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PLANNING NEEDS FOR EFFECTIVE HIGHWAY ADMINISTRATION

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Specialized Highway Planning Information: Social, Economic, and Financial Aspects

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• **THE WELL-BEING** of a nation is measured in terms of not only income and other indicators of material wealth, but also by the conditions of life and social relationships experienced by its inhabitants.

As a society becomes more complex, so do its problems. This is true of all aspects of national life, but especially so of those relating to a nation's needs for transportation facilities and services. Regardless of the complexity of any given social order, all of its transportation problems, whether they pertain to highways or other modes, are people-related, because the only reason for having transportation facilities is to serve the needs and desires of the people.

It is the purpose of this paper to identify and discuss some of the most pressing social, economic, and financial problems that face highway planners and administrators today, describing the types of information needed for their solution. However, the development and presentation of solutions to such problems is beyond the purview of this paper, although it will be possible to suggest some avenues by which solutions may be approached.

DEMOGRAPHIC PROBLEMS

Demography is the statistical study of human populations from the standpoint of such factors as births, deaths, and migrations. Many of the major problems perplexing highway officials now, and that will continue to bother them in the future, are directly related to the growth, decline, or migration of populations.

Before 1920 the United States was primarily a rural nation, with more than half of its population residing in what the Census Bureau classifies as "rural territory." The Census of 1920 found 49 percent of the inhabitants residing in rural territory and 51 percent in urban areas. In 1960, under a somewhat modified definition of urban territory, about 70 percent of the population of the United States was living in urban areas, and only 30 percent in rural territory.

This tremendous population shift has notably altered the nature and magnitude of the problems faced by highway administrators. In 1920 their chief concern was to get the farmer out of the mud; today it is to get the urban dweller out of the muddle.

Although the increase in the population from 1950 to 1960 of 28 million (an 18.5 percent gain) was the greatest in history, the amounts and rates of growth varied from one section of the nation to another. All Census divisions exhibited some growth, but the range of the increases was from 600,000 (a mere 5 percent) in the East South Central division, to one of 6,100,000 (40.2 percent) in the Pacific divisions, comprising California, Oregon, Washington, Hawaii, and Alaska.

Furthermore, this growth was largely concentrated in the metropolitan areas; Census statistics show that 84 percent occurred in 212 such areas. Of the metropolitan area growth, only 24 percent took place in the central cities, while 76 percent was found in the suburbs. The central cities of 14 of the 15 largest metropolitan areas actually lost population between 1950 and 1960. In fact, 85 percent of the net population growth of the central cities of all 212 areas was attributable to territorial expansion.

While the urban population of the nation was gaining by 29.3 percent between 1950 and 1960, the rural population actually declined by 0.9 percent. Although only three States and the District of Columbia showed net population losses during the 1950-1960 period, nearly half (1,532) of the 3,105 counties in the 48 contiguous States lost population.

The changes in the size, composition, and distribution of population that have been revealed by the latest Census have many obvious highway implications. Census data indicate that population is now increasing most rapidly in those areas in which automobile ownership tends to be most dense; and that low-density suburban sprawl, made practicable by the ever-increasing ownership and use of automobiles, has largely dominated population movement. There is no present indication of a decrease or reversal of this trend within the foreseeable future, unless forces not now evident come to exert an overriding impact upon the trend.

More people and more vehicles mean more traffic, but the reverse is not necessarily true. The areas where the popula-

tion is growing, especially the suburban fringes of the larger cities, are probably those where the need for new highway facilities of all kinds will be most acute, but the central cities where most of the suburban breadwinners earn their living, and the rural areas where they and their families seek recreation, are also more than likely—if past trends continue—to find their present highway facilities becoming inadequate even though their resident population is declining.

Fundamental to the planning of the required future facilities is a knowledge of the statistics with which demographers deal: births, deaths, migrations, and the age composition of the population. The 1960 Census and previous decennial censuses provide a wealth of information in all of these areas. Many States, usually with the cooperation of their local governments, collect and compile accurate statistics on births and deaths, at least. If highway planners will make full use of available population information they will be in a better position not only to measure and evaluate present highway needs but also to estimate those that will occur in the future.

Thus, by considering the age components of the 1960 population it is possible to estimate not only the approximate number of potential motor vehicle operators at the present time but also the potential eligibles over the next 15 to 18 years, since, except for migrations, all persons who will have reached the legal driving ages within their respective States during that period are already in the population. To convert these estimates of potential drivers into estimates of the number of licensed operators will require the application to the sex and age components of the population of factors which can be determined from various sources, such as State driver-license files or tabulations prepared in connection with the recent motor-vehicle-use studies.

Another application of population data that has direct value to highway officials is the use of information on births, deaths, and migrations in forecasting future population totals and distributions. Table 1 illustrates an appli-

cation of such data in evaluating nationwide population changes between 1950 and 1960. Here it can be seen that New England's increase during the period was almost exactly equal to the "natural increase" (the excess of births over deaths) that occurred in the area; while in three Census divisions—West North Central, East South Central, and West South Central—the actual increase in population was less than the natural increase, indicating a net out-migration of inhabitants from the area during the decade. On the other hand, the Pacific division experienced a net gain of 3.3 million inhabitants over the period in excess of the natural increase, clearly indicating that in-migration was the most important factor in its growth.

Similar calculations can be made for individual States and for some areas within States, the possibilities of such analyses varying with the nature and extent of the information available locally. Extensive analyses of this type have been made in connection with transportation surveys of larger metropolitan areas, such as those undertaken in the Chicago, Philadelphia, and Washington areas.

Mere projections of past trends in the total population of a State, a city, or a metropolitan area are not going to be sufficient for future highway planning requirements in most instances. What will be required to provide a reasonably

accurate base for the estimation of future needs for highway facilities and services will, in general, be the more sophisticated types of forecasts that can be made only by taking into account the demographic factors mentioned above and the social factors which are to be considered.

SOCIO-ECONOMIC ASPECTS

Other people-related factors that have an important bearing on long-range highway planning include labor-force, employment, occupation, income, and housing characteristics of the population.

The importance of population migration as a creator of major problems for all planners and public administrators, especially highway officials, has already been indicated. Among the readily recognizable results of migration are the leveling off or actual decrease of population in some areas (such as farming areas and the central cities of major metropolitan areas), and the rapid increase of population in other sections (notably the suburban fringes of the metropolitan complexes).

But mere knowledge of the magnitudes of migration, and of "from where to where" is not enough. For intelligent solution of both the present and future problems that highway administrators and their planning staffs must face, there must be an understanding in depth

TABLE 1
ILLUSTRATIVE COMPONENTS OF POPULATION CHANGE BY CENSUS DIVISIONS, 1950-1960¹

Census Division	Increase, 1950-1960		Net Natural Increase			Net Migration (1,000's)
	Number (1,000's)	Percent	Births (1,000's)	Deaths (1,000's)	Gains (1,000's)	
New England	1,195	12.8	2,218	1,046	1,172	23
Middle Atlantic	4,005	13.3	7,037	3,344	3,693	312
South Atlantic (north)	1,351	15.4	2,411	853	1,558	— 207
South Atlantic (south)	3,439	27.6	3,777	1,192	2,585	854
East North Central	5,826	19.2	8,376	3,249	5,127	699
East South Central	573	5.0	3,106	1,068	2,038	— 1,465
West North Central	1,333	9.5	3,614	1,461	2,153	— 820
West South Central	2,414	16.6	4,317	1,316	3,001	— 587
Mountain	1,780	35.1	1,708	485	1,223	557
Pacific	6,083	40.2	4,384	1,594	2,790	3,293
United States	27,999	18.5	40,948	15,608	25,340	2,659

¹ Bureau of the Census; Current Population Reports, Series P-25, No. 227.

of the motivating social and economic factors that cause migration, and of the situations that will result after the migration occurs.

A major cause of migration is the desire of people to better themselves economically and socially. For example, for many years the capacity of farming areas to absorb the young-worker element of the population has been decidedly limited. Now, because of relatively low income possibilities, increasing unit productivity, mechanization, changes in the types of farm operations conducted, consolidation of farm units, and the decline of farm-related activities, it is becoming even more limited. Consequently, young people new to the labor force have continued to migrate from the rural areas to the urban areas. The general pattern has been to gravitate to the city first; later, with the establishment of family units and the attainment of reasonably good economic status, many of these young migrants join with others among the more affluent city dwellers in moving on to the suburbs.

The highway administrator must have more than a passing interest in those who are left behind by the migrants in the rural areas and in the central cities. He must also have a similar interest, along with other public officials, in the complexion of the new suburbs. Unless he possesses more than superficial knowledge about the social and economic characteristics of these people he cannot plan intelligently for their needs.

Highway officials are not unaware of these requirements. In many recent surveys, especially the excellent transportation surveys undertaken within the past five years or so in several large metropolitan areas—notably Washington, Chicago, Pittsburgh and Philadelphia—careful attention has been given to the present and probable future economic and social aspects of the areas studied. Thus, the Illinois study considered such elements of the Chicago area as land use, the importance of families as trip makers, and the nature of economic activity.

A number of the metropolitan areas are interstate in character, and proper planning requires cooperative effort on

the part of several States. Examples of interstate cooperation in studies now under way or recently completed are the Penn-Jersey, Tri-State (New York, New Jersey, and Connecticut), and the Metropolitan Washington studies. In certain areas, the volume of interstate local commuting and freight movement is increasing rapidly. In some cases, the areas may not be large but cannot be properly understood unless approached on an interstate basis. In this category are Fargo-Morehead, involving North Dakota and Minnesota; and Evansville, affecting both Indiana and Kentucky.

Unfortunately, penetrating studies such as that made in the Chicago area have usually been limited to the larger metropolitan areas. There is a great need, however, for this type of study on a statewide basis, but if such is impracticable, studies could, perhaps, be made of representative rural and urban areas, the results of which could be given broad application.

The construction of major urban highway facilities poses many perplexing social and economic problems for highway officials, not the least of which is the problem of relocating people whose dwellings lie in the path of the new construction. Even though a fair price is paid for the property taken, it does not solve the problems of many of the owners and renters involved. For example, most of the downtown projects involve construction in blighted areas whose residents find it extremely difficult, if not impossible to relocate for economic or social reasons.

In the District of Columbia, for example, it is recognized that present procedures for obtaining rights-of-way for new facilities work hardships upon both owners and tenants of property to be taken for the improvement. When a location is "pinpointed" all property within the projected area to be purchased is immediately affected, since the owners are then restrained from improving or selling it, and the licenses of businesses operating in the area will not be renewed. However, the property cannot be bought until funds for the project become available. District highway officials would like to obtain authority to

set up a revolving fund for the advance purchase of property needed for highway construction, but it will require congressional action to make this possible.

The magnitude of the problem becomes evident when it is considered that the present 6-yr program of the District for the construction of freeways and related facilities will displace about 3,800 families (approximately 12,000 persons) from 1961 through 1965. Furthermore, this is only a portion of the total long-range program of the District of Columbia for the construction of such facilities.

Provision of a revolving fund for the advance purchase of rights-of-way, such as California now has, can go a long way towards alleviating hardships to landowners and tenants, and also toward preventing the unfavorable criticism of the highway program and highway officials that often result. Advance purchase of property for rights-of-way can also save money for the highway program—it has been estimated that the California plan, which permits purchase of property as much as seven years in advance of construction, has already saved the State \$250,000,000 in increased property values that would have accrued had the purchase been delayed.

Although matters of statutory declaration and administrative policy are beyond the scope of this discussion, the needs of administration for economic and social data to carry out existing legislative directives and agency policies, for the formulation of new ones, to answer inquiries, and to achieve public support of highway programs are of great concern.

Thus, in order to be able to answer questions that arise from the public, news media, other government officials, and legislative bodies concerning the displacement of people and the disruption of business resulting from urban highway construction, highway planners and administrators need to have information available about the impact of similar projects already completed. Needed would be data that could provide answers to inquiries such as: What be-

came of the people and businesses displaced? What happened to the value of adjacent property not taken for the improvement? What happened to business establishments near to but not in the path of the improvement?

Implications of Federal Housing Legislation

Highway administrators and planners are only now becoming aware of the full import of Public Law 87-70, the Housing Act of 1961. This legislation, coupled with provisions of the 1954 Housing Act, will undoubtedly have a direct and far-reaching effect on national and State highway programs. An accelerated program of comprehensive land and transportation planning is now possible. The legislation includes but is not limited to metropolitan areas. This legislation can be of great value to the highway program if highway officials are alert to the implications of all its provisions, and if the other governmental agencies affected—Federal, State, and local—are willing to cooperate with the highway administrators.

Many provisions of the housing legislation providing for urban transportation planning and research, and for urban planning generally, are new in concept insofar as Federal legislation is concerned and can have far-reaching effects. One major stated aim is to reduce urban transportation needs and to determine ways of meeting them at minimum cost, especially with the contribution of mass transit facilities where feasible. Another is to provide for more orderly and efficient urban growth through acquisition or other control of open-space land within urban areas. Area-wide urban planning is encouraged, including not only intergovernmental cooperation within one State, but also among States where urban areas cross State boundaries.

All this means that if highway officials are to be instrumental in the development and execution of highway plans in urban areas, they must participate actively with the other governmental agencies concerned in all stages of the activity from the beginning, through initial research and planning, and on to

completion. To do this they must initiate when necessary and participate actively in research in the social and economic aspects of the broad-scale area plan. Even though much of the research and planning activity may be let out to consultants, the highway departments will need to have on their staffs competent and well-qualified professionals who understand thoroughly the demographic, social, and economic aspects of urban-area long-range planning.

AVAILABLE SOURCES OF SOCIAL AND ECONOMIC DATA

There is a great wealth of information in readily available form relating to the economic and social characteristics of the population. Undoubtedly the most and best statistics are available on a national or regional basis, but much information can also be obtained on a State basis, with some variation among the States. A considerable amount of data is also available on a county or metropolitan-area basis; below the county level the amounts and types of information available vary considerably from State to State and with size of place.

Federal Sources

The best single source of such statistics is the Federal Government, especially the Departments of Commerce; Labor; Health, Education and Welfare; Agriculture; and Interior. Notable among the periodical statistical publications of the Federal Government is the annual "Statistical Abstract of the United States," to which are frequently published supplements such as the "Historical Statistics of the United States, Colonial Times to 1957," and the "County and City Data Book, 1956."

The 1960 Censuses of Population and Housing provide a wealth of information on the social and economic characteristics of the population by States, counties, metropolitan areas, and urban places, much of which was never obtained in such detail before. A brief resume of the publication schemes for the two censuses is presented in Appendix A. It indicates the nature and de-

tail of the data already available or soon to be published.

Coverage of Census Counts

As required by Federal law, the census of inhabitants was as nearly a complete enumeration (count) as it was possible to make. The information obtained included age, sex, race, marital status, and relationship to head of household of all inhabitants. For other population items, the published statistics are based upon data collected at a periodically selected 25 percent sample. Basic household information, such as tenure, color, vacancy status, number of persons, number of rooms and condition was obtained from a complete enumeration. Other items relating to housing characteristics, including availability of automobiles, was obtained from samples of 20 or 25 percent of all housing units.

Other Census Sources

In addition to the Censuses of Population and Housing, data on employment, output, and other items for trend analysis can be obtained for wholesale and retail trade and for selected service industries from the Census of Business, and for manufacturing from the Census of Manufacturers. These sources provide data by local area, including employment by place of work. The Census of Agriculture is invaluable for farm information by county for rural-area studies. Frequency of these censuses depends upon Congressional enactment.

Census of Transportation: Public Law 672 of 1948 (now included in Title 13, U.S. Code) provides that the Bureau of the Census shall make a census of transportation. Up to the present, however, the census has not been taken because funds have not been appropriated for it. A request for funds to undertake this census in 1963 was included in the budget of the Commerce Department which is now being considered by the House Appropriations Committee.

A plan for the transportation census has been developed by Census officials, and it is evident that the information

to be obtained would be of considerable value to highway planners, even though provisions in the directing legislation exclude from the census certain classes of carriers required to report to Federal regulatory bodies, and for which various statistics are regularly published. In accordance with the statutory provisions, the census plan is designed to avoid duplication wherever possible, but to provide information that will complement the data available from these other sources.

According to the plan, the undertaking would be divided into three major segments: (a) a travel survey, to be started in January 1963; (b) an inventory of trucking equipment, designed to provide information also about its use to be started in the fall of 1963; and (c) a shipper survey, to be begun in 1964, covering shipments made during 1963. Appendix B provides additional information on the coverage of these segments.

As now planned, the transportation census could not be considered in any sense a substitute for a statewide motor-vehicle-use study. It could, however, provide a valuable supplement to such a study. For example, the Census travel study will collect information on certain types of trips made, but will completely exclude others. No data will be obtained on miles traveled or routes used. Furthermore, the sample base for the travel study will not be large enough to permit tabulations of data for individual States, although it is understood that summaries will be made for each of the four Census geographical regions.

Current Periodic Sources of Information

At the national level, the most comprehensive series on economic activity is that published by the Office of Business Economics on gross national product and national income. This is supplemented by their annual series on personal income by State.

Monthly data on labor force, employment, and unemployment for the nation are collected on a sample basis by the

Bureau of the Census in the "Current Population Survey." Detailed monthly data on the number of employees in nonagricultural establishments by place of work are published by the Bureau of Labor Statistics of the U.S. Department of Labor as a part of a cooperative Federal-State reporting program. These data are available on a national, State, and metropolitan-area basis. Local employment offices are often an excellent source of information on recent employment trends, new plants, and local commuting patterns.

Regional offices of Federal agencies may also be consulted for recent studies and special analyses in which they may be engaged. Those of the Federal Reserve Board, and the Departments of Commerce and Labor (Labor Statistics) may be especially helpful.

Miscellaneous Sources

To a varying degree agencies of State and local governments publish on either a periodic or irregular basis economic and social statistics that would be of value to highway planners and economists. The data published include total population and vital statistics; and statistics on wealth, income, and ownership of real and personal property. Valuation and tax rate and income statistics, such as are usually available, are also rough indicators of social and economic conditions.

Information published by public agencies is frequently supplemented by publications of colleges and universities, research agencies, and Chambers of Commerce and similar promotional organizations. Several good compilations of economic and social statistics, with and without interpretive text, produced by various sources are available in most good libraries. An example is "Economic Areas in the United States," by Donald J. Bogue and Calvin L. Beale, published in 1961.

A note of caution should be sounded in connection with the use of "made-to-order" data sources. Good common sense, judgment, and an attitude of critical open-mindedness must prevail in evaluating and using them. It should

always be remembered that "facts" are not always what they seem, and that "if you can't know your data at least try to know your data source."

EFFICIENT USE OF RESOURCES

Much is said in these times about the efficient use of resources of all types. Under this heading may be grouped a whole host of problems that involve highway officials in one way or another. One of these problem areas has already been mentioned; the development of over-all plans for meeting urban transportation needs most effectively and economically. This is only one segment of a much larger problem area that involves the entire gamut of urban planning, in which highway officials are already involved and are certain to become more so.

There is a fundamental difference in the historical approach of many "urban" or "social" planners, on the one hand, and of most highway planners, on the other. Traditionally, the first-named group has planned on the basis of their interpretations of what should be good for man, assuming that men can be conformed to their designs; while highway planners have generally planned on a strictly pragmatic basis on which they have attempted to measure man's present and future highway needs according to his past and present behavior. Since the efficient use of many basic resources, especially land, will become increasingly important as the years go by and the population grows, it may be necessary for both groups to "give a little" in their approaches, if long-range future demands are to be met successfully.

Perhaps the most basic problem relating to the efficient use of resources as related to the highway function is that of the determination of the proper place of highway transportation in the over-all national transportation complex. Numerous all-embracing transportation studies have been made by public, quasi-public, and private groups, from the standpoint of developing a national transportation policy. To enable them to make long-range plans most effec-

tively, it behooves highway officials to be well-informed on transportation policy matters, and to be ready to undertake on a nationwide, State, or even local basis such studies relating to this over-all problem area as conditions may require.

Serious thought has already been given to the types of studies that might be worthwhile in approaching this problem. For example, Appendix B to HRB Special Report 55, "Highway Research in the United States," lists the following as highway research problems of importance:

1. Beginnings of a comprehensive study of freight transportation by motor vehicles;
2. Beginnings of a comprehensive study of passenger transportation by motor vehicles;
3. Highways and economic growth;
4. Highway charging systems;
5. Economic measures of highway needs;
6. Warranted level of improvement for roads other than primary rural highways; and
7. Studies of vehicular benefits and the quality of highway transportation.

The analyses that would be required in studies such as those listed would, of course, involve engineering approaches and the analysis of engineering data. They would also require the development, interpretation, and analysis of economic and social data. In many instances engineering-economy data and procedures would also be required.

Among the social and economic information needed for studies of this type would be population, income, economic activity, output and employment, motor vehicle ownership, and use data. Forecasts of these various characteristics and others, such as industrial and agricultural production, would also be required. Analyses of consumer expenditures for highway transportation of all kinds by income levels, and highway travel as related to income, would also need to be studied. Consideration would also need to be given to the effect of competition on highway travel; not only

competition from existing modes of transportation but also from modes not yet devised or in general use.

FINANCIAL PROBLEMS

A comprehensive statewide highway needs study, involving all roads and streets and all units of government responsible for the highway function, will consist of at least two major parts—an engineering or physical needs study and a financial needs study. The Federal Government, most States, and some areas below the State level have already had experience with such studies. They have learned that although the engineering or physical-needs determination is more or less subject to package treatment, the same is not true for the financial and tax studies. Jurisdictions that have made the long-range studies have also come to realize that a “one-shot” type of study is not sufficient, but that some updating of the findings of the comprehensive studies will be required at frequent intervals, with a major comprehensive restudy required at intervals of, perhaps, five to ten years depending upon circumstances.

The comprehensive studies require consideration of all the problem areas already discussed in this paper, and others. Among the others, the most crucial, perhaps, are those relating to the financing of a physical highway program.

The essential features, insofar as finance and taxation are concerned, may be enumerated as follows:

1. Historical evaluation of the present structure of highway financing, if such has not already been done in a recent study;
2. Evaluation of the relationship of highway financing at all levels of government to the financing of other public functions;
3. Allocation of highway costs among highway users and other groups on the most equitable basis possible;
4. Development of a financial program that will most effectively, efficiently, and equitably support the physical program; and

5. Development of a scheme of inter-governmental financing which will provide for the proper sharing of State-collected highway-user taxes with subordinate units, and such other inter-governmental participation in the financing of highways as may be appropriate.

In studying the relationship between the highway function and other functions, attention should be directed to the fiscal ability of the various governmental units responsible for the highway function. Although the concept of fiscal ability is a relatively simple one—“What can we afford?”—it cannot yet be determined to everyone’s satisfaction. In general, fiscal ability is said to be indicated by income, usually the disposable personal income of individuals, but this is not an entirely satisfactory measure. The total impact of all taxes, present and proposed, within a given jurisdiction can be estimated and offset roughly against the total income of those residing in that jurisdiction.

Pricing Highway Services

Some economists have in recent years been complaining that highways are underpriced; that is, highway users are not actually bearing their full share of providing highway facilities and services. They contend that if the prices charged for various segments of highways and highway services were set where they should be it would be found that some facilities already built or proposed would prove to be unsound economically.

Perhaps the most noteworthy example of this type of economic reasoning is the allocation by some investigators entirely to commuters of the total costs of additional highway facilities presumably required only for rush-hour commuting traffic. The obvious implications is that it would probably be cheaper to develop some sort of transit facility to handle this portion, at least, of the commuter traffic.

The charge of underpricing in urban freeways has been made with increasing frequency in recent months. By al-

locating the entire cost of a highway improvement, such as added lanes, to peak commuter traffic, and arguing that this improvement would not be required for other reasons, during the period of amortization, extremely high vehicle-mile and passenger-mile cost estimates are reached. No urban Interstate Highway is ever justified by commuter traffic alone, and the same could be said for almost any urban extension of a primary route.

This type of calculation leaves out several key considerations. It fails to take into consideration the easing of congestion on other city streets. It assumes that current capacity would be adequate indefinitely for all traffic except during rush hours. It omits savings accruing in the cost of vehicle operation, convenience, safety, and time. It ignores near-strangulation conditions in many urban areas which were the prime motivating reason for the construction in the first place. The national defense requirements which also were involved in the design of the Interstate System are also dumped on the shoulders of the commuter. The continually changing structure of the American metropolitan area, the wishes of the traveling public, and the increasing dependence on the motor truck are disregarded.

The need for a realistic and rigorous inquiry into all benefit and cost aspects of urban freeway construction must not be denied. The standard benefit-cost or engineering-economy analyses should, of course, be undertaken for each contemplated improvement, and applied to each alternate being considered. In addition broad-scale economic-impact analyses (actually another form of benefit-cost analysis) to measure both the favorable and unfavorable effects of contemplated improvements on adjacent property and businesses, on the city, its metropolitan area, the entire State (or States) immediately concerned, the region, and even the nation should be considered. These analyses must not only consider the items, such as savings in vehicle operating costs and increases in value of land, that can be measured quantitatively, but also those, such as time saved, convenience, and comfort, which are es-

entially qualitative and do not lend themselves readily to quantitative measurement.

Many of the price economists and planners who make the charge of highways being underpriced apparently fail to consider several additional factors that highway officials must consider in determining the warrant for a specific improvement. One is that not only the traffic volume but also its composition and distribution determine when congestion becomes intolerable and new or additional facilities are needed. Another is that increments of capacity, such as additional traffic lanes, become needed as soon as the capacity of the existing facility is exceeded by even a small amount, but a considerable further growth in traffic can then be accommodated without further additions. A third factor to be considered is that some of the major cost elements in urban construction, such as land, have almost infinite useful lives and should not be charged off over the relatively short amortization periods most frequently used by urban planners in allocating transportation costs.

Much of the adverse criticism leveled against the construction of urban highway facilities from the standpoints of excess capacity required by commuter demand, under utilization of all facilities during off-peak hours, etc., is equally applicable to mass transit. The existence of the latter has neither eliminated the need for the freeway, nor slowed the urban-fringe growth in the New York, Chicago, Boston, and Philadelphia areas in the past, nor is there any real prospect that it will in the future. In the final analysis, what will be done may depend as much on the kind of environment in which Americans want to live and work, as any quantification of costs and benefits which may be calculated over an extended period into the future.

Highway officials need to be apprised of and to understand what these economists and planners are talking about when they discuss the "pricing" of highway facilities and services. They also need to have readily available the right kinds of engineering, economic, and

sociological data, and to be familiar with the special analyses required, to be able to answer such criticisms intelligently.

Allocating Highway Costs

Those who have made systemwide, statewide, or nationwide studies of highway cost allocation know that much information of a social, economic, and fiscal nature is needed for these studies. Thus, the relative-use study made in connection with the recent "Highway Cost Allocation Study" by the Bureau of Public Roads, required the development of information about trip lengths, frequencies, and systems used that is available only from the motor-vehicle-use studies such as have been made over the past 10 years by about half of the State highway departments. These studies and others, such as studies of fuel consumption rates, are also necessary in the determination of the final impact of highway-user taxes upon the residents of various rural and urban areas of the States.

SOCIAL, ECONOMIC, AND FINANCIAL ASPECTS OF HIGHWAY PLANNING RESEARCH

There are many informed persons who believe that highway planning is, in general, supported by more research and better quality research than any other form of planning. Those who have participated in highway research and planning for an extended period can take pride in past accomplishments. There are available the types of information that enabled E. H. Holmes to make the excellent presentation on highway transportation that he did at the Woods Hole Conference convened by the National Academy of Sciences in August 1960. Holmes' presentation was published as "Highway Transportation" by the National Academy of Sciences. This publication is a reprint of a portion of "U.S. Transportation: Resources, Performance, and Problems." NAS—NRC 841-S (1961).

The Highway Research Partnership

For many years the Bureau of Public Roads and the State highway depart-

ments have participated in an extensive program of research and planning that involves the collection, analysis, and interpretation of many forms of financial, economic, and social data. In recent years local units of government, notably many of the larger cities, colleges and universities, and other groups have participated to an increasing degree in this endeavor. However, the coverage is by no means complete either as to subject matter or geographical area, and an increasing need for further depth in research conducted is becoming evident.

At its meeting in June 1958 the Executive Committee of the Highway Research Board adopted a resolution naming a committee of top research men in the highway field. The committee consisted of a representative of the Bureau of Public Roads, a representative of the universities, and three from the State highway departments. Its assignment was to screen available research data, set priorities, and estimate costs to get a really adequate program of highway research in action as quickly as possible. The committee went to work immediately with the assistance of officials of the departments, and project and special committees of the Board, which supplied a great deal of material. Material was also obtained from other sources. It published its report in June 1959 as HRB Special Report 55.

All highway planners and administrators should be familiar with this report, which made extensive recommendations, including specific areas in which research appeared to be most needed immediately. Unfortunately, a perusal of the recommendations contained therein will indicate that relatively little of the essential work proposed has yet been undertaken.

Recent Statements on Highway Research

During the meeting of the American Society of Civil Engineers held at Houston, Texas, in February 1962, several important papers relating to highway research were presented. A. E. Johnson, Executive Secretary of the American Association of State Highway Officials, discussed "the availability of new high-

way funds for research purposes" and outlined the history of the development of highway research in the United States. He emphasized the need for broadening and intensifying research, and described the provisions of the Continuing AASHO Research Program which was formally adopted by ballot in December 1961. The work carried on under this program will be administered by the Highway Research Board, with concurrences by AASHO as to the placement of projects and the method of handling. Specific projects can be adopted only on a two-thirds vote of the participating State highway departments. It is hoped that this program, getting under way, will produce some excellent results in non-engineering research, as well as in engineering research.

Rex M. Whitton, Federal Highway Administrator, in his address at the same meeting stated:

We can cite considerable progress so far in carrying out the highway program, but we must do more. One area in which we must step up our efforts in seeking improvements is in highway research.

* * *

We have need for much research. We need to know more about the dynamic combination of vehicle, road and driver.

* * *

The attainment of these objectives will require continuous effort on the part of highway engineers. As engineers, we will make that effort. . . . We would welcome your cooperation in working toward our mutual objective—the advancement of the science and profession of engineering.

During the same meeting O. K. Normann, Deputy Director of Research for the Bureau of Public Roads, discussed "cooperative highway research." He said, "Cooperation among the various governmental agencies, private industry, and the many associations and technical societies has probably been the most important factor in the development of our present highway transportation system and in the dynamic progress that is now being made to complete the National System of Interstate and Defense Highways."

He described the Federal and State funds available for highway planning and research, the extent of the work

done and in progress, and laid particular emphasis upon the cooperative nature of these activities. He concluded by saying, "Much of the leadership in research must come from the man close to the problem. The most effective applied research can be done by people vitally interested in finding a solution to the problems they are facing. . . ."

Compilation of Research Activity

In Normann's paper extensive use was made of a compilation prepared in the Bureau's Office of Research of highway research activity by various organizations, as indicated by participation in Highway Research Board Annual Meetings, State highway department use of 1½ percent Federal aid, and use of administrative funds of the Bureau of Public Roads. This analysis indicated that on the basis of research papers presented at the Highway Research Board meetings from 1960 through 1962, there is a heavy concentration of productive work in about one-fourth of the States and less than a dozen educational institutions.

An analysis was also made of papers presented at Board meetings in the 6-yr period from 1947 through 1953. It indicated that 188 papers presented at these meetings were prepared at colleges and universities; one institution accounted for 30 of these, a second for 29, and a third for 28. The institution producing the next highest number produced only eight.

Of 263 papers presented during the same period by State highway departments, only two departments presented 20 or more; three presented between 15 and 20, and five presented from 10 to 14. During the same period 177 papers were presented by agencies of the United States Government, of which Bureau of Public Roads employees were responsible for 115.

An analysis was made of highway department 1½ percent fund research projects in operation in the States in December 1961. Of 327 such projects, only 23 related to highway economics and finance.

Compilation by general area of research was also made of reports pre-

sented at the Highway Research Board meetings during the 3-yr period from 1960 through 1962. A total of 905 papers was included, of which 81, or 9.0 percent, related directly to highway economics, finance, and administration and 51 papers reported on various aspects of urban transportation. The urban papers accounted for 5.6 percent of the total.

It is not necessary to go further into the statistics compiled by the Bureau on the highway research program to learn that the areas of economic, social,

and financial research are being sadly neglected. It is to be hoped that this shortcoming will be quickly recognized and soon overcome by the initiation of an adequate and effective program of highway-oriented investigation and study of these critical areas. Only by this means can top-level highway officials be equipped to meet the challenges that the changing times are bringing, and be prepared to retain their positions of leadership in planning for future transportation needs.

APPENDIX A

PUBLICATION PLAN:

1960 CENSUSES OF POPULATION AND HOUSING

CENSUS OF POPULATION

Volume I, Characteristics of the Population, consists of separate reports for the United States, each of the 50 States, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and the Canal Zone. The subject matter is compiled by "chapters," as follows: *Chapter A, Number of Inhabitants*; *Chapter B, General Population Characteristics* (age, sex, marital status, race, and relationship to head of household); *Chapter C, General, Social, and Economic Characteristics* (nativity, parentage, state of birth, mother tongue, place of residence in 1955, year moved into present quarters, school enrollment by level and type, years of school completed, family composition, fertility, labor force, employment by class of worker, industry and occupation, place of work, means of transportation to work, income, etc.); and *Chapter D, Detailed Characteristics* (mainly information presented in Chapter C, cross-classified by age, color, and other characteristics, but also including other data).

The information included in Chapter A is presented for States, counties, and their rural and urban parts; for standard metropolitan statistical areas; urbanized areas; all incorporated places, unincorporated places of 1,000 inhabitants or more, and minor civil divisions. The breakdown of information in Chap-

ter B is almost as extensive; it is considerably less extensive for Chapters C and D.

Volume II, Subject Reports, consists of approximately 40 reports devoted primarily to detailed cross-classifications for the United States and various regions and areas of subjects included also in Volume I.

Volume III, Selected Area Reports, consists of two reports showing selected characteristics of the population for (1) State economic areas, and (2) according to the size of place where the individual resided.

Volume IV, Summary and Analytical Report, when published, will present an analytical review of the results of the 1960 Census of Population for each major field.

CENSUS OF HOUSING

Volume I, States and Small Areas, consists of separate reports for the same group of areas as Volume I of the Census of Population. In the State reports, information is shown for the State as a whole and for each standard metropolitan statistical area, urbanized areas, urban place, place of 1,000 to 2,500 inhabitants, country and rural-farm and rural-nonfarm portions thereof. Subjects covered include dwelling-unit occupancy characteristics, including tenure, vacancy status, race, structural

condition, year built, equipment and facilities, value, rental rate, and financing arrangements.

Volume II, Metropolitan Housing, consists of cross-tabulations of housing and household characteristics for the United States by geographic regions, and for each of the 192 metropolitan areas with 100,000 inhabitants or more, including tabulations for each city of 100,000 or more inhabitants.

Volume III, City Blocks, consists of separate reports for cities and other urban places with 50,000 or more inhabitants in 1960, and for a number of smaller places which arranged for block statistics. The data presented by blocks are for a limited number of characteristics.

Volume IV, Components of Inventory Change, will, when published, indicate the source of the 1959 housing inventory and the disposition of the 1950 and 1956 inventories. Data will be provided on components of change, such as new construction, conversion, and demolition of units; for the Nation, broad census regional groups, and for selected large metropolitan areas.

Volume V, Residential Finance, will present information on financing of residential property.

Volume VI, Rural Housing, will show cross-tabulations of housing and household characteristics for the 121 economic subregions of the United States for rural-farm and rural-nonfarm housing units.

Series HC (S1), Special Reports for Local Housing Authorities, consists of a series of separate reports for 139 localities on characteristics of owner- and renter-occupied substandard housing units and their occupants.

COMBINED POPULATION AND HOUSING REPORTS

Some reports are being prepared in which data from both the Population and Housing Censuses are combined. The PHC (1) series consists of 180 reports, providing population and housing data for about 23,000 census tracts located in 178 standard metropolitan statistical areas and two New Jersey counties which are not in such areas.

APPENDIX B

TENTATIVE PLANS:

1963 CENSUS OF TRANSPORTATION

The Transportation Division of the Bureau of the Census advises that present plans for the 1963 Census of Transportation call for dividing the project into three major segments, the principal features of which are outlined below.

A. *Passenger Transportation Survey*:

1. Relationship to 1963 Census of Transportation: The "Passenger Transportation Survey" is often referred to as the "Travel Survey," and is one of several segments of the proposed Census.
2. Purpose: To collect data on three aspects of passenger transportation—
 - a. Selected factors of major significance to local or urban transportation.

- b. The volume and nature of trips beyond the local area, as indicated by

- (1) Trips made to destinations 100 miles or more from the local area.
- (2) Overnight trips regardless of distance to destination.

3. Sample size and design: The proposed sample would be the Quarterly Household Survey which would provide quarterly interviews at about 17,500 households each quarter and form the basis for monthly mail supplementary information.

4. Data collection method:
 - a. During the first 10 days in the months of January,

- April, July, and October each household in the Quarterly Household Survey (QHS) will be contacted personally by a census enumerator.
- b. "Trip Reports" for the remaining eight months of the year will be obtained in a combination of ways, as illustrated by the "Tentative Panel Rotation—Travel Survey '63."
 - c. Travel during July and August is not only higher but the travel patterns are distinctly different from other times of the year. For that reason, serious consideration is being given to the substitutes of personal interviews in place of mail inquiry during those two months for the four rotation groups involved in the 12-monthly mail reporting program.
 - d. Quality checks will be made at specified intervals during the year as well as followups for panel members who have not mailed in their forms.
5. Summary of types of information to be obtained:
 - a. Household location
 - (1) Region—State—county—city.
 - (2) Rural—urban.
 - (3) Type of residential area—as indicated by value of dwelling (or rent paid).
 - b. Family composition and characteristics
 - (1) Family composition in terms of number of persons by sex and age.
 - (2) Occupation of head of household.
 - (3) Educational status of head of household and spouse.
 - (4) Income level.
 - c. Availability of transport
 - (1) Distance to public transport to go to work.
 - (2) Distance to public transport to go to main business district.
 - (3) Automobiles owned.
 - d. Information about local transport
 - (1) Length of time taken to go to work.
 - (2) Kind of transport used to go to work.
 - (3) Kind of parking facilities available at work.
 - (4) Kind of transport used to go to school.
 - e. Information about out-of-town trips
 - (1) Type of transport used.
 - (2) Number of persons from household on trip—classified by sex and age group.
 - (3) Principal reason for taking trip.
 - (4) Seasonality—month trip started and ended.
 - (5) Major destination.
 - (6) Distance from home to major destination.
 - (7) States or countries visited during trip.
 - (8) Duration of trips—number of days away from home.
 - (9) Over-night accommodations used during trip.
- B. *Survey of Truck and Bus Ownership and Operation:*
 1. General description: This survey will be an inventory of non-government trucks and buses in active use, showing their significant physical characteristics and the nature of their ownership and use. It will have two parts, a Survey of Truck Ownership and Operation and a Survey of Exempt and Intrastate Bus and Motor Carriers. The plans for the second of these surveys are incomplete at this time.
 2. Survey of truck ownership and operation:

- a. Sample size and design: The tentative plan calls for a stratified sample of power unit registrations — trucks and truck tractors. The size of the sample has been set tentatively at about 100,000 out of a total of roughly 12,000,000 in the nation, an average of about 1 in 120. The specifications of the sample will be tailored to the license numbering and recordkeeping system in each State, but in general the sample will be stratified by size or by some characteristic related to size or nature of use. The sample rate will be greater on heavy trucks than on the light ones.
 - b. Method of data processing: Every answer on the form will be coded and a card punched to give all the information for the specified vehicle. From these it would be possible to tabulate any useful cross-classifications of two or more questions on the form, provided the data do not reveal the ownership or activities of any carrier or truck owner.
 - c. Summary of types of information to be obtained:
 - (1) Vehicle description
 - (a) Vehicle type
 - (b) Type of fuel
 - (c) Axle arrangement
 - (d) Type and size of body
 - (2) Major use of vehicle
 - (3) Type of service of for-hire vehicle
 - (4) Business or occupation in which used
 - (5) Vehicle-miles driven and typical loads
 - (6) Employment
 - (7) Area and period of operation
 - (8) Truck fleet information
 - (a) Numbers of vehicles
 - (b) Types of vehicles
3. Survey of exempt and intrastate bus and motor carriers: This phase of the survey will be based on a sample of for-hire bus and truck carriers not subject to annual reporting requirements of the Interstate Commerce Commission. The information requested will be similar to that required by the ICC and will include annual revenue, number of employees, and number of buses and trucks owned or leased.
- C. *Shipper Survey:*
1. Purpose: A survey of shipments at point of origin will measure the volume and characteristics of commodity movements by all types of transport. The data add a new dimension to production and wholesale trade data by showing the geographic relationship between supply and market areas.
 2. Method: The survey will be based upon a sample of establishments and will cover shipments made by various means of transportation, including rail, truck carrier, private truck, water, and air. Shippers' reasons for use of the various means will be obtained. The immediate source of the data will be bills of lading, manifests, or their equivalents, covering shipments made in 1963. The survey will be made in 1964.

DISCUSSION

Carley.—You say that planners have spent their time on how man ought to live, whereas highway engineers are pragmatic and really are planning where man, according to his previous

behavior, has been living. Let me take strong issue with you there.

If that is the concept of highway planning, that is not planning. That is prediction. It is predicting where those

cars ought to be, where that man according to his previous behavior has driven his automobile. Therefore, we are in major conflict on the two papers. It is up to highway planners to say where a man ought to live; not only where by past experience he has shown he wants to live.

It is up to you people to decide by the way you build your highways where he ought to live. You have a social responsibility, and it is more than fact-gathering and historic data that tells you that he may want to branch out in this geographic section and this location, but it is up to you to point out that population distribution is necessary. Maybe you ought to build highways to take a man away from where he is living, rather than allow him to live in a congested urban lump, where he ought not to live at all.

Steele.—I did not mean, however, to restrict that to merely a projection in predicting, but rather to take into account the forces that have been in action in the past, and project on that basis. In other words, we should not just project what has happened within an area. If we did that, for instance, we would have New York City itself over 30 million within a few years. Actually, the city has been declining now for what—40 years.

So I do not mean simply to project what we have, but to predict on the basis of what man has demonstrated he wants to do, and will do if he is permitted to.

I do say that since the efficient use of many basic resources, especially land, will become increasingly important as the years go by, it may be necessary for both groups to give a little. I am not ruling out the idea that the highway planning must change somebody's concepts.

Carley.—You cite statistics about the loss of population in the central city. We have so many thousands of speeches given every year by demographers, social scientists, and others, about metropolitan growth. It really is a picture of metropolitan change, rather than metropolitan growth. I think that the point is well taken. Not only that, but

we do have to plan for change. There is growth in various areas, but it has been a picture of change more than it has of growth.

Steele.—That is correct. There is also the fact that merely because people move away and land uses change, that does not mean that the demand for transportation increases.

For example, Washington, D. C. has lost population, but there is much more traffic into the District today than there was ten years ago. The people who live outside now have to come back here to work.

Holmes.—You mentioned highway planners would have the responsibility for directing growth in the channels in which it ought to go, or encouraging man to live where he ought to live. Who is it that decides where he ought to live?

Carley.—I say it is the elected governmental leaders who are in part responsible, and it is not man alone who decides where he will want to live. That is what we are put in office for, to decide where it will be better for him to live.

Holmes.—Would you let him choose by giving him, say, a series of alternatives on which he himself might choose, or would you in some way, through the elected officials and some governmental process, make that decision for him?

Carley.—Certainly I do not want to make his choice for him. It is up to us to provide alternatives to people living in congested Milwaukee or congested Chicago. One of the ways to provide alternatives is to provide amenities in other places and means to reach those amenities.

This means jobs, recreation, highways, and other transportation modes that will get these people there. We allow them to pick, but we have an obligation to provide them with the opportunity to make a decent choice. In the past we often have not provided man with the opportunity to make a choice.

There is a sense of oughtness to anybody that is in government. In addition to describing things as the way they are, we have a responsibility to make them better. Making them better means an opportunity to let man live in a better

way, and in a better place than he has in the past. I say this is your responsibility as highway administrators and planners.

Granum.—Mr. Steele, I was interested in your emphasis on the value of the demographer, etc., to the highway planner. Over the years we have done our best to find some of these people. We have searched among the States, and particularly among the universities and the State departments on many occasions to find those people who could give us, as highway planners working with the States and other governmental units, some valuation or prediction of where people were going to be, how many there were going to be, etc.

Regrettably, I can count the people who could really help us on fewer fingers than on one hand. I found many who would furnish exhaustive treatises about the past history, who could give all the trends 50 and 100 years back, but who regrettably would not stick their necks out to the day after tomorrow. If we can find those people who can do a better job than has been done in the past in these predictions, I think it would be very helpful.

There was a letter to the editor in the *Washington Star* three or four weeks ago that was a rebuttal to the widespread conversation about the shift to urban areas, the population growth in the urban areas, and the 70 percent in the urban areas. The writer went back to analyze the changing description of urban areas, as posed by the Census Bureau, and what portion of this 70 percent was affected by the difference in definition of urban areas over the years. Then he further stated that out of this 70 percent, a high proportion are in a relatively few metropolitan areas. We know that the problems there are really terrific.

However, there are many acres in this country that are not urban, but do have highway planning problems. Anybody that flies over that great metropolis or megalopolis, as they call it, from Norfolk to Boston knows that it is going to be a long time before some of those piney woods are built up and populated by people.

One other thing in this regard: one of our greatest finance problems in highways is that of solving the local road problem. Therefore, I think we need to have great emphasis on badly congested urban area problems, without neglecting some of the other areas.

Babcock.—Mr. Carley, I think that as I understood your comment you say that the highway planner should have something to do in the determination of where and how people are going to live. I would submit as a thesis that this is directly in opposition to all basic fundamental planning; that the highway planner's obligation is to develop a transportation system which a qualified planner can give him in terms of the total predicted future land use and in terms of how and where people will live. Also, that this transportation plan must be fitted into the over-all program in the same manner that the utility plan, the recreation plan, and all others have to be fitted in; but that the total plan has to be developed by an agency other than the highway agency.

Now, the highway has to have planners, and they probably need city and regional planners. We have three who are working with us all the time. But we would still hold to the concept that we are not going to design a thoroughfare plan for a city until it has a land development plan, and that we are not going to design a thoroughfare plan until not only they have a land development plan, but that it is an adopted land development plan with the appropriate zoning and other controls so that it will become a reality. This I hold to be an appropriate concept in this particular case.

There are two types of planners, good planners and bad planners. There are some planners that try to shape a city the way they think it ought to go without any true, realistic, factual approach. There are other planners who visualize what the people want, and the general background of the city and how it will be developed.

As a case in point, the city plan of Raleigh, a city of about 100,000, was adopted in 1958. Today I would say the city is almost 99 percent on that plan.

This is also true with the transportation plan, because it was developed with careful thought by a man of great ability working with transportation planners as well.

I hold, that the highway planner has got to work within the framework of a total plan. There has to be some agency which will develop an over-all plan. You cannot have 18 different agencies doing that, but there must be one that develops a "total" plan. I think you have to fit your transportation planning within that over-all framework.

Carley.—What do you do if there does not happen to be a planner and a planning program in a particular region in your State? Then how do you build?

Babcock.—We do not build until we have a comprehensive plan and they may have to wait a year before we are going to plow in several millions of dollars.

Carley.—What I am saying is: In these given areas where there is not planning, it is up to you people to do the planning. I am talking about a far broader conceptual arrangement.

Babcock.—In our operation, we have been doing the planning cooperatively with the city, but we still call on a planner to do a land development plan.

Now, the State cannot get into a large metropolitan area and do the basic planning. I do not think it should—it is too far removed from it. There are local problems involved and a competent planning agency within that local urban area can do a better job than we could do, primarily because they are living in that area. They know the problems better, and their long-range master flexible plan is better than our people could provide.

We work with them and give them specialists, but I still think it has to be the community itself that must adopt a master plan based on what its people want to do in that area, and how they want to develop, and what they will accept. I think that is their responsibility.

Clauson.—I believe that you are both probably closer together than you realize. However, it would seem to me that this would be an area into which a con-

sultant should come into the picture and do the planning for the city. Then the highway department does not have to defend itself because its planners went into the city and did the related or over-all city planning.

I believe that this problem has troubled us in Iowa—that in any situation such as this where we have stepped beyond our legitimate bounds, it is desirable for a consultant or specialist in that field to come into the picture and do the planning.

Babcock.—What I think you are talking about here is that the highway department should broaden its whole concept of thinking in the development of its entire highway system within a State. To this I agree wholeheartedly, that they should think more than just of traffic. They should think in terms of the development of the State, and we have had recreation problems on the Outer Banks that many of you have heard of, and we are trying to look in that direction.

But I did want to get this subject re-oriented away from the concept of the State highway department doing a comprehensive urban plan in an isolated urban complex. This I think is fallacious.

Paterson.—Mr. Carley, I think one of the big difficulties is that you put your reliance on research in a kind of negative way by saying that we have no need for further broad-scale, long-term original studies. If you skip a piece here and then go on to your statement with regard to the oughtness of planning, I do not see how you can square these two things.

In other words, if you are going to rely on the oughtness of the planner to set up the criteria by which we are going to establish where persons will be living, then it seems to me the only way these persons can vote intelligently as to whether they want the kind of legislation that the oughtness provides is on the basis of current, detailed, penetrating, broad-scale research which you are referring to. After all, the idea of planning to determine where a government group is going to tell someone to live or tell them what to do is rather old, and

in this country our policies and philosophies have turned around the Jeffersonian principles of people making their own decisions, and government providing as much information as possible so that intelligent decisions can be made.

Mr. Granum was a little unhappy with the kinds of research we get, because a good many people interviewed are fearful of giving estimates which may later prove to be very embarrassing. This is quite true. I do not think any responsible chief highway engineer or highway planning engineer will find too much to criticize if an economist, a sociologist, is to make a prediction with regard to demographic changes 10 years hence, if they are off 10 or 15 percent. The point of it is that you have to take a risky position sometimes to be of any assistance or helpfulness. We worry about it constantly. We worry about being wrong, certainly; because all you can do is give the basic reasoning and assumptions behind the forecasts, and do the best you can with it.

St. Clair.—I certainly agree with what Mr. Paterson has called the Jeffersonian principle of free choice for the American people. We believe that our planning should be interpretive rather than compulsive, so far as it can be. But I think we have to acknowledge that when you locate a highway, and when you design a highway, you or whoever has the final authority is making a decision that will determine to a degree the location of places of residence, business, and commercial and industrial enterprises.

So we are in a sense—highway planners as well as the city and the regional planner—being a reluctant dictator to that degree. What he does is to go down there and form permanent public works.

Carley.—But the important point Mr. St. Clair raises is that the highway builders have had more of an impact on where people live in this country than any other single man-made factor, and more than any other factor except the presence of river basins. I do not think there has been anything more important than the locations of river basins, but the next thing certainly is the location of highways.

These have been decisions by men. Therefore, I call on the people who lay out the highways to carry always with them the sense of responsibility of what tremendous and awesome impact they have on social and cultural change.

Babcock.—I would like to put out a point that is entirely personal with me. I am not at all convinced that in the next 20 years the greatest and the most severe restrictions will have to be placed on the individual.

I have not seen the facts, that the transportation problem in the major urban sprawls that are continuing to develop, can be solved by either automotive transportation or by any form of transportation we now know today.

It is a fact that we have gone through patterns where we allowed a city to develop as it desired, and then finally found that we had to have the severest restrictions in zoning. I believe that we are very definitely going to reach the point in planning where decisions must be made which will severely restrict the individual's desire to choose his own form of transportation and to move as he likes.

Titus.—I would like to ask Mr. Carley about highway departments implementing this planning. Does it not require more implementing, in a good many cases, then highway departments of many States have now?

Carley.—I think it is probably true that there is some great restriction in the highway department's implementing. But I would like to add one other thing. I think most of the problem and most of the lag in this field comes not so much from the lack of legislation, but the timidity on the part of the highway administrators to do what they can do, and their being willing to settle behind the facade of, "Well, we just do not have the authority to do it."

Hager.—That was almost what I wanted to say. I doubt if the administrator does have the authority in most States to construct highways to induce traffic and benefit private enterprise. I think that the highway administrator's prime function is to build the urgent needs.

Now, if, in building those urgent needs, selecting a corridor for a needed highway between points A and B, there is a comprehensive plan, we should always work towards that comprehensive plan and give traffic, or future traffic service, in an area, providing it is economical.

I think that the question is of which comes first, the highway or the development of the comprehensive plan. In the development of a comprehensive plan, who pays for it? The highway user? The developer? Or some other agency in the State which is more qualified or probably more interested in the economic development of the State?

I mean, for example, such an agency as the development commission in Connecticut, which continually invites industry into the State. They get the industry to come in, and then come to us about the building of a road. We cannot build such a road until the traffic needs warrant it, and then we have to program it along with the other needs. There is never enough money to take care of those. So those are the predicaments that some of the States are getting into in this long-range program.

I am completely agreeable with everything you have said, Mr. Carley, but it is almost an impossible thing for the highway department to take it upon itself to induce traffic and build roads which would benefit private industry at the highway user's expense.

Holmes.—I was on a road between Hutchinson, Kansas, and Kansas City Friday. I was interested in the Topeka bypass where there were a couple of bridges where there were not any other streets there. There must have been some "paper" streets on either end.

The comment was that the highway department had been criticized, particularly and specifically, for building bridges where there were no streets to connect with them. But they said as the town grows they will have to be able to get across the bypass, with limited access, so the bridges were built. It can be done in Kansas at least, if you are willing to face up to the criticism that came. I think, of course, ten years from now everyone will be glad that

they did it. On the other hand, sometimes I wonder if we overemphasize the importance of transportation in some of these determinations that are made. Some of these mathematical models presume to take into account all of the factors that determine the location of an industry or some activity of that sort.

The one I am thinking of is in Connecticut. It shows the transportation people fairly far down on the list of the derivative factors. I do not think that in any way implies that transportation was not important, but compared to other items that were important in the location of that particular industry, transportation was relatively easy to provide and could come along afterwards without any difficulty.

And in that case—and I know this has been the case in other States—industry is located on the reasonable assurance that once the plant was known to be located there, with a greatly increased tax revenue brought to the area, there was very little difficulty in getting the necessary highway connections despite what plans might have been made in advance for the highways in other places.

So there is evidence enough, that highways are extremely important in locations of industrial, residential, and commercial developments.

On the other hand, there is just as much evidence that people locate in areas where transportation is particularly horrible. Just look around any metropolitan area, and see where people build their houses. After people build enough houses, the highway department has to provide transportation.

So there is an interaction in here that should bring a word of caution toward accepting as too much of a deterrent this factor of the location of the highway in advance of development. It does not always happen as you think it might.

Carley.—Well, we have under way in Wisconsin, a stretch of interchange between Chippewa and Eau Claire and the Twin Cities. A study is being made on the economic impact of that highway

with subsequent resulting development because of the location of an interchange. This will tell in 5 to 7 years what kind of development is coming about because of the situation.

Babcock.—In my judgment, in the last 20 or 30 years, this concept of planning which has been developed has probably been developed on less research and more hypothesis than any basic development that has taken place in this country in the last 2 or 3 hundred years.

I feel that there is a fundamental need for very basic research. I have seen planners who I feel are reasonably well qualified doing work in cities and going blithely ahead and planning precisely for more of the same, which any factual understanding of history will indicate will not take place. There is a need for many millions of dollars to be spent in basic, over-all planning research. There has been a great deal more in transportation research, even if it is only 0.17 percent.

Paterson.—The difficulties we have are related to the kinds of research which highway departments themselves can legitimately support. Apparently there has to be a very direct relationship between the research study and its usefulness to the highway department. It seems to me that this hampers the planning of the highway department.

In Missouri, we have no coordination of information and statistical services of government agencies. We have no over-all studies of economic and social implications at a statewide level, although we have one just starting. An economic base study of the State should be of direct usefulness to various groups, not only the highway depart-

ment. And yet it is somewhat difficult to overcome the reticence of these departments to support such studies, because they cannot make a case that it is needed immediately.

Hager.—In 1958 Connecticut appropriated \$45 million to build 45 miles of expressway from New London to Killingly, Rhode Island. The highway department opposed this bill because there was not enough traffic to warrant a 4-lane express controlled-access highway.

However, the legislature in its wisdom passed the law, based on the fact that it would induce traffic and develop that area of the State which was a blighted area with a large amount of unemployment.

We immediately started a research project with the University of Connecticut, and they have been following this since the project was completed.

The land values have doubled. Industry is coming in there quite fast. Unemployment has gone down. There is no doubt that for the economic development of the State as a whole we should build highways or could build highways to these blighted areas and prosper.

However, I still have to go back, as an administrator, and say that I do not see how we can use highway users' funds to induce traffic or benefit private enterprise.

Shaneman.—Suppose all 50 States did that. This is the same thing you get into. Put a highway in here, and we will attract industry and get redevelopment and everything. But you do not go on like that forever.