

THE TRAFFIC PROBLEM - URBAN AND RURAL

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In former days, when other topics of conversation failed, there was always the weather to fall back upon. We now have another, and equally perennial subject. It is the traffic problem - both urban and rural. It has been said of the weather, that everybody talks about it but nobody does anything about it. Let us also admit that we talk a great deal more than we do about the traffic problem.

Well, here we are today to talk about it some more. But let me say at once - as one who would greatly like to see a lot more done about the traffic problem - that I deem it a real privilege and opportunity to talk about it with such a group as this. For I am fully convinced that if, under such leadership as you are in a position to afford, our people could be persuaded firmly to grasp the nettle of their traffic problem, they would be surprised to find that the stings they have dreaded were much worse in their fearful anticipation than in the actual realization.

Let me be a little plainer. It is my belief that the reason we are confronted today with a serious traffic problem, the reason it is growing apace, and the reason we do so little about it, are in large part one and the same - a strong and continuing reluctance of

our people to invest the money and accept certain of the changes in the highway plant that are required for its solution. Some will say that there is misapplication of the money that is spent, and I will not discount the probability that there is some ill-advised expenditure. In part, especially with reference to the problem in the urban communities, a division of counsel as to methods to be employed and objectives to be sought, confuses the attack. But, generally, there is no real uncertainty as to the measures that need to be taken to solve the problem; they are well understood and ready for application. These measures are not more fully and more effectively employed because the public, fearful of the cost which it knows will be high, resistant to the dislocations which it knows will be involved, and in some instances confused by conflicting advice, has thus far provided for the attack upon the problem less than the funds and the authorities that are necessary for its satisfactory solution.

I am one who believes completely in the truth of Mr. Thos. H. MacDonald's aphorism of long ago that "we pay for good roads whether we have them or not, and we pay less if we have them than if we have not." And I think it applies equally to the relative costs of smoothness and muddle of traffic flow as to the costs of smoothness and mud of road surfaces.

So, I suggest that the net of the nettle, if you will excuse the pun, will be a not unpleasant surprise if we will but grasp it firmly.

The Problem Defined

What is the traffic problem? In the sense which I believe is implied by the program topic, it is the sum of many elemental problems arising out of various maladjustments of the roads and streets to the traffic of all sorts which flows over them. With particular reference to the cities, perhaps I should quickly add that it involves also a substantial maladjustment of the provision and the need of places for parking.

In these aspects, to which I will confine my discussion, the traffic problem is the result of a progressive overtopping of the capacity of existing roads and streets and parking places by a growth of traffic and parking demand that has exceeded all past expectations and is continuing at undiminished rate.

The 53 million motor vehicles registered in 1952 generated in that year a total travel of 517 billion vehicle-miles. This was 71 percent greater than the 302 billion vehicle-miles run up in 1940 by the 32,453,000 vehicles registered in that year. The increase in travel in the 12-year period paralleled almost exactly the increase in the country's total production of goods and services. If this parallelism continues and the gross national product expands at even the minimum rate suggested by the President's Economic Report, we may look for a travel of 725 billion vehicle-miles, a further increase of 40 percent, by 1963 - ten years hence.

So, if we think we have a tough traffic problem now, the next ten years it appears will present us with one much tougher, unless we can somehow find the means of increasing the capacity of our

highways and streets to convey the steadily increasing flow of travel. This, we are not doing sufficiently now, and have not done for at least ten years past.

The sufficiency ratings made annually on the primary rural highways - ratings which measure the relative adequacy of the highways in their physical condition and capacity for traffic service - have shown a distressing tendency to go down, not up, from year to year. In constant dollars, we spent as a nation less in 1950 than in 1940 for the construction and maintenance of our roads and streets. A few weeks ago the Secretary of Highways of Pennsylvania reported that 41 percent of the pavements on the primary highways of his State were more than 20 years old in 1952, and a similar condition exists the country over. We have a badly obsolescent street and highway system which we are trying by half measures to keep functioning in the service of a traffic grown, and still growing beyond its capacity. What to do to correct this situation - that is the big traffic problem which I shall discuss.

Where Does the Problem Lie?

The traffic problem, in this sense, does not involve the entire highway system. The fact that 243 billion vehicle-miles of travel was crowded in 1952 on 330,000 miles of city streets and only a slightly larger 274 billion was spread over 3,000,000 miles of rural roads - this is sufficient to suggest that in the cities the more serious problem must exist. But as, in the cities, we know that there is little traffic problem of consequence on thousands of miles of relatively quiet residential streets and major problems are confined to

the more heavily traveled arteries, so likewise the problem on the rural roads centers mainly upon a relatively small mileage of primary highways. Sixty percent of the rural road traffic is carried by the 219,000 miles of the primary Federal-aid system, comprising 7.3 percent of the total rural mileage. It has been estimated that the approximate one-percent of rural mileage which was included in the designated national interstate highway system served at the time of its designation, about 17 percent of the entire rural highway traffic. Assuming a like division of the rural traffic in 1952, this would mean that the 33,000 rural miles of the interstate system carried about 46 billion vehicle-miles in that year, an average nearly twice as great as the average volume carried by all city streets, but considerably less, we may be sure, than the volume carried by the principal city arteries.

Without laboring further the statistical indication, the fact, recognized by all highway officials, is that the principal traffic problems, that is to say, the principal deficiencies of traffic volume capacity on rural highways exist where the primary highways approach the larger cities and are greatest on the sections of such highways connecting the more closely spaced cities. For it is precisely on these sections, where traffic is now and has always been heaviest, that the greatest obsolescence exists. It is on these sections where, years ago, the earlier substantial development of traffic required correspondingly substantial improvement that, too often, we find the pavements twenty years old and more.

These pavements, built to the standards of their time, are often grossly inadequate for the service of the much greater and otherwise altered traffic which now uses them.

In the cities, the most serious problems exist on the relatively few streets running in the four directions between residential areas and the central business section, upon which, because of their directional, topographic, or other advantage, or perhaps only the remarkable persistence of travel habit, the greater part of the daily movement between homes and working places is concentrated. Some of these streets invariably connect at the city boundaries with main rural highways, and it is often the erroneous belief that their traffic congestion is due in large part to the in-pouring or through-passage of extra-city traffic. Practically all these streets are continuous through the business center and further aggravate the congestion of that area by carrying through it a substantial volume of traffic destined elsewhere, which it were better to have excluded from it. On all of them - these principal radiating arteries - the daily travel volume increases as distance from the center decreases. Their traffic capacity is reduced by the stop-and-go lights that are necessary for the control of intersectional movement; and with approach to the business section it has been further decreased by the practice of curb parking. On all such streets the daily traffic pattern displays a high peak of movement of one or two hours duration morning and afternoon, which, rather than the average of daily traffic, is the determinant of needed capacity.

Why Don't We Do Something?

If, as briefly indicated, it is possible to pin-point very closely the places where the more serious traffic problems exist; and if, as suggested, they involve a comparatively small part of the highway system, both urban and rural, then the question naturally arises, why don't we do something about it? Well, of course, we are doing something; but it is very definitely far from enough. Then, why don't we do more? We are back to those reluctances and those divisions of counsel of which I spoke in the beginning.

As I have said previously, the highway expenditure in 1950, when traffic volume was 52 percent above 1940, was actually less in constant dollars than it was in the earlier year. Of the lesser total expenditure, a larger part in 1950 than in 1940 (39 as compared with 30 percent) had to be used for maintenance, with the result that what was left for construction in 1950 was substantially less in its buying power than the corresponding remainder of 1940.

At this point it may be appropriate to interject a remark in explanation of the concern of most highway officials for an effective control of the wheel loading of vehicles within definite limits. Any road that exists is limited not only in its capacity to accommodate volume of traffic, but also in its capacity to support wheel loads. Most of the surfaces laid on the primary rural highways before World War II were designed to support with frequency wheel loading no heavier than 9,000 pounds, and large portions of their mileage have been found capable of supporting no heavier loads without damage.

Twenty years ago wheel loads of 9,000 pounds or more occurred only five or six times in the passage of each thousand vehicles. By 1950 the count had risen to 96 per thousand vehicles, and, taking account of the increase of traffic in the meantime, this meant more than a 40-fold increase in the frequency of application of such critical loads during the 20-year period. Unquestionably, this increase was in part responsible for the increase of maintenance cost which has progressively reduced the fraction of annual road revenue available for the needed modernization of the highway system. It is, therefore, a matter of gratification to highway officials to find that the weighings of 1951, the latest year for which the record is available, showed a decline in the number of these heavier loads from 96 to 86 per thousand. And it is also pleasing to note that this lessening of the frequency of critical wheel loading was possible without adverse effect upon the gross weights of vehicles or, probably, their pay loads. This is apparent in the fact that the percentages of trucks weighed in all weight groups from 30 to 50 thousand pounds increased simultaneously with the decrease in frequency of the critical wheel loading.

Insufficient Revenue the Principal Obstacle on Rural Highways

Now, to get back to the question as to why more is not done to solve the traffic problem. We were discussing the situation with reference to rural highways, and had pointed out that the annual revenues available for construction of highways in 1950 were actually less in their buying power than in 1940. But, not by any means all of these shrunken revenues can be expended on the portions of the system on which the more critical traffic stringencies exist. The system is wearing out all over, and a substantial part of each year's revenue must be spent to reconstruct worn-out roads on which no serious traffic problem exists.

What is left each year to devote to the modernization of sections of the system critically deficient in traffic capacity is simply not enough to permit a satisfactory progress in the elimination of the deficiencies. The desired elimination is expensive. It calls for the widening of pavements, the separation of opposing lanes of traffic, the easing of curvature and reduction of grades, frequently the separation of grades at intersections, all of which involves the necessity of wider rights-of-way; often on entirely new location. These are only expensive features. In the effort to take effective control of access to the modernized facilities - a positive necessity if they are long to retain the traffic capacity built into them - something more than a matter of cost is encountered. Legal archaisms and embattled property owners arise to impose delays often as frustrating as those arising from inadequacy of revenue.

The recognized need of large and immediate capital investment to reap assured future returns (and there is no doubt that the need is recognized) is precisely a situation in which in private business resort would be had to borrowing as a matter of course. This logical resort has been widely denied to the regularly constituted highway officials by constitutional and legal restraints and public reluctance of approval.

The alternative of toll road construction circumvents the restraints and at higher cost achieves quickly what has been impossible in much greater time by the means normally available. That the toll expedient is not the solution necessary for much of the existing traffic problem

is suggested by the recognized difficulties, if not impossibility, of its employment in cities where the problem is most acute, and by the limit set by even the most optimistic at about 2,000 upon the mileage of turnpikes financially feasible. The fact that the New Jersey Turnpike, which is, and will continue to be the most heavily used of all turnpikes, serves only about 4 percent of the traffic of its State and the Pennsylvania Turnpike a lesser percentage is further indication of the small potential of the toll road expedient as a solution of the traffic problem.

If the toll roads, notwithstanding these limitations and inherent restrictions, can serve eventually to demonstrate the results possible of attainment in solution of the traffic problem by the more extensive provision of free rural highways of similar design and enlarged capacity they will have served a purpose useful far beyond their own capacity for service.

Expedients Postpone the Day of Reckoning in Cities

In the cities, the day of reckoning with the ultimate solution of the traffic problem has been postponed by resort to ameliorating devices of traffic channelization and management and parking restriction.

Cars parked on both sides of a street of average width reduce its traffic capacity by about 45 percent. Prohibition of the parking almost doubles the street capacity. A pair of one-way streets, fully utilized, will accommodate about 17 percent more traffic than the same two streets traveled in both directions. Unfortunately, it has not often been

recognized that the advantage of one-way streets is fully achieved only when there is an approximately equal flow of traffic in both directions during peak periods. This limits the most effective use of one-way streets to downtown areas.

In intermediate and outlying city areas, where the flow of traffic is predominantly in one direction during the rush hours, reversible one-way streets, operated in one direction during the morning peak hours and in the other direction in the evening, are a less used but more effective device, if other two-way streets are available for the small traffic in the opposite directions.

The progressive timing of traffic signals, the signalization of pedestrian cross movements, and the more orderly channelization of traffic at intersections and elsewhere as needed, have all contributed further to the realization of a maximum effective use of the capacity of existing streets.

But, at best the capacity of normal city streets is rather narrowly limited, intersected as they are at block intervals by cross streets, and used as they are by a wide variety of vehicles, including street cars and busses, and by a mixture of local and through traffic. One four-lane freeway has the traffic capacity of three 68-foot, two-way streets, two pairs of 42-foot one-way streets, and six 56-foot two-way streets with street cars, all without parking. Moreover the 30 to 35-mile speed possible on the freeway compares with the approximate 15-mile peak-hour speed possible on the two-way streets and 20 miles per hour on the one-way streets.

Expressways and Off-street Parking the Ultimate Solution

From the standpoint of highway and traffic engineers there appears to be no question of expressways and off-street parking as the outstanding requirements of an ultimate solution of city traffic problems. A system of radial and circumferential expressways, at least one of the latter located near the fringe of the central business section and one in the outer fringes of the residential areas is the general pattern agreed upon.

Numerous studies of the origins and destinations of the daily movements of traffic and of parking demand have provided scientific basis for the best location of both arterial and parking facilities. In cities of all sizes the estimated cost of adequate facilities runs with remarkable uniformity to about \$250 per capita of the city's population for the arterial highways, and from \$900 to \$1,200 per car space provided for the parking garages.

The costs in the aggregate are tremendous and understandably can give us pause, but it is not cost alone that retards these ultimate solutions of the city traffic problems. Questions are raised as to the validity, and various effects of the solutions proposed.

Some city planners question whether the permanence of a central business section, obviously inherent in the proposal of centrally radiating arterials, is a valid assumption. Others, with whom the speaker concurs, opine that though the character of the central area and its business may change (indeed, are visibly fast changing) there

will always be a central area to which traffic will flow in volumes at least equal to the present.

There is dispute as to whether the off-street parking facilities should be publicly provided or their provision left to private enterprise. The backwardness of private enterprise heretofore is explained on grounds of fear of the competition of free or cheap curbside parking and publicly provided off-street facilities. It is fairly well agreed, however, that private enterprise can not be expected to provide the facilities required below a profitable margin, and that public agencies should control the location and regulate the operation of all facilities. Private enterprisers also welcome public assistance in the acquisition of land, in the financing of construction, and in the tax exemption of their investments.

The Mass Transportation Problem

One of the most frustrating controversies revolves about the question of whether it is to be made easier for motor vehicle traffic to move in larger volumes to the city centers or whether it would not be wiser somehow to encourage or force a return to the greater usage of mass transportation. Some who favor the latter have claimed a superiority of mass transportation over passenger automobile traffic of the order of 20 to 1 in economy of street space occupied per passenger moved. This fallacious claim, based solely upon a comparison of the street space statically occupied, is pared down to a 3 or 4 to 1 ratio when the operating characteristics of the two forms of transportation are taken into

account. In speed of travel the automobile shows an advantage over the bus which ranges from a ratio of 2 to 1 in downtown areas to $1\frac{1}{2}$ to 1 in outlying city areas.

Whatever the future may have in store for mass transportation, the fact is that its passenger usage, referred to an index of 100 in 1940 (corresponding to an annual total of 13,098 million passengers) rose during the wartime period of gas rationing to a maximum of 178.4 in 1946 and has since steadily declined to 115.7 in 1952. Even in the presence of conditions discouraging to automobile traffic it seems probable that the decline of mass transportation will continue, in the absence of some recuscitative measures not now defined.

While the experience during recent mass transportation strikes indicates that essential urban transportation can be continued without serious impairment with street cars and busses at a standstill, it is the preponderant view of highway officials that whatever of provision in the design of highways will serve to facilitate both automobile and mass transportation without discrimination - those provisions should be made.

This review of the traffic problem in both urban and rural areas, while necessarily brief, is sufficient I believe to suggest the magnitude of the problem and some of the reasons it is not more satisfactorily dealt with. Difficult in both its rural and urban aspects, it is in the latter that the obstacles to solution are greater. Money deficiencies

are in greater part the cause of the inadequacies of attack in the rural areas; in urban communities uncertainties of decision, as well as huge costs, loom larger as conditions retarding effective action than in the rural areas.