

community leaders and on the attitudes of these leaders, and highway effects on recreation or other nonwork associations.

These are some of the matters which are considered in this seminar. The authors have training in traffic engineering, economics, law, city planning, political science, and sociology and should be able to bring some of the sociological effects of highways into sharp focus.

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Five Years of Highway Research: A Sociological Perspective

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•RESEARCH into the economic and social impact of highway improvement is now in its sixth year at the Pennsylvania State University. This paper reviews in brief the researchers' efforts with emphasis on those facets of study which are of special interest to the sociologist. Indeed, the sociologist's proclaimed interests at times seem extremely widespread. With regard to highway impact, his concern may focus on the broader aspects of technological development through time and the concomitant increase in the complexity of a given society. At a lower theoretical level, as is the case here, he may emphasize various highway-community relationships. Even within this narrower framework, however, all relationships cannot be reasonably considered; i.e., they cannot be given the equal treatment they merit. Thus, the researcher must decide which factors he deems most worthy of consideration.

In this study, the sociological interest has been directed specifically toward changes in population, changes in level of living as measured by a social class rating, community values as evidenced to an extent by attitudes expressed, and degree of community organization as ascertained through use of an Index of Community Complexity. Sociologists themselves have been known to confess that their discipline is, at times, merely accumulative rather than being in a more preferred state of being "systematically cumulative." The sociological perspective presented here is posited on the assumption that systematic cumulation offers the best avenue to the understanding of highway-community interrelationships. Further, it is felt that this understanding is essential to the acceptance and success of the action programs affecting these interrelationships.

STUDY SITES

Three research sites in Pennsylvania have been studied intensively by the Pennsylvania State University research staff. These are Monroeville near Pittsburgh, Blairsville in Indiana County, and four interchanges in the vicinity of York. Because these locations and their respective highway changes have been described and presented graphically elsewhere, there is little need for reiteration here (1, 2, 3). It is sufficient to say that Monroeville had three major highway changes: the opening of a turnpike interchange, the opening of a new thoroughway to downtown Pittsburgh, and a widening of the major highway through the community. Many of the changes in Monroeville were compared with changes occurring in 38 other communities located on a ring equidistant from downtown Pittsburgh. Blairsville experienced the bypassing of its business district, and the York County communities were traversed north-south by an interstate highway and witnessed local construction of interchanges. Most of the findings set forth in the following relate to these three sites.

During 1963, researchers expanded the study to include 40 interchanges as a pilot study for the prediction of statewide interchange economic growth. Of these, 22 were selected for sociological study to initiate an effort to develop a predictor model pertaining to potential interchange protection as related to community structure. Two other communities, located in north central Pennsylvania, are also being studied. These were surveyed for attitudes toward planning and zoning. The objective of this part of the research is to study the effectiveness of personal contact and planning literature on related community attitudes.

FINDINGS

The findings with which the researchers have been most concerned pertain primarily to the decade of the 1950's, essentially to changes associated with recent highway construction as determined by the "before and after" technique. These findings, even treated quite generally, can shed some light on highway-community relationships, but they are probably more meaningful when cast in historical perspective. The early histories of the communities were studied through use of various published documents, commemorative booklets, and school records. Materials pertinent to the 1950's were gathered from local newspapers, interviews, tax records, and other government documents (1, 2).

On the whole, the case study communities have long highway-related histories. Monroeville, for example, first felt the importance of a highway in 1810 when the Old Northern Pike finally connected Philadelphia and Pittsburgh. Blairsville's highway history antedated Monroeville's by at least 23 years. In 1787, the legislature had authorized a state highway between the heads of navigation of the Juniata and Conemaugh Rivers, from Frankstown to Newport, the settlement which preceded Blairsville. Before the 1920's and the advent of a modern highway, Blairsville had been influenced by a canal; both communities had been affected by the railroad. Both communities had also been affected by the coal mining industry; thus, occupational structures had undergone pronounced change. There is little evidence that any of the communities studied paid much attention to orderly growth. Certainly there was little concern for whether community growth would lead to the unplanned obsolescence of the major arteries through the communities.

During the 1950's, the effects of highway development were recognized. Building of all types, but particularly residential, increased. Pressures on local facilities, schools, churches, and recreation areas were felt. Moves were made toward planning and zoning to prevent haphazard community growth, but whether highway protection is to become an integral part of those plans remains a moot question.

Intensive study has actually been undertaken in six communities, even though only three sites have been set forth. The York study area, as treated here, includes four distinct townships.

Population

Population data (1, 2, 3) were obtained from various sources, census materials, health department estimates, school records, and tax records. Detailed characteristics for households were obtained from interviews.

Of the six communities, all except Blairsville may be considered suburban. They, and the counties in which they are located, grew even though the nearby central city populations declined. Blairsville's population declined, but not quite as much as did the county in which it is situated. The community's decline no doubt can be attributed more to property condemnation for flood control than to the highway bypass situation. However, arterial highway communities exhibited greater growth than did nonarterial communities, even though the environment was otherwise similar. Those communities closest to larger population centers grew most. All study communities, following highway construction, attracted migrants who on the whole were younger and better educated than were those whose residence predated the new facility.

Level of Living

Data on level of living (1, 2, 3, 4) came from some public records such as occupations tax rosters, school census rosters, and poll books. Household interviews provided some of the information on incomes, education, and occupational mobility.

There is little question that the overall level of living of the study communities was higher after highway construction than it had been before. Blairsville's pool of unemployed and retired persons increased over 5 percent during the 1950's, whereas the professional category increased by $2\frac{1}{2}$ percent. Unfortunately, the community suffered a net loss of two manufacturing firms during the decade, but a part of the loss was overcome by the entrance of a major employer in the area, but outside the borough limits. The other research communities recorded noticeable gains in the number of manufacturing concerns, 13 in Monroeville during the decade and 17 in the York area from 1956 to 1962. Two inferences can be made: (a) new highway construction had some bearing on the location of these firms, and (b) some of the new residents were probably attracted by the firms' locations. However, all recent arrivals were not employed in these new plants, and these migrants made their contribution to local levels of living. Not only were they better educated than the preconstruction population, but on the average they were employed at higher occupational levels and had higher incomes. Moreover, it seems reasonable to hypothesize that, in addition to their geographic mobility, they had been upwardly mobile occupationally.

Attitudes

Information for the study of attitudes (3, 5) came primarily from two sources. One of these was several years of newspaper files which researchers surveyed systematically. The other was interviews of two types, one with a sample of heads of households and the other with a sample of selected community leaders.

In each of the six communities, the attitudes of leaders and those of other citizens were found to differ little. In all communities, majorities expressed favor toward recent highway developments in their localities. Most felt that the amount of expenditure had been "about right," and most felt that the cost should be broadly borne. Further, there is reason to believe that the favorable attitude toward the respective developments became more widespread after a period of time, presumably during which the residents became more accustomed to the changes.

On an intercommunity basis, there were some differences in attitudes. Suburbanites were more prone to view the highway as intended for local use. Correspondingly, they were proportionately more favorable toward construction costs. Furthermore, the suburbanites were more likely to express the feeling that the new construction had been beneficial and that they had favored it when it was proposed.

Community Organization

Data for this portion of the research (3, 4) were initially gathered by questionnaires to township and borough secretaries and subsequently from local and state government documents, interviews with planning officials, and school records. Community organization, as used here, refers to the existence of a number of local governmental functions or conditions which indicate progress toward comprehensive community planning. The degree of organization is measured relatively by the assigning of appropriate weights to each of the items. The summation of these values for a given community yields the community's score on what has been designated earlier as an Index of Community Complexity.

Use of this index revealed that highway communities tended to exhibit higher scores than did nonhighway communities. Although almost every community's score increased through time, nonarterial communities appear to have lagged about 10 years behind those on arteries. For those study communities on the same artery, the degree of organization was highest for those closest to the most immediate major population center. It was also found that the degree of planning development was related to community size and to level of living (social class rating) as evidenced by occupational

composition, income, and educational attainment. Additionally, there appears to be a relationship between community leaders' attitudes and the extent to which planning and zoning practices exist.

Highway Use

Data on use of the new thoroughfare (6) were obtained through interviews with heads of households and pertain to the Monroeville and York area sites. Use, as discussed here, relates to travel for work, shopping, and recreational purposes.

There appears to be a relationship between degree of use and selected socio-economic characteristics. Heavy users had higher level occupations, higher incomes, and more formal education. Homeowners and persons with numerous organizational memberships were likely to be heavier users, and newcomers were more likely to use the new roads than were the long-time residents. Many of these findings were substantiated by home O and D materials.

IMPLICATIONS

These findings are subject to a variety of interpretations, yet some facts are clear. The study communities had experienced considerable change before the most recent highway changes, but these latter changes appear to have had considerable impact on the communities. The influx of new people became marked; levels of living rose. Attitudes toward recent construction were generally favorable. Communities, for the most part, organized to direct their future development. Recent analysis indicates that those who were better educated and who were employed at the higher occupational levels were more likely to have expressed strong support for planning and zoning practices (7). Another effort, dealing with local government officials, indicates that they were favorable toward nearby construction and at the same time were generally favorable toward planning and zoning practices. Township officials, however, were less favorable than were borough officials (8). This is a problem which highway department personnel must face as they seek to have interchanges protected; this is particularly true in Pennsylvania where most of the proposed interchange construction is to take place within township boundaries.

Most of this project's work so far has been focused on suburban communities. It is well known that these are areas of growth and that the newcomers are the most prevalent users of the new roadways; something is known of the characteristics of the people. Given these facts, coupled with the idea of a favorable reception for the new roads, one would anticipate little problem for highway department personnel in suburban areas. Still, highway officials report otherwise and request an explanation.

Part of the answer may lie in the disparity between the times involved. Most research into the subject of the acceptance of local highway construction has occurred after the fact. Highway personnel must face local residents before construction, before the influx of new residents, at a time when local citizens are yet committed to stability as a major value.

Perhaps another partial explanation has been offered by Lash (9). His report, covering 12 years of study in one area, suggested that, although all conflicts could not have been avoided, the public hearings were not of a type to encourage a search for consensus. He pointed up the existence of differences in values and points of view and proposed that discussion at an earlier level might have permitted consensus and allowed participation in the democratic process. Virtually all present were opposed to the highway department's proposals. The same may be said of a public hearing attended by the author. There is little doubt that lack of information or late information can be detrimental to the overall process of discussion and negotiation. Research in south central Pennsylvania indicates that a number of landowners had no prior information that a highway was to go through their property. Their first knowledge came when they saw workmen driving stakes along the right-of-way (10). Obviously there is room for improved relations; possibly sociological research can eventually contribute to the desired improvement.

INTEGRATION

The project's first publication treated problems arising from the location of major highways and from unplanned land uses (11). This interest has continued, and the impact of community change on the highway has become a major concern. Since the inception of this concern, sociological interests have been quite visibly intertwined with those of the economists. Land-use planning at interchange locations of necessity recognizes the presence and importance of social factors (12), and a very recent presentation sent forth some specific aspects of community structure which are felt to be related to a community's inclination to engage in planning practices for highway protection (13).

The overall project design, as presently conceived, can be expressed as a triadic relationship:

1. The prediction of economic growth at interchange locations;
2. The design and programming of alternative land-use plans at those locations; and
3. The prediction of community willingness to adopt such plans in view of projected growth.

Given the physical and economic conditions necessary for community growth, an understanding of what changes may occur cannot ignore the importance of social factors. These latter variables are antecedent to any change and may, in fact, be cogent predictors of the form a planning program will assume.

Considerable reliance seems to have been placed on zoning as a mechanism to protect the highway right-of-way near interchanges. One research group has concluded that there has been unjustified confidence that zoning powers protect against the pressures of market demands (14). This same research group has warned that it is doubtful whether current planning practices afford a sound basis for the integration of land-use development and protection of transportation facilities (15). There are suggestions that some aspects of eminent domain may be feasible for highway protection, but often there are questions of acquisition costs, local acceptance of public ownership, and appropriate management. Another caveat relates to the difficulty of determining what the land-use pattern ought to be at any given interchange. Further, it is reasonable to question whether controls, exercised locally, would do other than to shove the problem beyond a specific community's political boundaries. Moreover, because local zoning, standing alone, may have some weaknesses, it makes sense to investigate the utility of related auxiliary control mechanisms. Admittedly, these are matters of concern and must receive the attention of action-oriented parties, but difficulty alone, or even past failures, should not preclude additional research effort. Too little is known about existing interrelationships and about potentials for mutually satisfactory adaptations.

OUTLOOK

The importance of understanding the highway-community relationship in Pennsylvania is accentuated by the magnitude of proposed interchange construction. Present plans call for 388 interchanges located in eight cities, 31 boroughs, 23 first-class townships, and 155 second-class townships.

It is the intent of the researchers to study a sample of 100 interchanges which are not located in cities, and the research focus is to be the three-pronged approach previously suggested. The sociological phase of this effort involves the development of a quantitative predictor model incorporating socio-economic and community structural variables.

One objective of sociological analysis is to identify the social forces that explain variation in the acceptance of those planning and zoning measures conducive to highway protection at interchange sites. Indeed, the future of interchange protection, in large measure, may rest on the extent to which there is study of these social forces.

Moreover, there appears to be a need to awaken local citizens to the consequences of interchange and other highway development. At present, local planning and zoning are in the hands of the local community. This authority can be used in some effort to prevent the unplanned obsolescence of a multimillion dollar expressway, for example,

by controlling development at interchange locations. Aware that such local power frequently has not been utilized, the Pennsylvania Senate has considered Senate Bill 543 which provides for succession of zoning authority from the community to the county to the state level if the interchange is not protected.

The reciprocities of the highway-community relationship are crucial to both highway and community development. That the past may illustrate little relationship between favorable attitudes toward highway protection and the existence and enforcement of the mechanisms to achieve that end does not mean that research into the attitude-action complex should cease. Rather there could be the implication of a message to be carried to local communities. It is highly possible that research couched in a sociological perspective may be of assistance in providing some of the content of that message.

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Informal Notes on Sociological Effects of Highways

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•THE SOCIOLOGICAL effects of highways are many and diverse. They are both direct and indirect. It is virtually impossible to separate the user effects of a sociological nature from the non-user effects. There is a school of thought which asserts that effects of these kinds are actually transferred from user to non-user groups.

The first question that might be asked is: What are these sociological effects and can they be identified? In this connection, it might be indicated that the very fact of highway and motor vehicle use, in and of itself, is a sociological manifestation. The highway business considers origin-and-destination studies as a part of the highway planning process. In the past, they have been dealt with in an engineering environment largely. Actually, these define sociology in action.

The highway improvement process itself also involves certain impacts of a sociological character. Urban highway improvement especially results, of necessity, in a certain amount of displacement and relocation of residence. The Federal-Aid Highway Act of 1962 provides for the rendering of relocation advisory assistance to this class of persons and permits Federal reimbursement of the costs of moving such families, up to a maximum of \$200 each, if such costs are authorized to be paid under state law.

Also included in this general subject matter is the matter of highway aesthetics. Highway officials have become increasingly concerned with aesthetics and are seeking to build facilities that will be pleasing to the eye as well as functional in their operations. Higher standards of performance in this area are present today than ever before.

Control of billboards along defined corridors of the Interstate System is authorized by the Federal-aid laws, and a bonus of 0.05 percent is authorized to be paid to those states which voluntarily embrace the program. About half of the states have already enacted the necessary legislation, appropriate agreements have been executed, and some of the states have already received bonus payments.

Highway officials are presently emphasizing the preservation, to the maximum extent, of fish and wildlife habitats and historic monuments. They are participating in studies that hopefully will lead to the preservation of some of the best of the nation's wild rivers. Additionally, a study is under way to define and establish a national program of scenic roads and parkways through the vehicle of the Recreation Advisory Council.

All of these programs and developments might be considered to define elements of the sociology of highway transportation. There are also other elements. Perhaps we could get some better insight into them by reference to several works in this area. For example, some interesting implications for sociological transportation research have been posed by Meyerson (1):

What is the meaning of driving to the individual: does the suburban wife-mother become in large measure an unpaid chauffeur? Does ferrying her family about deny her time she believes would be spent more advantageously on other activities of her choosing, or does the resulting contact with other aspects of the community expand what might be a privatized, lonely existence? For the adolescent boy has driving the family car become a sign of maturity as the wearing of