

Prepared April, 1928.

FEDERAL AID AS A ROAD BUILDING POLICY

IS IT AID OR COOPERATION?

Section II

By

Thos. H. MacDonald, Chief,
and

H. S. Fairbank, Assistant to the Chief,
U. S. Bureau of Public Roads

In the first section of this article we explained briefly the nature of the Federal-aid road improvement policy and enumerated some of the outstanding results which have been achieved since it was inaugurated in 1916.

In its inception a measure for the encouragement of State initiative in the development of more adequate highway facilities, it was shown that this original purpose has since given place, by force of the expanding range of highway travel, to the more distinctly Federal object of interstate road improvement.

Since 1921 the Government's participation has been limited to roads which are actually interstate arteries of commerce and communication; and it is this fact that has led those who have followed the changing status of our highways in the last decade to regard as a misnomer the name under which the Federal policy was inaugurated and by which it will probably always be known. In the sense that the term Federal aid is commonly used in other connections the appropriations made by

the Government for road purposes may not now be considered as aid at all. Rather, they represent a necessary Federal provision to accomplish an important Federal object - the improvement of a limited system of main interstate roads.

It is very fitting that these roads should be jointly financed by the States and the Federal Government, because they are at one and the same time the most important roads of the States and the great arteries of the nation, serving both intrastate and interstate traffic to a greater degree than any other roads.

The very large extent to which these highways now serve a distinctly interstate traffic is startlingly revealed by the traffic surveys which the Bureau of Public Roads has made in cooperation with a number of the State highway departments. Many of us, perhaps, still think of the rural roads in the terms of yesterday when they were largely neighborhood affairs, although one need not be a keen observer to have noted the increasing number of the cars one passes on the road that carry strange license tags.

It may be somewhat of a surprise, therefore, to learn that the cooperative traffic survey in Connecticut shows that the main roads of that State - practically identical with the Federal-aid system - now serve an interstate passenger car

traffic which is more than half of the total utilization of the system, measured in passenger-car-miles.

Similarly the surveys in Vermont and New Hampshire show that during the summer season the resorts of those States draw to their roads a traffic originating beyond their borders which in the case of the former is fully a third, and of the latter a half of the total highway traffic.

To such States as Delaware and New Jersey, the Federal contribution is peculiarly reasonable and essential. Both of these States lie directly in the path of a large and rapidly increasing traffic between metropolitan areas that lie wholly or in large part without their borders. New Jersey is called upon to supply the artery of commerce between New York and Philadelphia, and to carry also a heavy motor traffic from the entire East and Middle West, vacation-bound to her seaside resorts.

Delaware is expected to accommodate on her roads the heavy traffic between Philadelphia and Baltimore and between other points north, south and west of her restricted borders. A very large amount of traffic moves over the Delaware highways which is bound neither from nor to Delaware points.

Thus there is created in the East a situation wherein such States as Massachusetts, Connecticut, Rhode Island, New

Jersey, Delaware, and Maryland, by virtue of their size and position in the eastern tier, are carrying especially heavy burdens as a result of the traffic originating in and destined to their sister States. Others, such as New York and Pennsylvania - of larger area and less directly in the path of the heavy intercity coastal movement - are less heavily burdened with traffic not their own. It is precisely this unequal pressure of interstate traffic that cries aloud for relief and equalization through Federal contribution to the cost of providing the main highway facilities. It is rather remarkable, therefore, that such opposition as there is to continuance of the Federal-aid policy should spring so largely from this section in which the need for the compensation it offers is so clear.

In the West there has never been a doubt of the wisdom and justice or the outright necessity of Federal cooperation. Especially in the intermountain States, where a sparse population is faced with the obligation of building a vast mileage of roads, much of it through Federal lands that can not be taxed by the States, and of building these roads for the accommodation of a traffic which in very large part originates elsewhere - in these States, especially, there is no doubt whatever of the absolute necessity of Federal cooperation.

If there is aid extended in either direction they are rather inclined to the belief that it flows from their own State coffers to those of the Federal Treasury, by reason of the expenditures they are forced to make upon roads in the Federal lands thus far inadequately provided for by the Government.

The fact is, of course, that highway traffic has now taken on a decidedly interstate complexion, and the Federal appropriations represent, not aid gratuitously granted to the States, but rather a more or less inadequate compensation for the construction of interstate arteries. At the rate of \$75,000,000 a year - the amount of the Federal provision for several years past - this compensation is about 7 per cent of the country's total expenditure for road construction and maintenance. If the percentage of interstate traffic in all States were known - as it is in those where cooperative traffic surveys have been made - it would be found that the Federal contribution does not adequately compensate for the interstate, or - as it may properly be termed - the Federal use of the roads.

So it is asserted with ample basis we think, that the Federal provision for road construction, called Federal aid, is not aid at all, but a Federal payment for a Federal purpose. It is not a gratuity calculated to break down the independence

and the initiative of the States any more than, let us say, the improvement of rivers, or the building of post offices or army posts, or any other constructive work by the Federal Government within the State jurisdictions is calculated to do so, for no less certainly than these is the Federal cooperation in interstate road construction a necessary Federal activity.

Constitutional Authority Clear

There are doubtless some very able students of government who conscientiously believe that there is no constitutional basis for the Federal Government's participation. Section 8 of Article I of the Constitution, which specifically confers upon Congress the power "to establish post offices and post roads", they appear to regard as a limited authorization to lay out and build only a certain class of roads, viz., those over which the United States mails are carried. It was a concession to this view that limited expenditure under the original Federal-aid Road Act to "post roads". That there was, in fact, no limitation at all is attested by the fact that, according to the certificate of the Postmaster General, on January 1, 1927, there were rural delivery routes aggregating 1,278,424 miles in length. So when the Federal Highway Act was framed in 1921 it was the conscious purpose of the framers to restrict, rather than extend the mileage of interest to the Federal Government, which

resulted in the adoption of the 7 per cent basis with its maximum limitation of 200,000 miles.

The fact that, entirely aside from its reasonableness as a limit upon the road activities of the Federal Government, the definition of "post roads" as roads which carry the mails or have anything whatever to do with the mails, was entirely foreign to the intentions of the framers of the Constitution seems to have completely escaped most people. That "post roads" now means roads over which the mails are carried is the result of one of those curious inversions of the meaning of words which frequently occur over long periods as a consequence of changing habits and customs. The original "post roads" were the highways over which journeys were made of such length as to necessitate accommodations for the changing of horses and the over-night lodging of travelers. To provide those accommodations post houses or inns were established at convenient intervals and the roads took their name from these posts. There is not the least doubt that this was the conception of a post road that was in the minds of the framers of the Constitution when they empowered Congress to establish post roads. By reason of the fact that the carriage of parcels and packets necessarily took place over the post roads, the public agency which performed that service became the postal service, and the stations already established for other purposes naturally became the post offices.

So when we undertake to determine the meaning of the constitutional authority of the Federal Government with respect to road establishment we must bear in mind that the post roads referred to in Article I did not derive their designation from their connection with mail carriage, but, on the contrary, our postal service is so called because it originally operated over the post roads.

A similar substitution of one idea for another is seen in the altered significance of the word turnpike. Originally the gate set up to halt travelers for the payment of toll, this interesting word became later the customary name of the toll road itself, and now is commonly used in connection with any main highway whether it be a toll road or not.

What The Founding Fathers Thought

If there were any doubt whether those who drafted the Constitution did harbor a thought of excluding from the duties and powers of the Federal Government, the duty and power of road construction, that doubt would be quickly resolved by examination of the writings of the founders of the Republic.

To mention two only, and those the great exponents of the two extreme points of view with regard to the extent of the Federal authority, there was complete agreement between Thomas Jefferson and Alexander Hamilton; and both looked upon road construction as a necessary Federal function.

Jefferson, writing to James Ross in 1786, said: "I experience great satisfaction at seeing my country proceed to facilitate the intercommunications of its several parts by opening rivers, canals, and roads. How much more rational is this disposal of public money than that of waging war."

Alexander Hamilton, commenting on December 24, 1801, on Jefferson's message to Congress, said:

"In addition to objects of national security, there are many purposes of great public utility to which the revenues in question might be applied. The improvement of the communications between the different parts of our country is an object well worthy of the national purse, and one which would abundantly repay to labor the portion of its earnings, which may have been borrowed for the purpose. To provide roads and bridges is within the direct purview of the Constitution."

If, in the face of these evidences of the thought of the fathers, there were still a doubt as to the constitutional intention, it would certainly be set at rest by the fact that while the great majority of the Constitution makers were still alive, the Nation plunged energetically into the expensive enterprise of building the National Pike.

There are, of course, those rather shallow objectors who assume that, because for eighty years the Government did not take

part in the construction of roads, it is not empowered to do so. As well might they assume that the States have no authority to build roads because for fifty years they left that function strictly to the counties. The fact, in both instances, is simply that the function was not exercised because in that middle period of the country's growth, the railroads alone could meet the requirements of long-distance communication and roads were of such local concern that the only agencies that could appropriately devote their attention to them were the county governing bodies. The motor vehicle has very decidedly altered conditions, and the State and National Governments have simply resumed the exercise of the legal and constitutional functions,

No Extravagance

By some, the plan has been attacked on the ground that the Federal expenditures are excessive. Others fear that it will encourage the States in an extravagant expansion of their road expenditures. Of the several objections raised against the Federal-aid policy as it applies to road construction these are the weakest, because they are denied by the bare figures.

If the Federal expenditures for the purpose are excessive, then any expenditure at all would be too great, for the largest highway expenditure in any year has been only 2 per cent of the total expenditure by the Government. In the eleven years since

work was begun the total cost to the Government of the roads completed has been \$601,772,000, and in less than that time purchasers of motor vehicles to be used on the roads have paid into the Federal Treasury in excise taxes on their cars the sum of \$1,100,000,000. In no single year has the amount spent by the Government exceeded 10 per cent of the country's total expenditure for highways, and the average for the period is less than 8 per cent, a ratio which, as previously explained, is considerably less than the percentage of interstate traffic.

As to the fear that the Federal offer will cause the States to expand their expenditures unduly, it may be sufficient to add that after matching the Federal expenditures more than dollar for dollar the highway departments of the several States spent in 1926 nearly \$453,000,000 on purely State work. In other words the States are already spending eight times as much as the Federal Government now appropriates. In view of that fact there is clearly no immediate danger that the Federal contribution will encourage undue expansion of the program.

Thus, without further explanation, the bare figures of Federal and State expenditure refute the suggestion that the Government's expenditure is excessive, and prove that it can not be held responsible for extravagant expenditure by the States.

What Is Extravagance In Highway Expenditures?

In this connection it may be proper to inquire what expenditure could rightly be considered as extravagant. Public expenditures for road construction are investments. They are not expenditures at all. The money is simply converted into grades and road surfaces, and these so facilitate the movement of vehicles and so greatly reduce the operating costs of highway transportation that the sums invested in the roads are returned to the public, with very considerable increase, in the saving of transportation costs. When viewed in this light, one is almost prepared to say that no possible expenditure for road improvement could rightly be regarded as extravagant.

The expenditures now being made for road improvement by the States and the Federal Government, to repeat the words of Alexander Hamilton, "abundantly repay to labor the portion of its earnings, which may have been borrowed for the purpose." When they were written by Hamilton those words constituted a statement of well grounded belief. Today they are a theorem proved, and proved beyond the shadow of a doubt by the experiments of T. R. Agg at the Iowa State College of Agriculture and the Mechanic Arts.*

* Take a mile of typical earth road, unsurfaced. Operate over it 1,000 vehicles a day and maintain it as well as possible

under that traffic for a year. The combined costs of maintaining the mile of road and operating vehicles over it will amount to approximately \$52,000 in the year, and travel will be almost impossible at certain seasons.

Surface the same road with a concrete pavement. Operate over it the same traffic of 1,000 vehicles a day and maintain it under the traffic as before. Charge off the entire cost of surfacing in the life of the pavement with interest at 4 per cent and add the annual cost of the surface thus obtained to the maintenance cost. The combined costs of the mile of road and its maintenance and the operation of vehicles over it will amount to approximately \$49,000 in the year, less by \$3,000 than the cost of the earth road, and the road in this case will be in perfect condition throughout the year.

Hence, for the traffic of 1,000 vehicles per day transportation over the concrete road costs less than over the unsurfaced earth road. For heavier traffic the difference in favor of the surfaced road is greater.

This illustration is based on the experiments of T. R. Agg of the Iowa State College of Agriculture and the Mechanic Arts, reported in Bulletin 65, of the Iowa Engineering Experiment Station.

Federal Aid Apportionment

Consistent with Traffic Requirements

That the apportionment of the Federal appropriations is remarkably consistent with the need of the several States as measured by the requirements of their traffic is a fact that is the more notable because the basis of apportionment does not involve a consideration of the traffic.

The real measure of the magnitude of the Government's contribution to any State is not the gross amount of Federal money placed to the State's credit, but rather the amount apportioned to it per mile of the Federal-aid system within its borders. Thus, the total amount apportioned to Texas since 1917 now stands at \$49,606,279, whereas little Delaware has a total apportionment of only \$3,205,308. But, if we divide these figures by the mileage of the respective sections of the Federal-aid system, we find that the Texas apportionment provides only \$3,880 for each mile, whereas Delaware has benefited to the extent of \$12,050 per mile. Obviously the apportionment to Delaware permits the construction of much more expensive roads than is possible in Texas; or, at least, it permits the Government to share more generously in the cost of whatever types of improvement may be required and adopted.

From this example it will be clear that the amount of the apportionment per mile of the system is a reasonable measure of the extent of the Government's financial provision. Exactly how adequate this provision is in each case can only be determined by a study of the types of improvement required on each section of highway as determined by the traffic carried. For purposes of the present discussion such an analysis is not possible; but there is a simpler criterion which will give a very fair idea of the general conditions.

It has been found wherever there are parallel records of motor vehicle registration and highway traffic, that the two increase in direct proportion. This would naturally be assumed to be the case, since highway traffic is now almost exclusively motorized and since the number of vehicles used on the roads must depend on the number there are to use. But we do not have to make assumptions; the fact is proved by actual records of registration and traffic over the same period of years in a number of States. So, therefore, for purposes of general discussion we may safely accept the number of registered motor vehicles per mile of Federal-aid system in each State as a reasonable criterion of the probable density of traffic and, therefore, of the highway requirements.

We then have, on the one hand, the amount of Federal aid apportioned per mile of system as a measure of the degree of the Federal provision, and, on the other, the motor vehicle registration per mile as a measure of the provision needed. For purposes of ready comparison these two criteria for each State are listed in parallel columns in the following table, in which the States in each column are arranged in the descending order of the figures.

Federal-aid apportionments per mile of limiting 7 per cent system compared with motor vehicle registrations per mile of the same system, by States.*

State	Federal-aid apportionment 1917-1929, per mile of 7 per cent system	State	Motor vehicle registration 1926, per mile of 7 per cent system
1. Rhode Island	\$ 20,450	1. Rhode Island	667
2. Delaware	12,050	2. New Jersey	543
3. New Jersey	8,630	3. Massachusetts	480
4. Massachusetts	8,550	4. California	326
5. Arizona	7,830	5. New York	317
6. New York	7,200	6. Connecticut	314
7. Nevada	6,950	7. Ohio	250
8. Maryland	6,930	8. Maryland	244
9. Connecticut	6,290	9. Pennsylvania	231
10. Pennsylvania	6,040	10. Michigan	213
11. Utah	5,650	11. Florida	208
12. California	5,530	12. Illinois	202
13. Illinois	5,330	13. Delaware	169
14. Ohio	5,300	14. Indiana	155
15. Florida	5,120	15. Washington	122
16. Maine	4,850	16. Wisconsin	120
17. Michigan	4,710	17. West Virginia	103

State	Federal-aid apportionment 1917-1929, per mile of 7 per cent system	State	Motor vehicle registration 1926, per mile of 7 per cent system
18. North Carolina	4,550	18. Maine	94
19. Oregon	4,530	19. North Carolina	92
20. Colorado	4,490	20. Iowa	91
21. Indiana	4,450	21. New Hampshire	90
22. Alabama	4,400	22. Minnesota	88
23. Virginia	4,380	23. Virginia	86
24. Kentucky	4,330	24. Louisiana	85
25. Washington	4,190	25. Missouri	84
26. Louisiana	4,050	26. Texas	82
27. West Virginia	4,030	27. Oregon	80
28. New Mexico	4,000	28. Kentucky	76
29. Tennessee	4,000	29. Colorado	74
30. Mississippi	3,970	30. Vermont	71
31. New Hampshire	3,950	31. Nebraska	65
32. Georgia	3,940	32. Oklahoma	63
33. Texas	3,880	33. Tennessee	61
34. Wisconsin	3,840	34. Alabama	57
35. Vermont	3,830	35. Kansas	57
36. Idaho	3,710	36. Mississippi	55
37. Missouri	3,520	37. Utah	51
38. Montana	3,520	38. Arizona	49
39. Minnesota	3,300	39. Georgia	49
40. South Carolina	3,250	40. South Carolina	49
41. Wyoming	3,220	41. Arkansas	42
42. Nebraska	3,170	42. Idaho	34
43. Iowa	3,080	43. Montana	22
44. Arkansas	2,810	44. North Dakota	21
45. Kansas	2,710	45. South Dakota	21
46. Oklahoma	2,480	46. New Mexico	17
47. North Dakota	1,770	47. Nevada	16
48. South Dakota	1,690	48. Wyoming	15

* As the mileage used as the basis of comparison is 7 per cent of the total road mileage in each State, the order would be unchanged if the total mileage were used.

Examining this table, the first thing that strikes the eye is the very remarkable parallelism in the general order of the States in the two columns. Generally speaking, those near the top in the first column are also near the top in the second; and those near the bottom in one column are also near the bottom in the other.

Small States Compensated For Interstate Traffic Burden

It will be noted that those small Eastern States in which, as previously pointed out, the interstate traffic is a relatively large part of the total, without exception are properly compensated for the use of their roads by the citizens of other States. Every one of these States - Rhode Island, Delaware, New Jersey, Massachusetts, Maryland, Connecticut - is within ten places of the top of the list. All are Eastern States, and all are undeniably entitled to heavy compensation.

It will be observed also that, generally speaking, those States in which traffic reaches the highest density, as indicated by the number of registered motor vehicles per mile, and verified by our general knowledge of traffic conditions, receive apportionments per mile which are calculated to permit the construction of the kind of roads required by the traffic.

All the Atlantic Coast States from Maine to North Carolina, the State of Florida, all States of the East North Central group

from Ohio to Illinois, and all Pacific Coast States, nineteen in number, fall within the first twenty-five places of the top in the apportionment column. These are the States which from our general knowledge we would unquestionably rate as those of heaviest traffic. Notice how the general judgment is corroborated by the motor vehicle registration per mile and how in this classification these same States fall within the first twenty-seven places of the top. Maine, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Delaware, Virginia, North Carolina, Florida, Ohio, Michigan, Indiana, Illinois, Washington, Oregon, and California, all of them States in which traffic is known to be exceptionally heavy are so indicated by the registration of vehicles per mile, and all are among the leading States in the order of their Federal-aid apportionments per mile.

Public Land States Compensated

Test the comparison in still another way. Recall that it is one of the purposes of the Federal-aid policy to compensate the Western States in which there are large areas of public lands for the construction of roads through these non-taxable areas. Then notice how these States - Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, South Dakota,

Utah, Washington, and Wyoming - with four exceptions, receive apportionments per mile which give them higher rank in the apportionment column than the position to which they are entitled on the basis of their relative traffic density.

It may be thought that some of these States fare a little too well. There is equal ground for the complaint that some are not adequately compensated. It is not contended that there are not certain inequities in the method of apportionment. The wonder is that the more or less arbitrary basis is on the whole so equitable. But before we conclude that these Western States are too generously aided, it should be recalled that the apportionments to these States are expected to pay more than half the cost of the road construction; and that they differ in this respect from all other States. Because of this fact the public land State apportionments when matched by the State funds at the permissible percentage produce a total which is less than twice the Federal contribution. Consequently, a dollar of Federal money in these States does not produce as much road value as in the other States. In comparing these apportionments with the corresponding registrations per mile to determine their adequacy to the traffic it is therefore necessary to take into account the ratio of the Federal to State funds.