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Publication Date

1969-06-01

Peer reviewed

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

"On Strategies for Transport Planning"

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Working Paper No. 100

Discussion draft, prepared for the Exploratory Meeting on The Urban Transportation Planning Process, Organisation for Economic Cooperation and Development, Paris, June 30-July 2, 1969.

I

Transportation is surely the most researched, the most debated, and among the best financed of the city's systems. And yet, we scarcely know what we are trying to accomplish when we build transport facilities.

It's only recently that we've had to ask questions about our purposes. For a long time, transportation problems were understood to be rather straightforward inefficiencies in the city's mechanical plant. The task of dealing with those problems could be confidently assigned to engineers, for they had an array of ready technical solutions to apply: Roads could be built or improved; traffic-control systems could be installed; or new transit routes could be initiated. The test for efficiency was adequate channel capacity to handle the manifested or predicted flows of vehicles or travelers. The ideal state was congestion-free traffic. Thus, the transport planning task was to identify the most-overloaded links in the transport network and then to apply those public works and those control procedures that would facilitate free flow of vehicles and/or persons.

By now that conception has been virtually abandoned. It is now 15 years since Mitchell and Rapkin published their seminal book, Urban Traffic: A Function of Land Use,¹ and since the Detroit Area Transportation Study demonstrated the empirical validities of those propositions. It is now 10 years since the Penn-Jersey Transportation Study set out to test the reciprocal proposition--that land use is a function of transportation. By now we have been through an unprecedented wave of metropolitan transportation research throughout the world. Aimed at supplying firm bases for rational expansion of transport systems, the research was directed to revealing empirical regularities in traffic patterns and land-use patterns

and to exposing their mutual causations. We now know a great deal about travel habits, urban spatial structure, the dynamics of traffic flow, geometric design, and so on. We have built simulation models that predict some of these characteristics with tolerable adequacy. We now have hand-book procedures for applying the models, and cadres of persons skilled in their application. Metropolitan transportation planning should now have become a work-a-day, routinized process. And yet there is a growing sense of inadequacy within the transportation planning professions. Despite the extensive empirical findings and the elaborate technical apparatus, it's only the narrowly technocratic transport planner who any longer claims expertise in this field.

Three mutually reinforcing conceptions have been contributing to the erosion of our senses of competence and confidence; in the face of rising public protest to specific route alignments, they are contributing to a growing sense of ineptitude and frustration. The first is the realization that transport, per se, is intrinsically valueless--that transport facilities and travel have value only insofar as they contribute, instrumentally, to the accomplishment of non-transport ends. Second, the accumulating research findings are dramatizing the long-sensed fact that transportation facilities are integral subsystems within the larger city systems and that personal travel and goods shipment are inextricably bound up in the workings of modern societal systems. Third, the popular opposition to specific project proposals is making it unavoidably clear that the external costs and benefits of transport developments fall unequally upon the various subcommunities they touch.

It is true enough that transportation systems (and their own subsystems) can be viewed as smaller wholes within the larger complex. The professionalization and departmentalization of transport-specific tasks are clear manifestations of that view. Within that conceptual envelope and those divisions of labor, we can indeed continue to focus upon transportation facilities as discrete artifacts and upon transportation services as unitary functions. By further modifications in the road-and-rail networks, we can affect the flows of vehicles and thus influence levels of traffic congestion. We can modify the modal mix, and thus differentiate the types of transport services supplied. We undoubtedly will further improve the geometric design of highways and thus improve the safety characteristics of the system. And so on.

But we are now becoming so sensitized to the external effects of transport-specific decisions that we are all finding it increasingly difficult to play the roles of subsystem specialists. Now that we have been taught to think as planners--i.e., spontaneously to trace out the waves of repercussions emanating from our profession-specific actions, to hypothesize and then appraise alternative courses of action, to search for the larger-systemic consequences of what we do--we are finding that transportation planning is inseparable from city-system planning and from societal-system planning.

It is commonly understood, for example, that the mutual causations linking transport routes, travel behavior, land-use patterns, and rents are so interlaced that a decision with respect to any one is thereby also a decision with respect to each of the others. It is this set of relationships that have been most intensively studied during the past decade--

and-a-half, and it is here where our competence for inter-system planning, however limited, may nonetheless be greatest. But even if those limitations were removed, such that we could confidently say what policies and actions with respect to these four variables would be mutually reinforcing, in some hypothetically perfect way, we still would face the same dilemma. Coordinated land use and transportation arrangements would then comprise but a somewhat larger subsystem which is also intrinsically valueless. We shall still have to ask what it is we are trying to accomplish--how plans for this set might best contribute, instrumentally, to the accomplishment of our larger aims.

With the intellectual and methodological equipment at hand, the transportation-land-use planner is poorly equipped to respond to questions about large-system goals and about the instrumental contributions of his special brand of public actions. Now that he has come to appreciate the interdependencies that inhere in complex systems, he has become alert to the fact that an optimal design for a subsystem may be quite incompatible with the aims for the next-larger ones. He thus finds himself locked in a doorless room--damned, if, by suboptimizing for transport, he successfully performs the mission formally assigned to him; condemned, if he sticks to his professional task and fails to assume the larger mission that he is not equipped to pursue.

The dilemma I point to is, of course, not peculiar to the transportation planner.² Professionals in every line of work are locked in similar rooms, each isolated from the other, each wanting desperately to communicate with others, each seeking a joint alliance for the pursuit of common aim.

II.

The professions have adopted a number of strategies for avoiding the dilemma attached to suboptimization.

1. By far the most common is the application of profession-defined "standards." These are service-quality levels, set to accord with what are called "needs." As I have described these concepts elsewhere,³ needs are decreed by each professional group, as absolutist, mandatory conditions of adequacy. As absolutes, they are intrinsically valuable; hence they cannot be traded one against the other. As ends that are valued in themselves, they need not serve other ends-in-view. Thus some minimum qualities of education or health or transport or nutrition or housing are judged to be necessary to the public welfare, and professionals equipped to supply these are to be left alone to provide them, preferably at least cost.

2. A somewhat less autocratic, but similar, strategy is frequently employed which specifies levels of service to be provided as requisite to the accomplishment of externally specified goals. Thus, if nonprofessional policy-makers can be explicit about the particular conditions of welfare they seek, professional suppliers can then provide the instrumental inputs. Based upon empirical or theoretic findings concerning cause-and-effect relationships, professionals can sometimes say what "requirements" are called for to meet the conditions being sought. So, for example, if legislators can say what levels of safety are desired, highway engineers can design intersections and traffic-control measures that might reduce accidents to the target levels. Or if legislators can

say what minimum levels of infectious disease they find tolerable, public health professionals can install those preventive and treatment procedures that are required to reduce illnesses to desired levels. These professional inputs are all in the nature of conditional requirements—the levels and types of service supplied are conditional upon the objectives to be attained.

This strategy for supplying public services has an apparent advantage over the first, for it places responsibility for goal-setting in the political arena where professional biases are likely to be somewhat mitigated. (I shall leave unattended the problem of making this strategy work. It is sufficient here to note that politicians are seldom powerful enough to stand up before the professed expertise of the professionals. When they do resign their authority to technical expertise, Strategy Two frequently becomes operationally indistinguishable from Strategy One.)

3. A third approach has been popular among American transportation planners; and, despite differences in national styles of governance, it is now being diffused to transportation planners in Europe. The Americans have long avoided the suboptimization dilemma by invoking the doctrine of consumer sovereignty. Adopting the traditional posture of private suppliers of goods and services, they have thus been able to ignore the questions of large-system optimality: they simply supply transport commodities in the types and quantities that the market demands. The huge highway-building program in America is therefore largely based upon refined methods of market research. Origin-destination studies and traffic counts are the most popular of these, of course; but they have been

supplemented by elaborate techniques for forecasting future demand for automobiles, future trips, and future demand for transport facilities. Highway planners argue (rightly, I believe) that Americans love automobiles because they are instruments for enhancing personal freedom. They contend it is not within their professional prerogatives to say whether people should use motorcars, whether they should travel, or where they should go. Their task is only to furnish free and mobile citizens with the means for going where they wish to go, safely, at reasonable speeds, and along direct routes.

Their strategy has been remarkably successful. Americans have willingly paid high user-taxes for road-building purposes, thus reconfirming their preferences for auto-mobility with their votes, each time they buy gasoline. As one result, the flow of construction funds has been commensurate with expressed demand; and new roads have been supplied in sensitive response to consumers' manifest wants. It may be that within the setting of the American political-economy, no other governmentally supplied commodity or service is more sensitive and responsive to citizens' preference.

Of course, high per capita income in America has made possible the high rates of auto-ownership and the high personal capacity to buy the highway facilities. No European nation yet has the fiscal capacity to purchase as extensive an auto-highway system as the Americans'. But the differentials are narrowing rapidly. Most Western Europeans are now receiving per capita incomes commensurate with those the Americans were earning in the immediate post-War years when auto-usage rates began to skyrocket. The first-round expression is the phenomenal rise in auto

ownership in all the OECD nations, an undeniable manifestation of the universality of the motorcar's attractiveness. The Flats, Minis, and Volkswagens that are flooding the streets of European cities must soon be accommodated by new and improved urban roadways. As personal incomes rise further, it is nearly certain that Europeans will be as eager to expend the necessary construction funds as the Americans have. But the Europeans have a very major advantage over the Americans. With the auto tsunami coming some decades after it hit North America, the Europeans are in a position to avoid the mistakes the Americans have made.

When the road-building program gathered momentum in America, it in turn generated and abetted waves of external effects that were intended by neither the consumers nor the suppliers of roads. The most-noted effects attached to the spatial dispersion and spatial reorganization of the metropolitan settlements. The causal spiral is familiar to all observers of American metropolitan growth, and I need not recount the reciprocal effects that have induced rapid erosion of public-transit service, suburbanization of the white-middle-class populations, ghettoization of the old central cities, spatial redistribution of employers, and, in the context of the new ecology, racial redistribution of employment opportunities.

My purpose, rather, is to suggest that, however satisfactory the auto-highway option has been for individual consumers, each making an atomistic choice at a given moment in time and at a given location, the cumulative effects have not necessarily been the most efficacious ones—either for individual consumers, for some classes of consumers, or for the larger societal collectivity. It appears that the market strategy has indeed been a successful way of reducing oligarchic rule by a professional

elite, but it does not appear to have avoided the suboptimization dilemma. Millions of rational, atomistic decisions and actions with respect to transportation have not necessarily yielded either the most desirable summary effects within the transportation subsystems or the most desirable external effects in the larger system of which transport is but a part.

The most obvious example within the transport sector attaches to the growing problems of air and noise pollution. Noxious emissions from individual vehicles are harmless; the problems arise only when the numbers of individuals get counted in the millions. Similarly, the modal choice for the motorcar is inconsequential until choosers get numbered in the millions. Then the cumulative, large-system effects on public-transit service redound to the disadvantage of nearly everyone. Externally, a few motorcars in the streets of the great cities of Europe don't really matter very much. When the numbers become large, the subtle qualities of the cities are rapidly eroded, to the loss of residents and visiting admirers as well.

Surely there are very few persons who would deliberately choose smog or would willingly provoke the deterioration of a Florence, Italy. Those large-scale consequences are part of no-one's personal calculus of choice. His individualistic decisions are necessarily made within an ecology of circumstances that he cannot directly influence. And so he is forced to trade-off personal wants against collective ills. In net, most of those who have chosen the auto-highway mode of travel have experienced tremendous personal benefits. Those Americans who have simultaneously elected suburban houses and the style-of-life that goes with them have unquestionably profited greatly. For them, the benefit/cost ratios are

very much higher than they would have been in the absence of the auto-suburb option. But they would be higher still if they were not thereby also denied other goods they desire--the quiet streets, the clean air, the pleasant urban settings.

For others, the benefit/cost ratio is unquestionably negative. Carless persons are worse-off for the rise of the auto-highway transport system, because the deterioration of public-transit service has meant a reduction in their mobility. Those who are incapable of driving cars (the young, the elderly, and the infirm) are being increasingly handicapped by the new metropolitan ecology and the new transportation system. Those who are too poor to own cars find their mobility similarly impeded. That is to say, the distributional consequences of the automobile system have fallen very unevenly upon the various segments of the urban population. While it is certainly true that the majority of urbanites have profited immensely, others have been severely hurt.

It would thus appear that the market-approach to transportation planning has avoided many of the hazards that have traditionally attached to the first strategy I mentioned, that in which professional groups determine standards for quality and quantity of goods and services to be supplied. It has been more sensitive to consumer wants than even the second strategy promises, for it relies on direct feedback of information on consumer preferences, rather than on judgments of elected representatives. It has nonetheless failed to deal with the suboptimization dilemma. Moreover, contemporary transportation planning has yet to find an effective way of dealing with either the internal or the external redistributional effects of its activities.

Transportation planning has been focused explicitly and exclusively on the transport subsystem. By adopting the market approach, transportation planners have been able to avoid explication of instrumental goals. Operating within the bounds of a limited charter, they have then said that they'd supply whatever transport facilities the customers want. Any external consequences were then to become someone else's business. They have thus dealt with the suboptimization dilemma and the distributional consequences by ignoring them.

III

We are therefore in search of a different strategy for transportation planning. The need for an alternate is particularly pressing in the Western European nations. The combination of democratic governments and rising disposable incomes has already released the flood tide of automobiles, and the crest of the tide is approaching very rapidly.

Professor Julius Margolis at Stanford University has suggested that his most sensitive indicator of democracy is the number of automobiles in use. Nations that are sensitive to citizen wants are the quickest to respond to them. At this time in history citizens of every nation place a family car near the top of their private wish-lists. Sovereign consumers can claim their personal vehicles; others can be denied them by governmental decree.

In the setting of the European democracies, there can be no question of the choices that citizens, and hence their governments, are making. Judging from the North American and Australian experience, there can be no question about the scale of auto use that is imminent or of the scale of highway construction consumers will demand. The open question we must confront, therefore, is whether the sum of atomistic choices that Europeans make

must lead to the large-system effects experienced elsewhere.

The American cities were hastily built to accomodate the industrialization of the past century, and there was little there that commanded people's affections. The cities of Europe are the product of a much longer and different history and with many of them, a meticulous design care. It would be a pity indeed, if the shift in transport mode should also mean the demolition of large segments of them.

With Margolis and with the highway engineers, I urge that we begin our search for a new strategy by accepting personal transportation as a high-valued good. The sacrifices consumers make in acquiring motor cars suggest that they must be very important to them. I suppose that cars satisfy some sorts of deep-seated psychological wants, whether as symbols of status, masculinity, sexual prowess, courage, or any of the other virtues motivation researchers have attributed to them.⁴ But they do more. By permitting door-to-door, no-wait, no-transfer, flexible-routing, comfortable, and, above all, private transportation service, they are clearly superior to all other modes in those respects. None other comes close. The greatest deficiency is their high cost, but affluent consumers are obviously prepared to pay those costs. Persons who have discretionary use of motorcars experience a degree of personal freedom to move about that is clearly among the most highly valued attributes of modern life. Opportunities for employment or for participation in nonwork activities can be exploited even when distance costs by other modes might otherwise be deterrents. But probably as important as any incentive, the motorcar seems to engender a sense of personal freedom, of personal mobility, that is that mark of our time.

If these attributes of auto-ownership and -usage are valid, we would surely wish so to plan our future transport systems as to foster them and then to extend them to everyone. To be sure, some of the attributes I mention have little to do with transporting, i.e., with moving people and goods. Some (for example, the use of cars as symbols of status or personality) have little to do with conducting the transactional business of societies, and that, after all, is the central function of transport links. But I suggest they are nonetheless real and nonetheless important for that. They are by now adjunct functions of our transportation system, just as the symbolic meanings of painted chariots and engraved coaches were in other days.

I noted at the outset that all transportation facilities and services have value only insofar as they contribute, instrumentally, to the accomplishment of nontransportation purposes. So conceived, transportation services and travel can be only inputs into the operations of the systems they serve; they are never outputs.⁵

Viewed from the perspective of producers, roadways, airports, transit lines, sea ports, and the rest are built in large part because the business of complex urban economies demand interchange of goods between establishments at different locations. That simple fact has been well understood for centuries; nations have always invested in costly transport facilities because economic development has been understood to depend upon trade. The rationale for persons movement has been less clear, however; and that is partly why we've been relying on consumers' market expressions rather than upon explicitly stated developmental goals.

But the transport inputs to economic development probably have an equally valid parallel for human development. Persons in complex urban

societies also rely upon interchange with others. Most obvious, of course, is the need for interchange between employers and employees; and so, most urban-highway planning is specifically oriented to serving commuters traveling between home places and work places. But the desires for interaction are far more extensive than that. People come to the large metropolitan settlements in the first place only because the opportunities for establishing and maintaining contacts with widely diverse arrays of other persons and establishments is easier and less costly there. The metropolis is, in effect, a massive communications switchboard through which contacts are maintained between friends, buyers and sellers, servants and served, helpers and helped. Within that switchboard, the communications and transportation systems comprise the channels through which links between interacting partners are joined. The transportation system, whatever its modal characteristics, is thus a vital medium through which the interdependencies of complex urban societies get satisfied-- through which societal integration is accomplished.

I suggest that the central function that urban transportation systems perform for individuals is to provide access to opportunities. There are surely other outputs from transportation investments; but increasing access to opportunities for employment, for participation in cultural activities, for meeting one's friends, for sheer enjoyment of leisure time, etc. are paramount. By reducing the costs of overcoming space, improved transport opens the number of locales at which one may find engagement in activities of interest to him. Surely, that is why autos have become so phenomenally popular. They provide far greater geographic accessibility than any other mode of movement yet extant.

Surely, geographic accessibility is not the only, probably not even the most important means for gaining access to opportunity. At least equally

important are social, cognitive, and occupational skills; social rank; wealth; and motivation. In this respect, then, public policy aimed at expanding access to opportunity must invest in an array of programs, each directed to lowering barriers that presently limit options for individuals and groups.

A governmental strategy, aimed at improving human welfare by expanding individuals' accessibilities, must employ a spectrum of programmatic approaches in concert. Any modern strategy would be directed to improving educational opportunities, fostering positive mental and physical health, expanding the national and regional economies, improving the quality of the communications media, expanding the transportation networks and extending transport services to those presently excluded, raising family-income levels, expanding the range of housing choices, fostering diversity in the ranges of consumer goods offered for distribution, and more. Transport is clearly but one of many inputs into such a strategy.

The level of expenditure and the operational design of each program must be determined against the criterion of effectiveness: the test must assess how effectively each program element contributes to the ends being sought. A rational investment policy calls for the design of explicit measurements of payoffs, such that productivity of each programmatic input can be appraised against all others and such that marginal costs and marginal rates of return can be compared.

If governmental investors knew, first, what they are trying to accomplish, and, second, if they could measure their outputs as well as they now measure their inputs, they'd be far more capable of investing wisely. These are very stringent conditions, of course. It is not at all clear which of these two conditions will be most difficult to meet.

Transport planners have probably been even less explicit about the goals they seek to serve than have suppliers of other governmental goods or

services. Having adopted the adaptive strategy of responding to market demand, they have not had to verbalize about the goals their product would serve. Despite the very large literature in the urban transportation field, we still lack a clear agenda of purposes. A number of commentators have recently been bold enough to suggest rosters of goals or criteria, however, suggesting that the growing discussion may soon enlighten our transport planning procedures. I shall not attempt a catalogue of my own here, but with the aim of fueling a discussion at our Paris meeting, I shall attach several as an appendix to these comments.

Because we have lacked explicit statements of goals, we have also lacked measures of output that might serve as indices of progress toward those goals. The closest highway engineers have come to performance measures is number of miles of highway built (which is an input measure, of course, and tells us only how hard engineers have been working) and to measures of traffic congestion. The traditional presupposition has been that congestion is bad, hence that indices recording reductions of congestion signal positive gains. But, as Hans Blumenfeld suggested in a recent OECD report, the signals may have been read backwards. As he put it, "It may be said that we have a traffic problem not because our means of transportation are bad, but because they are good."⁶ The workings of Say's Law seem to assure continuing traffic congestion in a manner reminiscent of Parkinson's Law: traffic expands to fill the space available to it. Thus if Blumenfeld is right, we may have a perverse output-measure of transport effectiveness, reading the scale of traffic congestion as an index of travel mobility.

Following his lead, we may be able to concoct other such indices of output from transport investments. Lengthening travel distances for commuters may be another such perverse indicator of success. Similarly, lengthening distances between partners to friendships and houses to shops would indicate

the degrees to which interactional integration may occur over distances, as consequences of improved geographic accessibility. I have already suggested per capita ratios of auto-usage as another positive index of transport improvement. Still other possible output indicators come to mind: total number of vehicular trips per capita per week; numbers of week-end trips to recreation areas; indeed, numbers of vehicular trips that are themselves of a recreational sort, such as teen-agers' "cruising," family "motoring," and street-car sight-seeing. In addition we should be able to construct statistical indices of passenger safety and degrees of privacy, both positively valued attributes for virtually all travelers. The number of modal options available to individual travelers and routing flexibility are somewhat more difficult to measure, but it should be quite possible to construct these indicators, too.

On the production side of the economy, perhaps the most telling indicator of transport effectiveness would be the average distance between suppliers and producers of goods. Integration of the national and regional economies is in part a function of the degree to which suppliers of raw materials and parts are able to serve final-product manufacturers who are geographically removed from them. Mean-wage differentials among geographic sectors of each metropolitan area might be used as an index of labor mobility, and thus as an index of the transportation system's effectiveness in connecting employers and employees. Similar indicators of the transport-induced connectivity among distant places might be constructed by examining origins of college students, origins of shoppers, and origins of visitors to places for the performing arts, spectator sports, amusements, and so on.

Because the benefits and the costs of transport improvements have fallen so unevenly upon the various population subgroups, any effort to construct output measures must be capable of being disaggregated to record their

incidences. The distribution of effects falling upon the various groups defined by age, race, ethnicity, location, income level, and social class poses one of the central policy issues facing every nation in the world. The traditional consequence of transport policies, at least in America, has been to distribute an inequitable proportion of the benefits to the middle-majority population groups and an inequitable proportion of the costs to the minority groups. A national policy aimed at human betterment must attempt to correct those redistributive consequences. As a minimal start at that task, we shall have to construct sets of social accounts that permit us to monitor the flows of costs and of benefits to these various segments of the populations.

Of course, as I have already suggested, even if we could be explicit about the objectives we seek and even if we could build social accounting systems that monitor progress toward those goals, we shall then also have to appraise comparative effectiveness among the several programmatic approaches employed. We have yet to learn how to make the necessary trade-offs between the costs and benefits of transport investments and those specific to other subsystems. In our search for human betterment, we have yet to learn how to integrate plans for the various subsystems in such fashion that each might be internally coherent while simultaneously serving our larger systemic ends.

My comments here are suggesting that the approach of the Planning-Programming-and-Budgeting System (PPBS), when combined with sets of social accounts, is likely to supply the medium we have so far been lacking. The first step in developing PPBS and social indicators is the excruciatingly difficult one of enunciating system-wide, societal goals; then of formulating

compatible and contributing subsystem goals. Transport planning has too long avoided that task. I am now hoping that these introductory comments might initiate a discussion at our June 30th meeting in which that task might be pursued. OECD has taken the lead in provoking such an exploration. It is our joint mission, now, to respond to the imperatives that massive urbanization and the forthcoming technological developments are imposing.

The prospects for a new urban transportation technology are now becoming real. We soon may have a successor to the automobile, possibly in the form of a duo-mode system. The prospects for very high per capita income are a near-certainty, suggesting that options previously reserved for the wealthy will soon be extended to everyone. The prospects for expanding personal freedom and for increasing cultural pluralism suggest that no simplistic or unitary transportation schemes will any longer suffice. Increasing ranges of choice among increasingly diverse publics having increasingly varied interests will inevitably pose demands for highly differentiated transport systems having the capacities to supply differentiated transport services. It is essential that we anticipate those impending changes and then that we sensitize transportation planning methods to those diverse wants of individuals and to the larger collective interests that are common to them all.

-end-

FOOTNOTES

1. Robert B. Mitchell and Chester Rapkin, Urban Traffic: A Function of Land Use (New York: Columbia University Press, 1954).
2. See Charles J. Hitch and Roland N. McKean, The Economics of Defense in the Nuclear Age (Santa Monica: The RAND Corporation, 1960), pp. 158-181; C. West Churchman, Challenge to Reason (New York: McGraw-Hill, 1968).
3. In "Planning in an Environment of Change, Part II: Permissive Planning," The Town Planning Review (Liverpool), Vol. 39, No. 4, January 1969, pp. 277-295.
4. Several years ago David Riesman and Eric Larrabee published an insightful interpretation of the personal meanings that autos hold for people. Their essay is called "Autos in America: History Catches up with Ford;" it appeared in Encounter, Vol. 8 (May 1957), pp. 26-36.
5. You may argue that motoring or flying for pleasure are activities in which the payoffs are in the transport activity per se. I will quickly concede that example as a possible exception.
6. Hans Blumenfeld, "Criteria for Transportation Planning," in Future Directions for Research in Urban Transportation (Paris: OECD, 1969), p.98.

APPENDIX

[The following lists are borrowed from the "Initial Progress Report on 'Improved Methods for Estimating Transportation Effects' Project," The Urban Institute, Washington, D.C., May 1, 1969. List A is the Urban Institute's own. The others are listed in their appendix.]

A. From the Urban Institute

Transportation Effects: Noise

- Air pollution (and odor)
- Visual appearance
- Community social disruption
- Residential and business dislocation
- Housing supply
- Asset values
- Employment opportunities
- Income and expenditures
- Accessibility (to various services including recreational, educational, cultural, health, etc.)
- Trip pleasureableness
- Safety (accidents and crime)
- Program costs

C. List of Values Identified by Workshop #1 of the Highway Research Board
Conference on Transportation and Community Values, March 1969*

1. Sense of community - neighbors, etc.
2. Personal identity - self awareness, pride
3. Territoriality - definition of space, possession
4. Stability and security of area, e.g., area will not undergo a major change
5. Air, water pollution
6. Congestion
7. Noise
8. Protection against financial loss, e.g. homes, business
9. Access to city amenities
10. Aesthetics, historical preservation
11. Child safety in area
12. Child socialization
13. Homogeneous/heterogeneous neighborhood
14. Social status
15. Involvement in government affairs
16. Quality of neighbors, e.g., friendliness
17. Availability of local facilities, e.g. churches, parks, etc.
18. Adult socialization opportunities
19. Functional compatibility

* The length of the workshop sessions did not permit any refinement or screening of the list.

D. List of Environmental Criteria from Appleyard and Okamoto^{*}

On System Criteria

1. Safety, Comfort, Convenience, Awareness
2. Privacy, Control, Services, Responsiveness
3. Structure, Continuity, Predictability and Preservation of Valued Systems
4. Information, Exploration, Instruction
5. Interest, Choice, Identity
6. Social Interactions

Off-System Criteria

1. Local Nuisance, Stress and Pleasure
2. Local Fit, Mix, Privacy, Control
3. Valued Activities and Environments
4. Local Structure, Permeability
5. Information, Invitation, Expression
6. Choice, and Local Identity
7. Social Interaction

* From "Environmental Criteria for Ideal Transportation Systems" by Donald Appleyard and Rai Y. Okamoto, in Guidelines for New Systems of Urban Transportation, Volume II, Barton-Aschman Associates, Inc., April 1968.

E. List of Criteria from Henry Fagin*

1. Performance characteristics measuring the quality of service: speed, comfort, safety, convenience, dependability, adaptability
2. Clarity of the transportation pattern
3. Ease of access among interacting urban activities
4. The costs of transportation
5. Range of choice in housing and job type and for business location
6. Rate of environmental upgrading
7. Scale of areas of homogeneity
8. Cost of living
9. Mix of private and public transport, of private and governmental operation
10. Tendency toward increased or reduced travel
11. Prospective employment level in the transportation industry
12. Costs of transport services
13. Prospective charges and other income
14. Mix among modes
15. Accessibility
16. Efficiency
17. The "spread" of public works projects among the political subdivisions of the area
18. The continuing flow of money to maintain employment and prosperity in the industries essential to an expanding transportation system
19. A balanced transportation system utilizing each mode for its inherent advantages
20. Flexibility of transport facilities
21. Political acceptability
22. Financial feasibility

- 23. Prospective general impacts on the metropolis
- 24. Metropolitan economic efficiency
- 25. Development and protection of resources
- 26. Metropolitan security, stability, self-determination
- 27. Metropolitan adaptability to change

* From "Urban Transportation Criteria," by Henry Fagin in The Annals of the American Academy of Political and Social Science, Volume 352, March 1964.