

Urban Transportation in Great Britain: Policy and Problems

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•TO ANYONE interested in urban transportation problems and government's response to them, London is exciting. The most important and instructive thrusts in British transportation today are those involving regionalism in local government, enhanced local responsibilities, the integration of transportation functions (in the broadest sense of the term) at the regional level, and the marriage of transportation to strong land use planning powers. The epitome of these developments so far is London since 1965, where the concepts are in operation and are soon to be expanded.

REGIONALISM-PLANNING-TRANSPORT INTEGRATION- LOCAL RESPONSIBILITY

London is one of the world's oldest metropolises. Covering over 600 square miles, it sprawls across a giant chunk of Great Britain and is the home of 8 million people. It contains a historic center city within its boundaries and suburban communities as well. It is troubled by all the urban ills.

What happened in London in 1965? In that year a maze of almost 100 independent-interdependent local governments (much like Trenton and its suburbs, Newark and its suburbs), having no locally developed overall direction, widely differing resources, and confused lines of jurisdiction, were reorganized into a new two-tier system of government.

What brought London to this state? In a word, growth! Or, as reviewer Reyner Banham once put it "...ever expanding...growth which alarms the town planners, delights the speculative builder, moves the motorist to obscenities, enrages the lover of the countryside and baffles legislators..." (1, p. 6). He might have been describing New Jersey or any of a number of America's expanding urban areas.

By the 1950's, it had become apparent that a change of some kind was necessary if London was to avoid either local paralysis or virtual outright control by the national government. The response was creation of a prestigious Royal Commission on Local Government in Greater London.

From the beginning the Commission's basic philosophy was aimed at serving the common good by harnessing London's vast energy to the engine of self-government. Two fundamental assumptions had been made in approaching this task: (a) that the borough should be the basic unit of government in Greater London, and (b) that there were certain functions whose impact was so broad that borough government could not or should not be made responsible for them. Among the major activities identified under the second assumption were planning, and highways and traffic.

The movement of people was perhaps one of the most critically difficult problems, for in London the increased mobility offered by the automobile is mocked by a road pattern that predates the automotive age. Streets wind their way from point to improbable point. Parking is at a premium, and all is made more complex by the practice of affixing similar names to different thoroughfares. Thus, one is bewildered by the word Kensington appearing on 10 separate streets, Cadogan on 5, Gloucester on 8, to name just a few.

These physical problems were compounded by the diffusion of responsibility for streets and traffic controls among the myriad of local jurisdiction. The Royal Commission found that, in order to establish one-way street patterns, the approval of no less than 6 different authorities was required.

Planning, crucial for any sensible scheme of development or redevelopment, was suffering from the same malaise. In fact, there was no overall plan for Greater London. Rather, there were 9 different plans, 4 of which included areas beyond Greater London. The only general plan in existence had not been developed locally but had come from the national government's Ministry of Housing and Local Government. And, shockingly, there was no agency, local or central, responsible for the collection of basic information on factors such as population, housing, traffic, and industrial and commercial development.

The Commission had begun its work in December 1957. Almost three years later, in October 1960, its findings were reported unanimously. After lengthy discussions and evaluations, the national government released its views on the subject in a 1962 White Paper that largely accepted the Commission's findings. In 1963 Parliament passed the London Government Act, and in 1964 the first elections under the new system were held.

What replaced the old maze? Today Londoners are served by a regional government covering 32 reshaped boroughs and known as the Greater London Council (GLC). The GLC was established as an elected regional government to undertake those functions and activities that were either clearly regional in scope or clearly beyond the capacity of small local jurisdictions. When the reorganized system of boroughs was established, a strong effort was made to balance their populations and economic resources. Of course, nothing involving humanity can ever be truly perfect, and government is no exception. Thus, the London system is not as clear-out as I have described. Nevertheless, in these general terms is found the goal of the reorganization.

How then are the transportation and planning deficiencies being resolved through the establishment of the GLC? Administrative arrangements are such that the Department of Highways and Transportation works closely with the Department of Planning. To appreciate the significance of this requires that two facts be clearly understood: (a) Planning in the British context is equivalent to planning and zoning in New Jersey's context, and (b) transportation functions in London, in a very real sense, is a tool of strong planning.

But what is the transportation structure in Greater London today and what changes are planned? First, let me briefly review my impression of the system's operations and outline some of the goals that have been established for it.

Fortunately for London's millions, there is an impressive network of rails, subways, buses, and taxis. In fact, London's subway was the world's first. In a 1967 report of the Greater London Council, 26 percent of the area's work trips were credited to rails (including subways), 38 percent to buses. Although figures for taxis were unavailable for all of Greater London, taxis make up a healthy proportion of central-area vehicles, totaling 11 percent of the traffic.

Public transportation accommodates a large percentage of travel for a variety of reasons, two of which are negative: the challenge of driving and the inability of a large number of the population to purchase automobiles. But there are positive reasons as well, the most important of which, to me, is the extent of service interchange.

On the 8 subway routes, there are over 40 interchanges with British Railways as well as a large number of interconnections among the lines themselves. But beyond rail, there is extensive coordination with buses and taxis. To illustrate, upon leaving the Sloane Square subway station the traveler happily faces a stand of taxis directly across the street and several bus stops a short distance beyond. Thus, he is provided with a number of options all within close proximity of each other. This is typical.

Although interconnection seems the key, there are additional factors militating in favor of public transportation. For one, the traveler has little difficulty in finding his way. Posted at each bus stop are the numbers of the buses servicing that location and their routes and schedules. Subway stations have large multicolored systems maps showing all stations and interchanges, supplemented by prominently displayed signs

listing the destinations accessible from specific platforms. Each subway car has several maps showing the entire route that it travels. Pocket-size booklets of the subway and bus systems are free for the asking. Maps, more comprehensive and easily understood, are now being introduced. All have contributed to minimizing the deterrent caused by confusion.

Two other positive factors are reasonable fares and frequent schedules. Subway and bus fares are based on distance. The minimum charge of 4 cents per mile tapers off after 12 cents so that the average cost falls somewhere between 3 and 4 cents per mile. Taxis charge 24 cents for the first three-fifths of a mile and 6 cents for each additional three-tenths. Time is also a cost factor. However, serious consideration is being given to fare boosts for both buses and taxis as of this writing.

Subway schedules fluctuate depending on the time of day. During rush hours, some lines maintain service at intervals of less than 90 seconds. During off-peak periods one seldom has to wait longer than 5 minutes. Bus schedules are more difficult to maintain because of traffic conditions, but some routes aim for frequencies as low as 6 minutes.

Center-city London comprises only about 10 of Greater London's 620 square miles. Yet, it is the commercial and financial heartland for the metropolis, indeed, for the entire United Kingdom. Into it each day pour over 1,000,000 commuters of whom more than 90 percent come by rail or bus. Although the total arriving by automobile is small, it has increased in the last 10 years by over 30 percent. The full implications of this must be viewed in the light of a predicted rise in automobile ownership, from 1.2 to 2.5 million by 1981, and against the backdrop of the street network already described.

How will London cope with the seemingly irresistible tide of automobiles and the inexorable flood of traffic with which so many of our cities are all too familiar? While all levels of American government agonize over the question of costly urban highway construction and demonstrations increasingly mount against its disruptive effects, Londoners have charted a course of action.

By any standard it is a courageous decision: The automobile shall not be king in center-city. Whether for good or ill, it was taken only after years of extensive study of land use and transportation, population and economic growth, travel habits and travel demands. In any event, the decision-makers will be comforted by the knowledge that they utilized a projection of travel patterns reaching into the 1980's and grounded in intensive research.

Some may say, Why restrict the automobile? Clearly people want to drive or they would not purchase cars to the extent they do. They might even add that to prevent someone from traveling in the manner he chooses is an infringement on individual freedom. London's answer to these arguments is quite simple: Unbridled freedom for the automobile is too costly and destructive to permit. To build the highways required to accommodate the demand for center-city access would be frightfully expensive, as it is in all urban areas, and unacceptably damaging to the densely populated and built-up environment. The GLC intends, therefore, to manage the demand rather than capitulate to it. And it will attempt to do so with a number of approaches.

First, an Inner London Parking Area (ILPA) has been defined in which fees and time limits will be set to discourage commuting by car. The ILPA consists of 40 square miles, and rigid enforcement of regulations is expected throughout. Large areas have already been metered, and steps are being taken to control off-street parking as well. New building construction will provide significantly less parking for employees than was previously required. With this program the GLC hopes to ensure that "...on-street and off-street parking will be related to the capacity of the road network, land use, density of development, and economic and social needs" (2, p. 1).

Can such an approach succeed? At the Imperial College of Science and Technology I asked a transportation expert about a recent rise in the number of passengers using public transport. The professor walked to his office window and pointed to a large number of empty metered parking spaces on the street opposite. "It used to be quite impossible to get a parking place on that street before the meters were installed, and now look at it. Perhaps that is one of the reasons for the increase," he said.

The second method the GLC will use is the simple device of not building any additional major roads into the ILPA. Existing roads will still be improved to assist in speeding traffic flow. The lack of new construction is expected to have the effect of driving people out of their automobiles because of congestion and onto public transportation, the third major element.

The GLC is as committed to rail and bus improvements as it is to the first two weapons in its arsenal. It recognizes that all three are intimately bound and that to emphasize one and not the others would be foolish and unfair. The goal is balance among the travel modes, and public transport is to undergo subway extensions and improvements, a fundamental reshaping of bus services, and an expansion of park-and-ride facilities at rail stations outside the ILPA.

Despite the emphasis on automobile restriction, it would be wrong to give the impression that the GLC is ignoring highways. Far from it. But what it has decided is to build them in the suburban areas where traffic studies have predicted the greatest demand will occur. Moreover, it is in suburbia that the conditions are considered best for highway emphasis; the population is less dense though automobile usage is high, public transport is weakest, and parking is less susceptible to control. To fill the void caused by years of little or no construction, the GLC has outlined a limited-access highway network of over 100 miles that will cost more than \$2 billion on its completion in 1983. All will be built outside of the ILPA.

If the GLC's goals are ambitious, the obstacles in its path are no less impressive. For example, although it can regulate on-street parking, its off-street powers are limited and depend largely on cooperation from the London boroughs and private operators. And enforcement, the crucial phase of any parking program, rests not with the GLC but with the Metropolitan Police who are responsible to the national government. In the construction of highways the national government retains power, except for inner London, to build or not build the major primary routes known as trunk roads. Conceivably, it could decide to do so in areas where the GLC believes them to be unwarranted, or not to in locations where they are felt to be necessary. Rails and buses are outside the GLC's sphere of control, and responsibility for them is divided between two autonomous agencies. Hence, the possibility always exists of stalemates over policy in this very vital field.

Aside from the organizational weaknesses, Britain's financial crisis looms like an evil spectre. Already two extensions of the London subways, which had been agreed upon, have been deferred for economic reasons. The drive to save the pound may claim more victims, perhaps in the suburban road program.

And yet, with all the problems, progress has been made. Widespread agreement on the concepts, requiring as it did so much cooperation, is an achievement of considerable note. Moreover, as a result of hammering out the policies, some of GLC's deficiencies are soon to be corrected.

Today the GLC's Highways and Transportation Department has responsibility for the construction and maintenance of the principal (nontrunk) roads within its area. It is also responsible for traffic control, a critical area in which in New Jersey the jurisdiction of the Department of Transportation is minimal and for which no regional responsibility exists anywhere throughout the state.

Under the latest proposals for London, as outlined in a July 1968 Ministry of Transport White Paper, the GLC would assume still greater control over traffic and parking, particularly off-street parking. Jurisdiction over major roads would be expanded. The British Railways Board, which operates the bulk of the rail commuter services, would be placed under statutory obligation to consult with the Greater London Council on decisions regarding matters such as fares, levels of service, and new investments within the London area. Most important, however, the GLC would take over policy and financial control of the London Transport Board, which now owns and operates the bus and subway systems and has some commuter rail responsibility in the Greater London area. About the only aspects of transportation that would remain beyond the jurisdiction of the GLC are the taxi fleets and the actual enforcement of traffic and parking policy. These would continue to be a function of the Metropolitan Police, who are responsible to the national government through the Home Office.

If the British government and the GLC agree on the Ministry of Transport's proposals and they are enacted into law, the GLC's Highways and Transportation Department will be equipped with an incomparable array of tools to deal with the problem of movement on a systematic basis. This will, I believe, prove to be a healthy approach and one to observe carefully for the lessons it will no doubt teach.

These truly impressive transportation tools will not be used arbitrarily nor in a vacuum, for guiding and rationalizing them will be the strong planning powers mentioned earlier. Through its Planning Department the GLC "... must prepare and maintain a strategic development plan for the area—The Greater London Development Plan. [The Plan] ... will have transportation proposals providing for a pattern of communications related to the use of land and seeking to make the best use of all forms of transport in harmony with the environment... [and] one of the main concerns... will be to achieve a right balance between population and employment. This will directly affect such problems as the journey to work and traffic congestion" (1, pp. 33-34).

Under the zoning aspect of the planning powers, "The London Borough Councils must refer to the GLC all applications for planning permission for large concert halls, stadia, university buildings and other developments likely to attract large numbers of people: for airports, heliports, car parks, railway termini, and stations for public service vehicles.... All other applications are dealt with by the borough councils but they must seek the direction of the GLC before granting permission for major shopping development... development which might affect metropolitan roads or the GLC's responsibilities for traffic and transportation..." (1, p. 35).

Thus it is clear that the GLC has, or will have, powers to deal decisively with virtually all aspects of transportation. And they are powers that the authorities give every indication of willingness to use. To illustrate, I mention again the decision to restrict the automobile in central London. Basically this flows from a planning decision to preserve the center's historic character as well as its role as Greater London's major commercial area.

The question could fairly be asked, What if big stores decided, as they can and do decide in the United States, that they don't like the restrictions and are abandoning Central London? Under the system they would be forced to seek approval for their new locations from the very people who are determined to keep the center viable. Their chances would appear slim. Thus, one can readily see that, were this concept in effect in our urban areas and had planning decisions been made in them to revitalize the downtown centers as the major commercial foci, the new shopping centers springing up in suburbia would be judged on a different set of criteria from those now applied. Their relationship to regional planning goals would be paramount. In my opinion, this is how it should be.

That, in brief, is the structure of, and attitude toward, public transportation in the metropolitan area of Greater London. But what about the rest of the country?

One of the hottest political issues in Great Britain while I was there was the Transport Act of 1967. It is a massive document attempting massive changes in virtually all fields of transportation. The subjects of its more than 250 pages range from inland waterways policy, to the carriage of goods by train vs truck, to the organization of public transport in the country's major urban areas.

Through the Transportation Act of 1967, the British government is establishing a regional transportation approach in four of the country's largest metropolitan areas (referred to as conurbations) outside of London. These are Manchester, Liverpool, New Castle, and Birmingham. In none of these conurbations does a regional government exist. Rather, they are like an Essex County without a county government. Because the Transportation Act is limited to transportation matters, it does not establish land use planning on a regional basis, nor create elected regional governments. However, it does bring about a level of integration of public transportation services unheard of previously in these areas and, in doing so, involves local government every step of the way.

What is the philosophy behind this effort? The Ministry's 1967 White Paper answers this question quite clearly: "All the studies... suggest that our major towns and cities can only be made to work effectively and to provide a decent environment for living by

giving a new dynamic role to public transport as well as expanding facilities for private cars. Unless we recognize this we shall down the centers of our towns in an attempt to get rid of congestion; and at the end of the day we shall find congestion still with us, and the character of our towns destroyed" (3, p. 2).

The makeup of the Passenger Transport Authorities (PTA) will be established only after consultation by the Minister of Transport with the local governments to determine the exact area to be included. The Minister will appoint one-seventh of the members, and the other six-sevenths will be drawn from the local governments involved. Thus, local control will be assured.

It will be the job of the PTA to coordinate, rationalize, and, in general, oversee all public transportation within their areas. It is strongly felt that such a system is made necessary in order to prevent the ultimate dominance of the automobile and the consequences that flow therefrom. Over and over again in Britain one hears, "We don't want to happen to our cities what's happened to so many American cities."

The mandate for the kinds of bus and rail operations in which the PTA can engage is broad. But the government has made it clear that, although it intends to render financial assistance, the local governments will have to bear the brunt of whatever deficits are incurred as a result of decisions made on the local level. Apparently, the idea is to force some responsibility on the local people, whose task it will now be to decide what sort of services they want.

The Transportation Act provides for a series of aid programs to the PTA: 75 percent of the cost of constructing public transportation facilities (on the strength of this Manchester is planning construction of a new rail line and reorganization of its bus services); 25 percent of the cost of new buses; and, a 90 percent declining grant to cover the deficits of rail lines. This last program is of special interest because of the nature of the PTA rail and bus operation. The PTA can, if they wish, contract for services with British Railways, and the new National Bus Company to be established under the Act, or with other bus operations existing within the area. In the case of buses, any deficits incurred will have to be met by revenues raised locally.

In the case of rail, however, the 90 percent declining grant has been decided on evidently because there is far less flexibility with rail than with bus operations and because some of the rail services will be deficit-ridden from the start. The declining feature of the grant is pictured as an inducement to improve operations to the point where they become either self-sustaining or incur a deficit that is at least tolerable and can be made up on the local level. Its duration is set for a 7-year period after which the PTA, supposedly, will be on their own.

This scheme is a giant step toward rationalizing transportation in metropolitan areas, but it suffers as previously indicated from not having, like London, an elected regional government with regional planning powers, traffic and parking controls, and highway powers. However, London was apparently the herald of things to come; for the entire British system of local government has undergone a detailed study by another Royal Commission, and it has recommended regional governments for the conurbations on somewhat the order of the London system.

Given the normal time span between filing of recommendations, acceptance by the government, approval by Parliament, and final implementation, the PTA will probably have broken some very useful ground in the public transportation field for the new regional governments before they begin functioning. As a Labor Party publication has stated, "... no individual or local authority... can at present carry out proper studies on ways public transportation could be improved or new methods of rapid transit employed. The setting up of a passenger transport authority is a vital step towards the proper planning and operation of public transport as a whole" (4, p. 5).

This activity in Great Britain makes great sense to me. It bears close watching by those in the United States concerned with and involved in the acute difficulties of urbanization and the transportation needed to serve it. If we are to make any headway toward the solution of the monumental traffic problems we face in our urban areas, then surely the organizational tools required to do the job must rank in the first order of priority. Money, alone, is not enough.

BUSES—PAST AND FUTURE

The admixture of regionalism, local responsibility, and broad transportation integration coupled with strong land use planning powers appeared to be the most impressive developments in Great Britain. There were other items of interest, however, that, because of their potential applicability to our own situation, deserve mention in this report. For example, those who give increasing attention to the faltering bus operations in New Jersey might benefit from a short description of London's recent bus experiences. The picture there is not bright, but action is being taken.

The difficulties of the London buses are not readily apparent, unless one is a steady customer or involved in transportation. For in visitors' London few things are as visible as the famous double-decker with its passengers hopping on and off the open back and scrambling up and down the narrow winding stairs that lead to the top. It is an amusing, almost appealing sight; part of the charm of a charming city. But visitors' London doesn't tell the tale. It masks the statistics reflecting average passenger losses in excess of 100 million yearly, and an annual deficit now of approximately \$20 million.

It was not always so, this decline of the bus. At one time, not long ago, buses, virtually monopolized road traffic and happily earned profits for their owner the London Transport Board. Two factors have undermined this supremacy: prosperity and automobiles. Prosperity has meant automobiles, which compete directly with buses for passengers. Prosperity and automobiles have meant different shopping and recreation patterns resulting in sharply reduced bus patronage in off-peak service hours. Automobiles have brought traffic congestion, especially during peak hours, which in turn adversely affects bus service reliability, the quality most demanded by passengers (5, p. 4). Prosperity has spawned suburbia, at once contributing to both demand for commuter bus services and traffic congestion caused by automobiles. Prosperity has meant a labor shortage and, because most London buses require two-man crews, this has also affected service reliability. Most of these factors are applicable to New Jersey.

Transportation people in London are unwilling to accept that past trends inevitably determine the future. To do so would be to accept the bus's ultimate demise, and disaster simply cannot be permitted to overtake an operation that, though in trouble, carries almost 2 billion passengers annually. The national government, Greater London Council, and London Transport Board have all thrown themselves into the battle. Many efforts are under way to enable the buses to cope with the present and come to grips with the future. Some are in the nature of short-term expedients, others are more fundamental.

In the first category are measures that largely serve to improve traffic flow, such as the elimination of bottlenecks, banning of cross-traffic turns (except for buses), parking controls to create unobstructed streets (called clearways), and establishment of exclusive bus lanes. These are sensible steps, and some degree of success has been achieved. Their value, however, is limited because improved traffic conditions often tend to generate additional vehicles and renewed congestion; and the exclusive bus-lane concept is constrained by the intensely built-up nature of any densely populated city. What these measures can do is buy time; they cannot solve the basic problem.

The question can then be asked, Is the problem solvable? Although not at all sanguine, officials believe that if there is an answer it lies in a major shift of policy and financial powers among existing agencies, restructuring of bus operations, some pretty heavy investment, and restrictions on the use of automobiles by commuters.

The major power shift has been discussed in the previous section. It is the rather logical step of taking away responsibility for policy and finance from the virtually autonomous London Transport Board, whose functions are restricted to rail and bus, and giving it to the elected Greater London Council, which will thenceforth be responsible for the total transportation network, including highways and traffic control. This shift will, it is hoped, result in a more balanced allocation of resources among the modes based on the vastly improved coordination expected in transportation planning. In such a context, the argument goes, the viability of all modes of transport will be maximized. This, at least, is the theory.

The restructuring of operations is under way in a new approach to routing and scheduling. Bearing in mind the passenger's desire for reliability and basing its decisions on masses of data about future travel patterns, the London Transport Board is making major changes. In the suburban areas, where growth in automobile travel will be greatest, routes and schedules will accommodate demand for movement between business and commercial centers, and for feeding passengers to rail and express-bus commuter services to central London. Within central London itself, short-distance, almost nonstop services between rail terminals and other major movement points will be vastly expanded.

Hand in hand with route and schedule changes is the heavy investment feature. A large number of interchange points between feeder buses and commuter services will have to be built. In addition, a decision has been made to replace much of the two-man double-deck fleet with one-man single-deck buses to reduce labor costs. The national government, through the previously mentioned provisions of its new Transport Act, is committed to aid this kind of investment and will do so with grants for constructing interchanges and acquiring buses. Without such assistance it is doubtful that the Greater London Council and London Transport Board could implement the program as quickly as they would like.

Restrictions on the automobile have already begun with parking charges designed to discourage commuting into central London. Moreover, the possibilities of road pricing and special licensing schemes, which would really amount to tolls on those using central London streets, have been raised. Because the commuter uses the streets most frequently, he presumably would receive the most discouragement. However, at this point it is difficult to determine whether the references to these schemes are trial balloons or veiled threats. They may be both, but in any event the basic decision to restrict the automobile commuter is firm.

It is quite possible that after all the steps have been taken, the buses will still lose money. The deficit-inducing disparity between peak and off-peak patronage will probably continue, and even grow worse. This will not be reason enough to abandon the buses, however, for commuter railroads have shown that failure to pass the test of profitability, or to break even for that matter, does not mean that their peak-hour passenger function is not necessary, even vital. Indeed, it is likely to become more so with each passing year. The role of the bus is reasonably assured, therefore, it only as one of the principal carriers of a group causing it such severe problems today—the commuters.

The situations in New Jersey and London are by no means precisely comparable. Yet in light of growing concern with traffic problems and our desire to "save the cities," London's struggle to rationalize its bus services should prove most interesting.

WEST END TRAFFIC CONTROL EXPERIMENT

Those bedeviled by the traffic problems of American cities would be most interested in an operation under way today in London. Its nerve center is a room on the fifth floor of Scotland Yard, which looks as though it might be a set for a science-fiction film. On one of its walls, framed by 24 television screens, is a huge map with dozens of tiny lights flashing constantly. In front of the wall are 3 larger television screens, as well as more detailed patterns of key portions of the map. Facing these are operators' desks with enough switches and handles to evoke nostalgic memories of the once exciting, but now old-fashioned, Buck Rogers.

Alas, this is not the command post of some imaginative space age effort. It is, instead, the control room for a traffic experiment in a portion of London's famous, busy, and crowded West End. It is operated by Britain's Ministry of Transport, which is, in an age of moon exploration, still wrestling with the mundane problem of preventing traffic jams on the ground.

What the Ministry is doing is, in a sense, inevitable. It is attempting to computerize the business of traffic control. To do so, it has chosen an area of roughly 6½ square miles containing 150 miles of streets, and encompassing a "...wide variety of traffic problems resulting from...exhibition halls...football grounds, commuter traffic, and

...shopping areas..." (6). Some 100 traffic signals have been connected to the computer at Scotland Yard. The experiment began in January 1968. The British claim it is the first of its kind in the world to combine computer control of vehicle-actuated traffic signals with closed circuit television surveillance at critical points. Its cost is over \$1.3 million.

At this stage of the experiment closed-circuit television is vital, for the computer's automatic qualities have yet to be completely refined. When this happens, television will not be necessary, and human involvement will be reduced to a minimum. This will mean, of course, that the computer will automatically respond to data on traffic volume fed to it from a network of detectors sunk into road surfaces at vital locations. It will put into action for the area a series of plans that will vary with the increase or decrease in traffic flow. These plans will control the workings of all signals until traffic volume drops to a level at which an area plan is no longer required. At that point the computer will cut-out, leaving each signal to operate independently on the vehicle-actuated basis.

This is, to say the least, a large and exciting undertaking, and the Ministry's technicians have been encouraged by the results thus far. Their calculations reflect an increase of 7 percent in traffic flow since the experiment's start. For this early in the program, the results are above expectations and more than sufficient to justify the expenditure. The Greater London Council has been watching this progress with more than casual interest. As indicated earlier, it is the traffic control authority for all of London, and this may be one of the more important answers to its problems. Without awaiting the experiment's end, the GLC has decided to extend this approach to an additional 14 square miles containing about 300 signalized intersections.

The roles of the Ministry and the GLC are significant given the fact that the experiment area involves territory from three separate London boroughs that were, until a short time ago, their own traffic authorities. Traffic flowed over their streets for years, as it does today, oblivious of borders. And yet, it was not they who launched this experiment that benefits them but, rather, governments with broader outlooks and regional powers and responsibilities.

The technical achievements of London's West End project are doubtless impressive, but equally important is the fact that there was a regional approach to the problem. This is something that should not be overlooked by anyone interested in its application to an urban area in which there are multiple municipalities. Just as traffic congestion recognizes no artificial boundaries, the remedy for it should be free from the same constraints.

AIRPORT RAIL LINKS

The final item to be covered in this report, but by no means the final item studied, has to do with the increasingly important question of how to improve ground access to airports. Every so often an idea comes along that, without respect to its ramifications, captures the public imagination and seems to be so sensible that it becomes almost conventional wisdom. One of these is rail access to airports. For example, almost every proposal for a new jetport in the New York metropolitan area seems to be accompanied with an excusatory phrase that goes something like this: "...and even though it is far away from the main population centers, a high-speed rail connection will solve that problem." In the abstract it is a great idea, and it would be in reality were it not for the cost.

Whether or not rail access is provided to new jetports depends on careful study of the individual circumstances of each proposed jetport. And circumstances always vary from case to case. London's experience helps, I think, to demonstrate this point, for it is served by two jetports, Gatwick and Heathrow. Heathrow is by far the busier of the two, but Gatwick has a direct railway connection from Victoria Station in London. Heathrow is slated to receive one.

In Gatwick's case the rail line carries about 50 percent of the air passengers. Although this is an impressive percentage, the number of passengers flowing in and out of Gatwick in 1967 was only about 2 million. Because this is hardly enough to support the costly construction of an exclusive multimillion dollar rail link stretching 28 miles

from the heart of heavily built-up London, I made inquiry as to how and why it had been accomplished. The answer is that the line is not an exclusive rail link as it was already in existence when the airport was built. Further, and more important, it is a busy line in its own right servicing a good number of well-populated stops in southern England.

What happened in Gatwick's case was that, when the airport was built, a slight bend in the existing line was straightened for a nominal sum so that the airport became another stop on the existing line. Because the line has substantial business in its own right, the trains that stop at Gatwick can be operated without crushing deficits. If, however, Gatwick had been the only stop on the line, and even if the capital cost had still been as low as it was, it is doubtful that an exclusive service could be run to the airport without massive losses on the operating side.

Because of Gatwick's good fortune, service is good and in the peak vacation season trains leave the London terminal every 15 minutes during 14-hour daily periods. In the off-peak season, they leave every half hour. Tickets and baggage can be checked at the Victoria terminal. In all, it is a smooth operation even though the number of passengers handled is relatively small. But, clearly, Gatwick's special circumstances make it impossible to use its rail link as a justification for an exclusive rail link any place else.

Heathrow is a different story. The size of its operations greatly overshadows that of Gatwick's. It claims to be the busiest international airport in the world, handling 13 million passengers in 1967; the number of passengers has been growing over the past 5 years at a rate of 14 percent annually. Expectations are that by 1971 nearly 20 million passengers will enter or leave Heathrow.

At present, Heathrow, 15 miles from central London, is reached by car, taxi, or airport buses. The latter leave from several major downtown terminals, which provide complete ticket and baggage checking facilities. The problem of ground access is simply that traffic congestion on the highway serving Heathrow is growing rapidly and is increasingly interrupting the reliability of the vehicles that serve the airport. One can legitimately raise the question, Why not improve the highway instead of building a rail line? Here the story gets complicated, but it should be told for the enlightenment of those devoted to the concept of exclusive high-speed rail lines.

Heathrow's proposal comes as the result of a variety of forces, some of which are negative and some positive. The negative forces are as follows: (a) The expansion of the existing highway would cause severe environmental disruption given its present location through built-up areas; (b) highway dollars are scarce, and the need to spend them is seen to be greater in other areas of London, i.e., balanced against other highway needs the priority of a highway expansion to Heathrow is not high; and (c) it would take far longer to build the additional highway capacity than it would the rail link even if the money were available.

The positive factors come as a result of a confluence of interests that make the case for it exceedingly strong. To begin, the downtown rail-link terminal would be Victoria Station. This facility is now one of the busiest, if not the busiest, commuter station in London. It serves a huge area of southern England. It is the rail terminal for Gatwick Airport. It is old and decrepit in appearance. It is the focal point in an area that both the GLC and Westminster Borough want to redevelop. Thus, two important local governmental entities wish action at Victoria. Moreover, the British government plans to go ahead with the cross-channel rail tunnel to France, for which the English passenger terminal will be Victoria. The government desires this gateway to be impressive to the visitor, and thus it wants action at Victoria.

At Heathrow the terminal buildings are surrounded by runways and cannot easily be expanded. The British Airports Authority, therefore, believes it must have substantial check-in facilities at downtown terminals. Because that normally means passengers must take some form of public transportation to the airport, and because highway access is patently becoming congested, and because Victoria is centrally located and would provide interconnections with existing subway lines, rail service, bus service, taxi service, and the Gatwick terminal for air transfers, the British Airports Authority wants action at Victoria.

The British Railways Board sees these disparate desires as an opportunity to make a substantial real estate investment beyond the mere building of a new station. It wishes to construct either a major hotel or an office facility above it. To ensure the most profitable utilization of such an investment, British Railways wants an airport rail link with its terminal at Victoria so that the millions of persons who would yearly come from or go to Heathrow would have the opportunity to take advantage of whatever the new facility ultimately is. It is estimated that 8.4 million air passengers and 1.1 million other people would use the rail link in 1971.

Furthermore, the rail link could be constructed by 1971 (highway construction could not be ready until 1974) and would entail a minimum amount of disruption to the environment because most of the rail mileage is over tracks already in existence. The rail link, the development necessary at Heathrow and Victoria, and the rolling stock are estimated to cost \$57.8 million, of which the rail cost is approximately \$44.8 million (predevaluation figures). Here again, somewhat like the Gatwick link, the cost is significantly lower than what it would be if an exclusive link on an entirely new track were to be built. It is expected that patronage will be more than sufficient to cover operating and capitalization costs. Indeed in 1972, the first full year of operation, a profit of over \$5 million is projected (predevaluation figure).

The stories of Gatwick and Heathrow are significant, I feel, in demonstrating the futility and irresponsibility of blind faith in the construction of exclusive rail links to ensure the success of jetports built at great distances from population centers. In Gatwick's case, exclusivity would have been financially impossible; in Heathrow's case, the rail link appears close to reality in part because powerful governmental jurisdictions are interested in it for reasons other than those of improving ground access for passengers, in part because funds for a road solution are not available thereby ensuring rail patronage, and in large part because the proposition will pay for itself even though it will provide exclusive service. In both cases existing trackage within close proximity of the airports saved what, in all probability, would have been prohibitive construction costs.

RECOMMENDATIONS

What, then, does one recommend for New Jersey after study of Great Britain's policy and problems? First, one must point up the more important differences between Britain and New Jersey. These are as follows:

1. In Britain, a much smaller share of local government costs is borne by local governments than in New Jersey.
2. In London, transportation is more broadly defined as the role of one department than it is here, and more of the components either have been or will be integrated into one department.
3. In London, an elected regional government with real powers has been established. This system will probably spread elsewhere. This is in direct contrast to the tradition of local home rule in New Jersey, which stultifies efforts to achieve even the most sensible cooperation among municipalities.
4. In Britain, strong planning powers exist on both the regional (London) and national levels, and planning goals are established and pursued; London's green belt and the preservation of central London come to mind immediately. In New Jersey, planning and zoning controls are vested in more than 550 municipalities, severely hindering meaningful regional or state approaches. Those planning functions that do exist on the county and state levels are virtually without enforcement powers.
5. In London, transportation is married to land use planning and is a tool for implementing it, at least in theory. In New Jersey this is hardly true. The counties with planning departments do not have transportation departments, and the fragmentation of land use planning powers at the municipal level, rather than concentration at the county or state levels, forces the New Jersey Department of Transportation to respond to the accumulation of scores of scattered and unrelated decisions over which it has little or no control.

6. In Britain there is a greater willingness to rely on automobile restraint than in New Jersey. Indeed, one hears the words used often there, whereas such daring phraseology has not yet crept seriously into our vocabulary.

7. The degree of public ownership of transportation in Britain is enormous. Public ownership is virtually nonexistent in New Jersey.

8. Resources in Britain are in much shorter supply than they are here.

After outlining the differences, one is struck by the fact that some solutions to transportation problems like ours may well be unattainable; some surely are outside the realm of the State Department of Transportation. Supporting this contention are two basic facts about New Jersey government: (a) The excessive reliance on local property taxes for local revenue forces our municipalities to engage in vicious competition for tax ratables virtually without regard to its effects on their neighbors; and (b) to permit themselves maximum flexibility in the pursuit of ratables, the overwhelming majority of municipalities are willing to relinquish few, if any, powers, particularly planning and zoning powers.

It is almost unnecessary to point out that these forces fly directly in the face of, and powerfully undercut, our oft-stated goals of saving the cities and making urbanization a livable proposition. Because of our system, each municipality seeks to develop land in a way that is best for it rather than in a way that is best for the region of which it is a part. After all, under an elected system of local government, officials are subject to incessant demands to keep taxes down. The only way to oblige these demands is to develop tax-producing property on open land. The implications of this for transportation are obvious. Without systematic regional planning, transportation becomes only a response to a multiplicity of unrelated municipal decisions. This is not system, it is confusion.

Every effort must be bent to have more of the cost of local government borne by state government. Ideally we should aim at the complete underwriting of education, the heaviest of the local tax burdens. When the point is reached that local property taxes are not viewed as confiscatory (in the older cities this is the case, but in the suburbs officials are trying to avoid that position), only then can the municipalities be induced to think of the region as a whole, and only then can regional transportation systems truly be implemented.

Despite its manifest desirability, greater state financial participation is something that will not occur overnight. In all probability, it will continue to grow piecemeal as it has historically, though at perhaps a more accelerated rate because of the intensity of local problems and the reapportionment of the Legislature.

Just as a major overhaul of our revenue structure seems an elusive goal, so does also the basic realignment of powers and responsibilities in order to create a new set of regional governments unrelated to existing jurisdictions. The New Jersey County and Municipal Government Study Commission conceivably could have suggested this in its recent report but did not. And even if it had, in my opinion major realignment would not have a chance of success. It is another recommendation of the kind that must be relegated to the category of the ideal. From that lofty plane, we must descend to the less glamorous but usually more productive realm known as the possible. Even here, the path to progress is strewn with difficulties.

Despite the obstacles, however, there are ways to approach the establishment of regional planning and transportation. For we have now in existence political entities that, although they do not make the most sense from various points of view, have the virtue of being going concerns. These are the counties, and it is no accident that the County and Municipal Government Study Commission has chosen to recommend their strengthening. Not only are they in existence and operating, but most have the kind of central area problem that requires a planning-transportation solution. Essex has Newark, Union has Elizabeth, Passaic has Paterson, Mercer has Trenton, Camden has Camden, Bergen has Hackensack, Atlantic has Atlantic City, Middlesex has New Brunswick, and so on.

The greatest difficulties will be found in any attempt to alter the distribution of planning and zoning powers. Yet, as I have indicated, transportation powers alone are

not sufficient for the solution of transportation problems. Steps must be taken to broaden the base of land use control; the counties and the state government must become more deeply involved. A regional approach must be found. To accomplish this, the following changes in our planning and zoning powers would be desirable:

1. Give to the County Planning Boards, in addition to review powers, the power to approve or disapprove the decisions of municipalities with respect to major facilities such as shopping centers, office complexes, and industrial parks. The counties' decisions should be based on carefully developed county plans.
2. Grant the New Jersey Department of Transportation the right to challenge these same decisions when they would impact directly on the state's transportation facilities. The Department's criteria for judgment should be the capacity of the facility to absorb the additional traffic.
3. Require that county transportation departments (or agencies) work closely with the county planning departments.
4. Establish the State Planning Division as, among other things, an appeal board to which municipalities may appeal the decisions of the counties or the State Department of Transportation or both. In the event that the first change listed cannot be achieved, then at least grant the municipalities the right to challenge each other before the State Division of Planning.

These recommendations may also prove impracticable because of New Jersey's strong home-rule tradition, but they should serve as a bare minimum toward which the state should strive in planning.

Probably the most attainable of my recommendations deals with the creation and operation of county transportation departments. To effectuate this and thereby induce counties to act as transportation rather than highway units, an addition should be made to New Jersey's present aid programs. A major new grant should be legislated that would be available to each county for transportation purposes other than highways. It should be contingent upon two factors: (a) the establishment of a county transportation department and (b) the submittal to, and approval by, the Commissioner of Transportation of a comprehensive transportation plan that both serves the urban center or centers within the county and dovetails with a master state plan for transportation. Of the criteria used to determine the amount of aid per county, the two most important should be total population and population density. Others may be suggested, but these are, in my opinion, the most important.

The enactment of the new State Road Aid Program in 1967 may pose problems for the creation of still another large grant program at this time. This proposal should not be rejected for this reason, however, but kept ready for recommendation when the political climate seems more propitious.

Once established, county transportation departments should assume the responsibility previously held by county highway departments for the construction and maintenance of county roads, as well as the responsibility for the major municipal thoroughfares within their respective areas of jurisdiction. In addition, and equally important, the transportation departments should be free to acquire or initiate public transportation services of an intracounty nature.

Next in sequence, the parking and traffic functions now held by municipalities should be absorbed by the county transportation departments. These are too intimately bound to the success of any comprehensive transportation program to permit them to continue in the atomized state that now exists. The existing policy whereby permission must be granted by the state government before a traffic control device can be erected on a county or municipal street should be abolished. Instead, the counties should be granted broad permission as part of their new comprehensive transportation plans to institute those controls deemed necessary for the success of regional transportation networks. A different situation exists where traffic control devices are proposed for state highways. Here there is a clear case for requiring counties to seek permission from the State Department of Transportation. The present system that requires this seems both adequate and workable.

The importance of centralizing parking controls in the organization responsible for transportation has been stressed already in this report. Uncoordinated decisions on parking can undermine attempts to relieve urban traffic congestion, and, conversely, a coordinated and rational parking policy can serve as one of the principal weapons for bringing order to traffic turmoil.

I am sure that these planning and transportation goals will be approached in New Jersey with great caution. However, if we are to prevent an engulfment of our urban areas by an ever-growing number of automobiles, they are goals that we ignore at our peril.

The traditions of freedom of movement, home rule, exploitation of land, and locally raised revenue are extremely powerful in the Garden State. It will be difficult to overcome them. But I do believe that unless we break with these traditions, and quickly, the face of New Jersey will some day be like the face of a teenager with a bad case of acne. Unrelated blotches will cover what otherwise could be a handsome countenance, and we will be capable of doing nothing other than allowing the problem to run its course. Unlike acne, however, which ultimately passes, New Jersey's surface will not revert to smoothness but will remain devastated, forever. And the name Garden State will in the end become nothing more than a cruel joke.

ACKNOWLEDGMENT

In applying for the U.S. Department of Housing and Urban Development Fellowship that enabled me to study public transportation in Great Britain for 6 months, I was careful to point out that I intended to look at the governmental rather than the technical approach to this activity and that the best way to do this was by discussions with people directly involved rather than the traditional method of a formal course of study. Consequently, although I was connected with University College in London, I did not attend classes but had my research activity guided by a qualified faculty member.

The man who served as my adviser was Professor A. H. Chilver, Chairman of the University's Department of Civil Engineering and also Executive Director of the Centre for Environmental Studies, an organization established in London about 3 years ago and financed by both the British government and the Ford Foundation. The Centre served as my base of operations, providing desk space, secretarial help, and telephone service, as well as contact with many of the people with whom I discussed transportation. The Centre proved invaluable to me and I am deeply in its debt.

The series of meetings and discussions was extensive, varied, and supplemented by a considerable number of publications. A list of the people with whom I met and a detailed bibliography are available from the Highway Research Board at cost of reproduction and handling. When ordering, refer to XS-28, Highway Research Record 299.

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