Highway and Urban Transportation in the 1970's and 1980's
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The opinions and conclusions expressed in this publication are those of the authors and not necessarily those of the Highway Research Board.
Highway and Urban Transportation in the 1970’s and 1980’s

ISBN 0-309-01954-0

Price: $1.60

Available from

Highway Research Board
National Academy of Sciences
2101 Constitution Avenue
Washington, D.C. 20418
In preparation for the celebration of its Fiftieth Anniversary, the Highway Research Board compiled and published a history of its first 50 years of service. In undertaking this rather intensive review of the organization's past, we were reminded of the tremendous change and growth that have occurred during this time in highway-oriented transportation—in the equipment, the facilities, the technology and methodology, the amount of travel, the speed and comfort of travel, and the benefits and problems that have accompanied the provision of mobility to such a large and growing population.

Having reviewed the past, we thought that it would be appropriate during the annual meeting to consider what the future prospects are. To look ahead 50 years is obviously impossible, even for some of our most gifted experts. Therefore, we asked three prominent and competent professionals to look ahead only 10 years and then 20 years and to set forth their realistic views of what transportation will be like then. We asked them to consider the known present and likely future desires and demands of the public, the social and economic constraints, potential funding for transportation activities, technological developments available now or expected in the near future, and lead times necessary for major changes either institutional or technological.

Charles Zwick chaired the panel and also concerned himself with the allocation of national resources and the emphasis that is likely to be placed on transportation vis-à-vis other major national issues such as national defense, housing, poverty, crime, and education. Francis C. Turner gave his views on the likely physical transportation plant of the near future and on the prospects for automation and for highway-oriented and other forms of public transportation. He discussed safety of the systems and trends and relationships of highways with society, government, and other institutions. Paul Ylvisaker discussed transportation in an urban environment and gave particular attention to the expected social and economic constraints. He emphasized the close ties between transportation systems and the form of community development and singled out housing as perhaps the key issue of the coming decades. Turner and Ylvisaker disagreed on the ability of society to continue to support the trend toward urban sprawl. Turner believes that people want and will have private homes; Ylvisaker feels that society cannot tolerate the negative aspects of the resultant suburbia.

The panel discussion provided the thoughtful views of real authorities that should serve as solid information for serious students of national and urban problems.

—W. N. Carey, Jr.
Introduction

The assignment given to members of the panel was to forecast the evolution of today's highway-oriented transportation system and, in doing so, to lay bare the assumptions made about the factors affecting that evolution. Panelists were asked to give their prognosis of the change in technology and the demand for transportation services and the limits or constraints that will be placed on these by considerations such as aesthetics, pollution in its broadest sense, and the availability of funds to support the growth of transportation.

A major constraint in the charge to this panel was that we should be, above all, realistic. There is something about forecasting future transportation that brings about a desire to be exotic. Traditionally, magazines and Sunday supplements like to describe, usually with futuristic drawings, exotic new systems that are supposed to propel us into a whole new era in which transportation is presumably going to be instantaneous, without unpleasantness of any kind, and therefore, I guess, free.

One reason that I was delighted to participate in this discussion was a desire to learn more about the important and complex problems in this area. I think there is little doubt that real progress has been made in our understanding of the forces that shape our transportation system. I believe it is also fair to say that the more we define particular relationships, the more we realize how complex this system really is. Of course, this recognition of our lack of understanding provides the fascination for continued efforts of research workers.

As a budget director and now as president of one of Florida's largest banking institutions, I have continued to be impressed by the financial implications of transportation requirements. Transportation systems in general and highway systems in particular require large capital expenditures. Since the mid-1950's, the growth in expenditures for transportation have kept pace with the growth in the Gross National Product and the growth in the federal budget. The question is whether this growth will continue, or what will be the effect of a number of strong and conflicting forces in terms of budget allocations during the next 2 decades.

As we look beyond this decade into the 1980's, the uncertainties naturally increase. I think we can, however, talk in meaningful terms about a time interval 10 to 20 years from now. That is to say nothing more than that during the next 2 decades the range of possible changes in technology, on the one hand, and the demands of society, on the other, will be heavily conditioned by the situation as it exists today. I am not sure whether it was prudence or average age of those who developed this program, undoubtedly a combination of both were involved, but we were not asked to speculate on the last decade in this century. Therefore, we will leave it to more intrepid or younger experts to speculate on the situation as we leave the twentieth century.

—Charles Zwick
FRANCIS C. TURNER
Federal Highway Administrator
U. S. Department of Transportation

FRANCIS C. TURNER was born in Texas and received his civil engineering degree from Texas A&M University. He started his professional career with the U.S. Bureau of Public Roads as a junior highway engineer, and since that time he has served continuously in various capacities throughout the United States and in Canada, the Yukon, the Northwest Territories, and the Philippines.

He was a member of the task force established in 1967 to set up the U.S. Department of Transportation. Earlier that year he was appointed director of the Bureau of Public Roads by President Johnson. In 1969 he was appointed to his present post as Federal Highway Administrator by President Nixon.

Mr. Turner is a Registered Professional Engineer in the State of Texas and is a member of the American Society of Civil Engineers, American Association of State Highway Officials, Society of American Military Engineers, American Road Builders' Association, Highway Research Board, and many other semiprofessional and official groups in the road-building fraternity.

To set forth realistically what transportation is likely to be 10 and 20 years into the future is not a new or special task for highway engineers and administrators. This is exactly what we do every day on every project that we undertake, and we start about 30 or 40 projects every working day. By law, we are required to design all interstate projects for the type and volume of traffic that is forecast to use the project 20 years from the time construction begins. Moreover, a 6- to 10-year and sometimes longer lead time between programming the project and beginning the construction compels us to be realistic in forecasting specific dimensions and numbers for more than 20 years into the future.

Although the law specifically requires it only for interstate projects, the same procedure is customarily followed in all federal-aid projects. For a number of years, we have made 20-year or longer forecasts of highway needs in response to congressional directives as well as in support of our own responsibilities for general management of highway programs in this country. Characteristically, then, by the exercise of appropriate administrative leadership in the profession, we have been regularly doing exactly what this panel was asked to do.

In making forecasts, we have had to consider many things. What will be the shape of the urban areas? How will land be used in both urban and rural areas? How can the transportation objective best be interwoven with the attainment of other objectives of society? How will people want to travel and where, when, and in what volumes? At what rate will new technology provide other options to them? What will be their capability to fund the indicated needs, and what will be their willingness to do so? What will be the trend in vehicle design? What will be the performance characteristics of
new vehicles? How can we organize to attain the types and the quantity of highways that are finally determined to be needed? Indeed this is a large order, but it is exactly what the highway administrator is faced with every day. Looking into the future, therefore, is not a new experience; he is always doing it.

Being realistic, we do not rule out the possibility of revolutionary developments in transportation technology, although these may be unforeseen now. Even revolutionary breakthroughs in transportation knowledge are almost certain to be evolutionary in their development and application. This was true of railroads, motor vehicles, and airplanes. Transportation is an enormous industry, and heavy investments in money and time are necessary to bring about even small evolutionary changes. We can be almost certain, then, that the foreseeable requirements for highway facilities in the 1970's and 1980's will not be seriously altered by technological developments in other modes. Within the highway mode itself, the vehicle is most susceptible to change, but it takes more than a decade to phase in technical innovations in the rolling stock. That stock today numbers more than a hundred million vehicles.

Widespread change in the physical highway plant is even more difficult to achieve. Less than half of the nation's 3.7 million miles of roads and streets are classified as paved. Roughly half of the paved mileage is on the federal-aid system, which we have been building and rebuilding for more than a half a century. Since 1956, when we launched the accelerated federal-aid program, federal-aid projects have involved only about one-third of the total federal-aid system. In other words, it takes about 40 years just to go around the cycle one time.

Many projects to be built or completed in the decade of the 70's are already in the plan or design stage because the lead time is 8 to 10 years on urban projects and 4 to 8 years on major rural projects. As a result, I think there will be little outward change in the physical design of highways before 1980. This does not mean that we discourage innovation or that we are standing still. We do need to cope with the growing challenges of transportation in this country through innovation, but we need to be aware of the practical obstacles to any fast and sweeping changes in our transportation system or, for that matter, in any other parts of our society. To be realistic, we must start with what people want of the transportation system rather than what public officials think is the most efficient system in terms of dollars expended. It is apparent that people want the nearly infinite flexibility of the automobile and highway network that permits each individual to program his own movement rather than to be forced to conform to some rigid schedule of time and routing that may suit some of his trip needs but will not suit all or even a majority of them. People also want to control the places where they live and the circumstances under which they will raise their families. A majority of people have shown a preference for living in the typical spread development in suburban areas.

To some transportation experts, this sprawl type of arrangement is very inefficient. However, they measure efficiency only in terms of dollars expended for transportation, while the urban sprawler uses an entirely different set of numerators and denominators in which the factors are his personal desires as to how he wants to live. In calculating efficiency, he includes in his formula a whole series of plus and minus factors in both the numerator and the denominator as he makes trade-offs for this or that feature.

To argue, therefore, as some critics do, that the automobile-highway system is responsible for suburban sprawl is beside the point. The real point is that motor vehicle transportation has greatly expanded choices available to individuals for developing land into various uses that range from houses to hamburger stands. It is this exercise of individual choice, within some restraints set by public policy, that has brought about the pattern of development on the edges of cities. In a free society, we should hardly expect otherwise. To Americans, generally, this is what America is all about, and this is why they rightly think it is the best country in the world.
Certainly other factors are also involved in suburban land development, such as economic incentive and encouragement from various public policies. I am convinced, however, that the primary factor is individual preference and particularly the desire of a great majority for private homes with a little green around them and private transportation by automobiles. Coupled with this, of course, is the financial ability of large numbers of people to realize and achieve these preferences.

In their appraisal of the transportation desires of the public, highway administrators are supported by an impressive collection of facts—facts about the actions of individuals collectively measured by traffic flow counts, facts about individual travel preferences and practices gathered from tens of millions of personal interviews, facts about land use that determines transportation, and facts about public attitude.

We need to be rather clear eyed about suburbanization and the transportation demands associated with it because this is where the action is. During the past quarter of a century, almost the entire net growth in population occurred in the expanding suburbs. At the same time, the central cities decreased in average population density and, in some cases, in absolute numbers of residents. By 1990, we expect the population of urban areas to grow by 40 to 50 percent, and it seems altogether likely that this growth will continue along the present pattern of spread development. I can see nothing to reverse this pattern short of a fundamental shift in public policy, which would certainly require rather general public approval. Because it is hard to see how such a reversal could be accomplished without eliminating or reducing the choices available to individuals with regard either to personal mobility or to housing preferences or both, it is hard to see how such a reversal could win voluntary acceptance. In fact, housing authorities are now forecasting a further swing to single-family housing as a result of the life cycle and desires of many new families being founded.

Spread development, as we now know it, is characterized not only by low or average population densities but also by dispersal of many urban activities once concentrated in the central cities. These include commercial, industrial, educational, cultural, and recreational activities. This also means dispersal for employment and travel as well. No longer are the majority of transportation lines in urban areas to and from the central city. In fact, this travel is now only a small fraction of the total, about 5 to 15 percent. This fact is also the most important and elemental piece of information often overlooked or disbelieved by those who glibly talk about the urban transportation problem.

The result for transportation is that, in urban areas today, from 85 to 95 percent of all person trips take place outside the central business district. They are spread throughout the urban areas simply because of the wide dispersal of origins and destinations and the great variety of trip purposes. They are dependent almost entirely on highways, primarily by the private automobile with some supplementary assistance from buses and other public transit modes. Certainly none but highway modes could begin to handle most of these trips within the next 20 years. Nor could any other mode handle the enormously diverse and large volume of movement of goods and services that are essential to the life and vitality of urban areas.

The continuation of spread development, therefore, will create huge demands for highway transportation in the 1970's and 1980's. Given an urban population increase of about 50 percent by 1990, we can expect an urban travel increase of about 75 percent or more.

Even though urban areas account for 70 to 80 percent of the population, they account for only part of the demand for highway transportation. There are also rural and intercity transportation demands for both passengers and goods movement, and these demands too are met by heavy reliance on highways.

These, then, are the real demands to which the highway program must respond in the 1970's and 1980's. I have dwelled at length on the spread-development concept because it is what shapes transportation. We must understand it in order to prepare for the
future and to make forecasts for what it will be like. We can conclude, therefore, that, while all modes will be substantially upgraded and expanded to keep pace with national growth, highways, because of their personalized transportation aspects, will continue to be the dominant transportation mode for the movement of people and goods except for the long haul of passengers that will be by air and the long haul and medium haul of heavy freight that certainly will continue to be by rail.

Precisely because highways are the dominant mode and the only mode that ties all the other modes together, they must play the key role as we strive to coordinate the transportation system and achieve an overall transportation policy. The highway program has, in fact, been a pioneering effort in this coordination through sponsorship of the comprehensive and continuing urban transportation planning process that is now operating in every urban area in the nation. Because most of the interaction among modes actually takes place in the urban area, the urban transportation planning process provides the basic data essential to the coordination and planning for all modes.

Although much progress has been made during the past decade or so in this activity, we can look for continued improvement, refinement, and more effectiveness in this total transportation planning endeavor during the 1970's and 1980's, especially if planning assistance from the other modes can be channeled into the organizations that are already carrying on this basic, comprehensive highway planning function. The greatest immediate challenge to the intermodal planning and to the highway program lies in what most people refer to as the urban transportation crisis, that is, the daily morning and evening rush-hour movement. This is actually, however, a relatively minor portion of total urban travel, comprising not more than 15 percent of total urban-area trips.

Nevertheless, it is a problem, separate and distinct to a large degree from the other urban transportation needs, and a problem that we must resolve. The immediate practical solution to this problem is to increase the people-moving efficiency, sometimes referred to as productivity, of the existing urban highway system by using higher capacity vehicles (which translates, certainly, into buses) and by making better use of the back seats and the right side of the front seat of most passenger automobiles that are now lightly loaded.

Because buses can make use of existing and planned urban highways, the material increase in the use of bus transit can be accommodated without the heavy capital outlays that would be needed to provide some totally new system and that would strain financial resources and capabilities. Such a goal can also be achieved in the very near future—within 2, 3, or 4 years, rather than 15, 25, or 30 years into the future. Buses on highways, therefore, offer the only realistic and immediate answer to the need for improved public transportation in almost all urban areas, and this is going to continue to hold true through the 1970's and into the 1980's.

Fortunately, we obtained during the past year new legislation that is needed to make this kind of a solution work. First, the Urban Mass Transportation Assistance Act contains the authority to assist in acquisition of transit vehicles and their servicing facilities. Second, the Federal-Aid Highway Act of 1970 contains authority to construct the required roadway facilities and many other necessary appurtenances. The two acts, in combination, are complementary to each other. It is my opinion that they will essentially meet the vast majority of center-city transportation needs both immediately and 20 years from now. I am convinced that we will look back on this 1970 legislation as a landmark in the development of modern urban transit, just as we now look back on the 1956 Federal-Aid Highway Act with its program for interstate system construction as a landmark in highway development.

In addition to increased uses of buses to cope with the downtown congestion problem, I believe we can expect other measures to be adopted such as placing greater emphasis on car pools, using the unused back and right-front seats that I mentioned, and instituting staggered work hours or even staggered workdays and workweeks (and I suspect, in some cases, even staggered months as well). There will probably be some vertical separation of pedestrians from automobile traffic in the downtown areas by putting side-
wals on a second-floor level or underground in a few limited cases, such as in Mon-
treal and New York. There will also be time separation of commercial vehicles using
streets to deliver and pickup at stores in the central business district. These mea-
sures, simple in themselves, will improve vehicle and pedestrian flow and produce
substantial relief from present congestion and safety hazards.

Most cities, however, will not see much increase in volumes of rush-hour traffic to
and from the central business district because the center-city work force will not be
growing at a rate parallel to that in the remainder of the urban area. Because most
of the growth will occur in suburban areas and in medium-sized cities, there will be
little increase in the need for additional major transportation arteries into the central
business district beyond those now planned or under construction. This situation will
obtain for highways and freeways as well as for rail and other public transit lines.

In the future there will be better coordination under the auspices of the U.S. Depart-
ment of Transportation in such areas as the development of airports and their access
facilities in relationship with other modes of transportation. We will be considering
ways to coordinate heavy-freight movements between trucks and available railroad fa-
cilities to reduce the number of highway vehicles and heavy axle-load passages in order
to possibly increase traffic safety, present roadway lane capacity, and the life of the
roadbeds and structures while at the same time increasing railroad revenues without
increasing total transportation costs. We also will be considering the possibility of
increased use of rail to carry passengers making medium-length trips to reduce con-
gestion on highways, in airways, and at airports. Congestion relief is particularly
desirable for some air services such as the Washington-New York-Boston air shuttle
service.

In a number of cities, we will be exploring the possibilities of consolidating railroad
trackage and terminal facilities to permit abandonment. Some currently used rights-
of-way could then be made available for improvement as public transit arteries for
either rail or bus transit and, thus, reduce rail taxation burdens and operating costs
and permit the construction of needed transit facilities or new roadways without major
displacement of people.

Highway program administrators will be active partners in community development.
Our overall transportation planning process will be broadened to encompass even more
of the community goals and objectives and to bring citizens into the planning process,
if means can be found to make their contributions useful and effective. It is gratifying
that, at its Fiftieth Annual Meeting, the Highway Research Board devoted an entire day
to consideration of the problem of more citizen participation and how it might be ef-
effectively accomplished.

Environmental factors will be spread throughout the total planning and development
processes from the very beginning and will be properly weighed in relation to other
factors.

Housing and relocation provisions in the highway program already provide a positive
commitment to alleviate any adverse impact on citizens who must be relocated to pro-
vide the transportation facilities that are needed for total societal goals. In fact, our
authority now permits and has already brought about considerable upgrading of the
housing of many low-income families that have been displaced by the highway program.
This concern for social objectives and the well-being of individuals will increasingly
characterize the highway program of the future. It indicates a direction in which high-
way research should be heading—toward greater emphasis on the human rather than on
the material or the technical side, although the latter will still be needed.

On the operational side, we are dealing with people, and it is this aspect of our assign-
ment that is most difficult to plan and design for. On the technical side, we will have
more electronic gadgetry of all kinds to vastly increase our engineering capability and
to improve the end product.
Highway design will not change radically by 1990 in its visible aspects. Reconstruction, mostly the addition of lanes and resurfacing will have occurred on a considerable mileage of the present interstate routes as a result of normal traffic growth and required heavy maintenance. I think there will be some limited application in both vehicles and roadways of automation and other glamorized items such as dual mode. There will be substantial gains in the capability of signaling to and communicating with drivers by audio means to increase safety, volume of flow, and the overall efficiency of the present highway and street network.

There will be major improvements in highway safety through better roads, drivers, and vehicles, as we force the pace of the evolutionary process I mentioned earlier. We are today receiving substantial benefits from safety improvements made recently to the highway plant, and we will see even greater emphasis on safety in the future. Vehicles, like highways, probably will not change radically in outward appearance, but they will have improved crashworthiness, increased reliability, simplified maintenance, and, I hope, substantially decreased or no engine emissions that pollute the air.

The attention being devoted to safety and pollution reflects a concern for people and for the quality of life in the United States. The inclusion of a broad range of social responsibilities in the highway program, together with the transportation responsibilities, implies a major commitment of resources and makes adequate funding a necessity. I believe financing will continue to lean toward general user charges because of their demonstrated success, but these may possibly be supplemented by general funds, for example, some form of a readiness-to-serve charge. Administration of the highway program will continue to be reasonably similar to the present administration through the federal-state relationship. However, counties and metropolitan areas, or their equivalents under some other kind of a name, will increase, especially as area-wide planning, public works, and service agencies; these could have an important role in urban transportation and development planning in the future.

The highway of the 1970's and 1980's, I believe, will outwardly look much like the present ones, but the planning and administrative processes by which these highways are produced will focus substantially increased attention on the social and environmental factors. The lack of outward change certainly does not imply any shortage of technological development or capability. Rather, we will shift our emphasis toward the intangible factors related to the humanities.

People will continue to rely heavily and principally on the personalized mode of transportation because this is what they want. It will best serve their needs, and they can afford it. I do not visualize this country without automobiles or their equivalent, whether they are called by that name or not. Therefore, we had better learn how best we can live with rather than without the automobile, the truck, the bus, the highway, and the street network. The points of social and humanitarian emphasis in the highway field will be the same as those in other transportation modes, so that what we learn and use for highways can be equally applicable to other modes without the need for duplicative research. In this regard, we should encourage cooperative research programs, such as those of the Highway Research Board; and, in doing so, we will supply our abundant capability and resources to others as well as to ourselves with little or no additional cost to the public.

I believe we in highway transportation are already the leaders in these areas. I suggest that we broaden our interest sufficiently to cover the similar needs of our other modal neighbors. We fully recognize that the provision of highway transportation is for the purpose of helping communities, from the neighborhood to the nation, to meet their goals and objectives. That also is our goal. As understanding of how to establish community goals and of how transportation can aid in achieving those goals advances, our efforts toward meeting our goal will become increasingly more effective. We must never forget that mobility is itself a community goal, perhaps more important than any other single goal. We can never accept that our concern or the concern
of society is for transportation only without regard for other community goals. Our concern must be for transportation in relation to these other community goals.

To me, the future looks bright for a better America that, I believe, will be immensely aided by our efforts in the highway field. I am an optimist in this. I think the future of America is intimately tied in with the things that we are doing and that it will be better than the past, whether yesterday, 50 years ago, or 100 years ago.
PAUL YLVISAKER was born in St. Paul, Minnesota, and received his doctoral degree from Harvard University. For 7 years, he was a member of the faculty of Swarthmore College in Pennsylvania. His experience in urban affairs began in 1954 when he became executive secretary to the mayor of Philadelphia and was continued later when he served as commissioner of the New Jersey Department of Community Affairs.

In 1955 he joined the Ford Foundation to direct its public affairs programs. He became the director of the foundation in 1956 and served in that post until 1967. During his professional career, Mr. Ylvisaker has been appointed to several governmental commissions, both foreign and national, and has served in several visiting professorships.

At present he is Professor of Public Affairs and Urban Planning in the Woodrow Wilson School of Public and International Affairs, Princeton University.

Although I must disagree somewhat with Mr. Turner, I do so with a great deal of respect for the man and for the position that in essence he has taken. If anybody would have to prove his case, I would have to. History and technology are with his prognosis that there will not be major changes in the transportation landscape of this country in the next 20 years. Take technology first. Charlie Zwick and his colleagues at Rand taught me 12 years ago, that the lead-time development of any new or exotic form of transportation is easily 10 to 20 years. Therefore, I do not think that one can contradict easily the proposition that transportation modes and mix will remain roughly the same for that period of time.

Also, I think, history pretty well shows that, during the past 50 years, even the past 10, in which we have had rapid social changes, certain basic things like modes of transportation do persist. If one is going to be realistic, one does not easily indulge in science fiction. Nor does one easily indulge in social criticism, telling someone who has to build highways that he is socially obsolete and that he is going to have to mend his ways if he survives.

The facts are that when one deals with reality, with legislatures, with legislators who must be elected and re-elected by a real and not a fantasized public, and with the hard questions of how to get people to work or really to accommodate the diverse demands of a family for transportation, one does end up pretty much with, at best, an incremental change in the present system.

There is something gnawing in me, however, as I read Mr. Turner's talk before and listened to it again—something gnawing at the same part of me that would have given the same speech. It is feeling down deep that perhaps this speech is a bit like one that
would have been given in the 1920's by a railroad man who ignored the automobile, or in the 1950's by a mayor who talked about physical renewal of his city and never mentioned the word "Negro." Something is missing; somebody has his eyes closed.

If we are going to work in a complex system, and that is indeed what we are in with a vengeance these days, we have to think about those "other things"—the reciprocals, the mutuals, the backlashes, the reverse twists, the reverberations, and all the other factors as they impinge on us and as we impinge on them. We ignore those things at our peril, in both action and prophecy. The point at issue is not so much the remaining strength of highway and automobile as the growing strength of countervailing forces and contrary reactions in the system. More and more people are going to have to internalize within their own spheres of action a concern and a calculus of the things that are going on outside. The changes highway administrators will have to contend with will not originate in their own bailiwick. They are going to come as a reaction and a response to the things on the outside.

If you were to read Mr. Turner's talk again very carefully, you would discover that, in spite of some general words about social planning, social consequences, and the rest, he assumes that the nation will continue as is—with its central cities in trouble and swiftly moving toward bankruptcy. Newark is there already; others are soon to follow. By Mr. Turner's projection, we would still have the ghetto and vast differences in the economic conditions between central city and suburb.

He also assumes, implicitly, that citizens will act by leave of the highway builders rather than on their own agenda and initiative. Nothing is said about the growing shortage of housing and the rising public temper about it. No mention is made of the problems of automobile insurance and the accumulating bill that the policyholder is stuck with or, for that matter, of the whole back-breaking cost to society of living with the automobile. From his silence, one would assume that we had also solved all international problems and had not had to face the competition of nations who, with less land space, may yet choose public transportation as their economic base rather than the automobile, which then becomes an international dinosaur.

These are big questions to leave unanswered. Again, history and technology will argue that in spite of these externalities there is such a vast consumer demand and momentum that present trends will persevere. That nagging part of me, however, wants to address those externalities rather than assuming them away.

The love affair of the American with his automobile may never stop. However, his love affair with what goes with that automobile—its increasing cost, the problems of getting and paying for insurance, the fact that 50,000 people still die every year on the roads, the fact that it gets him into conditions and constraints that he cannot extricate himself from, the fact that it does not solve his housing problem—these "other things" are beginning to be weighed in his balance, and he is capable now of asking those questions before and not only after going out and buying the car.

Let me make another more subtle argument. Even if the half of me that "wrote" Mr. Turner's speech is right and we continue to be a nation of cars and highways, we will be better off if we internalize the costs and concerns that we characteristically allow to grow and fester as externalities. Economically, it makes much more sense if you draw into your accounting the true costs of your operations. It is also better from the point of view of mental health. Doing so cuts away at our social escapism and schizophrenia.

Let me take some of these outside concerns one by one. The main problem of the 1970's in terms of hardware is going to be housing. The nation's housing shortage is of crisis proportions. This present Administration, if it is unseated by anything beyond Vietnam and economic slowdowns, will be defeated because of its failure to solve the housing problem. It has not bit the bullet. The controversy between George Romney and the rest of the Administration has shown that the national government is not ready, like governments in other civilized nations, to take on the national responsibil-
ity for providing or ensuring adequate shelter. The only way to solve the housing problem, given the numbers involved, is to go into large-scale development, and this means having the power to take over large areas of land and systematically to plan whole communities rather than isolated housing projects. This means changing a tradition that has long been with us of local control over land use.

We have come to the point where we can no longer continue to be a society essentially of single-family homes; the costs of such housing is becoming prohibitive. We will be moving probably simultaneously in 2 directions. One will be to apartment buildings, a trend already obvious. In my state of New Jersey, as in most urban regions, multi-family construction in recent years is accounting for most of the new housing units coming onto the market.

The second direction is toward the mobile home. I would predict that, because the national and state governments have been so slow and delinquent in taking on their housing responsibilities, we will probably see an explosive growth in mobile home development. That will lead to further sprawl, and sprawl with a vengeance. One can already see it in the South, the Southwest, and the West. We have been able to resist it in New Jersey, but we cannot do so for very long. About 90 percent of all single-family housing costing less than $17,000 now is accounted for by mobile homes; 400,000 units were produced last year. As one goes South and West, one sees this kind of housing sprawled over every part of the environment.

If government will not accept its housing responsibility and if mobile homes become the dominant type of American housing of the future, this does mean more automotive transportation. Such a sudden explosive increase in highway needs, however, may be far beyond the system's financing capacity. So the mobile home will not easily let us escape from a complex system. We are bound to see the reverberations come zinging back from other costs it will incur: sloppy zoning, sloppy utility development, and the highway costs that accompany it.

The multiple-family home and planned-unit development are probably more desirable, but this pattern is going to be extremely difficult to work out in the short run. To the degree we work it out and to the degree multiple homes and higher density living become the pattern of urban development as it has historically been for most of man, then the role of the automobile becomes more questionable. I am not going to adopt the romanticism of the European-oriented planner of the nineteenth century who thought that if you build high-density communities you will not need the automobile. On the contrary, when one visits the high-density communities of Europe, one discovers that not only do they have public transit but they are still stuck with the automobile. This does indicate, however, that the transportation planner and the highway administrator will have to contend at the growing margin with a new mix of community development problems symbolized by the movement toward new towns and planned-unit developments. We will not see as much as we have seen in the past when the Federal Housing Administration and private developers suddenly spawned housing here, there, and everywhere. There will instead be concerted efforts to bring the transportation planner into a team situation that will focus on more balanced development.

The 1970's will see another kind of controversy and crisis. The dominant element in the economy has changed from manufacturing to services. The new power structure and the new power struggles that are emerging are in the service sector. We have perfected mass production, distribution, and consumption in the manufacturing sector, and we have kept a rather stable price level.

Services in this country are not so well organized. They are still medieval and monopolistic in their traditions; guilds and unions control the production of services. Service costs are rising faster than the general price level by a factor of a third. The battles are looming. How will one get delivery of health services? It means practically a revolution in the health industry, the fastest growing industry in the United States. How are we going to get legal services spread out among the population as they should be? As we urbanize, law becomes essential in everyday life and more
important to the lower income than to the higher income. The legal fraternity, however, is only slowly accommodating to a mass market. Engineering, philanthropy, the arts, day-care, and all the other services are now in trouble. They do not cater to the mass market; they are self-regulated, and they are slow to accommodate.

The confrontations of the 1960's and 1970's are concerned with the service sector. We watched the blacks in the early 1960's take on the service sector, particularly the governmental services of health, education, police, and welfare, saying that they were not structured to deal with consumers having low incomes but free choice. Then the students took on the educational establishment, saying that education is not organized as it should be. Nader was next to move on the service economy, with his exposes of bureaucratic foibles. Pressure is mounting on the medical profession to rationalize health services.

We are going to be relieved to a degree by this shift of pressures toward the doctors, the dentists, the plumbers, and all the rest who are now being confronted by a new populist movement. This new populism is going to demand eventually a mix of services equally and easily accessible to the average person who sees a basket of services like health, law, day-care, and education as necessary to quality of life in the city.

The communities of the future will have to be service-oriented. Transportation planners will have to think simultaneously about locating people and locating services. This may or may not pull away from the automobile. I think, to a degree, it will because it begins to amass functions rather than to spread them out, as they have been in the past.

Consumerism will force other chances. Planners will have to contend with it regularly in every plan that they draw up. They will not get away with tokenism; public participation will be for real, and it will be rugged. Of course, those of you in highway transportation are used to that; if anybody has been toughened up in the past 20 years by citizen participation and rowdy hearings, you people have. My hat is off to you for the cool with which you have taken it. You have now begun to discover, however, that there is a much longer checklist of considerations and complaints to which you are vulnerable as the system grows and complicates. That checklist is as long as the one a 747 pilot has to go through at take-off. You will have to answer questions such as whose culture are your highways going through, not just whose home; how will replacement housing be built, not just who is to be relocated; have you increased a citizen's access to a whole mix of services, not just sped his journey to work.

I want to say a little bit more about race. Clearly, you are going to encounter more of the minorities and their concerns in the suburbs. Suburban zoning is under attack along a very wide front, and it looks as though that attack is going to be successful, at least in the courts. In New Jersey, Justice Hall of the State Supreme Court just this last year said that, because housing is now at such a critical state of need, a housing project has the same standing as churches and schools and, therefore, presumably gets favored treatment for zoning variances. The zoning "game" is also under attack in the federal courts, and I would expect suburban exclusion will be outlawed during this decade. You will then be dealing with a different constituency. Even before that time, blacks and mayors of central cities will be appearing at suburban hearings and challenging plans and presumptions that formerly went unquestioned. All this points toward a mobility of the population, socially and legally, that we have not had to contend with before.

Another set of constraints will flow from the public's growing concern with the environment; clearly, that adds to the intricacy of the checklist. Also, it will show, I think, the rate at which technology is going to be pouring its produce into our system. The effect will in one way reinforce Mr. Turner's projection of the status quo. Technological innovations, leading away from what we have, may come more slowly; but the increasing surveillance by environmentalist is far more likely to center on highways and the automobile, forcing some major changes in the way highway people do business.
The competition for resources, I expect, is going to increase and accentuate until the year 2000 and beyond. I am not an optimist. I think we have gone through our period of affluence and that, had Joseph been interpreting the dreams of our President, he would have told us back in 1945 that we would go through a period of the fat cows and then a long period of the lean. Unfortunately, we were not listening to a Joseph at that time, and we have in many ways squandered our resources during a period of affluence that we may now see was short-lived.

Even if affluence were to continue, however, rising aspirations and swarming choices will weigh heavily on our resources forcing a competition for housing as against health, as against education, as against the arts, as against travel, as against assistance for foreign nations. The competition among advanced nations for internal capital is going to be extremely rough. In short, we may or may not find it possible to continue at presumed rates of highway and automobile spending.

My last point has to do with mental health. In order to play out the scenario that Mr. Turner has written for the next 20 years, we will have to keep our emotional balance; and keeping one's emotional balance in a growingly complex system will not be all that easy. What is happening in this society right now? People are on the verge of losing their emotional cool. One can see the signs in the rapid exit of people in public office. Mayors in the last 5 years who have left office voluntarily are an ominous number. Even worse is the rate at which voters are now speeding up the exit of public officials, if they will not go voluntarily. It seems that now in the United States we are coming to a one-term presidency. Presidents begin calculating in the second or third year of their first term whether they can possibly make it a second time round and end up deciding they cannot.

This kind of mood is really overcoming us. I was with a taxicab driver in New York the other day, and he said, "That guy Lindsay must have holes in his head. Why would a man voluntarily take on a job where he knows that even if I understand what he's trying to do, I hate him. You know, he doesn't have a chance for my support because, statistically, inside of six months, he'll be making decisions which will be against me, even when he's right. And so, I'm going to vote him out, you know. I think it better if he'd stood at home."

Another person, a philosopher, echoed this same sentiment: "I now understand why the Roman Empire fell apart at its height. It got so complicated that the best citizens couldn't take it anymore, and they began checking out."

How do you solve that one? How do you counter that mood? This, I guess, is the most subtle point that I will make, but the most important one. It is not by avoiding the accumulating complexity of our times; it is by moving into the center of it, taking on directly those gnawing concerns that troubled me as I read Mr. Turner's straight-line projection of a simpler past.
The charge given to me as a panel member was to look at transportation developments as one of the broad issues facing the nation and to answer questions such as, What part will transportation play vis-à-vis national defense, housing, the attack on poverty and crime, and other national issues? Should and will transportation continue to account for roughly 20 percent of the Gross National Product and why? This charge is obviously so broad that whatever I say can be fairly included within it. I will attempt to answer some of the questions but obviously not all. As an economist by training, I like to look at the demand and supply aspects of a problem. Therefore, I will first comment on the demand, or requirement side, and then on the supply, or the constraint side, of transportation growth during the next 2 decades.

As our nation continues to grow and become more wealthy, there will inevitably be a corresponding increase in the demand for transportation services. I cannot present here a complete theory of development, but the trends, I think, are clear and, in fact, dominant. With regard to goods and materiel movement, simple observation confirms that we will continue to integrate spatially our productive activities. In economic terms, we will continue to substitute a relatively cheap factor of production, transportation, for other more expensive factors. The rapid growth of international organizations carrying out production in many places throughout this world, I would argue, is only the top of an iceberg underlying a broad-based reorganization of the world’s productive activities. This trend will continue during the next 2 decades. I forecast this trend with high confidence even though we are now going through a period in which the specter of increased protectionism is raising its ugly head. In the end, the iceberg is too big and too fundamental to be subverted by a few who find that their private, comfortable positions are threatened.

With regard to the movement of people, I see the same growth in demand. Mobility is a highly desired commodity. As people become wealthier (and they will become wealthier), the demand for transportation will continue to rise. The transportation system must be able to meet this demand if we are to continue to enjoy the benefits of increased mobility.

As a panel member, I have been asked to consider the role of transportation in the national defense. The role of transportation in national defense is significant, but it is not the only consideration. There are many other factors that must be taken into account when planning for transportation in the future.

The future of transportation is uncertain. There are many factors that could affect the growth of the transportation system in the next 2 decades. Some of these factors include increased protectionism, changes in the economy, and the development of new technologies.

In conclusion, the role of transportation in the national defense is significant, but it is not the only consideration. The future of transportation is uncertain, but I am confident that the transportation system will continue to grow and meet the demands of the nation.
thier at an impressive rate over the next 2 decades) they will demand increased mo-
bility and, equally important, a higher quality of transportation services because it is
also true that privacy, safety, comfort, and flexibility are also income-elastic com-
modities. In brief, people will have more time available and higher incomes; they will,
therefore, demand increased quantities of transportation services. The mix of per-
sonal transportation services will continue to evolve in the direction of higher quality
services.

The first set of constraints is the technological potential. There will be real and im-
portant technological advancements, but I do not foresee that great breakthrough that
is going to bring us into a new era of dramatically increased mobility. The underlying
laws of physics are too immutable to expect that, notwithstanding futuristic drawings
or our most fond wishes. It takes energy to cause movement, and the transformation
of energy, as we were taught in Physics I, has side effects that get us rapidly into dol-
lar costs, on the one hand, and various potentials for pollution, on the other. In the
end, there will always be a question of choice. Are we willing to pay the price in terms
of dollars and side effects for a given transportation service? We were also taught
this simple principle in one of our first courses, Economics I.

We will continue during the next 2 decades to make progress on individual transporta-
tion components, but I feel that the really significant advancements will come from
new combinations of power and control systems with containers, rights-of-way, and
storage facilities. In short, by using new combinations of existing transportation com-
ponents, we can increase utilization of existing facilities and thereby free resources
and make money available to help solve problems of side effects.

Technology, while continuing to make progress, will also continue to be a real re-
straint on the growth of transportation during the next 2 decades. I commend to you
the area of system integration as one which holds great promise. Better utilization of
rights-of-way and more innovative and flexible combinations of containers and power
systems could make significant improvements. The transportation system has high,
fixed costs, and anything we can do to better utilize the system reduces average cost
or makes the system more efficient.

A second constraining set of forces is what I call a side-effects problem. I believe it
is obvious that any activity as big and as pervasive as is the current and prospective
transportation system of this country will have major impacts on the environment and
social order. It is also obvious that, because this is so, transportation systems will
be alternately blamed as being the source of all the problems of the late twentieth cen-
tury society or praised as being a solution to any problem, be it balance of payments
deficit or the role of the family as a moral force in an affluent society.

Both views are, of course, absurd. Between these two extremes, however, there is
a lot of room for blame and praise. An important first principle, I believe, is to be
realistic and accept this fact. The days have gone when those involved in the transpor-
tation activities of the nation can casually say that their job is to provide transporta-
tion systems, and it is someone else's responsibility to deal with the amorphous and
pervasive side effects. Review any major newspaper in a metropolitan area, and
chances are that you will find several important political debates concerning trans-
portation issues. In Congress, it is the SST, in Washington it is the Three Sisters
Bridge, and in Miami it is the jetport.

It is clear that in the future more attention will have to be paid to muting or eliminating
some of the undesirable side effects of transportation systems. It is also clear that
we cannot eliminate the problem of side effects by simply prohibiting transportation
systems or by eliminating economic growth as some of my more extreme friends would
argue. Economic growth and increased mobility give us the potential to do so many
socially desirable things; to argue that we should stop their development is, to me, the
height of poor judgment.
Once we recognize that there are benefits and costs in any important decision, and this is clearly the case in most transportation decisions, we are in a position to start working toward an acceptable solution. These solutions will not be easy, and the first step will require all individuals on all sides to give up their unnegotiable demands. In the end, a modern society can and will blend competing objectives into an overall public policy posture. We have solved tougher problems in the past, and I am enough of an optimist to believe that there is no lack of intellectual ability to solve these problems.

My prediction in this complex and important area, then, is that side-effect problems resulting from the movement of goods and services will become more important, more complex, and more central to the work of those involved in transportation.

A third restraint is the money needed to pay for these increased transportation services and where it will come from. Let me start this discussion with a point that is as basic as the physical laws that prohibit one grand technological solution to our transportation problem: You and I are going to pay for these new and grand transportation systems, either directly or indirectly through governmental expenditures. The only way to avoid this harsh reality is to try to shift the burden to someone else. Much of the debate on transportation financing goes to this issue of who is going to pay. Because we know that it is going to involve a great amount of money, we expend a great deal of effort attempting to shift the burden to someone else—anyone else.

I will defer, for a moment, the question of public expenditures and focus on private expenditures by individuals. Here, budget studies confirm what we expect from our own personal experience. As income goes up, there seems to be a proportionate increase in expenditures on transportation services. Will this continue in the future? My forecast is that it will. Let me elaborate on this point. First, transportation expenditures will not become an increasing proportion of one's budget as one's income goes up. There are just too many other claimants on the increase to make that a realistic option. In economic jargon, the income elasticity is close to one.

Second, and implicit in my earlier remarks, is that some of the costs now transferred or shifted to others will be directly charged to the users of transportation services so that, in a real sense, a doubling of transportation expenditures will not lead to a doubling of consumption of transportation services. Therefore, as a consumer, do not look for relief from the transportation portion of your budget as your income goes up. If you spend 20 percent of your income on transportation now, you will probably still be spending 20 percent of it on transportation services 10 or 20 years from now.

Notwithstanding this forecast, however, you will not necessarily share proportionately in these expenditures as income grows. Some of the increased expenditure is going to be absorbed in muting or eliminating some of the undesirable side effects of transportation systems. Today, these costs either have not been faced or have been shifted to some other expenditure category.

Since the mid-1950's, the federal expenditures on transportation have kept pace with the growth in Gross National Product and also the growth of the federal budget. The issue is whether this trend will continue during the next 2 decades. My forecast is that it will, but, again, this forecast is subject to several important qualifications.

First, the reclassification issue that I mentioned earlier will be involved. More and more of the expenditures to mute or eliminate the side effects of transportation systems will be borne by federal programs labeled as transportation programs. Therefore, even if transportation programs maintain their proportion of the total federal budget, as I believe they will, it does not mean that federal expenditures on transportation services as we now define them will double when the budget of the federal government is doubled.

Is this reclassification desirable? To the extent that the costs are directly related to transportation function, I believe it is. To the extent that transportation programs are used to accomplish other objectives, I question it. For example, should the transportation function be used to provide subsidy payments to particular elements in so-
ciety, such as the old and the poor? I think our analysis of public policy and the resulting programs undertaken would be more clear-headed, more rational, and more productive if these subsidy payments to particular segments of the population were clearly identified as such. It might then be possible to think of alternative techniques such as direct income supplements to accomplish the same objective more directly and efficiently. On balance, I would guess that more charges will be made to the transportation component of the budget than will be subtracted from it. Although the transportation proportion of the federal budget will remain a relatively constant percentage of the total, it will, in fact, not represent a proportionate increase in transportation expenditures as we understand them today.

A second qualification pertains to an uneasiness I feel about my forecast and concerns the increased costs and competition for scarce federal funds. This increased competition has been intensified over the last decade, and I forecast that it will continue to intensify during the next 2 decades. The nation's desire for increased public services has run ahead of the current tax system's ability to generate revenues. This imbalance between the desire for services and the ability to pay has led and will continue to lead to a more intense debate among the advocates of the particular programs. We have created a group of clients who will be effective opponents to the transportation interests for any increase in the federal budget.

In the late 1950's and early 1960's, the main concern was about fiscal drag (that is, a tendency for the federal tax system to generate more revenue than we could find useful public programs for); now the situation is completely reversed. Therefore, my forecast is that increased expenditures for transportation by the federal government will face stiffer competition than they have in the past. I still believe that the growth in expenditures will occur but with greater difficulty than it did in the past.

Let me summarize with four points. First, the future growth in the demand for transportation services looks very large indeed. Both underlying production considerations and the desires for mobility of the increasingly wealthy society underpin this forecast. Second, any force as big, as pervasive, and as important as transportation is and promises to continue to be cannot escape responsibility for the side effects of its activities. In the future, these considerations will become more central whether we like it or not.

Third, an important area for growth in transportation systems is innovative combinations of transportation components that increase the utilization of the existing facilities. Transportation systems have high fixed-costs, and anything we can do to increase utilization will lower average cost and, therefore, be an important contribution.

Fourth, in regard to this question of utilization, perhaps one of the most important things all of us can do is to work for reform in the current regulatory environment of this country. If you look at the regulatory environment as we approach the end of the twentieth century, you find first, that, it was conceived in the nineteenth century and, second, that, it is one of the major inhibiting forces to proper utilization of transportation facilities. This, I think, is recognized generally but not publicly discussed because it is politically unattractive. I live in a regulated industry, and one does not talk about one's own regulators. However, I think the time has come when all of us, if we are going to be serious about improved utilization of transportation resources, must face up to this problem. Perhaps the best way to say it is that, if we can get into the twenty-first century without a nineteenth century regulatory system, we will have made important progress.
Closures

Francis C. Turner

I respectfully disagree with Mr. Ylvisaker's rather pessimistic view of many of the things that face us. I agree that we have tremendous problems. I do not know the solutions to them. We have had big problems in the past, however, and we have solved them. I am confident that we will find solutions even to these difficult problems.

As public officials, we have a responsibility to lead the public and at the same time to follow its wishes. More and more, the philosophy of government today is to follow the wishes of the public rather than to lead the public. The general attitude that seems to pervade much of the discussion that we read in the press, that we hear over the communication media, or that was presented by members of this panel seems to imply that those in transportation planning, particularly in the highway field, do not consider anything except highways and the economics of highways and do not consider any of these allied goals and objectives of society. I respectfully disagree with that.

The major increase in costs in the highway program in the past few years that everybody is concerned about is due to the inclusion of many of these items that we agree are proper items to be charged to the highway program. All of these things that are defined as social objectives and that ought to be considered as a part of the total planning of highways should certainly be included in the work that we are doing at the present time. I think we have been doing a great deal of it all the time. I do not think of anything else that we could really do in this area that we are not already doing. I think the problem is that we have not gotten the message across to most people so that they are aware that we are following this total planning approach.

Mr. Ylvisaker mentioned that the movement of people to the suburbs has caused the central cities to decay, decline, to lose their vitality, and so forth. Well, I guess my comment on that is, So what? What is so holy about the central city as we have seen it in the past? Maybe it deserves to go through a change of life. I think maybe there are some changes occurring in the format of cities that will improve living conditions for people in the future.

Mr. Ylvisaker said that the man in the ghetto is being left in the ghetto. My comment to that is that he, too, does not want to be preserved in his status quo. He also wants to be a part of the flight to the suburbs. That is his goal in life, and the laws, the court decisions, and the acceptance of the change in philosophy in our way of life, such as integration and all of these things, make it possible for him to achieve that today. We have open housing; it is the law of the land. Therefore, the man from the ghetto who wants to get to the suburbs has the same opportunity as anybody else; he now has the opportunity that he did not have before. You can be sure that he is going to exercise that opportunity and that he is going to want to move to the suburbs just exactly like everybody else is doing. We ought to help him to do that. I think that our highway program is doing it. I think all of our activities, our philosophy, and our approach to life in general are contributing to that.
We talk about the love affair of the individual with the automobile. The individual is not in love with the automobile as a machine so much as he is in love with the personal mobility that it provides for him; that is what he wants. That is what he gets from the automobile, and that is the reason he likes it. Even before the automobile was invented, the individual wanted personal mobility too, and he got it by owning a horse. It was his prized possession, and the greatest crime was to steal a horse. That indicates the value that people have always put on personal transportation. It is not the vehicle that the individual really loves; nor is it the mode that provides the transportation. It is rather the capability of having personal mobility. I still maintain that that is one of the most important desires and goals of the individual.

Housing is a problem. One of the biggest problems that faces our country is the re-housing of people, and we are going to find a solution to it. I submit, however, that housing, to the average individual, does not consist solely of four walls and a floor and a roof. That is not really what the individual wants. He wants a house, four walls, a roof, and a floor with some greenery around it—his own greenery. He wants some open space. He wants his share of the open space under his own hand around his own house. He does not want it to be a part of a common green somewhere else.

I believe we are going to see a revival of medium- and small-sized towns. I believe this is likely to be one of our major national goals and policies in the near future. If that be true, then we will not be faced with this great problem of more intense land use that economics requires in large urban areas. Some of the greatest problems are in large urban areas. We should be promoting and encouraging reverse migration to build up the small- and the medium-sized cities by planning industrial, residential, and other development in these places.

Group housing, which may be efficient in itself, is not what people want. Europe grew up with that. If you have traveled in Europe, you have seen the clusters of houses in a community in which there is a communal type of living. But I do not believe the average American wants this. Efficiency to him does not necessarily mean the best arrangement of housing and services and transportation; it means the maximum attainment of the goals that he has for his personal way of life. I believe that includes something other than the communal-group-condominium type of housing.

I continue to be optimistic. I believe America is on the move upward.

Paul Ylvisaker

I want to say for the record that I am optimistic indeed because some of the problems I described in problematic terms are really corrective forces that are emerging in the system to stop some of the nonsense that has gone on up till now. I believe that a system is healthy when action coming from one of its sections is immediately confronted by the reactions touched off in the others. This is a confrontation that we are seeing: a healthy confrontation with the highway system, which for a long time managed to go without facing its consequences and its reactions. I am an optimist, too, for the reasons that are causing the managers of the highway subsystem to have to contend with the logic and exigencies of the larger social system.

There are some statements, however, that I cannot let stand. It is not true that the people left in the central cities have an equal chance to get out and find suburban housing. That is nonsense, given the income, racial, and zoning "game" restrictions that are all too real and abundantly documented. Come to Newark, Camden, Philadelphia, Boston, Annapolis, or any other city, and I will identify for you—if you incredibly happen to have missed them—those people who do not have an equal chance to move out to that suburban housing. Meanwhile, in the past 10 or 15 years, the effects of highway construction in the central cities have been to reduce the housing supply available to
these people. My job in Newark was to get on the streets amid 13,000 rounds of ammunition and to explain to people that they should stay with the system that had taken their only housing and left them no options whatsoever. On this point, I feel extremely strong; and I am glad the confrontation has occurred because it will force us to use our ingenuity, and I am optimistic about that ingenuity.

I frankly would recommend that we give the housing responsibility to the transportation departments. That would force them to deal directly with what they have too long and easily ignored.
THE NATIONAL ACADEMY OF SCIENCES is a private, honorary organization of more than 700 scientists and engineers elected on the basis of outstanding contributions to knowledge. Established by a Congressional Act of Incorporation signed by Abraham Lincoln on March 3, 1863, and supported by private and public funds, the Academy works to further science and its use for the general welfare by bringing together the most qualified individuals to deal with scientific and technological problems of broad significance.

Under the terms of its Congressional charter, the Academy is also called upon to act as an official—yet independent—adviser to the Federal Government in any matter of science and technology. This provision accounts for the close ties that have always existed between the Academy and the Government, although the Academy is not a governmental agency and its activities are not limited to those on behalf of the Government.

The NATIONAL ACADEMY OF ENGINEERING was established on December 5, 1964. On that date the Council of the National Academy of Sciences, under the authority of its Act of Incorporation, adopted Articles of Organization bringing the National Academy of Engineering into being, independent and autonomous in its organization and the election of its members, and closely coordinated with the National Academy of Sciences in its advisory activities. The two Academies join in the furtherance of science and engineering and share the responsibility of advising the Federal Government, upon request, on any subject of science or technology.

The NATIONAL RESEARCH COUNCIL was organized as an agency of the National Academy of Sciences in 1916, at the request of President Wilson, to enable the broad community of U.S. scientists and engineers to associate their efforts with the limited membership of the Academy in service to science and the nation. Its members, who receive their appointments from the President of the National Academy of Sciences, are drawn from academic, industrial, and government organizations throughout the country. The National Research Council serves both Academies in the discharge of their responsibilities.

Supported by private and public contributions, grants, and contracts, and voluntary contributions of time and effort by several thousand of the nation’s leading scientists and engineers, the Academies and their Research Council thus work to serve the national interest, to foster the sound development of science and engineering, and to promote their effective application for the benefit of society.

The DIVISION OF ENGINEERING is one of the eight major Divisions into which the National Research Council is organized for the conduct of its work. Its membership includes representatives of the nation’s leading technical societies as well as a number of members-at-large. Its Chairman is appointed by the Council of the Academy of Sciences upon nomination by the Council of the Academy of Engineering.

The HIGHWAY RESEARCH BOARD, an agency of the Division of Engineering, was established November 11, 1920, as a cooperative organization of the highway technologists of America operating under the auspices of the National Research Council and with the support of the several highway departments; the Bureau of Public Roads, and many other organizations interested in the development of transportation. The purpose of the Board is to advance knowledge concerning the nature and performance of transportation systems, through the stimulation of research and dissemination of information derived therefrom.