fare and wage levels, and so on; administrative simplicity is thereby eliminated.

In summary, deficit-related subsidies give one the choice between administrative simplicity and a bottomless pit or detailed administration and the possibility of some business failures, with the responsibility for the latter outcome resting primarily on the subsidy provider.

Capital-Cost-Related Subsidies

If judged by results for the sample properties, a capital-cost-related subsidy would provide no guarantee of the firm's ability to maintain existing service. Even paying full fixed costs would offset deficits for less than half those properties that incurred deficits in 1969. Furthermore, about 75 percent of the $35 million subsidy paid to bus-only firms by this formula would become windfall profits for firms not previously operating at a loss; about half the $57.5 million paid to multimode firms under this formula would likewise become windfall profits.

Capital-based subsidies can no more guarantee to hold fares constant than they can guarantee to keep firms in business. Furthermore, there is reason to believe that the impact of such subsidies would vary wildly among cities, according to the capital structure of the transit firms in their respective communities. Higher subsidy payments would very likely be received by heavily leveraged firms than by firms operating on equity capital only. If nothing else, a capital-based subsidy might lead to a drastic revision in techniques of transit financing.

For reasons mentioned in the preceding paragraph, the welfare implications of a capital-based subsidy are very uncertain; they would depend almost entirely on previous financing practice of specific transit firms. To the extent that windfall profits induced firms receiving them to lower fares, there would presumably be a net welfare gain to the transit disadvantaged. But fare reductions are by no means certain, nor would they be achievable by all firms. And, as with deficit subsidies, there are more efficient ways to achieve the welfare goal.

Would capital-based subsidies induce service innovations? Again, the historical capital structure of the individual firms plays a large part in answering that question, but so does the nature of the mode involved. Rail and multimodal systems, which traditionally have the higher debt-equity ratio—if only because they are more capital-intensive—are also inherently inflexible. It is difficult to envision meaningful service innovation on such systems regardless of the source of income to the firm. Even bus firms receiving windfalls from such a subsidy, however, would find nothing inherent in the mechanism itself to induce them to innovate. This is particularly unfortunate since most of the subsidy paid under such a formula would go to currently profitable firms.

As with a deficit-based subsidy, administrative cost could be kept very low. But the trade-off is similar: Low administrative cost here would be achieved at the sacrifice of any control technique that might be used to stimulate service innovations.

The strategy of paying maintenance, garage, and equipment costs for bus-only firms and maintenance-of-way and structures costs for multimode and commuter rail systems deserves somewhat closer attention, although the general remarks above still apply. This strategy is classed with the capital-cost strategies since it deals with the capacity of the physical plant rather than the amount of output actually produced. There is, of course, some managerial discretion in the amounts spent on maintenance for a given level of traffic; if nothing else, it might be argued that a policy of subsidizing maintenance expenditures should increase safety of operations.

Data given in Table 2 show some other interesting effects of a maintenance subsidy. For multimode and rail properties, this mechanism is far more efficient than any of the other capital mechanisms investigated and is at least as efficient as any of the operating-cost mechanisms discussed below in terms of its ability to deliver subsidy that will reduce deficits rather than create windfalls. Unfortunately, the maintenance mechanism is somewhat less effective in its ability to move those firms from deficit to break-even or profitable operation; as we will see below, the operating-cost-related mechanisms are somewhat better in this regard. (Obviously, caution must be used in interpreting these figures both because of the relatively small sample size and because the subsidy payments are estimated on the basis of past expenditures, which in turn may reflect attempted economies in maintenance.)

Operating-Cost-Related Subsidies

Table 3 gives details on the effects of 2 operating-cost-related subsidy mechanisms: payment based on variable cost and payment based on (2 levels of) total cost. The basic difficulty with operating-cost-related subsidies is twofold. For bus-only firms, any level of subsidy that moves a significant number of firms out of the red also results in substantial windfalls to profitable firms and very high overall program costs. For multimode and rail firms, the capital-cost strategies appear to be at least as effective, although, again, the figures must be interpreted with caution.

In general, the operating-cost-related subsidies share the strengths and weaknesses of the capital-cost-related subsidies, particularly with respect to mobility and welfare. Operating-cost subsidies may have an advantage with respect to innovation to the extent that service improvements depend more on noncapital than on capital outlays. But again, although operating-cost subsidies might make it more feasible for firms to innovate, they still fall short of providing a positive incentive to do so.

Administrative problems could increase with operating-cost subsidies, primarily because the greater number of operating-cost categories (as compared with capital-cost categories) may provide greater scope for creative bookkeeping and hence greater need for administrative surveillance.

Output-Related Subsidies

Although it is conceptually possible to devise highly sophisticated output-based subsidy mechanisms, with differential payments for service at various hours of the day, for example, existing data do not permit the estimation of the impact of any but the most elementary output-based mechanism. The example given in Table 4 is of this sort: a simple payment of 5 cents per vehicle-mile.

First, note that the impact of such a mechanism on bus-only firms will be essentially similar to the impact of an operating-cost subsidy because of the very high proportion of total cost per vehicle-mile constituting operating costs. Hence, the comments about operating-cost mechanisms apply with respect to effectiveness in overcoming deficits and inefficiency in avoiding windfalls. With respect to the 4 criteria, an output subsidy is likely to have the following results.

The ability to permit maintenance of existing service and fare levels would depend, of course, on the size of subsidy program and the initial position of the firm. Although a subsidy level high enough to offset all deficits in firms could be established, any level even approaching full offset of all the firms' deficits would have to be many times the amount needed merely to pay the deficits under a deficit-based mechanism. A program funded at that high a level is virtually inconceivable.

Any likely level of subsidy, as with cost-based mechanisms, will have such widely varied impacts on various firms as to make any general prediction about maintenance of service or fares impossible. The reasoning is identical to that applied to the cost-based mechanisms.

Output-based mechanisms can have serious welfare implications. One cannot predict whether firms being reimbursed for operating additional mileage would choose to accumulate that mileage in ghettos or in wealthy suburbs. However, the easiest way to run up additional bus mileage is on express runs between the central city and suburbia, not on local runs in congested areas. For rail operations, additional vehicle-miles are most easily built up by running rush-hour-length trains all day long whether occupied or not.

Some of the output-based mechanisms, in their more sophisticated versions, could provide a significant incentive to innovate by paying more for "new" mileage such as that required to try out a new line or a demand-actuated service, for instance. Caution would have to be used in creating differential payments for different types of service. A mechanism designed to encourage off-peak operation might result in diversion of service from peak periods, thereby increasing congestion; one that paid more for peak service might leave a city without any off-peak service (in an extreme case). In favor of output-based mechanisms, it must be noted that vehicle-miles are surely a better indication of service provided than costs and other input measures.

Output-based mechanisms are administratively simple and require only such readily available and verifiable statistics as mileage operated. Even a subsidy that differentiated between peak and off-peak miles would require little more than an occasional audit of schedules and route mileages.

Demand-Based Subsidies

Subsidies based on demand, in their simplest formulation, reward firms on the basis of passengers carried. This class of subsidy can, of course, be structured by time of day or section of city; in a more sophisticated version, subsidies could be based in part on increases in the numbers of passengers carried.

Analysis of the more sophisticated versions of demand-based subsidies is a highly speculative venture at this point because statistics on passengers carried are virtually unavailable in the industry, except in the aggregate by firm. However, even an analysis of a relatively simple mechanism—pay 5 cents per revenue passenger carried—brings out some interesting facts.

This mechanism would provide a windfall to already profitable bus-only firms of about $69 million (for firms in our sample)—an increase of about 675 percent in profits of profitable firms. At the same time, 82 percent of the dollar deficit in bus-only firms would be eliminated, and 70 percent of deficit firms would be moved to at least a break-even point. Total cost of this mechanism for bus-only firms would have been about $81 million in 1969.

At the same time, a total subsidy of $140 million paid to multimode firms on the same basis would only eliminate 68 percent of the total dollar deficit in multimode firms.

How does such a subsidy meet our objectives? Since the total amount of subsidy paid is very substantial, assuming that the subsidy will be sufficient to prevent any firms from going out of business seems reasonable. It follows that this mechanism does a good job of enabling firms to maintain existing service levels, although at a very high cost—well above that for deficit-based subsidy.

Would a subsidy of 5 cents per passenger enable firms to maintain existing fares? It would. In fact, quite likely such a subsidy would cause some firms to reduce fares. However, there is a danger of feedback inherent in such an approach. To the extent that transit riding is price elastic, fare reductions will encourage more riding, which will result in higher levels of subsidy payment. One estimate put the feedback effect at an increase of 22 percent in riding (and hence in payment levels) for bus firms in 1969. Although increases in riding are to be encouraged (to the extent that they do not result in disproportionate increases in cost), this type of reaction makes it extremely difficult to predict the ultimate level of subsidy payments. And this fact, in turn, raises administrative problems that will be discussed below.

The welfare results of a demand-based subsidy of the type described are likely to be neutral at best and counterproductive at worst. To the extent that firms view lower income individuals as captive riders, they may concentrate efforts at increasing ridership (and hence subsidy payments) on middle- and high-income individuals. As with the output-based subsidies, demand-based formulas might become another subsidy to the middle and upper classes.

A subsidy based on existing demand does nothing to encourage innovation. Quite the contrary, it rewards firms with a relatively predictable income for doing things exactly as they have in the past. Although a formula that bases part of the payment on increases in ridership might encourage some innovation, predicting the form that innovation would take is difficult. Furthermore, such a formula would penalize the highly congested, multimode cities rather severely because rail systems cannot make their service more attractive by operating to different destinations off-line.

Administrative cost of a demand-based subsidy could be quite low or extremely high, depending on the nature of the formula adopted and the degree of accuracy in passenger statistics sought. Many firms, since the advent of exact-fare plans, have no accurate passenger statistics, but rather estimate numbers of passengers carried for the system as a whole on the basis of total revenue divided by some factor representing average fare paid. Line-by-line and hour-by-hour counts are impossible to secure (except by manual tabulation by drivers—a notoriously unreliable method) because fare-box vaults are only pulled at the end of the day, by which time the vehicle may have operated on many different routes. Hence, a subsidy that depended on extremely accurate passenger counts would have to include in its administrative cost the expense of developing and implementing an accurate passenger registration system for all firms.

CONCLUSIONS

The concept that transit deficits are symptomatic of the problem and not the problem was discussed. None of the mechanisms discussed and investigated shows any promise of solving the fundamental problems of transit; at best, they may ensure continuance of service and provide a little risk capital that can be used to experiment with new types of service. But taking risks, even with some additional funds available, will require more imagination than transit operators have traditionally exhibited.

Furthermore, although there is mounting evidence that fundamental changes in transit operations are necessary, not enough is known about the responsiveness of demand to various changes in transit operations that might be attempted. As a result, it would be extremely unwise to place stringent conditions (which might turn out to be the wrong ones) on firms receiving subsidies or to make subsidy contingent on the firm submitting some plan—any plan—for service improvements. Moreover, transit operating conditions, demands, and needs are quite different among different cities because of size, location, and economic base, among other things. To attempt to prescribe any federal operating support program without taking account of these differences would lead to further distortions in local decision-making and resource allocation. It is also apparent that the deficits are concentrated in the major cities having multimode or major rail operations and that the type of service-improvement formula that might restore a bus-only firm to profitability in a short while represents a set of options that will probably not even be feasible for a rail operation.

The report to Congress recognized the pitfalls of federal operating subsidies discussed above and did not advocate a program of subsidies. It did promise further study of the problem and recommended that serious consideration be given to another type of program. It also urged enactment of the President's special revenue-sharing proposal.

If the basic goal of a subsidy program is not only preservation of transit firms but improvements in the quality of transit service, it seems logical to use federal funds to help fill the gaps in our knowledge of factors affecting the demand for transit. As a result, the report described some service innovation programs that might be funded as experiments designed to determine the types of service improvements that would gain

greatest public acceptance as well as the incentive mechanisms that would be needed to induce firms to attempt those improvements. This author heartily concurs with the thrust of those recommendations and hopes that they have not been forgotten in the ongoing political debate about transit operating subsidies.

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Metropolitan Washington Council of Governments

Many public transportation system managers view operating standards with skepticism and are often reluctant to make a clear statement of what operating standards they use. There are probably several reasons for this.

1. Transit system managers are concerned that any service standard that is explicitly adopted will be too rigidly applied, especially by nonoperating agencies. This produces a tendency in the transit industry to use standards defensively.

2. Different operating standards apply to different modes and to different-sized metropolitan areas.

3. Transit operating standards that are currently being used were determined by the society of another period. However, these operating standards are a part of the industry that is losing more revenue riders each year. This lag in developing new operating standards reinforces the defensive attitude within the industry.

4. The concentrated city of a few years ago is now a suburbanized metropolitan complex. The old casualness has been replaced by concerns with safety, shopping centers, and supermarkets. Transit is trying to find its role in the new society, and new rules for operating standards are not yet clear.

Clear statements of transit service operating standards would be very helpful both to the industry and to governmental agencies. Judgments on the relative merits of transit operations can be made, and the performance of individual systems could be measured and compared to similar systems. Operating standards could help set minimum as well as desirable performance levels for transit services.

The 4 papers that follow present distinctly separate views of operating standards. Hill speaks from the vantage of the manager of an all-bus transit system in a medium-sized metropolitan area; James is a private consultant; Rice was manager of a newly formed regional transit authority that acquired a privately owned bus operating company; and Krambles presents the large metropolitan area, multimodal transit operators' views. Weiner's paper, which discusses standards within a regional planning context, was not presented at the conference but is included to give another dimension to the subject.

F. Norman Hill
San Antonio Transit System

San Antonio is an old city that was originally selected in 1691 by a Spanish expedition as a mission site and formally established in 1718 by Spain. The Spanish governor, sent here by the king, laid out the town boundaries, which lasted until 1940. The center

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of the city was the San Fernando Cathedral and the Military Plaza. The governor established the city limits as a 36-square mile area extending 3 miles north, south, east, and west from the cupola of the cathedral. The San Antonio River meanders throughout the center of the city, and all of the important travel ways of the early days led to the cathedral, the plaza, and the river.

The central square of 36 square miles is still the core of San Antonio. The city now has expanded to an area of 190 square miles in practically all directions. A segment from the northwest to the northeast is the most rapidly growing and heavily populated new area.

From this brief description, it can be conceived that San Antonio streets are extended in all directions as spokes of a wheel, with the cathedral and the surrounding area as the hub. The main downtown streets do not have regular spacing, width, or direction, and routing transit service becomes quite difficult, especially with crosstown lines operating through the CBD.

San Antonio is the fifteenth largest city in the United States and the third largest in Texas. The city's 1970 census population was 654,153, an 11.3 percent increase since 1960. The present transit service area of San Antonio is somewhat smaller than the San Antonio urbanized area as defined by the 1970 U.S. Census of Population, but it includes the cities of San Antonio, Alamo Heights, Balcones Heights, Castle Hills, Terrell Hills, and Olmos Park as well as the San Antonio International Airport, Ft. Sam Houston, Brooke Army Medical Center, Brooks Field and Brooks Aerospace Medical Center, and Kelly and Lackland Air Force Bases. The San Antonio central business district encompasses an area of slightly more than 1 square mile—where the highest concentration of person trips by all travel modes occurs.

The San Antonio Transit System is an entity of the city of San Antonio, having been purchased from the private owner by the city on May 1, 1959. The system operates through a revenue bondholder's indenture, which provides that a board of trustees, appointed by the city council, shall in turn employ a chief executive officer and general manager of the system, who shall be responsible for the daily operations. The Board of Trustees consists of 4 members, on staggered terms, serving 8 years each without being eligible for reappointment; the mayor of the city is a fifth and ex officio member.

The San Antonio Transit System operates 33 basic lines with 66 route variations. There are 273.67 street-miles of bus routes in its service area. Of the 33 basic lines, 28 provide crosstown service through the CBD, 3 are loop lines that start in outlying areas and turn back within the CBD to return to their starting points, and 2 provide crosstown service outside the CBD.

The transit system has been highly successful in its operating results compared to most of the transit systems throughout the country. It has been unique, perhaps, in the respect that it not only has met its operating costs each year with wage increases and improvements in fringe benefits out of fare-box receipts but also has made without the benefit of tax money or subsidies the following capital improvements, regularly scheduled indenture payments, and contingent liability payments:

1. New heavy equipment maintenance facility;
2. New bus operators' station facility;
3. Regularly scheduled payment of interest and principal of revenue bonds issued for purchase of the system;
4. A $240,000 revenue bond reserve;
5. Minimum deposits of $30,000 a month or more to a renewal and replacement fund;
6. Modernization of its aged fleet of 261 buses with new air-conditioned buses;
7. Payment of principal and interest on general obligation bonds issued by the city for the purchase of the system; and
8. Regular monthly "in-lieu-of-taxes" payments to the city of $150,000 or 3 percent of the gross revenues, whichever amount was greater.

After the take-over of operations from the private operator, the new management

decided that one of the first things that needed to be done was to establish operating criteria or standards that would serve as a basis for the rendering of the present service, the extension of present routes, and the expansion of service into new developments with new lines.

In the development of these criteria or standards, the new management decided to obtain a detailed aerial map of the entire San Antonio urbanized area that would show very clearly the location and concentration of residences, industrial areas, shopping areas, other traffic generators, and the usable arterials and general streets. This aerial map was used to carefully study the geographical and physical layout of the San Antonio area and to plot routes for transit service. After making these detailed studies, the management and the Board of Directors adopted a set of minimum standards that have to be met before an extension of bus service is made. This plan, keyed to provide an economic basis for the operation of the system, proved to be a successful criterion for providing excellent transit service within the realm of the transit revenue dollar. The following are the minimum standards used in determining whether bus service is justified.

PRETRIAL STANDARDS

A. Route
   1. The route must be of all-weather paving of sufficient strength to carry heavy traffic.
   2. Streets must be capable of safely accommodating vehicular traffic, including buses.
   3. The proposed route must be accessible to residents who are considered potential bus riders.
   4. All bus routes should be located so as to take into consideration the future growth of the city and should be laid out by the San Antonio Transit System in accordance with its best judgment and experience.

B. Potential
   1. The area under consideration should not duplicate areas currently served. The area to be served should meet at least 1 of the 2 following qualifications:
      a. It must average 3 family dwelling units per acre in the area to be served, which is the area within 1,320 feet of the proposed extension except that dwelling units within 1,320 feet of the present end of the bus line will not be counted.
      b. In lieu of qualification a, the area may qualify if it exceeds 960 dwelling units per mile of route extension, counting only the dwelling units within the 1,320 feet of the proposed extension and not including those houses within 1,320 feet of the end of the existing route.
   2. If the extension requires an additional bus, the area to be served must, in addition to the above requirements, also include a minimum of 500 dwelling units to justify peak-hour trial service.
   3. Because of difficulties in accurately forecasting the number of bus riders per family dwelling unit in various sections of the city, judgment and current experience on bus lines serving similar areas will have to be considered in setting standards.
   4. The presence of bus-passenger traffic generators, such as plants, factories, large office buildings, amusement centers, and, in some cases, schools, must also be considered. The riding from these traffic generators has to be estimated and added to the riding that can be expected in the area from residential dwelling units.

TRIAL OPERATION

A. In cases where pretrial standards are satisfactorily met, service will be provided in accordance with the estimated potential of the area.

B. The trial operation will normally continue for a period of 60 days and if, at the end of the 60-day trial period, passenger checks show that the revenue-passenger rides originating in the area on trial amount to as much as an average of 3 adult revenue-passengers per bus-mile operated, then the service will be continued as long as the minimum standard of 3 adult revenue-passengers per bus-mile is met.

   In the event any extension fails to meet this minimum standard by the end of the trial period, then such trial service will be discontinued. If after 1 year has elapsed the density of population in the area has increased to the point where it would be reasonable to believe that the above minimum standards of an average of 3 adult revenue-passengers per bus-mile will be met, then another trial operation may be scheduled.

Besides the adoption of the minimum standards for service and route extensions, a decision was also made to establish and maintain, as long as possible, a low basic-fare structure. At the time of the city take-over, the basic adult fare was 17 cents with an additional 5 cents for each of 3 zones. These outer zones were spaced on a 1½-mile radius beyond the 2¾-mile central zone. Since May 1, 1959, only 2 fare adjustments have had to be made—the first in 1961 from 17 cents to 20 cents for the basic adult fare, and the second in 1970 from 20 to 25 cents for the basic adult fare. Meanwhile, we maintained the 5-cent additional-zone fare, a special system-wide 10-cent student fare, and a transfer charge of 2 cents for adults and 1 cent for students.

Since May 1, 1959, the application of these criteria to the system has resulted in 59 major extensions of service and the removal of only 3 such extensions. Street-miles of operation have risen one-third since 1959, from 198 to 264 miles. Contrary to trends in most large U.S. cities that have reduced bus-miles of service during the last decade, San Antonio has increased bus-miles from 7,732,000 in 1960 to 8,164,000 in 1971. This increase was accomplished with a decrease in bus-hours of service, accomplished by a 17 percent increase in average bus operating speeds—from 11 mph in 1959 to 12.9 in 1971.

In establishing frequency of service, we decided that the load factor (the number of passengers on board at a maximum load point) was not to exceed 150 percent of the seating capacity in peak periods. This load factor is in line with generally accepted industry criteria. A recent study of the system showed that during the peak morning hour the system-wide load factor is 104, meaning that 4 percent of the passengers are standing. These load counts are made at maximum load points, which are in the CBD boundary and within 1 mile from the city center point. During the afternoon peak hour, the average load factor is 98, meaning that only 2 percent of the seats are empty.

Great emphasis is placed on schedule adherence, and operators are checked to the half minute at check points. A current check of all lines shows that 96.7 percent of the bus trips are on time in the morning and 93.7 percent are on time in the afternoon and evening. These values are well above the national averages.

The responsibility for planning new service or changes in service is divided. The director of research and schedules has the responsibility for constantly studying the growth patterns of the city, the establishment of new residential areas and housing developments, and the location of new traffic generators, industries, schools, and the like. His principal tool is the large aerial photo map of the entire urbanized area, which is periodically updated. Inspection trips are also made to areas where there are frequent requests for service extensions or where new developments are being planned.

The director of operations has the responsibility for providing and supervising the daily service required in the community. He uses the results of schedule preparation developed in the Research and Schedule Department. The Department of Operations, however, makes its own study of changes, requirements and extensions of service, new traffic generators, and new residential areas either by on-street observers or by street service supervisors who cover the entire community in radio-controlled supervisory cars.

When either department determines the need for establishing a new service or making a change in existing service, the directors have a preliminary discussion of the problem at hand. They then proceed in their respective ways to develop necessary information and data on a suitable and usable thoroughfare, the housing density pattern of the area involved, and the type of service and frequency of service to be rendered. The examination of the aerial photo map usually dictates the usable thoroughfares available and the concentration of density of housing along those thoroughfares. After the data are reviewed, the Department of Operations conducts a field survey and plots on a street map each house, apartment, commercial and industrial complex, and other traffic generators such as schools, churches, and shopping centers.

If a usable thoroughfare is found and the density of housing pattern along such a thoroughfare reflects a density of 3 houses per acre, the Department of Research and Schedules must then design a schedule on the basis of the summation of the housing

density pattern of the area to be served. This, in turn, is developed into headway requirements, running time, and estimated mileage and cost of labor to operate the necessary or required equipment. The new service is established for a determined period of time, usually no fewer than 60 days, but sometimes longer depending on the conditions. Revenue results are closely watched while the service is being merchandised through a door-to-door approach. If the service, monitored periodically during the trial period, proves successful such that revenues exceed cost of operations, the service is retained. If it does not meet these requirements, then the service is carefully reviewed. If no further improvements can be foreseen for the continuance of its operation, the service is then discontinued.

Thus, the criteria established during the system's first year of operation have permitted the providing of service that has been patronized to a sufficient degree by the community to permit growth of the system. Also the use of such criteria has produced sufficient income to meet annual wage increase demands in excess of the cost of living, to make material improvements in the benefits of all the employees, to completely replace the obsolete fleet of vehicles with a modern, air-conditioned fleet, and to build new bus operators' facilities and maintenance facilities on the property.

Since May 1, 1959, we have met all operating costs and all indenture obligations and paid the city the principal and interest on general obligation bonds and the "in-lieu-of-tax" payments of 3 percent of gross revenues or $150,000, whichever was greater.

The low basic fare and the zone system have been very meaningful and attractive in maintaining patronage. The number of patrons increased each year until 1970, when a major strike took place and a very severe drop in riding was experienced. Patronage has not since been entirely regained. The merchandising program, the operation of on-time, dependable, and frequent service, and the use of clean, modern, well-lighted, air-conditioned vehicles have combined to justify continuation of the original standards. Of course, any of these standards as set up must remain flexible and reflect changing economic conditions. Moreover, standards that have worked so well in San Antonio are not necessarily applicable to other types of communities. Nevertheless, we are very willing to consult with other transit operators or to make available the data resulting from the operation of our service and the criteria we employ in supervising and monitoring the service.

D. H. James
Urban Transportation Consultant

Practically every newspaper or news magazine mentions some new standard, or set of standards, that has just been proposed or adopted. Various federal, state, and local agencies set, interpret, and enforce standards in many fields: automobile safety standards, air pollution standards, tire construction standards, food and drug standards, advertizing standards.

In the public transportation field, however, this is not so. The Urban Mass Transportation Administration (UMTA), the agency that would most logically set and enforce standards for the industry, has not as yet done so. The American Transit Association (ATA), the industry trade association, has what it calls "transit pars," but these are merely gauges of internal efficiency and have nothing to do with performance of the system as far as the general public is concerned. The Institute for Rapid Transit, another industry trade association, has published a guide covering rapid transit safety regulations and standards, but, again, this is mostly for internal use.

Various regulatory agencies have attempted to set some minimum standards in various transit operating areas, but none is either very comprehensive or universally ap-

plicable. So, my task is to discuss something that is really not too much in existence—transit operation standards.

The general guidelines that have been promulgated by various agencies and consultants in the past are, to some degree, not applicable to some of the new transit technology that is emerging. What specific standards might apply to demand-responsive routes? Should standees be permitted at all in this type of service? What is the maximum headway that is allowable or feasible? What warrants should there be to govern the use of exclusive lanes on freeways? On-ramps? In downtown areas? Counterflow lanes? What comfort and loading standards should apply to freeway transit operation? The same as for conventional local service? Something more restrictive? These are concepts that have arrived in transit during the past 10 to 20 years. Although there have been localized attempts to set some general guidelines or standards, they have not been widely adopted or disseminated, and variances exist among the areas where such concepts are in use.

Before continuing this discussion of what transit standards might be all about, we should have some sort of understanding as to what I think the position of a consultant is in interpreting and evaluating those standards and guidelines that do exist. A consultant is often called on to make judgments on the relative merit of a particular transit operation. After the consultant has been at it awhile, he can usually make some subjective decisions based on "seat-of-the-pants" observations, and he will nearly always be close to right—but close is not good enough, particularly when he is called to the witness stand to testify under oath. There must be more than that, so most consultants develop their own "in-house" standards, usually comparing the system in question with some of its peers, normally on an anonymous basis. If the consultant happens to pick a group of really first-class operations as comparison systems, he can "show up" the one he is judging, and the local agencies will never know the difference. On the other hand, the opposite tack can be taken, and the local operation can be made to look like the best in the country. So, the consultant, if he is to do his job properly, must be dispassionate; and to be dispassinate, he needs standards for measurement that cannot be impugned or falsified—he needs a nationwide standard for a system of that approximate size and character.

The transit operator, whether the system is privately or publicly owned, has one way of looking at any situation that involves interpretation of standards—and this is normally a rather conservative posture. On the other hand, the general public (usually represented by a serious-minded regulatory agency, but occasionally inflamed by the pyrotechnical oratory of a small group of extreme activists) tends to look at these same standards in a more liberal, expansive way. Between these 2 positions should lie the position of the consultant.

The consultant should be completely dispassionate. He should not be personally affected by the outcome of any controversy in which he participates. And even though he is usually in the pay of a public agency, his findings should always be in the interest of the greater good. If this means becoming unpopular with the public, the transit operator, or even the client, then so be it. If the client is truly interested in achieving the greater good, then the client-consultant relation should not suffer. If the relation does suffer, then perhaps the consultant is better off without that particular account.

This is where consultant standards come in. Not all consultants adhere strictly to the sentiments expressed above. Some consulting organizations are generally known as "company" consultants, and others tend to favor the general public at the expense of the operator. Also, there are agencies that tend to pick consultants on their previous track record—pro- or anti-operator. This is unfortunate, but nevertheless, a fact. Thus, this paper is concerned about the need for objectivity among consultants and the need for definite standards so that they can be completely objective.

Public transportation operating standards, as generally understood, are a body of guidelines concerning the manner in which transit operators provide service to the public. Most of these guidelines have to do with routes, frequency of service, and, to some degree, finances. Some of these standards are generally applicable to all operators, and others have been set up to regulate operators in one particular area.

The general standards currently in the most widespread use are those promulgated by the National Committee on Urban Transportation (1). These standards—or guidelines—are mostly concerned with routing and, to some extent, with loading standards and reliability of service. If we examine those guidelines dealing with routing one by one, we can easily detect the quite evident compromises that must have occurred among the framers. The committee that developed these guidelines was composed of members from the transit industry, regulatory agencies, political jurisdictions, academia, and the general public.

> 1. The route should be direct with respect to origins and destinations of passengers (transfers which passengers make should be held to a minimum).

How direct? To all possible origins and destinations? How about nontransit users? What is meant by minimum? None, or some unstated percentage of total trips?

> 2. Routes should be free of duplication except where they converge. How can there be duplication without convergence?

What is a reasonable place for convergence to occur?

> 3. In built-up areas, routes should be spaced at approximately half-mile intervals (quarter-mile walking distance), with intervals increased proportionately in areas of low and medium density.

What is a built-up area? Is it the same in Manhattan and Des Moines? How does one determine proportional increases? What is considered medium and low density?

> 4. Routes should have reasonable long-term flexibility (not necessarily day-to-day flexibility) to meet changing conditions.

A bus route is inherently flexible (or is it?), and a fixed guideway route is inherently inflexible. So what does this statement really mean?

> 5. Routes should include a minimum number of turning movements and should have adequate provisions for turnaround at both ends and for layover at one or both ends.

Again, what is meant by minimum—the smallest number of turns possible in moving from one end of the line to the other, or what? As for the second part, any line that does not have built-in turnaround provisions is going to run out of buses pretty fast! And one without a layover provision will run out of drivers even faster!

> 6. Routes should be laid out to take full advantage of street characteristics and possible operational improvements. Such factors include the conditions and types of roadway utilized, design features, strength of roadway structure (especially at vehicle stops), width, surface, control of access from side streets, and provision for loading and unloading.

Again, this is not really a standard—just plain common sense.

This group of "standards" has little or nothing to say about passenger loading (other than the well-worn 1.5 times seats in the peak and seated load in the base periods), relative speeds in different environments and modes, types of service to be provided under different demand circumstances, fare structures and subsidy arrangements, equipment type or condition under varying circumstances, and how much information should be disseminated, when or how routes should be established or curtailed, the location and spacing of stops, and many other things that could so easily have a reasonably definite established standard.

These elements are sometimes the subject of local standards; but more often local franchises or regulations or both no longer call for some maximum loading standard and possibly an allowable rate of return (for private companies).

There are some other generally accepted standards around: maximum age of 15 years for buses (rarely adhered to anywhere) and 70 percent of trips to operate on time over a given period (on time is defined as being 1 minute early to 3 minutes late by the National Committee on Urban Transportation). But there is no single, logical, codified set of standards available to the consultant to use in evaluating how well—or how poorly—an area is being served. Further, this lack often works against the transit operator himself. Many times I have observed transit systems that were doing quite superior jobs of providing service to their communities, but were constantly the recipients of verbal abuse from the general public mainly because there is just no way to show the public that a good job is being done.

Often the lack of standards stems more from lack of data than from anything else. Many systems have no idea what their on-time performance is, for they have given up making checks. Financial and passenger statistics on a line-by-line basis are no longer normally kept by a majority of transit systems. Indeed, many systems have no idea how many passengers they actually carry in a day. In numerous operations, there is no fleet-by-fleet maintenance record kept, and far too often no attempt is made to record data on oil consumption so that whether even internal maintenance standards are being met is unknown. Almost never are road-call data analyzed so that equipment reliability can be determined on a fleet-by-fleet basis.

There is a definite need for a concerted effort to develop and codify a universal set of standards against which all transit systems can be measured and to provide the means by which data can be secured so that the required measurements can be made. These standards must be specific—and quantifiable—and must be high enough so that all systems must strive to attain them. For example, one standard might be that, for a given period, 100 percent of all trips made be on time—0 minutes early to 4 minutes late in peak periods and 0 minutes early to 2 minutes late in off-peak periods. Probably no system could consistently meet such a rigorous standard, but lesser figures based on that 100 percent could be measured and compared on a national basis with other systems with similar characteristics.

As well as a maximum standard or goal there must be a minimum. When any system falls below such a minimum, action can be required by its regulatory agency to ensure compliance with at least the basic minimum or face certain sanctions. Possibly, UMTA might require that the minimum be met before the system would be eligible to receive grants (probably after a year on probation).

Standards that might be developed should fall into some definite categories, possibly similar to the outline that follows.

System External: Passenger Related
- Route layout
- Schedule preparation
- Schedule adherence
- Equipment reliability
- Equipment appearance
- Equipment comfort
- Information services
- Employee courtesy
- Type of service provided (express, local, fixed route, demand routed)
- Pollution abatement

System External: Regulatory Body Related
- Revenue-cost relations
- Fare requirements
- Miles operated per route-mile
- Route-density relations
- Transfers required (origin to destination)
- Route spacing

System Internal: Operational
- Total hour-platform hour relations

Employee turnover
Supervisor-employee numerical relation
Accidents per thousand miles operated (by category)

System Internal: Mechanical
Man-hours worked per thousand miles operated
Component life
Miles operated per unit of fuel or lubricant
Miles operated per chargeable road call
Supervisor-employee numerical relation

System Internal: Route Specific
Cost-revenue relations (costs fully allocated to give full effect to peaking)
Speed for each type of service (variations from norm)
Layover as percentage of total running time

This is not, by any means, an exhaustive listing, but rather a starting point. It also does not attempt to quantify what the standards should be. That should be decided only after long and serious study.

Table 1 gives examples of how the standards might be set up. Quantifications used are for illustration only. Minimum standards and national averages should be determined separately for different-sized systems.

To develop these minimums will require that averages first be determined for each category—and this in itself will require much work. Much of the information just does not exist, at least in usable form. Even some of the standard measurements are not standardized. For example, route-miles are measured differently by different systems, and comparisons of average frequency of service (vehicle-miles per route-mile) are almost impossible to make. Hours of service are presented differently by different systems, and there is not too much agreement as to what a passenger is.

So a program for the establishment, interpretation, and application of standards must start with definitions. Then, data must be collected based on these strict definitions, and agreement must be reached on what is and is not desirable. Next comes codification, including the weighting of the various items to achieve an overall rating potential. The final steps are adoption by UMTA and the various regulatory bodies and application.

Table 1. Illustrative transit standards.

Standard	How Measured	Goal	Minimum
Route layout			
Directness of route	100 percent = 1.0 times shortest possible street distance from end of line to end of line (50 percent = 2.0)	90	70
Terminal loops	100 percent = all lines have terminal loops no larger than 4 normal blocks square	100	80
Route development			
Density of development	100 percent = all persons in areas with densities of 20+ persons per net residential acre must walk no more than 5 minutes to bus line[a]	100	80
	100 percent = all persons in areas with density of 10+ persons per net residential acre must walk no more than 10 minutes to bus line[a]	100	70
Schedule preparation			
Based on current data	100 percent = all routes checked 3 times each, 3 seasons per year, minimum of 2 hours morning peak, 3 hours base, 2 hours p.m. peak, and 2 hours night[b] or 100 percent = (number of routes) × (9 days) × (9 hours)	100	70
Easy to understand	100 percent = all routes with base frequency of 10 minutes or more have headways evenly divisible into 60 minutes (10, 12, 15, 20, 30, 60 minutes)	100	80
Equipment reliability			
Miles per road call	Miles operated per chargeable road call	25,000	15,000

Note: Midwest bus urban transit system serving 5 to 10 million annual passengers.

[a]Standard subject to interpretation where local government permits subdivisions of the cul-de-sac type that do not permit through movement of buses, or where road systems are inadequate for transit use.

[b]Where routes operate less than full operational day; 100 percent = same proportions of periods that service is provided. On Saturdays and Sundays, minimum is 3 checks per year.

Also to be decided are who will collect data in particular areas and how will they be collected. System internal information can be supplied directly by the system, but often the external information might better be gathered by an independent organization, under ground rules that ensure similar collection methods throughout the country. The various standards that require public opinion (equipment comfort and appearance, information processes, passenger amenities) might best be handled by having the general public submit an annual "report card" on how they think the system is performing, grading different elements from A to F.

Is there a real need for such a body of measurements, considering the amount of work and money that would be entailed? To me, as a consultant, the answer is yes! So that I can discharge my responsibility to my clients, I must know exactly how well a given system is performing. I must know, when making recommendations on routes, schedules, internal practices, public relations, or whatever, what must be done to meet desirable standards.

To me, as a member of the public, the answer is yes! I must know how well the system serving me performs so that I can judge how worthy it is of my continued support at the fare box, at the polls and, increasingly, in the type and amount of taxes that I pay.

The establishment and use of fair standards are even more necessary now that most of the larger systems are publicly owned and fare stabilization programs make the old operating ratios less and less useful as measuring sticks for system efficiency (if indeed they ever were). Taxpayers want to know what they are getting per dollar expended; and, basically, what they are getting is determined by how well the system serving them compares to similar systems.

REFERENCE

1. Better Transportation for Your City. Public Administrative Service, 1958.

Joseph F. Rice
Wilbur Smith and Associates

When I was asked to prepare this paper, I was secretary of the newly formed Central New York Regional Transportation Authority and the only public employee—and engineer—on the board. Our task, very simply, was the take-over of a local bus company that had had declining ridership for many years. This paper discusses some of the problems we faced.

First, some questions and suggested answers relating to standards or criteria of transit service.

Why does bus transportation exist?

1. As a business, to make a profit on moving people and provide a reasonable return on the investors' money.
2. As a service, to meet the transportation needs of people who cannot, will not, or are not able to provide other means of transportation.
3. To meet special transportation needs such as school busing, movement of industrial employees, shuttle operation between parking lots and jobs, and circulation in CBD's, college campuses, and large hospital centers.
4. As a public utility, to reduce the number of cars in a specific area because of public policy, insufficient parking, pollution and air quality, inadequate capacity of

streets and highways, and insufficient investment capital to provide added facilities.

5. As a public or private effort, to induce more people to use a specific area or business.
6. To meet specific peak demands as a result of special events.
7. To satisfy economic needs of riders because of car operating costs, parking fees, or commuting time.
8. As a contract operation, to provide reasonably good service (time) between "bedroom" communities and downtown.
9. To serve as a necessary adjunct to a more profitable interstate or contract hauling business.
10. To provide service from some other transportation mode terminal such as an airport, a railroad station, or a transportation center.

What determines whether the service is good?

1. Elapsed time for the journey
   a. Home to stop (weather problems)
   b. Wait for bus (in Syracuse, an unknown quantity!)
   c. The ride itself—bus moving (very rough pavement, low drop inlet) and bus stopped
   d. Travel to destination
2. Fare and its collection
   a. Amount
   b. Special inducements (5-day pass)
   c. Class fares (elderly and under 12)
   d. Collection procedure (exact fare)
3. Frequency during the time of need
   a. Headway
   b. All-day service
   c. Late night service
   d. Specialized service
4. Ready access to information about schedules and routes
5. Personal safety and comfort of the user
   a. Bus shelters (safe and clean)
   b. Ease of boarding and alighting (platforms)
   c. Lighting at stops

How can an adequate level of service be achieved?

1. Preemptive rights over traffic control signals in areas such as the CBD where the average running speed is low (TOPICS, light emitters, sound emitters).
2. Mobility to respond to "personalized" needs of customers (Model Cities, elderly, very young, mothers).
3. Preferential treatment including reserved or exclusive lanes and busway treatments for all or parts of a day (1 bus = 44 seats, 3 cars = 12 seats; 1 bus = 35.2 people, 3 cars = 4.5 people).
4. Clearly defined stops, routes, and facilities oriented to constantly exhibit the image of bus transportation through shelters, lights, and communications (UMTA, TOPICS).
5. Maximum use of the entire network of streets and highways (bus lanes, busways, counterflow lanes, ramp bypasses).
6. Special considerations such as color, shape, and marking that will define the preferential status of bus areas uniformly for all users on a nationwide basis.

CRITERIA FOR PAST STANDARDS

The criteria for past standards appear to be developed around operating costs, revision and consolidation of routes, high patronage locations, minimum investment, and passenger comfort and safety.

Operating Costs

Concern with operating costs had to enter into transit services for the buses to keep running. Accountability to the stockholder is a powerful incentive. However, raises in fare and the predictable loss in ridership, which somehow never seemed to bottom out, made necessary economics that affected route analysis and development, supervision, and modernization of equipment. Thus, operating costs greatly influenced transit service.

Many transit companies in the past have "retired the job with the man" in functions such as route analyses, research, and supervision. Effective public relations almost became a thing of the past on many transit properties. The bus company name on the side of a bus was believed to be adequate advertising for new customers. Supervision declined to key corner, fixed posts; roving supervision was accomplished by senior executives, whose time and talents could really not be spared for this service, except there was no one else to do the checking.

Revision and Consolidation of Routes

As patronage continued to decline and good equipment became more scarce, fewer routes could be served at a break-even, let alone a profitable, operation. Longer routes with fewer buses operating at larger headways were the inevitable result. Patronage declined further.

Each application to consolidate or drop routes really did affect service and was frequently bitterly resisted by a few who wanted to continue to ride the bus. However, these service waiting times often became so long that an automobile was substituted for the bus.

High Patronage Locations

The central business district has historically been the terminal for many trips. Other similar locations such as apartment complexes, airports, industrial sites, or governmental centers are also major trip points. Inasmuch as an eighth of all travel and 58 percent of all trips are 5 miles or less in length, transit should be ideally suited for this type of service. Unfortunately, bedroom communities have developed away from the traditional transit routes; and, although high patronage locations were present at one end of a trip, they were often not there at the other end. Thus, it was not possible to effectively capitalize on the high patronage locations of the past. The potential of fringe parking lots appeared not to have been exploited because of costs, except where joint use of shopping centers was possible.

Minimum Investment

Equipment must be replaced, even though it is maintained in excellent condition. The 15- to 22-year-old buses in Syracuse were marvels of ingenuity and maintenance magic. Some of the parts had to be made by hand, but they continued to function. New equipment, when it could be obtained, replaced from 2 to 5 of its older counterparts, thus lowering the inventory to a point where service could only be given to the high de-

mand routes. Management opportunity was limited, and young blood was hard to come by in such a situation. So service, based on investment, could not meet the diminishing demand in a cost-effective way.

Passenger Comfort and Safety

Transit service has been functional in the past. The PCC trolley car was probably the most comfortable car of its day. Provision of passenger-comfort items such as air-conditioning was a luxury that many systems just could not afford even when passengers were plentiful and competition from the automobile was hardly noticeable. Safety was no great problem, nor was having a bus stop 2 to 3 blocks from homes.

Thus, levels of service were determined by a society of another day, and those levels of service, set by a transit industry that each year lost more revenue riders, cannot be applied today.

CHANGES IN CRITERIA

Changes in criteria for standards came about because of technological advancement, a changing society, a critical need, and economics.

Technological Advancement

Improved equipment that can do more things better, faster, and safer always causes an impact on established services. Better brakes and tires, more visibility, reliable and less expensive air-conditioning, and longer lasting mechanical components are a few. But perhaps one of the most important potentials today is communication. It involves traffic signals, central computers, bus stops, and individuals in the homes and makes possible reduced or skip stops, automatic location information on bus-arrival time, and bus service to one's home as requested. These are items that necessitate change in criteria and design of bus service to take advantage of current capability. They provide the means to improve responsiveness, meet user needs, and provide a competitive edge.

A Changing Society

The concentrated city of a few years ago is now surrounded by a suburban complex containing new employment places, supermarkets, and shopping centers. To be responsive, new equipment (both large and small), shelters, information systems, and doorstep service for safety appear to be required. Platform loading for speed and efficiency—particularly for the elderly—can now be considered. This involves carefully stopping the vehicle at a point where a platform can be extended to the floor level of the bus, thus eliminating steps.

A Critical Need

The need for transit service as an alternative mode as well as an only mode of transportation must be given consideration. To provide a choice now is even more critical because of increasingly scarce parking space. New towns afford an opportunity to design for transit.

Economics

In the final analysis, economics and conservation of resources demand that new standards be set. Air quality, accident reduction, and land management are part of economics as is movement of more people per vehicle. Very little has been said to date about the economics of 40 to 50 buses compared with 1,200 to 1,400 cars in the context of accidents and loss to the community.

SUMMARY

In summary, change dictates new standards. If we do not make it work for us, it will work against us.

The remaining question then is, Are standards of design and operation of transit service satisfactory and applicable to today's conditions? I would have to say that they are not but that we know how to make them so, and we are working toward that end. The combined talents of the planner, engineer, sociologist, environmentalist, and psychologist can clearly identify the needs. We can then apply the necessary research and operative talent to solve the problem.

Standards should take into account customer desires, technical capability, land use and land planning, requirements of society now and in the future, implications of historical freedom of choice, and economics.

George Krambles
Chicago Transit Authority

I approach the topic "standards in transit service" with some trepidation. A standard can be quite useful as a broad guideline. And, of course, some standards must be absolutely literally followed to avoid catastrophic failure or malfunction. But there is also an ever-present danger that an unnecessarily rigid standard may wind up as an all-too-convenient weapon for killing off innovation and progress. Among a transit manager's tasks, a heavy burden is that of making judgments between the good and bad aspects of a standard.

Practically every aspect of transit service could be, and is, codified with standards. Actually, most standards are unwritten, but no less effective. Operations, maintenance, engineering, and planning are, of course, primary quadrants for transit standards; but, as one moves through that list, one finds the need for flexibility increasingly overtaking the need for rigidity. In a parallel way, the tasks to be performed are rather well structured at operating and maintenance levels but increasingly interact with ad hoc policy decisions at engineering and planning levels.

In the overall context of this conference, its primary orientation will be to standards applied at the planning level, but a few at the other levels might first be worth brief mention. A few of the more interesting standards that CTA uses in providing the second most extensive transit service in North America are discussed below.

EMPLOYEES

At operating levels, standards are applied to employee selection, training, and performance. Over the years one of the surprisingly difficult standards to define is that of employee appearance. Old photographs show that trainmen of the 1880s and 1890s commonly wore long sideburns, handlebar mustaches, and beards. The lack of heat in

early streetcars was reason enough in those days. Today, everyone accepts long sideburns (though many draw the line at mutton chops), and reasonable (whatever that means) mustaches cause no acceptance problem. But beards, hair down over the collar, and all manner of unusual hairdos, although acceptable on a doctor or an architect or a record shop employee, are causes of many complaints when on bus operators. Are passengers really going to reject our service on seeing a long-haired or bushy-faced operator? Is our imposition of hirsute standards an infringement of an employee's civil rights?

FREQUENCY OF SERVICE

Obvious service design standards are those relating to the maximum number of passengers per vehicle, usually called the "loading standard" in the industry. Yet at one of the conference workshops, there was little agreement as to how many standees would be acceptable in peak traffic. Typically, though, schedule policy in a given transit system establishes a range for the selection of service frequencies (trips per hour) or the reciprocal, headways (time between trips). Commonly, the maximum service is determined from the allowable crowding standard for passengers per vehicle, and the base or minimum service is determined from the headway so that the time between trips will meet the policy criteria of the transit system involved.

In Chicago, where flat geography and a rectilinear street pattern led to a gridiron pattern of long north-south and long east-west bus routes and an exceptionally active use of transfers by riders, a standard of rather frequent service, even in off-peak periods, was adopted. With interconnecting bus routes generally only a half-mile apart in a gridiron network, scheduled connections at many transfer corners are impossible. Poor frequency standards would severely jeopardize the sale of rides involving transfers, which are used by more than half our customers. In another city with mostly radial lines and little or no transferring, this would be a lesser consideration.

LENGTH OF ROUTES

Another standard relating to Chicago more than to smaller cities is that of maximum workable length of a bus route. Chicago is about 25 miles in length and 10 miles in width. At a practical average speed of 12 mph including stops, routes from one end of town to the other or from an outlying extremity to downtown and back would require very long journey times. Such trips would be so long that a bus operator would experience fatigue and his work output could be expected to diminish. Coincidentally, the total passenger load is almost never uniform for the full length of a route. Approaching a line's outer end, the total demand for service may be only a fraction of what it was in the inner part of the corridor. These 2 problems often result in schedule and route-design standards that provide "short-turning," that is, vehicles operating only part way out on a route.

VEHICLES

Maximum fleet requirements constitute a common control on service standards, as do the vehicle characteristics: length, width, door width, and seating and standing capacity. Rare as this may be, it is no less frustrating to find that bus size limitations, which cut back productivity, are imposed by such in-house constraints as rapid transit elevated structure columns sitting in roadways. So much has been recorded elsewhere on the subject of vehicle performance and comfort that they are simply mentioned here as obvious elements of comprehensive transit standards.

As is the case with other criteria, one standard affecting fleet requirements sometimes comes into conflict with another. For example, having established a service

loading standard of X passengers per vehicle at the maximum loading point of a transit route, the schedule designer may find that rigid compliance with that standard would require in a specific case that a bus and its operator be brought into service from the garage at one end of a line after one or more others are already pulling into a garage at the other end of the same line because there is no further riding demand for them to serve returning. This condition, although commonly accepted for lack of an alternative in long-distance commuter service, will be pressing the transit system to rearrange its schedule so as to accept a heavier loading standard rather than lower productivity.

SPACING BETWEEN TRANSIT ROUTES

Based on an assumed reasonable walking distance to or from a transit stop of $^3/_8$ mile, more than 99 percent of the population of Chicago is covered by CTA service. Because of the gridiron route pattern and some radial routes, most of the population is within $^3/_8$ mile of more than one CTA service, usually one going east-west and another going north-south.

PERIOD OF SERVICE

Three-fourths of Chicago's 135 bus routes and 5 of the 6 rapid transit routes operate around the clock every day. Of course, the portion that runs in the late hours is run at a heavy loss, even though there are many well-loaded vehicles on certain midnight trips. In Chicago, policy standards are followed to provide the broadest possible period of service for those people who need it at night. A surprisingly large total number of persons would be unable to work if there were no public transit to move them in the owl periods.

SECURITY

Transit's very commitment to serve all the city at all hours makes it increasingly vulnerable to crimes. In countering the trends of crime in recent years, transit must constantly be alert to adjust its standards to optimize the defense of its riders. Within this area have developed exact-fare procedures, uniformed and incognito "decoy" police patrols, advanced communications, alarm techniques such as Chicago's bus monitor system, and upgraded lighting and station design standards.

FARE COLLECTION

In a rapid transit system, fare collection can involve as much as 16 percent of the operating costs; and, under some specific conditions, fare collection costs even exceed the revenues they yield. In bus operations, costs of processing fare collections at garages can be formidable. Naturally, a transit operator must be sensitive to disastrous situations and be alert for possible changes that will offset tendencies toward waste.

Standards for rates at which fares can be collected by agents and by turnstiles are used to determine the manpower and hardware requirements. Standards for pedestrian movement or standing are used to fix platform, passageway, stairway, escalator, and related requirements.

PLANNING ROUTE CHANGES

Standards are essential in evaluating proposals for route changes, extensions, or

cutbacks. Aerial surveys are a useful modern tool for quickly inventorying the possibilities of a route change. Photos taken from about 7,000-ft elevation provide a good scale for counting buildings and estimating heights, which in turn provide a base for population and riding estimates.

In the planning of a new route, one problem to be solved is that of the terminal. In Chicago, we almost always will need an off-street turnaround complete with passenger waiting area, employee toilet, and phone. If more than 1 bus route is to share a turnaround, the design must provide an operating lane at the loading point for each route plus a bypass lane that will be used by a bus from any route to pass any of its leaders.

Other standards to be met by route changes consider the pavement widths, strengths, geometry at turns, traffic controls, and limitations involved.

Potential new traffic is perhaps the most important criterion affecting a route change. The best available estimating techniques are more art than science, but they can be applied by an experienced planner with great effectiveness. In Chicago, the probable attraction to transit for every housing or working unit is related to its distance from the route under consideration. An estimating basis is provided by the calculated riding habits actually experienced on an existing route in an area of comparable density and economic status.

To further define the potential of a new line, CTA planners ask industries along the route to respond to questionnaires that inventory facts about the number of employees (male, female, skilled, unskilled, white collar, blue collar), the number of visitors, the availability of parking, and the 1-year anticipated changes in these figures. Suggestions as to possible solutions are invited from parties requesting change, with indications of order or preference when more than one alternative is presented.

When service extension proposals are being made as a consequence of a request from outside of CTA, typically from an industry that recently relocated to an outlying area and feels that transit is obligated to follow it, the existence of systematic analysis procedures from the industry provides reassurance that the proposal is receiving fair consideration.

Edward Weiner
U.S. Department of Transportation

Planning is a rational process directed toward attaining objectives. The Southeastern Wisconsin Regional Planning Commission (SEWRPC), as part of its regional land use-transportation planning program, formulated a set of regional development objectives as a basis for land use and transportation plan design, test, and evaluation. Of a total of 15 specific development objectives, 8 related to land use development and 7 to transportation system development. One of the latter related directly to transit service; it called for "a balanced transportation system providing the appropriate types of transportation service needed by the various subareas of the region at an adequate level of service." Two additional transportation system development objectives related indirectly to transit service in that they dealt with a reduction of accident exposure and with the alleviation of traffic congestion and reduction of travel time between component parts of the region.

To be useful in the regional planning process, the objectives had to be sound logically and related in a demonstrable and, when possible, measurable way to alternative physical development proposals. The objectives were, therefore, refined by the formulation of a corresponding set of guiding planning principles and a supporting set of specific development standards for each objective. This refinement allowed the objectives to be related to physical development plan proposals and thus used in the processes of plan design, test, and evaluation.

The following definitions indicate the purpose of each of these elements (1):

1. Objective. A goal or end toward the attainment of which plans, policies, and programs are directed.
2. Principle. A fundamental, primary, or generally accepted tenet used to support objectives and prepare standards and plans.
3. Standards. A criterion used as a basis of comparison to determine the adequacy, correctness, and suitability of plan proposals to attain objectives.
4. Plan. A design that seeks to achieve agreed-on objectives.

The objective states what is to be achieved, the principle states why the objective is valid, and the standard states how the objective can be met.

TRANSPORTATION SYSTEM DEVELOPMENT STANDARDS

The supporting transportation system development standards fall into 2 groups: comparative and absolute standards. The comparative standards, as the term implies, serve only as a basis for the comparison of alternative transportation plans. Minimizing the vehicle-miles of travel is an example of such a comparative standard. There is no "desirable" value for this standard. Simply, the alternative plan that generates the lowest vehicle-miles of travel will best meet this standard.

Absolute standards are measurable in terms of a maximum, minimum, or desirable numeric value. A desirable operating speed for a specific type of highway facility is an example of such an absolute standard.

Transportation System Plan Design

The development of a transportation system plan involves a systematic process of, first, identifying the deficiencies in the existing and committed system by comparing various elements against the applicable standards; second, postulating improvements and additions to the existing and committed system to alleviate these deficiencies; and, third, testing the postulated improvements to determine whether they do in fact alleviate the deficiencies.

In the testing process, the total person travel demand expected to be generated within the planning area in the plan design year is estimated and divided into portions expected to use the 2 basic modes available, the automobile and public transit. These 2 segments of the total travel demand are then assigned to specific routes within the highway and transit systems. At this point, the transportation systems planner must determine whether the postulated facility improvements should be included as part of the total transportation plan. The transportation system development standards are designed to facilitate this determination.

Overriding Considerations

In the preparation of regional transportation plans and in the application of the transportation system development standards, 2 overriding considerations exist. First, the facilities included in each transportation plan must constitute a complete and integrated system. It is not possible to determine the manner in which the individual facilities composing a system interact from application of the transportation system development standards per se. This must be done through quantitative test and evaluation of the proposed system by the use of traffic simulation models.

Second, an overall evaluation of each transportation system plan must be made with respect to cost. The cost of meeting the standards must necessarily be considered in order to ensure plan feasibility. If the attainment of one or more standards is beyond

the available financial resources, either the standards must be lowered or additional financial resources sought.

Thus, decisions made and results reached in one phase of the planning process have ramifications in other phases of the process. The objectives to be achieved and their supporting standards dictate the design of the plan; but the design of the plan and its cost may also cause modifications in the objectives and standards as initially formulated. Also, the decision to change some element of the land use plan may necessitate modification of the transportation plan; and conversely the decision to change some elements of the transportation plan may necessitate modification of the land use plan.

Furthermore, community development objectives are not static but are subject to change over time. These changes must be monitored and suitable revisions in the plan made to ensure that the needs of the people are met by the plan design.

TRANSIT PLANNING

In the recent past, transit planning has been a relatively neglected phase of the overall urban transportation planning process. To some extent this has been due to the relatively minor role that transit plays in many smaller urban areas. But this somewhat cursory treatment of transit planning has also been due, in part, to the lack of a well-developed planning methodology for accomplishing the task.

The design of a transit system is a more difficult task than the design of a highway system, at least within southeastern Wisconsin. The basic highway design problem within the region consists of providing the traffic capacity required to eliminate deficiencies in the existing and committed system and to meet anticipated travel demand while still maintaining an operational system and not destroying environmental amenities. In contrast to the highway system, the existing transit system in southeastern Wisconsin has more than adequate capacity to carry the existing and potential passenger demand. Moreover, transit system capacity determinants, such as frequency of service and type of equipment, are more readily variable so that the capacity of this system is much more flexible than is that of the arterial street and highway system. The design of a transit system thus becomes a problem of creating demand for service rather than that of supplying system capacity to meet an existing demand. This makes it particularly important that the designer understand who will use the system and why.

Users of a transit system can be divided into 2 groups: those who must use transit (captive riders) and those who choose to use transit (choice riders). The captive riders cannot use the automobile to satisfy their travel needs because either a car is not available to them or they are not able to drive. In the design of a transit system, the provision of service to these captive riders is an important concern. The choice riders decide to use the transit system because such use in some way is more advantageous to them than the use of an automobile. If a transit system is to attract these riders, transit service must compete favorably with the service provided by the highway system. The success that a transit system may achieve in diverting choice trips from highway facilities will, to a considerable extent, determine the balance that will exist within the region between highway and transit utilization. This ability to divert choice trips thus becomes a second important concern in the design of a transit system.

In that the passenger loads on transit routes and facilities within the region seldom reach the capacity of the routes and facilities, there is no technique available in transit system design equivalent to the capacity deficiency analysis used in highway system design by which transit improvement proposals can be developed. Furthermore, because highway facilities are generally available throughout the entire region, an automobile trip can always find a route to and from all areas of the region. In contrast, transit service is not available throughout the entire region, and a transit trip consequently cannot be readily made to or from all areas. Since the number and the location of transit trips are dependent in part on the availability of transit service, no technique is, therefore, readily available to determine what the potential transit demand in any area of the region may be without first postulating new transit routes.

Four questions thus arise in transit system design:

1. Where should new transit routes be provided?
2. What types of service should be provided for each route?
3. What quality of service should be provided for each route?
4. How much will the service cost?

A fifth question, concerned with who should pay for the transit service, is not a technical question to be treated in the design process but, rather, a policy question to be answered through the political process. It will not be treated here.

As already noted, the transit system design will determine the extent to which transit service will reduce the need for additional highway facilities. These 4 questions were, therefore, considered in the formulation of transit system development objectives and standards for southeastern Wisconsin, but were considered separately for local and rapid transit.

Local Transit Standards

Local transit service was defined as the transportation of persons by buses operating in relatively frequent service over prescribed surface streets on regular schedules (2, p. 20). In long-range area-wide planning, it is extremely difficult and of questionable value to plan a local bus system to the detail of setting headways and determining schedules. The operating companies or agencies are generally in a better position to determine the modifications in local service that are required to meet changing needs. The following standards in support of the basic transit system development objective, however, served as a guide in planning for local transit service.

1. Local transit service should be provided for all routes within the region where the minimum potential average weekday passenger loading equals or exceeds 600 passengers per day per bus. (A transit route may be serviced by a single bus if it can make a round trip in 1 hour or less. If either the route length or the potential revenue-passengers increase, additional buses may be required to service the route.) Local transit service area radius was considered to be ¼ mile in high-density residential areas and ½ mile in medium- and low-density residential areas.
2. Local transit routes should be provided at intervals of no more than ½ mile in all high-density residential areas. (A high-density area contains 10,000 to 25,000 persons per gross square mile or from 22.9 to 59.2 persons per net residential acre. A medium-density area contains 3,500 to 9,999 persons per gross square mile or from 7.3 to 22.8 persons per net residential acre. A low-density area contains 350 to 3,499 persons per gross square mile or from 0.5 to 7.2 persons per net residential acre.)
3. Maximum operating headways for all local transit service throughout the daylight hours (6 a.m. to 8 p.m.) should not exceed 1 hour.
4. The average distance between local transit stops should not be less than 660 ft for local transit service.
5. Loading factors for local transit service should not exceed the following:

Headways on Route (min)	Maximum Loading Factor for Periods Exceeding 10 Min (percent)
10	100
5 to 10	125
< 5	140

6. Transit routes should be direct in alignment, have a minimum number of turning movements, and be arranged to minimize transfers and duplication of service.

7. The proportion of transit ridership to the central business district of each urbanized area within the region should be maintained at least at the present level and increased if possible.

Rapid Transit Standards

Rapid transit service was divided into 3 subcategories, defined as follows (1, p. 20):

1. Modified rapid transit is the transportation of persons by buses operating over freeways in mixed traffic.
2. Bus rapid transit service is the transportation of persons by buses operating over exclusive freeway lanes or exclusive and fully grade-separated rights-of-way to provide high-speed service.
3. Rail rapid transit service is the transportation of persons by single- or dual-rail trains operating over exclusive and fully grade-separated rights-of-way to provide high-speed service.

If the rapid transit system is to alleviate the demand on highway facilities, especially during peak hours, it must provide service attractive enough to divert choice trips from the use of the automobile. The service must be attractive with respect to both route location and speed. In rapid transit system design, therefore, it becomes necessary to provide a high enough level of service to attract sufficient ridership to justify provision of the service and to reduce the demand for highway facilities. To accomplish this objective, the rapid transit plan finally developed for southeastern Wisconsin made maximum use of the extensive freeway system proposed for the region (Fig. 1). This freeway system supplies wide areal coverage and occupies the corridors of highest travel demand within the region (Fig. 2).

In the rapid transit plan development, high-speed transit service was initially proposed for all highway corridors exhibiting a high travel demand; no prejudgments were made of the type of transit service to be provided. For planning design purposes, however, proposing only the location of these rapid transit routes was not sufficient; quantitative tests of the proposals were also necessary to determine whether they would indeed serve the purpose for which they were intended and to determine what type and quality of service should be provided. These initial proposals were, therefore, tested by a set of simulation models (1, 2, 3) to determine whether the potential utilization would be sufficient to justify incorporation into the final plan.

The following standards were formulated to aid in the rapid transit plan design, test, and evaluation (1, Table 2):

1. Transit service of an appropriate type should be provided for all routes within the region where the minimum potential average weekday revenue passenger loading equals or exceeds the following values:

Transit Service	Min Potential Avg Weekday Revenue-Passengers	Transit Service Area Radius (miles)
Modified rapid transit		
6 a.m. to 8 p.m.	600/day/bus	3
Limited	300/4 hr/bus	3
Bus rapid transit	21,000/day/preempted freeway lane	3
	For separate right-of-way, see Figure 3	3
Rail rapid transit	See Figure 4	3

2. Maximum operating headways for all transit service from 6 a.m. to 8 p.m. should not exceed 1 hour.

Figure 1. Proposed regional bus rapid transit system for 1990.

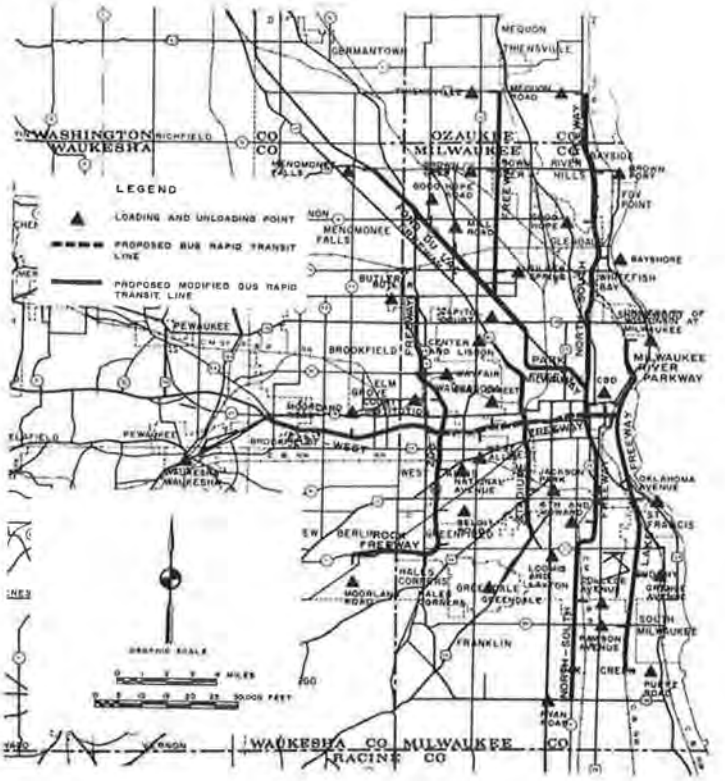


Figure 2. Regional average weekday traffic in 1990.

Figure 3. Threshold service for bus rapid transit.

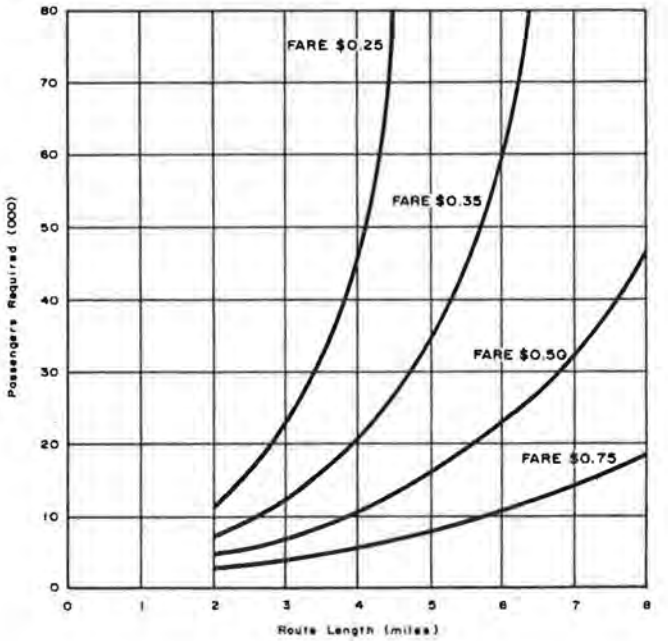
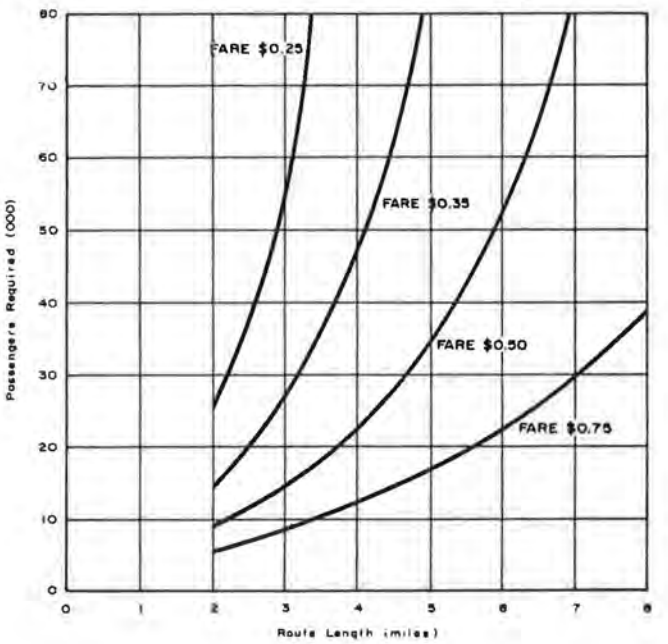


Figure 4. Threshold service for rail rapid transit.



3. The average distance between transit stops should not be less than the following:

Transit Service	Avg Distance Between Stops
Modified rapid transit	No stops between terminal areas
Bus rapid transit	2 miles (for line-haul sections)
Rail rapid transit	2 miles (for line-haul sections)

4. Maximum loading factors should not exceed 100 percent for periods greater than 10 minutes.
5. Transit routes should be direct in alignment, have a minimum number of turning movements, and be arranged to minimize transfers and duplication of service.
6. The proportion of transit ridership to the central business district of each urbanized area within the region should be maintained at least at the present level and increased if possible.
7. Modified rapid transit or rapid transit service should be provided as necessary to reduce peak loadings on arterial streets and highways in order to maintain a desirable level of transportation service between component parts of the region.
8. Parking should be provided at transit stations to accommodate the total parking demand generated by trips that change from automobile to transit modes.

DERIVATION OF RAPID TRANSIT THRESHOLD SERVICE WARRANTS

Standard 1 can be termed a rapid transit threshold service warrant, for it specifies the minimum potential revenue-passenger loading that would justify initiation of rapid transit service. The warrants were set on the basis of analyses that require additional description. Two cases were involved: One case concerns the preemption of freeway lanes (analyzed on a quite simple, purely rational basis), and the other concerns the construction of exclusive facilities (analyzed on an economic basis).

Preemption of a Freeway Lane

One method of providing bus rapid transit service is to use a freeway lane exclusively for the operation of buses. In April 1964, the director of planning for the U.S. Bureau of Public Roads stated (4): "Many factors are involved in a decision to reserve a lane for buses, even during peak hours. The Bureau of Public Roads takes the position that such a reservation is reasonable if the usage by bus passengers exceeds the number of persons that would normally be moved in the same period in passenger cars."

On an average weekday basis, the number of persons carried by automobile in a freeway lane can be computed as follows (5):

Urban Design Capacity	Vehicles per Day
6 lanes	85,000
1 lane	14,200

Therefore, if it can be demonstrated that 14,200 × 1.5 (average car occupancy) or 21,000 passengers per day can be carried by the buses, justification is sufficient for preempting a lane of freeway. (The determination of daily vehicular capacity is a complex problem involving many factors, including specific peak-hour volumes, directional split, design geometrics, and distribution of traffic by lane. The foregoing computations, therefore, represent an approximation based on average conditions within the region.)

Bus Rapid Transit on Separate Right-of-Way

The cost of providing transit service is equal to the sum of the operating and capital costs. The method used to pay for the service—fares with public subsidy—does not alter the true cost of providing the service. Therefore, a series of threshold service warrant curves were developed specifying the number of passengers paying an "equivalent fare" required to justify the institution of rapid transit service. The equivalent fare was defined as the amount that each transit passenger would have to pay if the total cost of the transit service was to be recovered from the fare box. In this manner, the true cost of providing the service was estimated. The threshold service warrant curves thus provide a common basis for the evaluation of alternate courses of pricing policy; they are an aid in system design as well.

Formula Development

The threshold service warrant curves were drawn from computations based on the assumption that the sum of the system operating and capital costs are to be paid by the passenger revenue generated by the system. More specifically,

$$\text{Passenger revenue} = \text{operating costs} + \text{capital costs} \quad (1)$$

$$\text{Total daily passenger revenue} = \text{equivalent fare} \times \text{number of busloads per day} \times \text{avg number of passengers per bus} \quad (2)$$

$$\text{Total daily operating costs} = \text{operating cost per bus-mile} \times \text{number of busloads per day} \times \text{length of busway} \times 2 \quad (3)$$

$$\text{Total daily capital costs} = \text{length of busway} \times (\text{daily capital cost for right-of-way and construction per mile of busway} + \text{daily maintenance per mile of busway}) + \text{daily capital cost for terminal construction} \quad (4)$$

If X = number of busloads per day, L = length of busway, F = equivalent fare, operating cost per bus-mile, including depreciation of rolling stock and supporting yards and shops = 56 cents per bus-mile, average number of passengers carried per busload = 26 per bus, daily capital costs for line right-of-way and construction per mile at a 6 percent rate of return plus daily maintenance costs per mile of busway = $901 per mile per day, and daily operating costs = $0.56(X)(L)(2) = 1.12XL$, then Eq. 1 can be rewritten

$$26XF = 1.12XL + 901L + 31 \quad (5)$$

Equation 5 can be solved for X (the number of busloads per day on the route), which is multiplied by the average number of passengers carried per bus to yield the number of revenue passengers required at a specified fare to justify the service.

In the calculation of the data for the construction of threshold service warrant curves, fares of 25, 35, 50, and 75 cents were used. Route lengths varied from a minimum of 2 miles to that length at which the revenue-passenger loads required exceeded 80,000 per day. The final curves developed are shown in Figure 3.

Cost Data

In the development of the threshold service warrant curves for a bus rapid transit system, the following construction, maintenance, and operating costs were used.

1. The average cost of acquiring land through developed portions of Milwaukee County was determined on the basis of past experience to be about $150,000 per acre,

including costs of acquiring and razing existing buildings and structures. A typical cross section for a 2-lane exclusive bus roadway was postulated (Fig. 5), which requires approximately 15 acres of land per mile of roadway, resulting in an estimated cost for right-of-way acquisition of $2,250,000 per mile.

2. The cost of constructing the roadway was estimated as follows:

Item	Dollars per Mile
Portland cement concrete pavement with valley gutters	150,000
Storm sewerage	50,000
Fencing	25,000
Earthwork utility relocation, sodding, and seeding	180,000
Grade separation structures (2 per mile)	200,000
Subtotal	605,000
Engineering, surveys, and contingencies	45,000
Total	650,000

3. The cost of constructing a transit bus terminal at the downtown end of the line was estimated at $100,000.

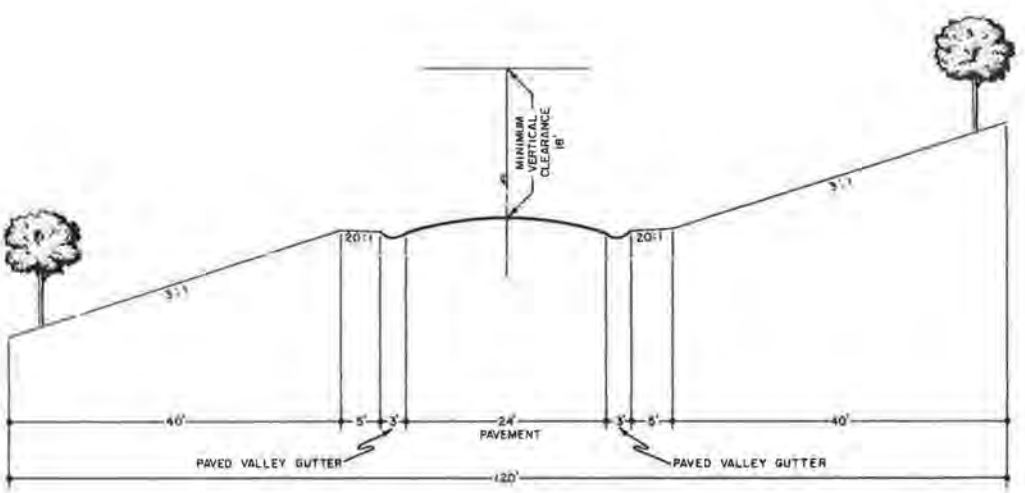
4. The cost of maintaining the busway, including snow removal, was estimated at $1,500 per lane-mile per year or $3,000 per route-mile per year.

5. The cost of a standard 52-seat, air-conditioned bus capable of 60- to 70-mph running speeds was estimated at $27,750. Using a 6 percent interest rate, a 12-year service life, and a 5 percent allowance for downtime, the annual cost was estimated at approximately $3,444 per bus.

6. The total cost of the necessary yards and shops for equipment storage and maintenance was estimated at $5,000 per bus. At a 6 percent interest rate, a 25-year service life, and a 5 percent allowance for downtime, the annual cost was estimated at approximately $411 per bus.

7. The total operating costs, including equipment maintenance, fuel, conducting transportation, traffic, and general overhead, were estimated at 45.6 cents per bus-

Figure 5. Typical busway cross section.



mile. Depreciation on buses and supporting yards and shops was estimated at 10.7 cents per bus-mile, giving a total operating cost of approximately 56 cents per bus-mile.

The capital costs were divided into 3 categories: fixed facility costs that vary directly with route length, such as right-of-way, construction, and maintenance; fixed facility costs that are independent of route length, such as a central terminal; and rolling stock and costs that can be associated with the number of buses, such as yards and shops. The first 2 categories of costs were used to calculate the daily capital cost. The third category was included in the operating costs as depreciation. This was consistent with the plan proposal that a public agency construct the busway and lease its operation to a private transit corporation.

8. Daily capital costs were computed before the threshold service warrant curves were calculated. The present-worth method was used, for which the formula is

$$R = P \frac{i(1+i)^n}{(1+i)^n - 1}$$

where

R = annual rate necessary to retire principal and pay interest,
P = present worth of investment,
i = interest rate, and
n = number of years to retire principal.

The interest rate was set at 6 percent based on the concept that an economical public project should have a return at least as high as a private investment. The number of years to return the principal was set differently for each component of the proposed system based on the estimated physical life of the component. A return period of 25 years (except for maintenance) was used in the following calculations of daily costs

Item	Total Cost	Annual Cost
Right-of-way	2,250,000	176,078
Construction	650,000	50,849
Maintenance	—	3,000
Total		229,867
Terminal	100,000	7,823

The amounts were divided by 255 average annual weekdays to yield approximately $901 per mile per day for the first 3 items and approximately $31 a day for the terminal.

Rail Rapid Transit

Formula Development

The rail rapid transit threshold service warrant curves were computed by using the same basic equations used in computing the bus rapid transit curves. The following equations were developed:

Passenger revenue = operating costs + capital costs (6)

$$\text{Total daily passenger revenue} = \text{equivalent fare} \times \text{number of carloads per day} \times \text{avg number of passengers per carload} \quad (7)$$

$$\text{Total daily operating costs} = \text{operating cost per car-mile} \times \text{number of carloads per day} \times \text{length of rail line} \times 2 \quad (8)$$

$$\text{Total daily capital costs} = \text{length of rail line} \times (\text{daily capital cost for right-of-way and construction per mile of rail line} + \text{daily maintenance cost per mile of rail line}) + \tfrac{1}{2}(\text{length of rail line} - 2)(\text{daily capital cost for each line station}) + 2\,(\text{daily capital cost for each terminal station}) \quad (9)$$

If X = number of carloads per day, L = length of rail line, F = equivalent fare, operating cost per car-mile, including depreciation of rolling stock and supporting yards and shops = 73 cents per car-mile, average number of passengers carried per carload = 28 per car, daily capital cost for line right-of-way and construction per mile at a 6 percent rate of return plus daily maintenance costs per mile of rail line = $1,456 per day, daily capital costs for each line station (one every 2 miles) at a 6 percent rate of return = $168 per line station per day, daily capital costs for each terminal station (2 required) at a 6 percent rate of return = $322 per terminal station per day, and daily operating costs = 0.73(X)(L)(2), then Eq. 6 can be rewritten as

$$\begin{aligned} 28XF &= 1.46XL + L(1,456) + \tfrac{1}{2}(L - 2)(168) + 2(322) \\ &= 1.46XL + 1,540L + 476 \end{aligned} \quad (10)$$

Equation 10 can be solved for X (the number of carloads per day on the rail line), which is multiplied by the average number of passengers carried per car to yield the number of revenue passengers required at a specified fare to justify the service.

In the calculation of the data for the construction of threshold service warrant curves, fares of 25, 35, 50, and 75 cents were used. Route lengths varied from a minimum length of 2 miles to that length at which the revenue-passenger loads required exceeded 80,000 per day. The final curves developed are shown in Figure 4.

Cost Data

The following construction, maintenance, and operating costs were used in developing the threshold service warrant curves for a rail rapid transit system:

1. The same approach was used to estimate the rail system right-of-way cost as was used for the bus system. The estimated cost of right-of-way acquisition for the rail system was $2,250,000 per mile.
2. The cost of constructing the rail line was estimated as follows:

Item	Dollars per Mile
Double track line	225,000
Storm sewerage	50,000
Fencing	25,000
Earthwork, utility relocation, sodding, and seeding	180,000
Grade separation structures (2 per mile)	600,000
Electrification	500,000
Signalization	450,000
Subtotal	2,030,000
Engineering, surveys, and contingencies	210,000
Total	2,240,000

3. The cost of constructing a rail terminal at each end of the rapid transit rail line was estimated at an average of $1,050,000 per station, including crossovers and storage sidings. The construction cost of line stations at 2-mile intervals along the rail line was estimated at $550,000 per station including 250 linear feet of platform.
4. The total cost of maintaining the rail line, including snow removal, was estimated at $10,000 per track-mile per year or $20,000 per line-mile per year for a double-track line.
5. The cost of a rapid transit rail car was estimated at $80,000 per car. Based on a 6 percent interest rate, a 25-year service life, and a 5 percent allowance for downtime, the annual cost was estimated at $6,571 per car.
6. The total cost of the yards and shops for equipment storage and maintenance was estimated at $8,000 per car. Again, based on a 6 percent interest rate, a 25-year service life, and a 5 percent allowance for downtime, the annual cost was estimated at $657 per car.
7. The total operating costs, including equipment maintenance, power, conducting transportation, traffic, and general overhead were estimated at 53 cents per car-mile. Depreciation on cars and supporting yards and shops was estimated at 20 cents per car-mile, giving a total operating cost of 73 cents per car-mile.

The capital costs of rail rapid transit were also divided into 3 categories as were those of bus rapid transit.

8. The threshold service warrant curves were calculated after certain costs were reduced to a daily basis. The present-worth method used for bus rapid transit was used. The interest rate was 6 percent, and the period of time required to return the principal was set at 25 years for each component of the rail system based on the estimated physical life of the component.

Item	Total Cost	Annual Cost
Right-of-way	2,250,000	176,017
Construction	2,240,000	175,235
Maintenance	—	20,000
Total		371,252
Terminal station	1,050,000	82,142
Line station	550,000	43,026

Based on an annual average of 255 weekdays, daily costs are $1,456 per mile for right-of-way, construction, and maintenance; $322 for each terminal station, including crossovers and storage sidings; and $168 for each line station.

SUMMARY AND CONCLUSION

The objectives and standards, including threshold service warrants for rapid transit service and the supporting cost data described here, were developed for long-range area-wide planning purposes. As such, they are necessarily preliminary and will require refinement as the recommendations contained in the now adopted regional transportation plan are implemented. It is anticipated that the first major refinement will be carried out as preliminary engineering plans are prepared for the busway recommended in the adopted plan.

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Donald A. Morin
Federal Highway Administration

This session focused on the current use and effectiveness of marketing and advertising programs for transit industry. Main issues addressed concerned, How much money should be budgeted for marketing? Can it be a positive force in attracting riders? How can information on successful new types of service be gotten to others? Is it important to wait for a better product before doing marketing? What are the strategies for good marketing practices?

In the papers that folow, Schnell cites the promotional devices used in San Diego, Los Angeles, and Toronto. Reading emphasizes the need for understanding the dynamics of making a beneficial service available. The approach is one of determining the goal, conducting the research on methods, developing a plan for proceeding and an action program to carry it out, and evaluating the result.

Kelley discusses an airline company's approach to marketing. He notes the need for the advertising agency to be used as a full partner in the firm's activities, rather than being called in only for preparing ads. The need for identifying the different consumer markets and tailoring media and material to effectively influence each was emphasized.

John B. Schnell
American Transit Association

Thomas O. Prior, general manager of the San Diego Transit Corporation, has fully exploited every opportunity to draw attention to the transit service in San Diego. Shortly after the San Diego Transit System became a public authority, arrangements were made to purchase 100 new buses. Tom determined to get the maximum publicity out of the purchase of these buses. He felt that many people in San Diego hardly realized that a transit system existed in their city. First, San Diego Transit sponsored a color-the-bus contest. Students or anyone else was asked to submit color designs. The newspapers cooperated by printing black and white sketches of the new buses on which contestants were encouraged to place their own color schemes. After receiving hundreds of entries, a panel picked out the 6 best entries and then requested the San Diego populace to vote on which of the 6 they wished to have for the new buses. Eventually a 14-year-old boy was declared the winner. This pair of contests took a great deal of time and acquired a great deal of free newspaper publicity.

MARKETING PUBLIC TRANSPORTATION

When the new buses were ready to be picked up, Tom Prior made arrangements for 45 of the San Diego bus drivers to be flown to Pontiac, Michigan, to drive the buses back to San Diego. Naturally, the San Diego newspapers took pictures of the bus drivers as they boarded the airplane. As the buses returned to San Diego a contest had been arranged to guess what time the buses would enter the San Diego city limits. Thousands of people entered this contest, and additional free publicity was received. As some of the buses approached San Diego, they stopped in some of the surrounding communities such as Chula Vista and El Cajon and the mayors and public officials boarded the buses. Thus, civic pride of all the neighboring communities was aroused, and a mammoth celebration with brass band, bunting, handshaking, and photographers was arranged downtown. Some speeches were planned, and the mayor and Miss San Diego christened the buses by breaking a bottle of San Diego Bay seawater over the bumper of the first bus.

When San Diego Transit reduced its student fare and allowed the students to ride 24 hours a day, 7 days a week, and all year long on student passes, this too was maximized in publicity. When reduced fares for senior citizens were inaugurated, Tom had his picture in the newspaper with senior citizen groups discussing the new arrangement. The idea was to make the people of San Diego realize that the bus system existed, cared about the populace, and was trying to provide new and innovative service and reduced fares whenever possible.

Other advertising campaigns included "Discover San Diego by Bus on Sunday." The transit system provided a reduced fare and did a lot of advertising to provide this family type of tour to see the scenic wonders of San Diego on Sunday. Sunday is a low transit ridership day, and this helped to build up the quantity of buses needed for Sunday service. Other signs advertised STADIUM SPECIALS—50 cents and emphasized the fact that the 50-cent fare was to and from the stadium and was equivalent to the parking fee that would be charged had one driven a car to the stadium.

When the San Diego Coronado Bridge construction required the termination of ferry service, San Diego Transit had plenty of advance publicity and satisfactorily handled the new type of commuters. When exact-fare started, there was adequate advance publicity, and the transit advertisements continued to complement the many businesses who agreed to serve as token outlets. This means of thanking the businesses for remaining as token outlets helped to engender good will for this relatively thankless task.

When the celebration for receiving a grant for a new maintenance and administrative office facility was to take place, the San Diego Transit System employees cleaned up a body shop, assembled suitable tables, linens, and proper china, and prepared the entire meal themselves complete with wandering violinist and a gift to Carlos Villarreal, former UMTA administrator, of an old coin fare box reconstructed as a very attractive lamp. As an additional marketing touch, Tom had a mammoth fake check for $1,970,000 prepared. The photographers were very happy to snap pictures of the mayor looking startled as Carlos Villarreal presented this fake check to him.

During Administrator Villarreal's visit one of the advertisements on the side of the bus was KEEP FIT—RUN AND CATCH A BUS, and he posed alongside of this ad in a running position, making additional photographic copy for the local press. San Diego Transit has received national awards for that humorous and catchy phraseology as well as for TAKE TWICE DAILY TO RELIEVE CONGESTION. Another advertising campaign was conducted in Los Angeles by the Southern California Rapid Transit District in 1965-66. The theme for this campaign was your "extra car," the SCRTD bus. The humor and the good sense were hammered home in an entire series of such ads, some of which are as follows:

Amazing Automated Parking With Your Extra Car
No Down Payment on Your Extra Car
235 h.p. With Your Extra Car
Save $100 per Month on Your Extra Car
Revolutionary Air Ride Suspension With Your Extra Car
Guaranteed Lifetime Warranty With Your Extra Car

Why Stay Home Alone. Use Your Extra Car
Why Fight Traffic. Use Your Extra Car
Why Pay More. Take Your Extra Car
Quiet Please, Passengers Resting on Your Extra Car
Your Extra Car Is Going Your Way
Every Family Needs an Extra Car
Join the Rebellion. Take an Extra Car
Take an Extra Car to Lunch
Safety by Far With Your Extra Car
Take Your Extra Car to the Angel Stadium
Your Extra Car Will Take You to the Zoo

These slogans were used on the sides of buses, on interior car cards, in newspapers, on cardboard covers slipped over the top of existing bus signs, and in many other places where thousands of citizens saw them every day.

Ridership increased in Los Angeles during and immediately after the extra-car campaign, while it decreased in many other cities during this same period of time. Another Los Angeles transit promotion involved the use of privilege cards that entitled students to reduced fares on buses and all citizens to reduced fares for many sporting events, some theatrical programs, and other types of entertainment opportunities.

Innovative advertising and promotion have also been used in Toronto where GO Transit's logo of a large GO in green letters outlined in white is used on all vehicles and in stations, platforms, and signing. It was also used in an extensive campaign to advertise the opening of commuter train service. Some of the advertisements used phrases such as

On March 11 GO Easy
GO Getter
3-Days to GO
J. W. Dillworth (a typical person) is on the GO Reading and Relaxing

Sometime later when the demand-responsive transit service was initiated in the Bay Ridges area serving the Frenchman's Ridge Rail Station, the advertisements contained slogans such as

GO Is Coming Right by Your Front Door
Now GO ALL the Way
GO Grows

These are only a few examples of the many types of advertising and promotional means that an enterprising marketing department of a transit system (or an advertising consultant) can achieve.

James E. Reading
Regional Transit Service, Inc.,

My definition of the marketing of transit is as follows: the dynamics of making a beneficial service available to the public for value received. The 5-step procedure for marketing transit is as follows:

1. Establish a reasonable goal, i.e., identify the segment of the public to whom you are going to market which aspect of transit.

2. Undertake research to determine the peculiarities of both the market and the service and the environment in which the two must meet.
3. Establish a plan as to how to proceed.
4. Implement the plan.
5. Analyze the results and, based on this analysis, establish another goal and start over again.

There are 6 groups of people who must be addressed in transit marketing campaigns: transit system employees, labor union leaders and members, transit passengers, local government officials, employers, and residents.

In marketing Rochester's Regional Transit Service, we try to make the RTS logo synonymous with our service so that residents will recognize it immediately. Driver dispatchers see that all employees are available and scheduled as planned. The Rochester transit system was the first operation in the United States to have 2-way radios in all of its vehicles.

The street supervision crew wear royal blue trousers and lime green jackets on the pockets of which is emblazoned the RTS logo. They are very distinctive, and the public recognizes them quickly and does not hesitate to ask them questions. Some people felt at first that the proposed uniforms were too striking and the supervisors would be embarrassed to wear them. This turned out not to be the case.

The Regional Transit Service has a 30-hour course in effective management that is required for all management employees and may be taken on a voluntary basis by other employees. The one established rule is that anyone who wishes to be promoted must have successfully completed the course.

We award to employees a certificate for community service for work above and beyond the normal call of duty. One employee received this certificate for volunteering to coordinate the transportation required to shuttle hundreds of workers back and forth to the dike repair work on the Genesee River during the July 1972 flood. Other employee-oriented actions include "Transit Talk," an internal publication that is mailed to an employee's home so that it will be read by the employee's family; a sign at the door of the operators' room that says, "Down these stairs go some of the world's best professional operators. Are you one?"; and an annual professional driver's award to the driver with the best safety record.

We have also improved bus-stop signs. The older signs read only BUS STOP, but the newer ones read BUS STOP—NO CARS OR TRUCKS. On one route that is heavily used by household employees the bus stops are numbered in increasing order from the city. A new employee can then be told to take the 7 bus and get off at stop 38.

Each Lexan and aluminum bus shelter is constructed in 5-ft modular lengths so it may be expanded as the need arises at individual locations. In each one is a sign that says WELCOME ABOARD. A similar sign is now used on the verticle fascia between the first and second bus steps. The old sign, which read WATCH YOUR STEP may have connoted a hazardous entry into the bus, and we feel the new one attracts the passengers' attention and thereby causes them to watch their step.

Inside the bus, signs illustrate the complete exact-fare structure, not just the base fare. We feel that the public is entitled to know everything about the fare structure.

Rochester has the highest number of handicapped people per capita in the United States. We found that some of these people literally have to drag their feet up the steps to enter a bus. Since the steps have an overhanging lip, this makes it difficult to get the foot up to the next step. The manufacturers indicated that to eliminate this lip would involve extremely high costs, possibly a total redesign of the bus. Eventually we found that for $10.56 we could modify each bus in our shop to eliminate the overhanging lip and to provide a more convenient hand rail. The bus manufacturers have agreed that our method is practical, and specifications now include these 2 items.

We also sponsor a training program for blind people on how to use transit service. We found that instructors in this program could much more capably help to train blind people if they themselves learned how to negotiate the entrance and aisles of a bus while blindfolded.

In one shopping center that has 52 stores plus a hotel and many offices, we maintain a courtesy booth that is staffed 8 hours a day, 6 days a week. The staff person dispenses schedules and information, sells tokens and passes, and usually handles 17,000 to 30,000 inquiries per month. When a staff member is not present, a sign on a red telephone remaining on the desk invites people to use this direct line to our information service. Out telephone answering service is generally handled by 2 people, but we have 17 people who are trained to answer the phone. During an emergency situation, we can have 6 people answering the phones within 60 seconds.

Our schematic bus route maps are color-coordinated to match the routes and timetables. On the back of the map we have listed the many points of interest most often asked for through our answering service.

When it was necessary to raise the fare in Rochester, we passed out 100,000 copies of "Fare Facts." We also used other media to ensure that the public had received the message. As a result, we had only 27 phone calls and 3 letters of complaint following the increase in fares.

RTS and General Motors are working together in the development and demonstration of a new passenger information system. These signs, 3 each at 2 major downtown bus stops, will indicate the route number and destination of each bus before it arrives. This project is coupled with GM's platooning system of moving buses more rapidly through downtown.

There are other information services to residents. A brochure entitled "A Ride Through History" tells of the historical sites in Rochester. Those taking this tour buy a 50-cent ticket and may get on and off the bus to see as many sites as they wish along one route for only one fare.

Another brochure, "Charter Power," tells of our charter services. One form of charter that we have been encouraging is for senior citizens who live at new apartment locations that are designed for their use but have no nearby shopping facilities. We inaugurated a special bus to take them to local shopping markets, and the idea was so successful that we now have several buses providing this type of transportation. An unusual charter was that by a bride and her wedding party who wanted to stand on the bus on the way to the church so their dresses would not be wrinkled.

We offer a free ride to go downtown shopping to encourage new riders, and of course we do get a full fare when the rider goes home. We conducted a park-and-ride campaign at several fringe parking lots and advertised this park-and-ride facility on the sides of the bus, at bus stops, and in media campaigns. In some heavily used downtown locations, we post schedules.

Our marketing budget, including salaries of the director of advertising and public relations and the artist-secretary, is $62,500. This is the amount of the guarantee from transit advertising. The cost of marketing park-and-ride is above that amount and is funded by the Rochester Genesee Regional Transportation Authority, our parent company.

M. L. Kelley, Jr.
Eastern Airlines

As a starting point, I would like to use some of the questions assigned for this discussion.

1. What are some general guidelines for good marketing strategies?
2. Can these strategies be applied to a product such as public transportation?
3. If so, how can they be applied?
4. What can be expected from an intense effort devoted to marketing public transportation?

Questions 1, 2, and 3 have to do with the consumer and his needs. And here we enter into the marketing process just like any goods manufacturer when we ask: Who is our customer? What is he seeking? How does our product meet his various needs, and how does it stand in his personal value system?

From this the marketing process takes us into the development of basic strategies and then substrategies and the examination of copy, media, and sales promotion approaches.

Everyone's marketing business is equally complex, but, in transportation to paraphrase George Orwell, ours is more equal than others. First, there are geographic differences in what we offer and how our services are perceived; we have a patchwork quilt in terms of competition; and we exist in an environment that is regulated in routes, pricing, and even the kinds of dealer programs we can run. The product we deliver to the passenger varies by a number of criteria: mechanical, where the airplane we fly makes a difference; weather, where the airplane we fly may be delayed; and the service on board, where there are tremendous variables based on the human equations. Finally, we have a product with relatively low penetration. Only half of all adults in the United States have ever sampled our product. Only 21 percent of the adults have used our product in the past year.

Perhaps because things were so complex, the market for air travel initially was considered as a single entity, a homogeneous society in which people demanded or got almost identical services or values from the product. In short, airline marketing was directed to the entire market in order to sell to the greatest possible number. As one effect of this approach, product marketing efforts become more and more similar. Every carrier talks about its aircraft, its seats, its food, its personnel, always trying to develop a point of difference. And, of course, when a point of difference is developed, it generally can easily be duplicated. This still persists to some extent. Thus, for the consumer it becomes increasingly difficult to differentiate among carriers; and, because there are few discernible product differences, customer usage often becomes merely a function of advertising and promotion weight.

From this broad marketing approach, some market segmentation began to appear slowly along what we might call "traditional" lines. We singled out business people, vacationers, and personal travelers and, later, a number of more specialized subgroups. Marketing strategies were still fairly basic. For instance, most vacation offerings were 7 days/6 nights or multiples thereof largely because that is how the hotels and tour operators had always done business. The airlines began to build marketing organizations geared to these market definitions to ensure that one person or group could concentrate on those segments with the most potential. Eastern, I might say, was among the first to develop this product manager concept, which gives continuing attention to and thorough analysis of market opportunities.

Let us look a little deeper at the kinds of consumers Eastern wants to communicate with: the business men and women who have unique travel needs, the vacationer whose wants with respects to an airline are different from those of the business person, the personal traveler whose motivation to fly is unlike that of both the business person and the vacationer. There are also subgroups such as military, youth, ethnic groups, and others looking to satisfy distinct needs related to air travel.

How does an airline such as Eastern approach this problem?

We know that the business person is a frequent flyer. Because of this, his or her own experiences play a big part in the decision to choose an airline and are not easily swayed by advertising. But there are a number of important aspects on Eastern that we must communicate to business people. First, we want them to know where we fly. When they are going from point A to point B, we want to be sure they are aware that Eastern can take them there.

Our primary medium for making business people aware of Eastern's destinations is radio. We chose radio because it allowed us to make the cities we were talking about come to life. We looked for interesting, unusual, and exciting aspects of cities and created stories about them. In the series using the voice of Orson Welles, which has now become quite well-known, such diverse subjects were covered as the Cloisters in New York, the Morning Call in New Orleans, and even a bargain basement in Boston.

A second important reason for using radio was its low price.

Besides telling about the cities we fly to, we had another important goal: to tell business people why they should fly Eastern. This means making them aware of the number and time of Eastern's flights between cities.

And radio provided us with the required local flexibility to accomplish our goal. We could run 50-second commercials and follow with 10 seconds of local pertinent information about Eastern service. For example, in Atlanta, at the end of the New York commercial, the announcer would say: "Eastern Airlines has 12 daily nonstop flights with service to all 3 New York airports. Eastern also has after-dinner flights which save you 20 percent off the day coach fare. For information and reservations, call Eastern, or your travel agent."

We have also used newspapers to inform the public about our destinations and our service superiority. One technique by which we have tried to provide interest about cities was by way of useful maps in our ads. Incidentally, our research tells us that we have made good progress in letting people know where we fly. Awareness of cities has doubled and in some cases even tripled.

Because of the importance of business people to Eastern, we are continually looking for new products that we think will appeal to them and, coincidentally, to personal travelers, people flying to visit friends and relatives. One example is Eastern's after-dinner flights, which provide individuals with significant cost savings if they are willing to fly at off-peak hours. Another product, unique to Eastern, is leisure class, which allows customers the possibility of flying free if they are willing to accept that they might be delayed to the next flight. Breakfast-at-dawn flights, much like after-dinner flights, provide cost savings for early flyers.

A concept that provides a convenience to the customer is our "call Eastern" program in Atlanta. It allows the flyer to call Eastern no matter where he is going. If we cannot take care of his needs, we will make arrangements for him on another airline.

Earlier I talked about research as a means of measuring our progress in informing consumers about our destinations. In addition to measuring results, we also use consumer research to help us identify new business opportunities. An example of where research helped us is in developing a marketing program for the fall period, which traditionally for Eastern had been a very slack time of the year.

We started to study the fall problem intensively in 1970. We found the consumer had changed considerably within a few years. Leisure time and recreation had taken on new meaning. Because of job commitments, people were not taking 2 or 3 weeks' vacation at one time but were breaking up their vacations into smaller segments. Many people found this more relaxing and beneficial anyway. In addition, long holiday weekends were being used to travel short distances, and many city dwellers were taking part in a mass exodus from metropolitan areas to places where they could relax and enjoy their long weekends.

So we designed a promotion built around a low weekend air fare and special ground packages. We began the 1971 campaign in newspapers. The newspaper advertising was coupled with an intensive magazine and radio campaign suggesting that people could afford to take a break at these special prices. Sales promotion materials such as brochures, shopping bags, and counter displays were used to reinforce the concept and to provide more information through the travel agents and in the terminals and ticket offices.

In all of this autumn-weekender material, never once did we talk about a vacation. This is not a vacation; it is an impulse purchase. We have been very careful to define it that way. The results have been excellent; 1971 weekend package sales were 200 percent higher than the previous year, which in itself had represented a large jump from 1969.

So we have started to make great strides in filling in one of those valleys that plague the airline's sales picture. We also put on a similar program for spring. It was tailored slightly differently to the market, but again was based on the realization that a spring trip—not a vacation—is part of our new living patterns.

The spring promotion kicked off with newspaper advertising. Television commer-

cials also were added. Both the advertisement and the commercials were drawn from a special stage set that we erected in the Kennedy airport terminal. Basically it employed figures of different types with cut-out heads. People put their heads in the cut-outs and instantly became somebody else for the weekend, which was our theme. Prior to the Easter rush, we had people at Kennedy taking pictures of visitors to the set, giving them Polaroid prints.

In sales promotion we backed up the advertising with a travel agent display that dispensed a brochure giving details of all the special packages, and we also produced conventional travel agent reference materials. Results of the spring promotion showed the same kind of performance that we have had from the autumn weekenders.

In our summer program, we have also made strides to change the product and to appeal to new segments of the market. The traditional summer audiences consisted of consumers taking advantage of off-season rates at their vacation destination—singles and couples, young and old with low to middle incomes. The segment that was lacking in our view was the true family segment. Too many families were still driving to the mountains or to a nearby beach.

So for families we developed special products that offered great values in ground accommodations. One of our basic strategies was to focus on the family vacation as a rewarding and enriching experience, not only for the children who could learn something in their travels, but also for the parents who could share in that learning process and take delight in it. We developed that theme in commercials showing the range of family activities in Florida, a father and son rafting in Jamaica, and a little girl sketching and recollecting her Puerto Rico vacation.

In addition to television, we advertised in magazines. This advertising was supported by a newspaper supplement that explained the types of accommodations and prices available to families.

A further series of newspaper advertisements continued to point out the features of our family product and the difference in cost between using the family car and flying to one of our destinations. And, of course, we backed it up with travel trade advertising and collateral material designed to give agents the information they needed. To support this program in very topical fashion, we developed educational kits on the ecologies of Florida and Puerto Rico and offered them in scholastic magazines. We are still getting requests long after our supplies have run out.

In one year, summer bookings rose 35 percent. And this family segment proved what we had believed: that it could be a substantial source of new revenue for the airline.

We then added a further ingredient to the family program: Disney World. Some years before the opening, Eastern entered negotiations with the Disney people and made an agreement with them to be designated as the official airline of the new park in Florida. One of our introductory commercials about Eastern and Disney World featured a little girl dreaming about meeting various Disney characters and then waking up to find the magic kingdom outside her window.

We also prepared a supplement that appeared in major magazines and that comprehensively described the attraction and facilities at Disney World and positioned Eastern as the best way to get there. Announcement ads appeared in major newspapers in major markets to reinforce the connection and give price information on the tour packages. An extensive trade effort told travel agents that Eastern was best equipped to supply them with information for their customers. Sales promotion materials for the trade and general public supported that thrust; we even added in-flight items for further merchandising impact. We were able to have a little fun with Disney too. Last Christmas when the Kennedy terminal was crowded with vacationers and people going home from the holidays (many of them children), we were able to raise a smile on many young faces by playing in the terminal the Mickey Mouse Revue, a series of Disney figures assembled as an orchestra.

I should add a word about Eastern's 1972 winter campaign. "Winter. Love it or leave it" was a promotion theme designed to make us visible in the winter to people who are in the vacation market at that time. It had impulse elements, recognizing

that, although many traditional winter vacationers are committed early, there are new entrants to the market who can be encouraged to fly with us. This campaign humorously depicted miserable winter scenes of snow and slush and then quickly switched to show the sunlit beaches of various destinations.

In addition to these major market segments, Eastern markets a number of other products to smaller but still important consumer groups. Because the air travel needs of these groups are unique, we use special media and even special copy to explain Eastern's story.

For example, research tells us that a significant portion of Eastern's flyers are golfers. So we developed a program addressed to this interest group, with Jack Nicklaus, as Eastern's golf pro, placing his endorsement on specially tailored golf vacations. In addition, we promote golfing vacations to this segment in specially targeted print media throughout the year. The Flying Golfers Club gives its members special information on courses, equipment, and instructions, all outlined in a bimonthly newsletter. Periodically, membership drives for the club are run in selected publications.

A key part of any airline is its planes, which represent a tremendous investment. At Eastern we believe that we are developing one of the most modern fleets in the world. A good example is Eastern's L-1011 Whisperliner, which was introduced in newspapers with an advertisement detailing its various features in blueprint form. An introduction commercial showed the excitement of the arrival of this big plane for the first time in one of our communities. The underlying thesis was that because we care about people we bought a plane that could bring the benefits of wide body air travel to all cities.

How do we pull all of these approaches together? We seek consistency in tone of voice (with Orson Welles in both radio and television), in style, and in the graphic and logo treatment. But, clearly, that is not enough. We need something that appeals to the common value systems in all our consumers, a sustaining program that glues everything together and presents a unified impression or image to air travelers.

One element that we have defined as important for us to get across is size. And research studies show that size in our business is often associated with multiplicity of destinations. That is the rationale for a series of destination commercials, covering such extremities of our system as Montreal, Jamaica, Los Angeles, and Mexico.

Another important element is expressed in the commitment we made when we first adopted our "wings of man" theme. That was perhaps most effectively articulated in one of the first commercials, called "boy and bird," to introduce that theme. It linked the dream of freedom to the dream of flight and stated our intention to make man as at home in the sky as he is on land—to be the wings of man.

I mentioned at the outset that I would discuss 4 questions. The first three I have dealt with. The fourth was, What can be expected from an intense effort devoted to marketing public transportation? Well, there is all the difference in the world between expectation and actual results, and I can tell you some of the results of the program I have outlined.

1970 and 1971 have been recognized as the 2 most difficult years in recent airline history. In those 2 financial years Eastern was the largest carrier operating in the black. We made modest profits, while airlines of comparable size had sizable losses. We were able to do this, too, without resorting to the large furlough programs that have been such a sad fact in our industry in recent years. In 1971 and for the first 6 months of 1972, we had the highest load factor in the industry. Although our expectations might have been more ambitious, we have some cause for pride.

James A. Scott
Highway Research Board

Three papers discuss structures and programs for implementing transportation plans at the state, regional, and federal levels. Mueller describes the creation and subsequent activities of the Florida Department of Transportation. Colcord discusses the institutional opportunities, particularly councils of governments and departments of transportation, available within states to plan and implement transportation programs. Ettinger discusses the assistance the Urban Mass Transportation Administration can offer under various legislative provisions.

Edward A. Mueller
Florida Department of Transportation

Any approach to public transportation in Florida requires some understanding of the transportation organization. By 1972, transportation efforts in Florida had evolved from a highly politically motivated highway department to an urban-oriented, somewhat sophisticated, multimodal professional department of transportation. The changes were not always accomplished smoothly or gracefully, but they did occur. What used to be the strong political right arm of the governor several decades ago is now an action-oriented agency that carries out its program by working together with legislators and all varieties of federal and local officials.

In 1969, Florida legislatively reorganized its transportation functions. At that time a department of transportation was created, largely composed of the former state road department but including other forms of transportation with the exception of waterway development. Four functional divisions were created: planning and programming, administration, road operations, and transit operations. A secretary of transportation was created to oversee these functions. The Administration Division handles personnel, finance, contract lettings, permits, office services, reproduction, and the like. It also houses the right-of-way functions, the numerous toll-collection facilities, and the turnpike. The Road Operations Division designs, constructs, and maintains highways. The Planning and Programming Division undertakes the planning activity for all modes of transportation. In the preconstruction process, this division carries all activities

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through the location survey process up through the design hearing; in transit studies, it carries matters up to the transit technical study category. The Transit Operations Division does work similarly to that of the Division of Road Operations and is responsible for aviation and conventional bus and rapid transit. It is also concerned with railroads and will be concerned with waterways.

The lessons and customs of the former highway operation have been carried over to the transit operations. Florida has some unique ways of doing business that need explanation.

Florida has an 8-cent per gallon gasoline tax. Four cents of this goes back to the department itself for "transportation purposes"; 2 cents of this goes to counties; 1 cent is for transportation purposes and is the only money that can be used for maintenance; and 1 cent goes to cities for transportation purposes, but part of it is subject to "diversion." Florida counties also have the authority to impose, by referendum, an additional 1-cent gasoline tax to finance transportation systems.

One will see from the above that only 2 cents of the 8 cents are restricted to highways. Thus, Florida might be said to have a transportation trust fund since three-fourths of the revenue is flexible although dedicated to transportation. We think it is more important at this time for states to have this flexibility now than for the federal government to have it some time in the future.

Florida has been a keen advocate of the partnership concept from the first in developing its 11,000-mile primary highway system, which is largely nonlimited access. This state has insisted that local government, usually counties, purchase the right-of-way. Only for Interstate and highways at a few key locations where unusual circumstances prevailed has the state ever bought any right-of-way. It has not been uncommon for counties to get right-of-way donated for the entire road. Because Florida is so flat, it usually has been easy to indicate a width such as 100, 200, or 250 ft and get landowners to cooperate. When land is not donated, then, of course, local government has to buy it.

In the beginning, the transportation department maintained 7,000 miles of secondary roads for counties and charged them for this. Since October 1, 1971, the counties could do this themselves or have the department do it. The department also designs and builds the secondary road system in cooperation with the counties. Somewhat unusual in nature, the secondary system encompasses many major miles in some places.

We often have had to resort to toll facilities. Some of these are revenue based; others use a combination of revenue and county secondary funds. Almost all major facilities are now operated by the transportation department even though financed with local gas tax funds. The backing usually secures a lower interest rate and, of course, helps to sell bonds under better marketing conditions. The 1969 reorganization process in Florida provided a better cooperative method in selling bonds that requires the joint approval and acceptance by the state and local unit of government.

I cite all of these matters to show that a spirit of partnership and cooperation has prevailed in the construction of our 20,000 miles of principal highway systems. Units of government in Florida just have to get along together; otherwise, the job will not get done.

Lessons learned from highway experiences are being applied to transit operations. In 1970 our legislature made it possible to involve ourselves in nonhighway affairs, and we are taking advantage of it very rapidly. We have set up a basic policy of sharing in cost participation and development. For transit projects, such as bus purchases, for example, we will equally match funds with local agencies and, in turn, use these funds to match federal funds for a project.

We have built our budget, in all instances, on matching available or expected-to-be-available federal funds. Our project funds are committed this way, anticipating the local matching to be done. Some projects do not involve local funding; these are statewide in nature or so small that it is not worth the red tape necessary in getting matching federal dollars.

It is very easy to work with local government units. A single mutually acceptable agreement is drawn up that commits the local funds and sets out what the state should

do. In many instances the state will lend money to get a project into being, do the federal processing, and hold the public hearing. Although the department of transportation has really been in business for modes other than highways for a relatively short period, it already had a good record of project achievement. I would like to share some of the specifics.

We are working with local government and the Urban Mass Transportation Administration to salvage several failing systems, primarily by replacing worn-out buses and by providing capital grants to publicly owned urban systems. We also are establishing exclusive or preferential bus lanes, developing fringe parking facilities, and reviewing special TOPICS projects that will aid bus operations.

We are considering an elevated, rubber-tired system in Miami. Various types of rapid transit are being explored in the urban corridor between the Tampa-St. Petersburg and the Daytona-Cape Kennedy areas and encompassing Disney World and Orlando.

We have plans for a turbotrain link between Miami and Disney World in central Florida. Also, the department sees the future potential of a high-speed tracked air-cushion vehicle carrying tourists and residents between southeast Florida (Dade, Broward, and Palm Beach) and central Florida (Tampa-St. Petersburg, Orlando, and Disney World). A tracked air-cushion demonstration project is certainly a reasonable possibility as a beginning link in tying together southeast and central Florida.

In considering potential rail programs in Florida, we have not been able to avoid the great problems that exist throughout the state in rail-highway at-grade intersections. This interference between the 2 major transportation modes is far more significant than the interfacing of these and other modes for the continuous uninterrupted transport of goods and people over a balanced system. There remains as a final alternative the possible relocation of rail lines to the less urbanized fringe areas of our cities. I have held quarterly conferences with all the railroads operating in Florida to explore ways in which we may jointly improve rail service.

We need to develop additional legislation, especially in the financial field. A channelization bill was introduced that would flow all federal transportation funding through the Department of Transportation, but the legislators balked. They want to take a longer look at it. The department is seeking new sources of state revenue to develop strong programs in urban bus transit, air facilities, and high-speed ground service so that no more Highway Trust Funds will be used than necessary.

I will now address more specifically some of the questions that have been posed. We are naturally interested in the practical problems of implementing public transportation within the political framework of urban areas. A state public transportation policy was developed by the department. This policy pledges state support—technical and financial—to local governmental units within the limits of legislative appropriations. Public transportation received $5 million in 1971 and $7.4 million in 1972 from the state Transportation Trust Fund, primarily gas tax revenue.

We prefer to have local transportation projects originate at the local level. The local people then feel that the project is their own and the state is simply helping them achieve something for the community. We even encourage full community participation in the planning stages so that the various segments of the population feel that they are a part of what is being developed. We have found that they are more apt to support the facilities if they have a hand in developing them. Otherwise, we have found that some segments of the communities view our efforts with suspicion. Often they feel that the transportation system is the brainchild of some far-removed politican and is to be built for political purposes at public expense. Full community participation is about the only way to reduce this attitude and to make the people satisfied that they are really building something for themselves, something that they need, something that they will use, and something that they are willing to pay for.

Usually, the request for a local project originates in the local or regional planning agency. Initially, this is usually a request for a study to solve a particular problem. In the event that the request is for assistance to salvage a faltering transit system, we usually participate on a fifty-fifty basis. If the request is for a long-range study involving a federal grant, we will match the local share and handle all of the paper work

to secure the federal grant and to assist in developing the scope of the studies up to and including contracting with the consultants who will do the job.

We attempt to schedule, or at least anticipate, these local projects as far in advance as possible so that they can be properly considered in the appropriation process. The entire Department of Transportation operates from a 5-year budget and work program.

This works fine with highway projects because funding is more predictable; but, with UMTA funds and projects generating at the local level, the third, fourth, and fifth years of the public transportation get rather "iffy." If we can get the federal funding channelization bill through the legislature, this will do much to improve the validity of the budget and work program. With a 5-year approach to the major projects, development time becomes secondary in importance to the system design concepts.

In most cities public transportation has become a public utility. It is essential to the life of the community, and public subsidization is not only desirable but necessary. Most communities have had to establish fees for certain services such as garbage disposal and sewer systems, and these fees are assessed whether or not the services are used. It is a funny thing that we quite willingly will pay these fees to haul our garbage and to transport our sewage, but not to transport ourselves. It is our great love affair with the private automobile that is the culprit. But more and more we are coming to realize that public transportation is just as essential to our well-being as any of the other public utilities.

Since no city or county can likely operate an adequate public transportation system at a profit, we must get a firm local commitment of ongoing support at the outset. Even though the federal and state governments will provide the bulk of the initial financing for capital equipment and the technical assistance, the local government is ultimately charged with the responsibility of operating the system. Therefore, the local authority will have the greater voice in determining the level of service and the fees to be charged, for depreciation and operational cost must be borne by and large by the local community.

What can the planner or engineer do, if anything, to influence the implementation of public transportation? Planning is very much a part of the process for developing transportation systems. Good planning has very important functions:

1. Translate project objectives into service design that will meet actual needs,
2. Establish the funding commitment necessary, and
3. Justify the expenditure and program to the funding agencies and user groups.

These are 3 major approaches to transportation planning:

1. Broad-scale transportation system planning with statewide benefit,
2. Specialized planning that addresses the regional transportation requirements including not only transit system requirements but also rapid transit systems, and
3. Tailored service intended exclusively for a specific urban area or often for a single group or need within the urban area (e.g., a city transit service and a transit system for the disadvantaged).

The planning process provides a sequential process that will ensure the development of a sound transportation improvement program.

Frank C. Colcord, Jr.
Tufts University

Since the 1950s, the most serious deterrent to the achievement of balanced transportation in urban areas has been inadequate funding for the public transportation mode.

With the recent impressive growth of both federal and state funding for public transportation, this problem seems on the way to being overcome. We face the prospect of actually being able to mount large capital programs for transit in our metropolitan areas without a major bloodletting over the property tax. We are, therefore, confronted, really for the first time nationally, with the problem of untangling the complicated institutional web with which we have surrounded ourselves to provide our cities with transportation. We must confront the question now of who should have the power to make decisions on urban transportation.

Furthermore, there does seem to be a general consensus among both academic observers and practitioners that we cannot reasonably discuss public transportation decisions without talking about the whole urban transportation package, including of course highways. The objective of comprehensive urban transportation planning as a part of general metropolitan planning has been explicitly required by federal law since the Federal Aid Highway Act of 1962 and has been further reinforced by numerous legislative requirements ever since, most notably by the Demonstration Cities and Metropolitan Development Act of 1966, which established the review procedure required by the Bureau of the Budget Circular A-95.

These federal requirements, and in some instances certain state statutes, have had significant institutional effects at the state and local levels. They have succeeded in getting highway, transit, and urban planners in the same room for the first time; they have forced the placement of highway and transit plans into a single document and required a synthesis of these plans; and they have resulted in the first real public debates of these issues in many urban areas.

But despite these effects, it would be hard to work up much enthusiasm yet for the policy accomplishments of these federal requirements at the local level. We have already suggested that the most important reason for this has been unbalanced financing. Certainly another reason is the inherent difficulty within the American political system of accomplishing comprehensive planning. And the third is the inadequacy of the local institutional structure.

Before discussing the last of these, we must deal with the question of whether comprehensive planning is in fact a realizable objective.

The term "comprehensive" suggests the notion not only of all-encompassing substance but also of long-range timing. The difficulties of considering everything at once and also of predicting needs (as well as desires) over the long term are immediately obvious. No one could deny that both objectives defy the best in man, and many sophisticated discussions of this subject have appeared in print. The difficulties have led some to argue that comprehensive planning is thus an ephemeral hope and that we should lower our sights.

This writer has difficultics accepting this latter view, particularly because he looks at comprehensive planning from the vantage point of transportation planning. We are faced with the indubitable fact that for major transportation facilities, whether they be highways or rail transit, the lead time from initial planning to actual completion of construction is very long. Ten to 15 years is not unusual. The only real alternative to planning such facilities in accord with some accepted broad goals—i.e., a comprehensive plan—is to plan them according to simplistic transportation goals. In fact, this is in large part just what we have done. But the accepted broad goals must be recognized for what they are, and this provides us with something of a middle way. Broad goals for 20 to 25 years hence must be understood to be adaptable over time and subject to reexamination as conditions change. And programs to meet those goals, including transportation programs, must be staged in such a way that they lend themselves to these shifts in attitude among the public and policy-makers and the resulting shifts in goals.

The question of institutions is closely related to this matter of comprehensive planning. A realistic view of the potentialities and possibilities for long-range comprehensive planning must recognize the ever-present likelihood of change. The institutions we have for the conduct of such planning and for the implementation of the programs that evolve from such planning must be highly sensitive to the changes in viewpoint and

attitude in the community that can and should effect changes in the plans. They must themselves be encompassing of all transportation policies as well as of other policies that are closely related to transportation. Our institutions must not be structured in such a way that the winds of broad community opinion are not heard because of a narrowness of access or a remoteness of geography or hierarchy.

When program agencies are unifunctional, when they are distributed among several levels of government, receiving their funding from different revenue sources in different locations, and when the only bodies that encompass all of them are frequently weaker in terms of political influence and even professional skills than the program agencies they are presumably coordinating and making policy for, then the objectives of achieving comprehensive planning, and more important that of achieving a high degree of sensitivity to changing attitudes and opinions of the relevant communities to be served, are almost beyond hope. In most of our states and urban areas, that is still the situation in which we find ourselves, despite the progress made under the stimulation of federal statutes.

The weaknesses of the present rather jerry-built institutional structure for transportation decisions are widely recognized. Most of what has been constructed to deal with these decisions has been concerned with long-range planning. Rather little has yet been done about providing coordinated, metropolitan decisions on projects. In some respects, these decisions are more important to the achievement of a region's comprehensive plans than are the grand master plans. The principal respect is that a master plan, to be meaningful, must establish priorities for projects on a multimodal basis.

In most places with which this author is familiar, whatever the priorities established in the master plan, there is no effective means of enforcing such priorities. The actual planning and construction of highway and transit projects is performed by separate operating agencies on the basis of their own funding capacity, of political feasibility, and of the agencies' own technical judgment. No metropolitan body reviews these decisions and enforces some preestablished priorities. As suggested earlier, although it is unrealistic to ignore the possibility (indeed, likelihood) of changes in these priorities over time, it seems reasonable to insist that these changes be explicitly made by the agencies responsible for the original plan, not by operating agencies on their own.

The issue must be squarely faced of what agency can best perform these functions of setting the priorities of a comprehensive plan, of issuing the directives to program agencies to proceed with project plans and implementation, and of altering the priorities and indeed the projects to meet changing conditions. Although these functions are now widely distributed, the objective should be to centralize them in a single place in each metropolitan area, for they are in fact all part of the long-range planning process.

It should be explicitly stressed at this point what our reasoning is in insisting on the above. This can best be done through example. Let us presume that a metropolitan region has in its comprehensive plan agreed on a long-range fundamental objective of establishing a strong center and strong subcenters as an alternative to sprawl. The plan calls for major and high-priority investments in fixed rail transit as one means of achieving this objective. Let us assume then that insufficient funding is available for such transit lines and substantial funding is available for new freeways on the periphery of the metropolitan area. As things stand now, the transit program would have to either await the development of new state and federal funding or go to the voters for local funding from the property tax or a local sales tax. But there would be nothing to stop the construction of the new highways. Because the fringe municipalities would probably favor the roads anyway, no political opposition would be expected from that quarter. Only the opposition from the council of governments or the metropolitan planning agency or both and perhaps from the inner-area municipalities would be expected. The (highway) program agency would ordinarily want to "get on with the job" because its success is generally measured by new roads constructed.

It should be evident from the above that the construction of the peripheral highways would be exactly counter to the objectives of the master plan even though consistent with the objectives of the state highway agency (which provides the dollars) and the

peripheral local governments in whose jurisdictions the roads would be located. It should, therefore, be equally clear that the agency that approves the master plan must also be the agency that determines project decisions. In this sense, project decisions are system decisions.

So, we turn again to our central question of who should make these authoritative decisions. Such a determination in any metropolitan area should hinge on a realistic evaluation of the present and potential capabilities of the candidate agencies. These capabilities include political muscle, technical competence, and representativeness. At present, these capabilities are rather widely distributed where they exist at all. Also, they are distributed in differing ways; in particular, the distribution among agencies of the state and those of the local area vary considerably from place to place. These facts suggest the necessity of flexibility in seeking solutions to the problem confronted here. Differing state and local political traditions militate against a simplistic, conforming solution for all urban areas.

Two major institutional trends in recent years have moved us closer to realizing the goal of a capable metropolitan transportation decision-maker. The first is the trend toward departments of transportation at the state level. The second is the rapid growth in large urban areas of councils of governments, which are usually combined with or closely related to metropolitan planning agencies. Although these metropolitan institutions have responsibilities far broader than transportation, their creation was significantly stimulated by federal transportation legislation.

The transportation-department movement has several objectives that are close to those identified above. First, such a department is intended to give to the states a comprehensive capability in the transportation field, both urban and interurban, both private and public. It significantly broadens the state's traditional responsibilities, which have been roads and regulation of common carriers. Second, the establishment of a transportation department opens the door to enhancing the powers of the state's chief executive over highways, a function that in most states has been quasi-autonomous. If the governor's powers over the highway program are increased, there is a greater likelihood that other values besides narrow highway objectives will be allowed to impact the highway program. The program is likely to be subjected to greater access of impacted as well as user groups and to competitors for the state's dollars. Third, and closely related, the highway program is likely to be less exclusively responsive to narrow highway interest groups than has been the case in the past.

The council-of-governments movement, now near universal in large urban areas, is a second-best response to the widely perceived need for metropolitan government in the United States. Its accomplishments have been modest, largely because it is almost wholly dependent on consensus for its authority, but there have been some. The very presence of the councils, and the federal legislation that stimulated their development, has forced metropolitan areas to do some thinking about goals and objectives. The council provides a forum for discussing such goals, as well as long-term transportation programs aimed at meeting such goals. The councils have identified some problems that need metropolitan solutions, in some instances have encouraged the establishment of agencies to operate such programs, and have generally built up competent planning staffs. What they have not been able to do, because of their limited authority, is to require municipalities to make decisions consistent with their plans. Our earlier illustration was intended to demonstrate that. It also demonstrated the fact that the state government's role can often be counter to the objective of strengthening these agencies despite frequent statements to the contrary by many state spokesmen.

The objective of unifying decision-making can be met, in theory, either by strengthening the council of governments so that it has the capacity to make and enforce decisions of the types described or by transferring these powers to the state. Either of these decisions will have to be made by the state and, in some states, the first solution appears to be best; in others, the second.

Let us consider the alternative of the strengthened council of governments. With very rare exceptions, there is little reason to expect a council to be significantly strengthened as a result of local initiative. Although everybody mouths the impor-

tance of "metropolitan decision-making," there are few local governments (read, local politicians) who are willing to give up really significant powers residing in their municipalities or counties. Most of what little metropolitan decision-making we now have has resulted from "carrots and sticks" emanating from Washington, D.C. In general, the states have played a passive role; they have willingly created metropolitan institutions when demanded by local leadership or referendum. But they have never to my knowledge required the establishment of such institutions over the opposition of local political leaders—as was done by Ontario in the Toronto area.

There are ways, however, that states can make use of their substantial urban transportation funding as a means of encouraging the strengthening of metropolitan institutions. As we have already suggested, the present methods of funding transportation programs in urban areas tend, in fact, to undermine these institutions. With the growth of state financial assistance to transit (in combination with federal aid), it becomes increasingly possible for states to offer to their major metropolitan areas the option of block transportation grants as opposed to the present approaches of functional grants or categorical project funding or both, with the decision-making power residing in the state in the latter case. The block transportation grant, however, is only really feasible if 2 factors are present: (a) The funds, whatever their source, must in fact be available for whatever uses the urban area chooses, in accord with its own priorities, and (b) the urban area must have the capability to make these decisions. Thus, the responsibilities of the state are, first, to provide sufficient and flexible funding so that such grants are feasible and, second, to require an adequate delegation of responsibility by the state and by the jurisdictions of the area to their council of governments to make transportation decisions.

The approach of strengthening the council of governments and devolving most major transportation decision-making to the urban area is the preferable option for most of the largest urban areas for the following reasons: (a) The federal government has already moved a long way in this direction as described earlier and, in its proposed Federal Aid Highway and Mass Transportation Act of 1972, recommended a single fund for urban areas if appropriate "consortia" are established to administer these funds locally; (b) most of our largest urban areas are located in states that either contain other large cities or are more rural than urban, and the result is either a tendency for the major metropolitan areas to compete with each other for state largesse or a dominant non- or even anti-urban ethos; (c) given the difficulty inherent in achieving a consensus on meaningful metropolitan goals and the likelihood that such goals will change over time, one can reasonably argue that locally elected officials are likely to be better "tuned in" to current and changing public attitudes than are state officials; (d) councils of governments are better suited to relate transportation to other metropolitan issues such as environmental and social questions than are state transportation agencies because of the breadth of their missions; and (e) giving councils of governments a stronger role in urban transportation should have the effect of forcing them to consider other related problems such as land use controls.

Although this option offered to metropolitan areas to make their own transportation decisions may well be sufficient to encourage improvement of metropolitan decision-making capability, it must be recognized that such a "carrot" will not always succeed in its objective. There may well be places where many local governments will prefer state authority to council authority. Councils are not infrequently viewed as weak, as dominated by particular members (either suburban or central city), or as biased toward particular policy solutions (e.g., transit). Whether such opinions are justified is beside the point; if they exist strongly enough, they can make the carrot we have suggested unworkable. In these instances, certain adaptations may be necessary to accomplish the objective. For example, it may be necessary for the state to sweeten the pill of strengthening the councils by offering a larger amount of money than would otherwise be available.

The closest that any metropolitan area has come to an approach such as that suggested above (other than those few that have metropolitan governments) is the Metropolitan Transportation Commission established in 1970 for the San Francisco Bay area.

This representative multimodal body has significant powers over both planning and project decisions and, through a memorandum of agreement, has tied itself closely to the region's council of governments, the Association of Bay Area Governments. It is not the perfect theoretical solution—which would be to give these powers to the association—but it appears to be a workable compromise.

Another approach, which seems peculiarly well suited to the Los Angeles area, is to place major stress on subregional institutions for decision-making. That area, by its SMSA definition, is so immense that there is really no sense on the part of its citizens of belonging to a single metropolitan region. This writer has suggested in another context that the counties that constitute this region be recognized as subregional decision-making units for transportation purposes and that most planning and programming decisions be delegated to that level. The Southern California Association of Governments would then be responsible only for interface decisions in the transportation field, and that would probably help to make it a more viable institution. The counties, which now have little control over their cities, would be forced to work out decision-making arrangements with them and be strengthened thereby.

The second general approach available to states and urban areas to achieve unified decision-making would be to raise all the key decisions to the state level. This has begun to happen in a number of eastern states and has certain desirable attributes under some circumstances. It is most fully developed in Maryland, but the trend is evident in Massachusetts, New Jersey, New York, and several other smaller states.

The Maryland Department of Transportation has available to it a trust fund for all modes and is in fact the owner and operator of the Baltimore transit system. There is no longer a separate highway commission. Massachusetts has not achieved such a high degree of centralization, but the Metropolitan Boston Transit Authority is a state agency, as is the Massachusetts Port Authority, which operates the sea and air ports and a bridge, the Turnpike Authority, which operates tollroads and 2 tunnels, and the Metropolitan District Commission, which operates a number of major scenic highways, among other things. All of these are somewhat loosely organized within the state department, but each continues to have its own board.

Maryland and Massachusetts are both states in which there is a single dominant metropolitan area entirely within their borders. In the case of the latter, the core city of that metropolitan area also happens to be the state capital. Although not formally the state capital, Baltimore houses much of the Maryland state bureaucracy and, in any event, is only a short distance from Annapolis. Both states are among the most urban in the nation, and in both instances their major metropolitan areas represent about half the population of the whole state. Under such circumstances, something rather like a city-state is developing and will clearly continue to do so. On a smaller scale, both Delaware and Rhode Island are evolving in a similar way. In any of these states, one could reasonably argue that strong metropolitan institutions would duplicate and compete with state institutions. For somewhat different reasons, both New Jersey and Connecticut are also moving in the direction of a stronger state role in transportation and planning. Here the logic seems to be the opposite of that in Massachusetts and Maryland. In neither of these highly urban states is there a major dominant city; both states contain large suburban areas attached to out-of-state centers, as well as numerous smaller urban areas. Here, too, with urbanization and fractionated government, only the state has the potential capacity to direct major urban programs like transportation.

The following are major deficiencies facing states as they consider more active involvement in urban transportation decision-making.

1. Few states have moved very far toward meaningful statewide comprehensive planning. As a result, state transportation plans and programs seem likely to continue to be functionally oriented rather than based in broader state or urban area objectives.
2. Unlike councils of governments and local governments, the states frequently do not have a wide array of programs in urban areas that are impacted by transportation,

and that would provide natural spokesmen for such interests within the state government. Those interests more commonly find their official spokesmen in local governments.

3. No states have any effective power over land use in urban areas. Indeed, the thought of states assuming such powers would be considered very radical in many if not most states.

4. The transportation capability of most states remains heavily highway oriented. This is changing in some places, but, in many, if not most states, urbanites strongly distrust their departments of transportation as being handmaidens of the highway lobbies.

Most of the states mentioned above are places in which governors have increased their powers considerably in recent years. There is no question that this solution can only be workable or desirable where that is the case. The governor, in states such as those mentioned, is the only chief executive the metropolitan areas have; thus, it can be argued he is representative. If he has gained control over his formerly autonomous (and often legislatively controlled) highway agency and transformed it into a multimodal transportation department answerable primarily to him, then he has demonstrated the needed "political muscle." With reorganization, he may also have asserted stronger controls over other state agencies and should thus be able to draw on whatever technical skills may be available there to evaluate transportation programs with respect to their nonengineering impacts. Furthermore, there is conclusive evidence that urban state governors have recently greatly expanded the planning and managerial capability of their own immediate offices to thus ensure greater coordination of programs.

To summarize and conclude, we have argued that effective coordination of urban transportation programs with other goals of metropolitan areas requires that comprehensive institutions exist not only for long-range planning purposes but also for implementation of plans. The enforcement of agreed-on priorities is an essential element of the planning process.

Further, we have argued that both kinds of decisions must be made by the same institution and that, to be effective, that institution must have "political muscle" (power), must have the requisite technical skills, and must have legitimacy (i.e., representativeness). The latter is particularly important because of the problems inherent in long-range planning in U.S. metropolitan areas; the body that makes the plan and sets the priorities must be capable of sensing changes in public attitudes requiring revision of those plans and programs.

Given the importance of this last point, it has been concluded that in most places the most desirable path to follow to achieve the above objectives is to strengthen the present councils of governments so that they have sufficient authority to enforce their transportation plans and decisions. With only limited exceptions, states should delegate their own present decision-making power relative to highways to the councils, but conditional on the latter's capability to act. Any action to strengthen the councils will have to come from the state.

Although this appears to be the best solution for most urban areas, there are a few places—mostly small, highly urbanized states with no more than one major metropolitan area—where the state and not a council can do a better job and can also meet the legitimacy requirement reasonably well. In these places, the elaborate trappings of metropolitanism may be not only unnecessary but unworkable.

Most states and their urban areas are at something like a crossroads on these decisions. Both the transportation-department and the council-of-governments movements are well advanced. It is hoped that the values to be derived from each are well understood and do not lead to competition for the power to make key urban transportation decisions.

Joel Ettinger
Urban Mass Transportation Administration

The first federal Mass Transportation Assistance Program was established in 1961 under authority of the Housing Act of 1961. The program was transferred to the Department of Transportation on July 1, 1968, from the Department of Housing and Urban Development, at which time the Urban Mass Transportation Administration was created.

From the inception of the program, national policy has put high priority on efforts to aid cities in solving the increasing problems of urbanization. The Urban Mass Transportation Act of 1964, authorizing $375 million to be spent during a 3-year period, initiated major federal involvement in public transportation. This was followed by the Urban Mass Transportation Assistance Act of 1970, which authorized $3.1 billion during 5 years and stated the intent of Congress to provide $10 billion to be spent during a 12-year period. This was the first long-term commitment of federal funds for public transportation.

Under the provisions of these acts, UMTA assists in the development of improved urban transportation systems through programs of financial aid for capital grants, research, development, and demonstration projects, and technical studies. Capital improvement grants are made to public bodies providing up to two-thirds the cost for new transit systems and modernization of existing transit equipment and facilities. Research, development, and demonstration projects include studies, tests, and demonstrations of new ideas, methods, systems, and equipment for improved transportation planning, systems, and operations. Technical studies grants are made to public bodies providing two-thirds of the cost for long-range transportation planning studies, short-range transit development programs, preliminary engineering activities, and special studies.

Of these programs, UMTA's greatest impact on regional transportation planning has been achieved through the technical studies program. Section 9 of the Urban Mass Transportation Act of 1964 authorized the Secretary of Transportation to "make grants to states and local public bodies and agencies thereof for the planning, engineering, and designing of urban mass transportation projects, and for other technical studies, to be included, or proposed to be included, in a program (completed or under active preparation) for a unified or officially coordinated urban transportation system as part of the comprehensively planned development of the urban area."

Activities funded under this program include the area-wide, long-range, continuing component of transportation planning, which defines the general framework or direction within which detailed transportation plans—highway and transit—are developed; short-range planning activities, which define a 5-year coordinated public transportation system that is consistent with comprehensive and long-range transportation planning for an urban area; preliminary engineering of rapid transit systems, individual rapid transit lines, and equipment; and special studies, such as transit needs of Model City areas, new towns transportation studies, airport access studies, and collection-distribution studies.

Long-range studies include the initial component of the transportation planning program, the continuing activities, and the plan refinement phase. This last phase provides for the detailing of the basic framework developed in the initial phase. This includes detailing the proposed system on a project-by-project basis to enable decisions to be made on priorities for implementation. Activities include detailed route and station location, station design, and station access and impact. Specific emphasis is placed on detailed analysis of environmental, social, and economic impact of the proposed system as well as the impact on special target groups.

Inclusion of project planning activities—plan refinement and preliminary engineering—under the UMTA planning program provides a unique opportunity for carrying the program from initial planning through detailed design to implementation.

Of special note are the short-range planning activities that provide for the creation of a 5-year transit development program. This document outlines a 5-year implementation program of transit improvements—bus and rail—within the urban area and pro-

vides for the integration of capital, noncapital, and operational improvements that are consistent with the long-range comprehensive and transportation planning activities.

Foremost in UMTA's administration of the technical studies program has been the implementation of the goals stated in the Transportation Secretary's memorandum of August 5, 1971, creating a trial program for improved intermodal planning. Through the technical studies program, UMTA has been working closely with the Federal Highway and Federal Aviation Administrations and with HUD in giving new emphasis to the evaluation of urban transportation alternatives, to the more effective coordination of different modes of transportation, to the impact of transportation on city growth and structure, and to the preservation of urban values.

In keeping with these goals, UMTA's policy has been to insist on the development of coordinated transportation programs before UMTA will provide funds for long-range transportation activities in the region. This coordination is achieved through the preparation of coordinated "operations plans" (covering 5 or more years of activity) and preparation of an annual unified work program. The necessity for a unified work program has had significant impact on the coordination of regional planning activities. This document jointly prepared by all state and local planning and operating agencies through the coordination of the regional planning agency describes, at a minimum, all transportation planning activities to be done in the region during a 1-year period, regardless of funding source. If possible, all comprehensive planning activities should be included as well. Through use of this document in support of funding requests, UMTA is able to properly evaluate the requests and to determine how its activities relate to the local regional program. At the heart of UMTA's effort is the concept that planning must be cooperative and that the development of coordinated transportation planning work programs will foster the cooperation to achieve a meaningful transportation planning process.

Of equal importance is UMTA's policy of making single grants to a regional planning agency to cover all long-range transportation planning activities. In most areas this agency is responsible for comprehensive and transportation planning and is in the best position to guarantee coordination of transit planning activities. However, although the regional planning agency is responsible for coordination, the local operating agencies or subregional jurisdictions may be responsible for performing many of the work tasks. Interagency agreements can be locally negotiated, passing the technical studies funds through to the specific subregional body or transit agency. Again, UMTA believes that this policy will most readily provide the cooperation necessary to achieve meaningful intermodal planning.

Four evening seminars met concurrently during the conference, and reports by the chairmen follow.

The Planning Seminar, chaired by Wegmann and Shuldiner, addressed the question, What should or can be done in the area of planning to aid in the solution of problems in public transportation?

The Research Seminar, chaired by Hoel and Schnell, addressed the questions, What is the role of research in aiding in the solution of problems in public transportation? What are some of the high-priority research areas that need attention? Who should perform the research?

The Education and Training Seminar, chaired by Grecco and Satterly, addressed the question, What can be done in the field of education to stimulate and challenge individuals to enter the field of public transportation as a career?

The Legislation Seminar, chaired by Brand and Haines, addressed the question, What should or can be done in the legislative area (local, state, and federal) to aid in the solution of problems in public transportation?

PLANNING, RESEARCH, EDUCATION AND TRAINING, AND LEGISLATION

PLANNING SEMINAR

Frederick J. Wegmann
University of Wisconsin—Milwaukee

Paul Shuldiner
University of Massachusetts, Amherst

The Planning Seminar focused, as a point of departure, on the different requirements that long-range and short-range transportation planning imposes on the planning process. Long-range transportation planning was characterized by its comprehensiveness, particularly with respect to modal considerations, and by its concern for the relation of large-scale transportation investment decisions to a broad array of social, environmental, and urban development goals. Thus, long-range planning should provide guidance to short-range planning and associated programming, design, and implementation decisions.

By its nature, short-range transit planning must deal with rather immediate and practical problems such as cash flows and investment priorities, routing and scheduling of vehicles, and allocation of manpower—issues on which long-range planning is scrupulously silent. In general, neither the data nor the techniques are available to provide,

in a timely and sufficiently detailed fashion, optimal or even demonstrably good solutions to these and the many other pressing problems faced by transit planners and operators. Those procedures that are used are poorly documented; consequently, the orderly development and dissemination of improved techniques are a slow and uncertain process.

STATEMENT OF PROBLEMS

The following specific problem areas were identified as being particularly germane to transit system planning:

1. Problems common to both long- and short-range transit system planning
   a. Lack of responsiveness of planners to and involvement in long-range policy-making, including proposals for institutional change
   b. General absence of qualified planning personnel in small- to medium-sized urban areas
   c. General inability to predict the land use and developmental impact that would result from specific transportation decisions and lack of planning techniques capable of permitting the design of transportation systems that would tend to lead to the realization of desired urban futures
2. Issues specifically related to short-range transit system planning
   a. Transit system design procedures, such as sketch-planning techniques (The status of transit planning is said to be somewhat akin to the status of the urban transportation planning process in the era when vehicle counts were the primary basis for planning and designing highway networks.)
   b. Standards and criteria for transit system planning and operations, including those relating to economic characteristics of system operations, mobility, congestion, and overall system configuration, and suitable definitions and measurements of required criteria as well as the establishment of standards
   c. Coordination with other elements of the urban transportation planning and design process such as street and highway improvement programs, TOPICS, and parking policies
   d. Specific techniques to conduct transit system planning, design routes, schedule vehicles, and cut runs and information on transit demand from origin-destination data disaggregated to the level required to refine alternative designs

RECOMMENDATIONS

Based on the previously defined problems, the seminar recommended the following actions.

Criteria for Transit System Planning

A major effort should be undertaken to update the National Committee on Urban Transportation (NCUT) manuals first published in the 1950s. Existing transit system criteria and standards, although out of date, are still extremely useful to small communities where computers and systems planning capabilities are generally not available. The revised edition should be of a broader scope than the present edition, which generally deals mainly with economic criteria and then only from the standpoint of the transit operator. These criteria should be expanded to include social concerns, levels-of-service definitions and standards, and system continuity concepts. For example, development of level-of-service criteria comparable to the level-of-service concepts for highways, as defined in the Highway Capacity Manual, could help to

1. Determine geographic variations in transit service and convey this information along with statements of needs to policy boards;
2. Allocate resources in response to needs defined in terms of level of service so that it will be possible to define the cost required to implement a given level of service; and
3. Refine procedures for transit system financial planning to assist in assessing return on investment as a function of route structure, work output, or level of service.

Level-of-service standards could provide for consistent cost comparisons among various sectors of the city or different cities as a means of determining their relative need for financial assistance.

The seminar suggested that the NCUT manuals be updated by bringing together all interested parties and allowing them to exchange information. It is recommended that the Highway Research Board undertake the leadership role in this effort and be responsible for identifying interested persons and organizations, identifying sources of financial support from organizations such as UMTA and FHWA, and providing staff and organizational support. A steering committee should be established as soon as possible to formulate strategy and establish the timing of subsequent implementation steps.

Transit System Planning and Operations Workshop

Since many of the current transit system sketch-planning techniques may be classed as more art than science, it is recommended that a workshop be held to assess the state of the art and to suggest ways in which improvements to these techniques may be brought about. For example, it would be desirable to bring together experienced individuals responsible for designing and testing the feasibility of extending bus routes to determine whether their experience could be codified in a set of guidelines that in turn could be further refined to allow development of computerized routines and operations research techniques. In general, it is recommended that lines of communication be established between planners and consultants working with highly sophisticated techniques and transit operators utilizing more pragmatic approaches. Based on common data and situations, a comparision of the procedures used would be of value to determine whether significant differences occurred in the resulting bus routes. Only through a better comparison of procedures can improved sketch-planning techniques evolve through the marriage of computer techniques with on-line operating experience. It is suggested that an organization such as UMTA take on the responsibility for organizing these workshops.

Better Data

Closely related to the improvement of sketch-planning techniques for transit system planning is the need for better data, particularly origin-destination data at the proper level of disaggregation in sufficient amounts and at reasonable cost. Currently, adequate data on transit ridership are generally not available; most of the data collected represent point counts rather than passenger access and egress patterns or actual trip origins and destinations.

It is recommended that alternative techniques be explored for the collection of origin-destination data suitable for transit planning. One procedure recommended for further study was the use of surveys at work sites to gain information on journey-to-work trips more expeditiously than is now possible in the conventional home interview survey. In turn, techniques must be established to facilitate the storage and easy retrieval and analysis of the resulting data.

Dissemination of Information

In general, a need exists to improve the dissemination of the results of research and planning studies and to present this information in a form that is easily accessible and understandable by professionals on a broad level.

RESEARCH SEMINAR

Lester A. Hoel
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John B. Schnell
American Transit Association, Washington, D.C.

Although there exists today an overriding concern with current financial problems within the transit industry, the need for research is clearly evident. For example, a major deficiency of the railroad industry was a failure to engage in basic research. Instead, there was a heavy emphasis on immediate problems, and as a result fundamental technological studies such as wheel-rail interface analysis and tunnel ventilation are just beginning to be completed in this country. Accordingly, the viewpoint of the group was that, in addition to the crisis atmosphere surrounding public transit today with its attendant fiscal problems, a concerted research effort to determine the role and capabilities of various urban transportation alternatives within the next decades should be undertaken.

A balance between technological research and institutional factors should be considered. Although technological research into new systems of transportation is an important part of the continued activities in the urban transit area, the institutional, political, social, and economic factors have the largest impact on the ability to solve present and future transportation problems. The issues can be exemplified by determining, for example, what the effect will be of the elimination of a particular type of service such as the effect that would occur when there is a strike. The focus on the consumer—his needs, demands, and preferences—and the potential problems that the consumer has in improving his mobility are aspects of transit research.

The dissemination of the results of research that already exists, together with a better interchange of information, is an important part of research activity. Current results, if known and used, could result in the better application of present technologies and systems and an earlier solution to transit problems. The gap between practice and research must be bridged so that the researcher understands the needs of the practitioner and the practitioner understands the techniques, approaches, methodologies, and results that can be expected from research. There is a great deal more that can be done with what we now know and what we already have if this information can be better harnessed.

The potential of the taxi industry should not be overlooked. The taxi should be viewed as a transit mode. Better integration with other transit facilities as well as innovations in security and surveillance should be considered as research areas.

Many strategies must be defined with respect to the application of different transit technologies. For example, the solutions that are appropriate in small cities are different from those in medium cities, and order of magnitude results should be known that can be implemented easily and at low cost. How do the various subsystems fit together? In what way can systems design be better utilized to improve performance? What are the relative roles of various technologies, and where are they best applicable?

Additional research needs concern the impact of labor in urban transportation and its effect on new systems development, for example, demand-responsive systems. Motivation and behavior, together with means of improving productivity and the participation

of the labor force in services that the transit industry performs, are areas for study. Manpower needs, training requirements, and the employment of minorities should be determined. Estimates are required to determine the present and projected manpower needs of the transit industry for managers, professionals, clerks, supervisors, and operators.

The effectiveness of nontransportation alternatives in achieving stated objectives should be better understood. A definition of the alternatives and their effects and implications should be sufficiently explored so that the entire range of transit alternatives is considered as part of a systems analysis process. For example, the effect on modal split of increasing tolls or eliminating parking in the downtown business district is an area of needed research.

Subsidies for urban transit should be fully studied. How are they justified, and for whom? What will they be used for? What level of participation is appropriate from local, state, and federal governments? The mechanism for determining priorities within an urban area and for developing citizen participation in the planning process must be more carefully understood. The role of the planner and the engineer in the process of determining transportation alternatives is a subject of continual change and one that should be better understood.

A strong consensus was that we should be doing more research in urban transit. There should be a better understanding of what we mean by research and an improved dialogue among the researcher, the transit manager, and the user. There should be improved mechanisms for dissemination of results of work already completed, and these should be incorporated into all aspects of transit operations.

The following is a list of suggestions for research propounded by participants in the seminar. This list of subjects does not imply a relative degree of importance or the seminar participants' knowledge of the extent of research in the subject area.

1. Vehicle locator systems and how these systems can be made sufficiently accurate and economical for both demand-responsive bus systems and taxis;
2. How the transit industry and the taxi industry can complement each other for the most efficient supply of transportation to serve the public;
3. How the transit system officials, planners, consultants, and others can educate elected municipal officials of communities in which small bus systems may go out of business to prevent the last-minute rescue operations or, worse, the discontinuance of all service;
4. Taxing aspects of transportation elements, including rail, bus, and taxi;
5. In UMTA service development projects, standards to be used in agreements with municipal officials concerning the levels of ridership and costs of service in which the municipality will agree to continue the service after the demonstration period is concluded;
6. Fare counting, passenger registration, and measurement of passenger miles;
7. Standard or comparable transit industry accounting systems;
8. Standards of service versus time of day, types of service, region, or type of city;
9. Methods for measuring improved "service-to-society" aspects of labor-management negotiations and fairness and equity of collective bargaining arrangements with regard to area labor rates and benefits;
10. Means of providing new types of service such as demand responsive without labor standards that augur against such innovative service, for example, the practice of rebidding jobs every 90 to 180 days;
11. Means of establishing pride in work, respect in community, and longevity in employment;
12. Means of establishing social, recreational, welfare, and employment values of a transit system to the community;
13. Means of measuring alternative transport such as using taxis or buying everyone a car;
14. Noncapital means of promoting transit, such as increasing tolls and parking fees or spreading the peak hour;

15. Maximum level of ridership that can be developed if a very high level of transit service is provided;
16. Appropriate ranges of marketing expenditures as a percentage of operating expenses for various population groups and types of service;
17. How best to conduct a "transportation academy" or a series of regional universities that will include the many varied functions of a transportation academy;
18. Means for evaluating a city's transportation and transit network, including walking distance to transit service, waiting time, travel time, waiting time for a transfer vehicle (if applicable), riding time, walking time to destination, quality and comfort level of the transit trip, safety and passenger security of the trip, cost of the trip (whether the cost is only the fare or whether it involves all of the operating costs as included in any subsidized or "absorbed" costs), and social benefit with regard to the use of the system by the transit deprived;
19. Means of interfacing existing transport systems with future personal rapid transport systems;
20. Means of encouraging an intensive PRT system to be constructed in Europe, Asia, or South America so that the effect of the human values, transfer questions, and construction costs can be analyzed somewhere other than in the United States; and
21. Means of testing a transit system (as described in areas 15 and 20) by the intensive use of buses on extremely short headways in a medium-sized community (one of the advantages of such a study might be the consideration of how best to accomplish the cross-jurisdictional decision-making necessary for such an intensive and comprehensive project).

EDUCATION AND TRAINING SEMINAR

William L. Grecco
University of Tennessee, Knoxville

Gilbert T. Satterly, Jr.
Purdue University, Lafayette, Indiana

In the dictionary, one can find the word "training" in the definition of education, and some believe the terms to be synonymous. The difference used for this report is that education is oriented to mind development while training indicates exercise or practice in order to develop skills. The objective of this seminar was to determine the educational and training needs of the public transportation industry. One way to determine the needs of an industry is to identify all the components of that industry and then to examine in detail the specific needs of each component.

TRANSIT OPERATING AND MANAGEMENT FIRMS

The types of skills required to operate a public transportation firm can be classified as either management or operating. Most positions, from the vehicle operator to the top manager, can be plotted along this continuum. Each job will, to varying degrees, require some of both management and operating skills.

The specific needs of the transit operating firm vary depending on whether it is bus transit or rail rapid transit. Because of the large number of them in this country, bus transit systems will be used as an example. Positions required to operate a bus system that are somewhat unique to that industry were discussed; common positions such as bookkeepers and stenographers were not included. The greatest need of the bus transit industry is for bus drivers. The problems are typically ones of recruitment, training, and retention.

Bus Drivers

Applicants for the position of driver come equipped with the basic driving skills, but many transit agencies provide specific driver training. In addition to actual operation of the vehicle, there are other facets of the position that require training such as route information, customer consideration, and vandalism control. In some properties, it has been essential that drivers have the mechanical ability to keep aged vehicles moving.

Dispatchers

In addition to the basic responsibility of managing people, the dispatcher must have the ability to schedule vehicles and predict passenger demands. The nature of the tasks is generally perceived by many transit properties as requiring previous driver experience.

Management

Depending on the size of the transit property, the number in the management group can vary from several to many. The management skills required are somewhat typical of other labor-intensive, consumer-service-oriented institutions. If the transit property is large, the managerial responsibilities may be separated into operations, planning, and marketing. These positions, whether singly or in combination, require formal education in basic management principles that are somewhat independent of industry type. There was some disagreement among seminar participants concerning the relative importance of the above principles compared to those learned on the job. These latter management skills are job-specific and were regarded by some as requiring skills acquired by working up from driver to each level. The best compromise is that neither of the above choices should be selected to the exclusion of the other.

CONSULTANTS AND PLANNING AGENCIES

The demand for education to meet the needs of consultants and the urban or regional planning agencies has generally been provided by various university programs. In most instances, the professionals come from civil engineering and urban planning graduate programs. As a result, these institutions have, in general, attracted additional staff capabilities to maintain their share of the market. Programs of UMTA providing research and training grants to universities tend to broaden the base, but funds by themselves do not ensure additional quality programs.

The consultant must be educated to assist the community or its planning agency that has no in-house expertise. He must have a general understanding of the problems of public transportation. This is essential to his assisting the community in the identification of their problems. Most essential to his education is a familiarity with the planning process and its application to the problems previously identified. Both consultants and planning agency personnel must have organizational capabilities in order to see that the studies are performed efficiently. Proper inputs by professionals and interested and informed citizens can be achieved through care in this phase of the process.

The most critical phase affecting the quality and cost of planning for proper decision-making in public transportation is data collection. The educational program must assist the professional in identifying the proper data on which to base analysis and plan development. This is the most costly phase and is extremely critical to the quality of the recommendations. There are many university-level courses that can assist the professional public transportation planner; these include statistical courses on regres-

sion, experimental design, and psychometric scaling techniques. In many instances, the educational program is so extensive that a course on each need cannot be taken. On these occasions, newly designed courses combining several needed subjects are taught.

The other phases of the planning process are analysis, forecasting, plan development, evaluation, and implementation. Each of these has its unique educational requirements. Many of these needs are job-specific so that the need is less likely to be satisfied by existing courses unless they are offered in a transportation planning or urban planning curriculum. In the cases of plan evaluation and plan implementation, there do not exist courses in even the more advanced public transportation curricula. The students need assistance in developing and filing the proper grant applications. There are courses generally available in the business college on marketing principles, which are necessary to implement a successful transit operation.

CONCLUSIONS

A distinction was made between demand and need for trained managers. One of the problems in the transit industry is that there is not a demand for trained managers because the industry believes that it cannot afford to hire college-trained managers for middle and upper level management positions. This is not to say that the transit industry does not need college-trained managers.

Seminar participants estimated that transit companies would need approximately 100 college-trained managers per year during the next 15 to 20 years. If the needs of the various levels of government for persons trained in transit management but working in research, planning, and liaison are included, the total number of college-trained persons in public transportation would be approximately 200 per year.

Questions raised were, How can high school graduates be interested in public transit management? How can they be motivated to study to become transit managers.

Decreasing enrollments for freshman engineering students in colleges across the country have been the trend in recent years. The publicity in the press about unemployment of engineers in the defense and aerospace industries has had an adverse effect on freshman enrollments in engineering schools. Also the interest among high school students in ecology and the identification of engineers with the development of products that pollute the environment have not helped to increase an interest among high school students in studying engineering. In general, high school students are not aware of the challenges and opportunities available to them in either engineering colleges or business management colleges that would prepare them for a career in public transportation. High school counselors and math and science teachers will have to be educated so that they may inform the high school sophomores and juniors about these opportunities in public transportation.

The consensus of the group was that a 4-year bachelor's program in either an engineering or a business college within a university would provide the necessary education for potential transit managers. Of the possible 120 semester credit-hours in the program, approximately 20 to 30 hours would be in specific transportation courses (planning, design, operations, management). Additional courses in areas such as labor relations, accounting, public relations, law, marketing, urban planning, sociology, psychology, and political science would also be included to supplement the major in transportation.

Many universities have interdisciplinary degree programs available today where persons interested in public transportation can build an educational program in public transportation that involves them in more than just one college. For example, at Purdue University, a student can enroll in an interdisciplinary engineering department and, with the aid of an adviser, develop an integrated program with a major in public transportation including courses in a number of different schools and colleges (engineering, business, humanities, and social sciences). The student must meet minimum requirements in math, science, and engineering sciences in addition to his or her major and supporting minor areas of study. Upon completion of this program, a bachelor of

science in engineering is given. Similar programs are now possible in many civil engineering departments that have adopted a more flexible curriculum.

A need that exists within the university is the development of public transportation course content material such as course outlines, bibliographies, texts, case studies, and audio-visual materials. The suggestion was made that transit company operators work with university faculty in the development of this material. The transit operator is in a position to know what the problems are in the real world and can pass these on to the university community so that students get the feeling of working with realistic problems. A clearinghouse for curriculum materials was suggested to enable an exchange of information among universities.

The question of financial support for students studying public transportation management at the undergraduate and graduate levels was raised. At the present time most, if not all, support for students in the field of public transportation comes from the federal government through the research and training grants of the Urban Mass Transportation Administration. UMTA has been placing most of the emphasis on the research aspects of the program and wants research results that the transit industry can use. Other research funds in the area of public transportation are very limited, and much of the money goes to research companies. This practice achieves results without the additional benefit of support for undergraduate and graduate students.

If the emphasis is going to be placed on training of transit managers, someone or some organization or organizations, possibly the federal government, are going to have to support the students either through scholarships or through traineeships similar to what the federal government did several years ago in the area of water resources. It does not appear feasible to suppose that transit properties are going to support the college education of future transit managers, especially when most of the properties are financially marginal operations. One possibility would be to provide for co-op job opportunities for students to work alternate semesters for transit properties at salaries high enough for them to pay for their college expenses on the alternate semesters.

During the on-the-job training periods, the student would be rotated from department to department where he or she would be given experience at certain jobs, for example driving a bus in service for a period of 6 to 8 weeks. In other situations or tasks, the student may only be an observer for a shorter period of time. The idea of the program would be to give the student exposure to as many facets of transit as possible. Another possibility is to employ the student just during the summers after he or she has finished the freshman year or selected transit management as a major area of study. Again the student would be rotated from department to department within the transit company.

Another problem discussed involved the lack of interaction between persons who are involved in providing public transportation and the faculty of universities who teach courses and do research in public transportation. In the area of highway engineering there is generally good communication and interaction between the state highway departments and highway engineering faculty. Federal, state, and local highway engineers also interact with university faculty through the many activities of the Highway Research Board. Efforts should be made to establish similar types of communication and interaction between university faculty and persons in the transit industry.

RECOMMENDATIONS

1. Encourage the American Transit Association to form an educational committee (transit property personnel and educators) to address the problem of education of managerial personnel for all areas of public transportation. This committee would set out specific objectives and course requirements and assist in the development of needed text materials.
2. Encourage UMTA to seek personnel for employment who have had transit operating experience.
3. Encourage universities to hire educators who have had transit operating experience or to encourage present faculty to seek transit operating experience through sum-

mer work or sabbatical leaves. The latter would require possibly UMTA financial support plus cooperation of the transit operating agencies. The coordination of the options could also be the responsibility of the previously mentioned committee.

4. Encourage the personnel employed in transit management to publish case studies on operations that would serve to educate others on the state of the art and disseminate more widely the results of demonstration projects.

LEGISLATION SEMINAR

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Legislation is a government act that gives the force of law to a decision on public policy. It can take several forms, including regulation, setting goals, and distributing public money. Through these authoritative expressions of the public interest, legislation can command or encourage appropriate action to help solve public problems such as those in public transportation. The charge to this seminar was to consider the role of legislation (local, state, and federal) in solving various problems in public transportation. The seminar considered general problems, financial problems, operating standards, and marketing.

The seminar considered legislation to be synonymous with implementation. In the course of legislation, a policy is agreed on, as are the constraints under which it is to be implemented. But uncertainty about the contingencies of implementation consistently requires administrative discretion and professional judgment. The intention here is to provide this judgment to help inform the legislative process itself.

GENERAL PROBLEMS

The broadest possible scope of action for legislation was the focus of the seminar. The more narrow set of actions normally governed by regulatory legislation for public transportation received only brief discussion at the outset. The basic powers of regulatory agencies are not able to overcome the current problems of public transportation. Regulation is restrictive in nature, deriving from the notion that private capital, let loose without regulation, will seek after limitless profit and bloodletting competition. Neither of these excesses, when they existed in the past in the case of transit, served the public interest. Thus, while existing transit regulation may have been justified in the past, conditions have changed. Regulation that limits profits is inherently not suited to promoting profit and the increased quality of service that can be provided by a profitable and healthy industry. Also, regulation that inhibits competition also restricts the ability to adapt to changing conditions and to innovate and try new transit services in new ways. Decreased regulation appears to be one action that legislation could accomplish. The objective of such legislation should be to encourage innovation that promotes ridership and service.

The seminar agreed with the prevailing view at the conference that, since private properties were more and more being combined with their public regulatory bodies in one public transit authority, the problems of overregulation are decreasing. In fact, a second area for legislation is how to regulate the now public self-regulating transit authorities.

Accountability of public transit agencies in their expending of public funds is required, without making the compilation and reporting of performance measures so burdensome

that the efficiency of the operating agencies is impaired. Considerable feeling existed among the operating personnel in the seminar that too many levels of review already existed when transit agencies went beyond their own fare boxes for financial resources. On the other hand, the view was eloquently stated that no chance for review by elected officials at various levels circumvented the democratic process.

In general, the specifics of reporting to grant-making agencies at the state and federal levels are generally within the realm of administrators to decide. That is, reporting requirements are governed by administrative law. However, it was felt that administrators should take care not to overstep their jurisdictions and assume that administrative law governs issues that it does not. For example, federal and state agencies may act as comprehensive planners, as opposed to taking a coordinating role, which may be the extent of their statutory responsibility in certain instances. If care is not taken in these matters, there may be specific and not necessarily good legislation to restrict administrators.

The size of the region at which the transit agency should exist was the subject of much discussion (by transit agency is meant the organization that controls the transit service either by directly operating it or by contracting for specific services or both). The dilemma arises over the need for regional control to ensure comprehensive planning and coordination and the need for control at the local level to ensure accountability and maintenance of minority rights. It was generally agreed that the transit operating agency should cover the same geographic area as the transportation planning agency to promote intermodal planning and coordination. This generally means that transit agencies should exist at the metropolitan or regional level. Unfortunately, this size of region does not normally promote accountability to elected officials because there are very few elected regional officials. Transit operating and investment decisions should be related to local and state governments where elected officials exist. This can be done by separating the funding of deficits for local service and regional service. Decisions on the former can be made by locally elected officials and decisions on the latter by regional officials (if any) or state officials. How this could be done is discussed below.

The extreme case of the conflict in relating regional transit authorities to elected officials occurs in urban regions involving more than one state. Such regions may truthfully be considered very difficult territory for a transit authority. Also, regions should not overlook the rights of a minority of the citizens who use transit in a region. Only through local decision-making can the rights of the transit riders, nationally and locally, be protected.

FINANCIAL PROBLEMS

The matter of how to make up deficits incurred by transit operations received much discussion. On the one hand, there were advocates of raising fares or making fares more proportional to transit services used. The latter could be implemented by using zone fares. These proposals would have the effect of funding some or all of current transit deficits out of the fare box at the point of sale. Others in the group felt that transit was a public service and should be funded publicly to promote public welfare objectives, particularly the welfare of current captive transit riders.

One proposal for public funding of transit deficits was that the local communities make up the entire deficits incurred in providing transit service used by their residents. This proposal was found to be controversial by some and unworkable by others because of the difficulty in tracing the residences of the users of the entire regional transit system and to the lumpiness of local taxing jurisdictions. The proposal is equivalent to a user-covers-cost concept, where the user, if not taxed the full cost at the fare box, is taxed at his residential location. This generally promotes economic efficiency goals (i.e., more optimal allocation of resources in response to local needs). It would also progressively tax more affluent residents who happen to live in the lower density parts of cities where transit incurs its highest deficits by the nature of its fixed-route and

-schedule service. Thus, the concept promotes stated welfare objectives of transit by righting what is now an existing perverse redistribution of income through existing property tax assessment formulas and single-fare systems that assess financially strapped inner cities in proportion to their ridership (and thus fare-box) contribution and not in proportion to their deficit contribution.

An improvement over existing property tax deficit funding methods that is consistent with the concept would be to separate the funding of deficits for local and regional service. For local service (bus and feeder bus) where data on the cost of service provided to and used by riders can be relatively easily compiled, the concept could be easily implemented. The "avoidable cost" of the local bus service (the cost that could be saved by its elimination) would be paid by the community served. Localities could decide the extent to which the transit agency (or a private transit contractor) should provide such service. The state or region would continue to bear the overhead cost of the entire transit system. The avoidable cost concept is one that has been much used in railroad regulation.

Express service, particularly when provided by rail rapid transit, is of more regional significance. It is difficult to trace the use of such systems back to residential trip origins because so much travel is within, to, and through the CBD and is heavily related to economic activity (employment). In addition, regional transit service benefits the region as a whole. Deficits incurred in providing such service could be funded by some regional taxes, if they exist, or by state taxes. The state taxes would be channeled into single transportation funds for the region to use to fund transit deficits, if it chooses to do so, in conjunction with local priorities. Nonurban regions of states would likely choose not to allocate a large share of their transportation funds to public transportation.

Reliance for regional transit subsidies on currently overloaded, highly unpopular local property taxes puts transit in a very difficult political position. Separating regional transit service from local transit service for purposes of funding deficits would provide important relief of overburdened local property taxes and would improve the political position of transit generally. The separation of transit services for purposes of funding deficits would also have the effect of promoting accountability to elected officials as noted above. That is, decisions on local service would be made by local elected officials. Decisions on regional service would remain to be made in the generally imperfect way we now operate, namely, by elected state officials with other than just regional concerns or by regional groups of local officials who are individually accountable only to their local constituents.

The consensus of the seminar was that the problem of "mobility" is appropriately national in scope whereas specific investment criteria and priorities should be determined locally according to the situation. The federal role should be to ensure certain minimum standards for mobility, particularly for certain minorities and the poor who are most dependent on public transportation. Legislation might be written to provide only for this limited federal enforcement of mobility standards.

Provision of federal transportation funds to urban areas would be tied to enforcement of such mobility standards. This has similarities to the way the federal government now administers welfare and employment security programs. A single urban fund for transportation or even general revenue sharing would be required. "If we plan as a whole, we should fund as a whole," was a statement supporting this proposal. Public transportation should not be considered and funded separately. It should be considered as one way of providing urban transportation mobility.

These proposals were new to some members of the seminar. In the course of the discussion, many helpful additions and clarifying remarks were made. However, consensus was certainly not achieved in the short time available. The lack of written proposals as a basis for discussion also hindered the development of consensus. The above are thus offered as proposals that could be enacted by legislation, not as the proposals the seminar felt should receive their support as a whole.

The seminar members did agree that legislatures must set policy for continuing transit service. In the larger cities, at least, the operative work is continuing. Annual

appropriations for service at the state, regional, or local level are likely to be inevitable because of the need for accountability to elected officials. However, the legislature must produce the funds promptly in time to meet payrolls. There have recently been problems with the lack of timeliness of such appropriations.

Legislation clearly plays a role in the funding of public transportation. It is an authoritative expression of the public interest relevant to this particular geographically defined problem. The scope of the problem determines the level of government jurisdiction at which legislation is most appropriate. This theme was evident throughout the general discussion. Priorities should be set and public accountability should be placed at that level where planning and policy evaluation are most appropriate. The specific form the legislation should take awaits the action of legislatures, not our group of technicians, as it should be in the democratic process.

ESTABLISHING OPERATING STANDARDS

The seminar agreed that there was no role for legislation in setting fixed operating standards. Appropriate standards, such as seating or loading standards and vehicle productivity, will vary greatly among areas. Local conditions, including existing capital investment, dictate that no uniform levels of transit service can be prescribed in detail at a national or state level. Because transit involves public ownership and operation of the vehicle as contrasted with provision of relatively static facilities for highways, the degrees of freedom by which transit service can vary are far greater than for highways. All this indicates a need for local control by local staff who understand the link between the service impacts of fixed service standards and the costs of providing such standards in a local area. However, incentives for providing good transit service should be included in state and federal funding legislation. Also, the legislature does have a role in setting other performance standards such as minimum safety and pollution standards.

With respect to other actions of producing or supplying transit service, the role of legislation seems to be limited and indirect, concerned for the most part with controlling funding; that is, dollars can be appropriated for development or purchase of more efficient transit vehicles. Labor, capital, and land costs can be affected by tax and labor legislation. Also, the legislature should not pass laws allowing special groups to ride transit free or at reduced cost, for this affects the cost of providing transit service. If such laws are passed in the name, for example, of welfare legislation, then transit agencies should be reimbursed for the additional costs involved, the fare-box revenue lost, and the costs of administering the service. This includes transportation for the poor, handicapped, school children, and aged.

The seminar members agreed that there was indeed a direct federal role of involvement in research, development, and demonstration of new public transportation services and technology. Such a role can involve funding local agencies or direct federal agency involvement. Federal legislation should take the lead in setting objectives and priorities.

MARKETING PUBLIC TRANSPORTATION

The seminar first discussed the assigned topic of marketing transit. Again, the seminar felt the role of legislation was limited. Legislation should allow money to be spent on promotion, but not require it. Its benefits are uncertain! However, legislation can be very important in other ways of influencing use of transit.

First, it can reduce directly the cost of transit use by allowing certain groups (e.g., welfare recipients) to be given monthly passes or some other form of publicly sponsored prepaid use of transit.

Second, legislation can affect the use of transit by improving the quality of the service provided, mostly, however, only by giving money for such purposes as described in the previous section.

Third, transit usage is also directly affected by the service available by automobile. Legislation, particularly local ordinances, can directly affect highway service through imposition of parking taxes and restrictions (e.g., automobile-free zones and limited entry into certain areas). Such restrictions are now actively being considered for several large cities. However, the seminar did not recommend that such restrictions be imposed. We only note the clear cross elasticity of transit demand with respect to such restrictive highway actions.

Fourth, transit usage is affected by changes in residence and work-place locations, and these are in turn affected by land use controls. Zoning legislation at all levels of government can encourage transit use by at least encouraging high-density development along transit lines. Local ordinances can also give incentives to increase development near transit lines by dropping parking space requirements per square foot of floor space (i.e., per employee or resident) for development within so many feet of a bus line or transit station. Ultimately, CBDs well served by transit should have no local ordinances requiring parking spaces to be provided. This would encourage transit use and discourage highway congestion at bottlenecks leading in and out of the CBDs.

CLOSING REMARKS

The seminar recognized that there are many ways legislation can help solve the problems of the transit industry. Legislation potentially governs a wide set of actions indeed. Its actions are limited mainly by the detail with which legislators choose to involve themselves in certain decisions. Policy guidance is desired from legislators, not decisions on specific types of investments and operations at specific locations. However, the need for policy guidance by legislatures is critical both to alleviate current problems in the transit industry and to impose certain structural changes in organization and funding that will anticipate future problems and promote public welfare objectives. Only legislation can make such changes.

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