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A Highway Program for the United States

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In June 1938 Congress called upon the Chief of the Bureau of Public Roads to investigate and report upon the feasibility of building a system of transcontinental toll roads consisting of three routes extending east and west and three routes extending north and south entirely across the country.

Last spring the President forwarded to the Congress the report of the Bureau, now known as the Public Roads Administration, in which it was declared that a direct toll system would not be feasible as a means of recovering the entire cost of six superhighways conforming to the terms of reference. Having thus answered directly the question propounded by the Congress, the Administration added further, in general terms, its conclusion, based upon the evidence in hand, that the construction of toll roads of any description cannot be relied upon as a sound solution of the whole problem of providing adequate facilities for the vitally necessary highway transportation of the United States, or to solve any considerable part of that problem.

The Administration did not wholly reject the direct collection of tolls as a means of recovering the cost of highway improvements. On the contrary, it specifically recognized and pointed out certain classes of projects to which the direct toll method can probably be

applied with success. These are projects so situated or conditioned as to be beyond the competition of reasonably adequate "free" facilities; and of this character there are numerous bridge projects and some highways. But, as a general rule, it was, and is the Administration's conclusion that any attempt to finance the construction of long stretches of highway or entire systems of highways by means of direct toll collections is foredoomed to failure because of the competition of reasonably adequate "free" highways and certain inherent characteristics of highway transportation that rebel against conditions that must necessarily exist in the use of toll highways.

In the foregoing remarks the word "free" has twice been used to describe ordinary public highways in competition with toll roads. Lest there be some misapprehension, it will be well to explain at once that the term is used to define a condition of the use of the public roads, not a condition of cost. It implies only a freedom from immediate payment for each entrance upon the highways, and does not suggest that the roads so used are either supplied without cost or used without payment. That, on the contrary, the cost of our existing roads has been heavy, and has been defrayed in great part by the indirect payments of their users - these are facts of which this audience will surely require no proof. Yet, if proof were necessary it could now be supplied from the mass of data collected by the highway

planning surveys in 46 States. And, as to those major public highways that would be likely to come into competition with any toll roads that might conceivably be considered, it would generally be demonstrated that the costs of these so-called "free" roads have been more than met by the indirect payments of their users, even where the expected deficiency of direct toll collections would characterize their projected toll road competitors as infeasible.

It is these now demonstrable facts that explain the paradox of the Administration's alternate proposal of a modernized 30,000 mile system of interregional "free" highways as a feasible substitute for the 14,000 mile system of toll roads which its investigations have led it to conclude would be infeasible.

The Administration advanced its proposal of the interregional system as part of a series of proposals constituting what it was pleased to describe as a Master Plan for Free Highway Development. It is a plan which, though it involves some substantial departures from past highway policies, is yet rooted in those policies, and is intended to modify and adapt them to changing needs, rather than to strike out upon entirely new and untried lines. And, since the proposed new plan is essentially an outgrowth from past plans and policies, it will be helpful to examine briefly the character of some of those plans and policies and the conditions that gave them birth, and also to indicate the changes of condition that now suggest a modification of plans.

Most of the basic principles that have guided development of the public highways thus far were established in the decade between 1910 and 1920. It was in that decade that the motor vehicle first gave proof of its true character as a new and useful means of transportation, and proof also of its remarkable powers of multiplication. It was in that period that increasing revenues from the licensing of vehicles came to be regarded as a peculiarly appropriate source of funds for the construction and maintenance of roads; and in that period too that the first gasoline taxes were levied and dedicated to roads.

In that same ten-year period the slowly gathering conviction that the new vehicle would raise highway problems beyond the powers of local authorities reached its culmination in the passage of the Federal Aid Road Act of 1916, which at one stroke brought to the solution of those problems a long experienced Federal Agency and new or strengthened agencies of all of the States.

Prior to 1910 there was little to distinguish one rural road from another in degree of importance. Practically all country travel originated at, or was destined to rural homes, and the amount of travel varied from road to road only inconsiderably with the amount of settlement along each road. As there was little difference in their use, so, with the exception of a few privately owned and fast decaying turnpikes, there was little distinction in degree of improvement between the various roads. By 1920, the motor vehicles, at first the almost exclusive

possession of townsmen, by their selective use had elevated certain roads - generally those joining the larger cities and towns - to a position of importance materially above that of the remainder of the rural road network. Thus, by the choice of the traffic itself, a relatively small mileage of "trunk" roads was set apart; and the inclusion of such roads in the State highway systems and the Federal-aid highway system was merely an inevitable recognition of the superior importance they had already acquired. For the transfer of these selected main trunk highways from local to State and Federal control and for the preference they were given in expenditure of the road user revenues, there were a number of sound and very practical reasons. First, because of their denser traffic, they were the roads that presented the most difficult technical problems of improvement and they stood, therefore, in greatest need of the more expert care of the State and Federal agencies. Second, since mile-for-mile their traffic was greater than that of other roads, their improvement with motor vehicle revenues would benefit the greatest number of the payers of such revenues. Gathered into interconnected systems, they formed a mesh of thoroughfares, covering the entire land, the strands of which would lie closer to all points of origin and destination of travel than would the units of any other aggregate of roads of like extent. Hence there was a third reason for their preferential improvement: That by such preference the greater part of all the longer trips would be facilitated

and only the shortest and most local movements and some short beginnings and ends of longer trips would be unaided. And, finally, it was perceived that by no means other than a rigid confinement of principal effort to the improvement of these integrated systems of trunk highway would it be possible, with the limited revenues annually becoming available, to effect a generally useful improvement in any reasonable length of time.

Establishment of the Federal-aid highway system by the Federal Highway Act of 1921, carrying with it, as it did, the dedication of important sums of both Federal and State revenue to the improvement of that system, had the effect of gathering these gradually evolved principles of the previous decade into a definite code that has determined the character of all that has since been done toward the improvement of the highways.

With State and Federal-aid systems designated the country over, with all Federal contributions, most of the road user revenues, and additional funds from other sources exclusively dedicated to these systems, the State and Federal road building agencies had a single and sharply defined task. To it they adhered with no deviation whatever, and with substantially increasing revenues through the decade of the twenties, so that by the end of that decade there remained few unimproved gaps in a connected trunk-line system of highways of which the whole country had become proudly conscious.

In their undertakings within the designated systems, the State and Federal agencies were governed by an order of priority established in close relation to the volume of traffic; so that, generally speaking, the sections first improved were those nearest the larger cities and those located in the more densely populated areas, the improvement of other sections following at later periods. That this was an orderly and desirable procedure is beyond question; yet it is to this very practice that we must now attribute some of the existing inadequacy of important highways. The reason is that each successive improvement, as it was made, was designed to the standards accepted as adequate at the particular time; and standards were gradually raised as the need was recognized, and means and methods therefor were developed. Amid these changing circumstances, roads were built that had a normal life expectancy of 20 years and upwards, and these roads have remained long after the vehicles for which they were built have passed out of use, still physically intact, but in other respects inadequate for service of the traffic and vehicles of the present day.

The most troublesome inadequacies are those that were least expected and least capable of anticipation - the deficiencies of curvature, gradient and sight distance that exist numerously in roads designed for use by the vehicles of a decade when present high speeds of travel were not only not foreseen but were far beyond the limits permitted by

law. Insufficiency of surfaced width, to the extent that it has resulted from increased traffic, was generally not unanticipated, and presents serious problems only where the needed widening is now prohibited or embarrassed by right-of-way difficulties. However it is just such right-of-way difficulties, occurring in connection with relocations necessary for the modernization of alignment as well as where surface widening only is required, that present some of the most serious obstacles to the prompt relief of unsatisfactory and sometimes dangerous highway conditions.

The various deficiencies noted have become apparent mainly during the last decade. In the same period the continuing construction programs of the State and Federal Governments, financed with sustained revenues of the motor vehicle and Federal funds vastly augmented during the depression, have completed the pioneer improvement of the primary rural highways and made some progress in the elimination of the various deficiencies of the initial improvements, notably by a considerable widening of surfaces and the elimination of railroad grade crossings. As to these highways the tasks of the future involve mainly a continuance of work of the latter sort, generally described by the term modernization.

When the State and Federal-aid systems were first designated city streets were generally not included in them. This was true as to most of the State highway systems and the Federal Highway Act specifically

prohibited expenditure of the Federal funds in cities having a population of 2,500 or more. Although certain city streets joining with the selected highways were needed and used to complete the primary network, no Federal funds and, in many States, no State revenues could be used for the improvement of these essential links. The reason for these prohibitions was that at the time they were imposed the city streets were regarded as adequately improved, and the State and Federal revenues were therefore reserved for those external improvements for which a greater need was recognized.

For a considerable period, while traffic grew apace and the primary rural roads developed from country lanes into heavily traveled thoroughfares, little was done to fit the connecting city streets efficiently to perform their task of conveying the increasing flood of traffic into and across the cities. City street administration remained for the most part entirely in the hands of municipal authorities and quite apart from any connection with what was going on outside the city limits.

When road user revenues displayed their remarkable growth proclivity, municipal administrations claimed an increasing share, but what they received they expended on any streets within their borders, often in no relation to the road program steadily unfolding beyond their limits. The tangible result - now generally evident - is a serious inadequacy of the transcity connections of the primary rural

highways. Less tangible, but of greater interest for the moment, is the resulting tendency to view the provision of adequate city streets and adequate rural roads as wholly separate and (when they appear as rival claimants for road user funds) even antagonistic enterprises.

As, in this way, there has developed a tendency to treat city streets as entirely apart from rural roads, so in the administration of rural road improvements there has been, and remains in most States, a distinct cleavage between the administration of the primary highways by the State and Federal Governments and the administration of the lesser rural roads by local authorities. We have seen that the primary roads were set apart from other roads originally, because of their superiority as traffic servers, in order that they might be preferentially developed under the more expert care of the State and Federal authorities, and with the substantial road user and Federal funds reserved for them. By this expedient measure the nation has quickly acquired a continuously improved, if still somewhat inadequate, primary rural road system - a result that could probably have been achieved as quickly in no other way.

The mileage of the selected primary roads in 1936 approximated 340,200. The remainder of lesser roads amounted to 2,609,200 miles. This large mileage of relatively unimportant secondary and tertiary roads has remained, for the most part, continuously under the administration of numerous county, township and other local authorities. In 14 States a total of 177,500 miles of such roads has been taken under State control, the transfer, in 4 States, including substantially the entire mileage of such roads.

While improvement of the primary highways proceeded rapidly and systematically under authority of the major governments, local authorities continued with varying success their historic functions of maintenance and improvement of the roads remaining under their care. In the beginning their revenues were derived largely from taxes on property. These, in some instances, they attempted to anticipate through bond issues, often with unfortunate results. Later they sought and, in most States, received a part, and an increasing part of the road user revenue. In the several States previously mentioned, they finally turned over the whole problem to the State Government, motivated in so doing generally by financing difficulties. Uppermost among the causes of these difficulties was the public's increasing resistance to the exaction of property taxes. Confronted with this resistance and the difficulty of obtaining other funds to replace the waning property taxes, it is probable that local authorities in many States would have sought relief by transfer of the problem to the State Government had not the depression supervened. The depression brought unemployment, and unemployment brought work relief, and to local road administrations the country over, work relief has been the means of an extensive program of construction and maintenance. In large part the Federal funds that have made this program possible were grants by the Work Projects Administration and its predecessor agencies. In lesser part they have been extended through the Public Roads Administration.

Regarding the physical state of the local roads throughout the period since designation of the primary systems it will suffice to summarize briefly as follows: As revenue difficulties increased there was a deterioration of the roads; as Federal funds have replaced declining local revenues, the condition of the roads has improved, and it is probable that there is at present a larger mileage of well improved local roads than there has ever been before.

But here again it must be emphasized that this improvement has been arranged in only the most casual relation to the improvement of the primary highways, and by a multitude of independent local authorities, of short official tenure, lacking both the means and the incentives of cooperation among themselves. In most States the improvements planned and accomplished as secondary and feeder road projects financed by joint Federal and State funds administered through the Public Roads Administration, stand out as virtually the only improvements conceived in conscious relation to a general plan of rural roads.

Thus, we have traced the separate courses of the almost completely unrelated efforts by which the three principal component sections of the whole street and highway system of the United States have been brought to their present condition. Considered separately, the condition of none of them is viewed as satisfactory. Considered together there appear many evidences of disproportion and lack of reasonable

coordination. On each component section a pioneer work of improvement has been roughed out. The great need of the present is that these three component sections of our whole street and highway network shall be considered jointly, and that there shall be developed a general plan and policy that will serve to direct and implement the future efforts of all governmental authorities toward the common purpose of producing an efficiently integrated and economically supportable total roadway facility for a nation-wide system of highway transportation. Such a program, obviously cannot stop with a mere plan of coordinated physical improvement. It must also harmoniously define, and effectively provide the financial and administrative means for accomplishing such a coordinated improvement.

The development of such a general program implies an ability to take the broadest possible view of the existing situation and the ability to envision, at least approximately, the attainable goal of highway transportation. It implies a comprehension of all the multitudinous facts and trends that define the situation existing and the goal to be attained. This was the conclusion to which the Public Roads Administration had come in 1935; and it was this conclusion that prompted it to invite the State highway departments severally to join with it in what have come to be known as the State-wide highway planning surveys. Together, these surveys, now undertaken more or less completely in all States, constitute the nation-wide fact-finding effort

that is necessary to afford that broadest possible view that alone will permit the formulation of a general highway program for the States and the nation.

Most of the surveys are now nearing their initial objective - the assembly of all of the facts depicting the current situation. I refer to this as the initial objective, because a long analysis of the facts must follow, and because it is not intended that our fact finding shall stop with the present, but rather that it shall go on to the continuous determination of the changing facts that will reflect a constantly changing situation. But already the surveys have resulted in a tremendous acquisition of knowledge that is fast being digested. In many ways this new knowledge is finding immediate practical use in the daily operations of the State highway departments and the Public Roads Administration. A very important use was that to which it was put in the preparation of the Administration's toll road report to Congress. That report drew heavily upon the new factual knowledge to present in broadest outline the conception of a master highway plan. The wide consideration sure to be given the Administration's proposals will involve a further resort in greater detail to the steadily increasing volume of analyzed facts; and, in the end, we trust, will lead to the greatly beneficial results that were the Administration's expectation when it proposed the studies.

On large-scale county maps resulting from these surveys there will appear for the first time on any maps all of the rural roads with indication of their present surface improvement. The same maps will show the location of all rural homes, churches, schools, stores, and all other places that are the origin or destination of highway travel; and besides these things they will show all railroad lines, all navigable and navigated streams, all airports, canals, and almost every other feature of any kind that is related to any form of transportation. Such maps are already completed for 2,000 of the 3,070 counties in the United States. In the near future they will be available for all counties in 46 States, and will supply invaluable information for the projection of a general highway program.

The traffic maps made by superimposing upon the highway and transportation maps just described a graphical representation of the average daily volume of traffic using each section of rural road, afford at a glance a clearer idea of the relative traffic importance of the individual road sections and of the primary, secondary and lesser roads than it is possible to obtain in any other way. Examination of these maps brings out clearly many instances of road improvement disproportionate to traffic demand on both primary and lesser roads, and often shows large differences in the types of surfaces built by State and local authorities respectively to serve traffic of the same density. This is a kind of information especially needed for the formulation of any

general plan designed to bring about a more consistent improvement of the whole highway system.

For 60,000 miles of the country's most important roads, in all States, exact information is now being assembled in Washington regarding the character and width of the road surface at all points, the width of present rights-of-way, the location of all excessive curvature and gradients and all sections where sight distance is less than a fixed criterion, the places and numbers of all fatal accidents reported during the last year, and the average daily traffic at all points with separate indication of the numbers of passenger cars and trucks and busses and the amount of the total traffic in every State that bears the license tags of other States. For every bridge on these 60,000 miles of road these reports will indicate the load capacity and clearances, both vertical and horizontal, and the approximate heaviest weights and largest dimensions of vehicles regularly using them; and all of this information from 48 States will be uniformly plotted in diagrammatic style in order that it may be quickly digested and compared. The roads for which this information is being compiled have been chosen as the nation's most important thoroughfares in either peace or war; and the diagrammatic reports that will reveal clearly their every significant feature will be completely assembled in Washington a few weeks hence; to be followed in short order with reconnaissance estimates of the

improvements required to bring the entire mileage to a desired standard and the cost of such improvements.

In these surveys every remaining railroad grade crossing, on city streets and rural roads, will soon have been examined in detail to determine its relative hazards and the extent to which, if closed for the passage of trains or permanently closed and the traffic diverted to other crossings, there would be inconvenience or delay of the highway traffic. These examinations develop evidence of the exact physical layout of each crossing, the angles and grades of approach, the sight distances from various points on the road to points on the tracks, the number and character of train passages, the volume of road traffic, a record of known accidents, and, in cities, an approximate indication of the property damages and right-of-way expense that would be involved in an elimination project. With such detailed information in hand it should be possible to develop a defensible order of priority in the elimination of the crossings at the rate established by any desired program of expenditure.

In the results of the surveys we have, for the first time, definite proof of the negligible volume of fully transcontinental traffic. It is found that, on the average, no more than 300 vehicles leave the two coasts each day bound on such continental crossings via all main east-west roads between our northern and southern boundaries.

Highway travel is clearly shown to consist predominantly of movements of short range, with one-way trips of 100 miles or more comprising 2 percent or less of the total number of all trips. Trips extending outside of cities to a one-way distance of 5 miles or less comprise from 26 to 104 percent of the total number of intra-city trips in eleven typical States and one-way trips of 30 miles and less in the same States make up from 88.6 to 95.4 of the total number of all trips.

It is estimated that 56.4 percent of the total of all motor vehicle traffic is served by the primary rural highways and their trans-city connections, which form 11.3 percent of the total mileage of roads and streets. Thirty and two-tenths percent of the total traffic moves over the streets of all cities in which the total city street mileage is 6.1 percent of the total road and street mileage; and the remaining 13.4 percent of the traffic is served by secondary and lesser rural roads that form 82.6 percent of the total mileage.

The streets of cities are found to be used mainly by city residents, rural users being responsible for only about 1 percent of the street traffic. On the primary roads also city vehicles predominate over rural vehicles in the ratio of 61 to 23; and it is only in the relatively light traffic of the secondary and local roads that the rural vehicles exceed the number of city-owned vehicles by the small margin of 53 to 42.

The traffic counts of the surveys show that traffic of a volume approaching the comfortable capacity of a two-lane roadway is found at present on no more than about 3,000 miles; and that traffic generally considered as heavy is found as a general condition in rather limited areas (particularly in the Northeast and along the two coasts) and elsewhere mainly at the approaches to the larger cities on the important highways.

The thickening of traffic at the approach to cities is found to be a universal condition, and one for which there is generally a less than adequate provision in the existing highway facilities. Unfortunately the particular sections of highway involved are often hemmed in so closely by property development as to make it difficult to increase their capacity without incurring heavy right-of-way expense.

Origin and destination studies of the traffic at such city approaches show that it is generally composed in large part (as much as 90 percent) of traffic originated in or destined to points in the city; and that of the total in-and-out city movement a large part originates in, or is destined to points near the city center. These generally observed conditions suggest that the construction of by-pass routes will not generally afford the relief to city street congestion that has been expected of them; and these and other observations point to the probable necessity of constructing during the decades just ahead a very considerable mileage of express thoroughfares into and across the larger cities.

It is such as these definitely observed and recorded facts and many, many more, touching upon all phases of the highway problems, that will shortly be available for consideration in the formulation of a future program or programs. Hitherto the whole problem has been dealt with in three quite distinct parts, involving respectively the city streets, the primary rural highways and the lesser rural roads. As was natural in the earlier stages of the motor vehicle's development and the pioneer stage of highway improvement, ultimate objectives have been only vaguely perceived; and the work of highway, road, and street construction has proceeded in the three separate categories, administered by distinct groups of public officials, without clear thought of ultimate integration, and guided only by a sense of immediate need and expediency. Natural and reasonable, as well as expedient, while the common goal of the several efforts was still remote, this procedure has become increasingly inappropriate and dangerous as the uncorrelated undertakings in each category have approached their respective limits. The point has now been reached where it is highly desirable to strike a balance between them. From where we now stand, aided by the information supplied by the planning surveys, it is possible with some clarity to perceive the ultimate goal of a total street and highway system closely knit and adjusted to function in all its parts. Henceforth, whether administration shall continue, as in the past, under separate authorities or whether there be some unification of control,

it is desirable that all effort shall be guided by the definite knowledge of a general plan. Some of the elements of such a plan were suggested in broadest outline in the recent report to Congress by the Public Roads Administration.

The Administration's proposals contemplate that all rural roads and city streets shall be regarded as comprising a whole system of highways, and that the further work and expenditure upon this whole system shall be directed consciously to the creation of a state of balanced efficiency in the system as a whole. To that end the Administration sees need of continued work along certain definite lines and governed by certain definite principles and limits.

In briefest statement the program would consist of a balanced development of the following elements:

1. The further improvement of the presently designated State and Federal-aid highway systems as ordinary rural roads, revised by local modification as necessary to enable them to support and efficiently discharge their traffic with a maximum of safety. This will involve some strengthening and widening of existing surfaces and the local correction of excessive curvature and gradient and deficient sight distance to accommodate present and reasonably anticipated speeds.
2. The designation, location and development of a new system of interregional highways joining as directly as practicable the larger cities of all States.

Designed especially for service of the highway movements of longer range, these routes should by-pass all smaller towns and should embody the principle of limitation of local access wherever necessary to secure the safety and dispatch of the express movement. Wherever practicable they should follow the general lines of existing primary highways, but should depart from them as necessary to effect direct connection of primary controlling points and obtain adequate width of right of way and the control and protection of their accesses.

3. The further improvement of roads secondary to, and feeding the primary highways, as required for the economical service and safe conduct of their traffic; and the careful extension of improvement to presently unimproved roads of this class only as justified by traffic requirements and definite social and general economic considerations, and as such extensions are seen to be capable of support within the limits of revenues specifically anticipated. The further improvement of roads of this class should be made consistent with the probable future use of the rural lands served by them, as such probable future use is indicated by surveys now being conducted by State and local agencies under the inspiration and coordinating direction of the United States Department of Agriculture.

4. In, and in the vicinity of cities continuance of a normal program of street reconstruction and repair, and, added thereto, a planned development of arterial routes connecting peripheral areas and important rural highways with the principal urban center, and similar arterials located on circumferential lines to accommodate traffic interchanging between the various external highways and peripheral areas. The added facilities should also include other major arteries, as required, to join directly the recognized subordinate foci of urban development.
5. As an especially desirable feature of the program in all its parts, the elimination of railroad grade crossings in the order of the determined relative hazards and economic losses entailed by them, and a similar separation of the grades of important highways at heavily traveled intersections.

It is believed that such an integrated program should be, and now can be defined, by agreement, in each State and in the country at large, upon the general objectives to be attained in a relatively long period (say 20 years), and by the more detailed planning of a consistent partial program realizable within the limits of the definitely scheduled and anticipated revenues to accrue with a shorter period (say 10 years).

The benefits resulting from such a program would range from those of the most local character, such as improvement of the facilities of intra-city traffic or of similar local movements outside of cities, to those of the most general character, such as the provision of improved facilities for interstate commerce and communication and for purposes of national welfare and defense. The benefits conferred will also include those flowing directly from travel over the highways and those of a more general nature, such as those associated with the furnishing of improved access to land and property.

Accordingly, the financial means employed to accomplish the program should combine revenues appropriate to, and expressive of the relative weights of, the several classes of benefit. Three general classes of revenue are indicated; namely: Federal contributions, as justified by the benefits to interstate communication and commerce and the national welfare and defense; State road user revenues, consistent in amount with the direct benefits to travel; and local property or other general taxes, consistent with the general benefits conferred.

As the several classes of benefits would flow, intermixed in various proportions, from all parts of the program, so, in strict logic, the several forms of revenue should be combined in corresponding proportions for the support of all parts. As such a course would involve innumerable fine decisions and adjustments, it would perhaps be impracticable, and as a practical substitute the three general classes of revenue, raised in amounts equitably expressive

of the several classes of benefit, might be devoted to definite parts of the whole program for which their use is generally appropriate.

Specifically the Federal revenues might be devoted to the improvement of the suggested interregional system and the regular Federal-aid system, since these are the systems touching most directly the national and interstate interests. To the extent that local road and street improvement may be predicated upon broad grounds of the social and economic welfare of the nation a Federal contribution to these facilities also would be justified.

Road user revenues could be used to match the Federal contributions to main arteries, both rural and urban, and to support the remainder of cost of a definitely appointed group of roads and streets comprising what might be called a motorway system. Such a system should comprise all primary roads and streets and the more important feeder roads and streets, to the limit supportable by a total of such revenues yielded by rates reasonably adjusted to the worth of the road service and the purpose of permitting a maximum appropriate development of highway transportation. A limit to the inclusion of feeder roads and streets in such a motorway system would be set at the point where the total vehicle-mileage generated on the entire highway system by traffic originated on such feeders would fail to produce, at the applicable rates of taxation, an annual sum sufficient to pay at least their own annual costs. The further and controlling condition to be met would be that no greater mileage of roads and streets should be included in the motorway system than that which could be supported in all its costs by the road-user revenues collected.

Since, for inclusion in the motorway system, city streets and rural roads would have to qualify by exactly the same tests, one result of the definition of such a system would be a fair adjustment of the competing claims of the various units of government for a share in the motor revenues.

By establishing a tangible relation between the total of road-user revenue collected and the costs of a definite system of roads, the proposed method would also tend to discourage the diversion of road-user revenues to other than road purposes. The stipulation of such revenues for the particular purposes and facilities defined would be rendered unassailable from any point of view, if the total payment on behalf of each motor vehicle were made to include, besides the sum realized by the determined rates of special road-user taxes, a further sum raised by taxation of the vehicle as property at the rates applying to other forms of property.

Finally, that part of the cost of the projected general program, not coverable by Federal contributions and special road user payments adjusted as previously described, would remain to be met with funds raised by any form of general taxation, levied by appropriate local subdivisions of government.

When the facts developed by the highway planning surveys are fully analyzed one conclusion is certain to have a prominent place among all the conclusions to which they will point. It is this: That the work

of providing adequate street and highway facilities is far from finished. On the contrary it will be very clear that there are tasks ahead which, in magnitude and difficulty, exceed the greatest and most difficult of past accomplishments. Of these the greatest will be those involved in the provision of adequate arterial streets in cities and in the modernization of the principal rural highways in metropolitan areas. Some such improvements will be costly beyond any past experience. They will be costly by reason of their necessarily elaborate design; and they will be costly by reason of their heavy right-of-way requirements in areas where land costs are high.

Such facilities in many instances may not be considered merely as future possibilities. They are already present necessities. To acquire them as rapidly as their need will become urgent it will be necessary to resort to bond issues; and every sign points to the fact that the bonds issued will be revenue bonds. In part they may be serviced with motor vehicle license revenues and gasoline tax funds. This, at least, would be not inappropriate. In part they may be predicated upon revenues collected directly in the form of tolls from users of the elaborate facilities created. A definite trend in this direction is to be noted in recent developments. Possibly also there may be an employment of other and more unusual financial measures, such as the recovery to the public of the unearned increment upon the value of lands and properties benefited by the improvements. This possibility was stressed by the

President in the message with which he transmitted the Administration's recent report to the Congress; it is a possibility that has been tested with some success in other countries, notably in England.

Already the provision of many such works has been too long delayed, by reason of a general reluctance to face the heavy costs and other unusual difficulties involved, among which are the difficulties of right of way acquisition previously mentioned. In some cases the costs of right of way may far exceed the cost of constructing the facilities. For example, the property damage and right of way cost incident to the widening of Woodward Avenue in Detroit accounted for \$9,806,400 of a total cost of \$11,127,900 for that improvement.

It was with a view to removing this obstacle to needed action, so far as practicable, that the Public Roads Administration's report proposed a plan for the acquisition of such rights of way by the Federal Government, when requested by State and local governments, to be leased to such governments over a long period on terms that would, in such a period, amortize the cost. The same purpose could be accomplished by Federal loans for similar long periods.

The prospect of an early provision of means for the accomplishment of these desirable purposes was heightened in the closing days of the last session of Congress by introduction of identical bills by Senator Hayden of Arizona and Representative Cartwright of Oklahoma, which would

extend the aid of the Federal Government either through loans or the acquisition and lease of rights of way.

Under the terms of these bills the Reconstruction Finance Corporation would be "authorized to make loans to the States, municipalities, or other public bodies to finance, or to aid in financing, the construction, reconstruction, or improvement of road projects and the acquisition of real property or interest in property necessary or desirable for, or adjacent to, such road projects; such loans to be made after the approval by the Commissioner of Public Roads of plans and specifications for such projects submitted by such States or other public bodies, and upon such terms and conditions as will reasonably assure the repayment thereof within forty years, with interest at such rate or rates as may reasonably be expected to reimburse said Corporation for the cost to it of the capital required for the making of such loans."

The bills, if passed, would also permit the Commissioner of Public Roads to enter into contracts with States or municipalities or other public bodies, in accordance with which he would acquire in the name of the United States, "by gift, purchase, exchange, exercise of the power of eminent domain or otherwise", real property or interests in real property "necessary or desirable for, or adjacent to, any road project which will be a post road or will foster interstate commerce, aid in the national defense, facilitate the use of the mails or promote the general welfare", which properties or interest in property the State, municipality or other public

body would either purchase or agree to maintain and purchase from the United States "at such price and in such manner as will reasonably assure recovery by the United States within forty years of the cost of such real property, with interest at such rate or rates as may reasonably be expected to reimburse the Reconstruction Finance Corporation for the cost to it of the capital required for such acquisition. * * * *."

These bills will come up for consideration at the next regular session of Congress with considerable prospect of favorable action. In that event a first step will have been taken which will probably lead eventually and at no remote date to the formulation of a highway program for the United States embodying some, at least, of the principles suggested in this discussion.