REVIEW AND ANALYSIS OF FEDERAL-AID APPORTIONMENT FACTORS

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INTRODUCTION

This paper is intended to be used as background material for the 1970 and 1972 National Highway Needs Reports, and as introductory information for further apportionment studies. Within the Office of Planning, this paper represents phase one of a two-phase-or-longer examination of Federal-aid apportionment.

Two areas are discussed, although no attempt has been made to balance them in terms of time spent in research or in depth of treatment. Thus, this paper is primarily concerned with the history of the apportionment formulas that govern the distribution of Federal-aid primary, secondary, and urban (A-B-C) funds to the 50 States, plus Puerto Rico and the District of Columbia. As a rule, this involves re-creating the legislative atmosphere surrounding the inception of a new Federal-aid highway program in order to gain a perspective contemporary with the period being studied. Only occasionally, when warranted by major changes in the direction of Federal-aid legislation, has the history been treated in great detail.

This paper also includes a brief discussion of selected features of the apportionment formulas that should receive further attention at a later date. There appears to be near-unanimous agreement that some aspects of Federal-aid apportionment require revision. These aspects are mentioned, but no alternative methods of distributing Federal highway funds are suggested. Only the simplest comparisons have been made. Three reasons account for this. First, the process of impartially deriving and balancing apportionment factors is extremely time-consuming. Second, more meaningful data can be collected and organized in conjunction with the current Functional Highway Classification Study and the planned National Highway Needs Study. Third, the Federal-aid systems as they exist today may not be representative of legislative interests in the near future.

With these reasons in mind, and in the hope of keeping this paper manageable, various areas related directly or indirectly to A-B-C apportionment have not been considered. The Interstate Highway System is mentioned only briefly because the concepts underlying it are not immediately applicable to the A-B-C program. Similarly, Federal-aid apportionment is not reviewed for such programs as TOPICS, safety, beautification, and public domain roads. The Federal-State matching ratio and the sliding scale are mentioned in passing as complements of the apportionment formula. Finally, the composition of the Federal-aid highway systems--which roads go into which category--will be best determined after the Functional Classification Study is completed.

EARLY FEDERAL-AID APPORTIONMENT FORMULAS

Between 1900 and the passage of the first Federal-Aid Road Act in 1916, numerous bills defining a Federal role in highway construction and finance were introduced in the Congress. In their efforts to instigate a Federal-aid highway program, these bills were unsuccessful but not unimportant. With virtually no experience to call upon (the last "Federal aid" had been expended on the National Pike in 1844), early highway enthusiasts could be forgiven for introducing some rather naive proposals. 1/ What is surprising is the amount of intelligent thought and criticism that characterized the planning stages of the Federal-aid "era."

An examination of early Federal-aid highway legislation indicates that it was difficult to develop an acceptable apportionment formula for distributing Federal funds to the States. In some instances, this facet of Federal participation was simply omitted when Federal aid was being considered. More often, apportionment factors were suggested in general terms, with no attempt to place them in a formula. 2/

1/ A good example being H.R. 10111, introduced in the 64th Congress, January 26, 1916. This imaginative 55-page bill proposed that two "national multiroad highways" be built (one north-south, one east-west) with rights-of-way one mile wide. Each highway was to contain separate roadways for carriages, wagons, passenger and freight trains, fast and slow automobiles, bicycles, and roller or motor skates. Also, separate "zones" for factories, houses, parks, lawns and flowers, shade-trees, and footpaths. Where the two highways crossed was to be located on a one-hundred-mile-square "Park Villa Reservation" built with immigrant labor.

2/ See the testimony of various State highway representatives in Jonathan Bourne, Jr., Public Road Systems of Foreign Countries and of the Several States (Washington: Government Printing Office, 1913).

This is not to say that specific apportionment proposals were lacking. On the contrary, a large and confusing variety of factor combinations confronted those responsible for drafting Federal-aid legislation. As early as 1900, a bill was introduced in the Senate "for the building of public roads in the several states in the United States of America." 3/ The bill authorized appropriations of $5,000,000, distributed "in proportion to the mileage of roads in each State." 4/ The lack of clarity throughout the bill attests to the inexperience of its drafters in managing this type of program. The doubts harbored by Congress on Federal-aid for highways are demonstrated by the fact that the bill never reached the floor of the Senate for consideration. 5/

What has been called "the first actual Federal-aid bill to appear in Congress" was introduced late in 1903 by Representative Brownlow (Tennessee). 6/ The Brownlow bill called for $24,000,000 in Federal-aid over a three-year period, with distribution of funds proportional to population, except that any State with less than 700,000 population was to receive the flat sum of $250,000. Apparently, the Brownlow bill, although unsuccessful, received more publicity than its predecessors, for it seems to have spurred a new round of Federal-aid legislation in Congress, in addition to generating national interest in a Federal-State cooperative highway plan.

3/ Senator Boies Penrose, quoted in J. W. Brooks, A History of American Highways (unpublished), sec. 13a, p. 1.

4/ Brooks, ibid.

5/ Ibid.

6/ Ibid., p. 5.

After 1904 the number of highway bills increased rapidly to the point where some sixty were introduced in one session of Congress in 1912. 7/ Still, no Federal money had been appropriated for public roads construction, although many of these later bills contained highly refined Federal-aid provisions In 1912, however, an experimental Federal-aid highway program was incorporated in the Post Office Appropriations Act. The Act authorized the expenditure of $500,000 by the Secretary of Agriculture and the Postmaster General to improve "the condition of roads to be selected by them over which rural free delivery is or may hereafter be established." 8/ That Federal participation in financing road construction was tied so closely to carrying the U.S. Mails is a point that was to be of great importance in later Federal highway legislation.

The 1912 act achieved mixed results. It failed to ignite the active interest of the States, or even to gain their cooperation in building a system of post roads. This was partly due to the apportionment and matching provisions of the act. Approximately $10,000 was distributed to each State, but the State was required to put up two dollars for every one dollar appropriated by the Federal Government. Any uncommitted funds reverted to the Treasury, to be redistributed among remaining States.

For a number of reasons, only seventeen States took advantage of the Post Road Act. One writer called this poor showing "a reflection both of the absence of available |State matching| funds and of officials

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7/ Carl Hayden, "The History of Federal-Aid Highway Legislation" (typewritten, 1944?), p. 4.

8/ Quoted in Brooks, sec. 13b, p. 2.

to advance the State interests." 9/ This is only a partial explanation. Some States were constitutionally prohibited from cooperating with the Federal Government in this type of program, while in others all road-building authority was vested in local jurisdictions. A few western States could not designate any rural mail service routes. 10/

As an action-oriented plan designed to promote public roads construction, the 1912 act was probably a failure. But as a small-scale pilot project, designed to demonstrate the eventual feasibility of a Federal-aid highway program, the act succeeded. The need for sweeping revisions in almost all aspects of the approach to Federal-State cooperation was evident. But to most of those involved, a theory had been successfully tested, and it was felt that the Federal-aid concept needed improvement, not abolishment.

9/ Hayden, p. 5.

10/ Brooks, sec. 13b, pp. 7-8.

BACKGROUND AND ENACTMENT OF THE FEDERAL-AID ROAD ACT OF 1916

The passage and mixed success of the 1912 act generated widespread interest in the potential results of a well-planned Federal-aid program, but it also emphasized the competing and often conflicting viewpoints that were at stake. Although an intensified program appeared to be a virtual certainty, the form of the program was by no means settled.

One facet of the varying interests at work was reflected in the large number of apportionment formulas proposed. Those who were struck with the realization that large sums of money would be involved in an expanded Federal-aid program began to regard more closely the apportionment possibilities. The following factors were all considered during these years as bases for the distribution of Federal funds:

(1) Total population
(2) Farm population
(3) Total land area
(4) Area of cultivated land
(5) Total road mileage
(6) Rural post road mileage
(7) Mileage of improved roads
(8) Mileage of unimproved roads
(9) Assessed valuation of taxable property
(10) Highway needs
(11) Highway funds already expended
(12) Equal distribution of funds among States

This is only a partial listing of the apportionment factors proposed at various times. Moreover, when these factors were weighted and combined differently, the number of formulas that could be created was even greater. Many plans, however, never received serious consideration, either because they were obviously too biased or because they were dependent upon data that were not easily compiled.

Inevitably, the more practical methods for distributing Federal aid were consolidated into fairly predictable patterns. At the same time, conflict over the apportionment of Federal aid was channeled into two broad areas: The legitimacy of the Federal interest in road construction, and the disagreement between rural and urban road interests.

The first question--the legitimacy of the Federal interest in road construction--was inflated disproportionally for the sake of appearance. It is true that opponents of Federal aid objected to a cooperative highway program on grounds of its alleged unconstitutionality. The Federal role was seen by some as a usurpation of traditional State and local prerogatives. Little doubt existed, however, that these objections posed no real threat, constitutional or otherwise, to the establishment of a Federal-aid program. Senator Bourne (Oregon), who chaired the Joint Committee on Federal Aid in Construction of Post Roads, stated as much when he said:

> Among those of legal training, a technical discussion of the constitutionality of national highway appropriations would no doubt be interesting, but I believe the time has long since passed when controversy over this question could be deemed appropriate. Even a cursory review of the ever expanding activities of this Government...demonstrates that a discussion of the constitutional question is purely academic. 11/

11/ Bourne, "National Aid to Good Roads," 63d Congress, 2d Session, Senate Doc. No. 438, February 20, 1914, pp. 3-4.

As Bourne and many others pointed out, several constitutional justifications could be found to support the legality of Federal aid, among them the clauses giving Congress the power to "provide for the common defense and general welfare" and to "regulate commerce...among the several States." Furthermore, the Federal role in road construction during the early part of the nineteenth century served as a precedent for the proposed legislation, albeit an imperfect one. It does not appear, therefore, that proponents of Federal-aid legislation were particularly troubled by the legal aspect of their drive.

If this is true, it makes even more confusing the fact that none of the above legal grounds were employed as first-line justifications for a Federal-aid program. The most plausible rationale was felt to be another clause of Article 1, Section 8 in the Constitution, empowering Congress to "establish post-offices and post-roads." It is not difficult to see why such a direct mandate would apparently provide the strongest defense of Federal involvement in public roads construction. As the basis for the 1912 Post Office Appropriations Act, this clause established a clear Federal interest in linking delivery of the U.S. Mails to construction of mail delivery routes. Consequently, it was effective in assuaging those who accepted the legality but not the necessity or desirability of Federal aid.

But the "post roads" argument was, or should have been, recognized as a convenient device--nothing more or less than a maneuver designed to assure a favorable response to Federal-aid legislation. There was no intention that a program of this type be

limited to construction of mail routes; after all, it was not the Post Office Department, but rather the State highway representatives that urged Congressional action. The direct benefit accruing to the Federal Government through more efficient mail delivery was incidental to the real objective of Federal-aid supporters--namely, the development of a national good roads network for purposes of improved marketing and general transportation. Senator Borah of Idaho certainly did not try to hide the fact: "When you come to postal roads, of course, the bill is not for that purpose. That is a constitutional peg upon which to hang the legislation." 12/

Apparently, all this was either ignored or regarded as unimportant when Federal-aid distribution was debated. Despite the fact that postal delivery performance was of secondary importance, the constitutional "crutch" was carried over, so that most apportionment formulas contained a factor based on existing mileage of post roads within each State. Senator Bankhead of Alabama, who was primarily responsible for pushing the successful Federal-aid Road Act of 1916 through the Senate, stated in a Committee Report:

> ...The direct interest of the Federal Government, as represented by the great mileage of rural delivery and star routes for the transportation of mail and parcel post, should have some weight in the granting of Federal funds, for certainly the Federal Government has a right to expect that its mail routes will be benefited by this general scheme of improvement, and so it would seem that the mileage of rural delivery and star routes should form another factor in the apportionment of appropriations. 13/

12/ U.S., Congressional Record, 64th Congress, 1st Session, 1916, Vol. 53, Part 8, p. 7294.

13/ Quoted in U.S., Congress, House, Committee on Roads, Hearings, on H.R. 2426, 78th Congress, 2d Session, 1944, Vol. 2, p. 445.

This type of reasoning was repeated throughout the Federal-aid proceedings before Congress. Whatever logic it possessed depended on the relationship between the use of this criterion and the purpose of the highway legislation being considered; a relationship made somewhat tenuous by the inconsistent standards applied to the apportionment of federal funds as compared to the construction of new roads. While apportionment was made dependent upon mileage of roads that were, in fact, existing rural postal routes, the 1916 act authorized Federal participation in the improvement of "any public road over which the United States mails now are or may hereafter be transported." 14/ Obviously, almost any rural road could be included within these vague guidelines. In light of the implicit intention of the 1916 act, the choice of RFD and star route mileage as an apportionment factor seems arbitrary. 15/ This is not to say that the factor

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14/ U.S., Congress, An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes., Public Law No. 156, 64th Congress, 2d Session, July 11, 1916. This Act and all others (through 1961) not specifically cited in footnotes may be found in Gilman G. Udell (compiler), Laws Relating to Federal Aid in Construction of Roads (Washington: Government Printing Office, 1961).

15/ Briefly, rural free delivery (RFD) routes provide what the name implies--rural home mail delivery service, usually motorized, and performed in Post Office or contract vehicles. Star routes provide intercity bulk mail transportation on a contract basis, usually between post offices. Some star route contracts require limited home mail delivery, but this practice is being gradually phased out. The computation of mileage for these services involves many variables, and is often subject to inconsistencies. This will be discussed in more detail later.

has worked poorly through the years or that it could not originally have been justified on more pragmatic grounds. The point is simply that a faulty line of reasoning determined the choice. Had Federal aid been more frequently defended on other grounds, postal route mileage might never have become part of the Federal-aid apportionment formula.

The preceding issue--the legitimacy of the Federal interest in road construction--was one of two major areas of conflict which were to affect the distribution of Federal-aid highway funds. The other, more difficult to isolate because it was such an integral part of the entire Federal-aid question, was the disagreement between rural and urban road interests. In many ways, the same problem still exists within the highway program, although reflected in new areas of concern.

The cleavage between rural and urban States actually dominated early attempts to pass Federal-aid legislation. In general, the densely populated eastern States, many of which already possessed a good road system, objected to paying (through taxes) a disproportionate share of the appropriation to support a road program that would benefit farmers in rural western and southern States. The rural States, on the other hand, claimed that they should be heavily represented in the apportionment formula because (1) they were most in need of good roads, and (2) they lacked a sufficient tax base with which to finance road improvements. Furthermore, the rural States opposed any program designed to aid big-city "tourists" rather than farmers and rural markets.

The debate on this question was especially bitter, and at times it appeared that rural/urban disharmony might postpone, if not cancel, the Federal-aid highway program. From the beginning, the rural forces were better organized and probably more numerous. Certainly their legislative output was greater, in terms of unsuccessful highway proposals. Representative Hayden of Arizona introduced a highway bill that would have apportioned Federal funds in the following manner: 1/3 area, 1/3 rural postal route mileage, 1/3 "according to the number of Senators and Representatives to which each State, respectively, is entitled in the Congress of the United States..." 16/ A Senate bill used the familiar area, postal route mileage, and population formula (equal emphasis on each factor) with the notable qualification that the population of all incorporated towns and cities was excluded. 17/ Other examples along similar lines could be cited, including attempts to provide relief, through the apportionment formula, for those States having large areas of untaxable Federal land.

The apportionment formula finally incorporated in the 1916 act was essentially derived from a legislative draft submitted by an AASHO special committee in 1915. AASHO recommended that equal weight be given

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16/ U.S., Congress, House, A Bill to provide for national aid to the several States in the construction and maintenance of rural post roads., H.R. 7614, 64th Congress, 1st Session, January 5, 1916.

17/ U.S., Congress, Senate, A Bill to provide that the United States shall aid the States in the construction of rural post roads, S. 1218, 64th Congress, 1st Session, December 10, 1915.

to area, population, and rural postal route mileage. The AASHO program formed the core of H.R. 7617, introduced in January 1916 by Representative Shackleford of Missouri. The Shackleford bill, as it came to be known, passed the House, but in the process the original apportionment plan was changed to the following:

(1) $65,000 to each State
(2) One-half of the remainder based on population
(3) One-half of the remainder based on RFD and star route mileage

When the bill reached the Senate, it was amended in various ways, one of which included a return to the AASHO recommended apportionment formula. Senator Bankhead defended the Senate action by arguing that "if the interests of the East are protected by the factor of population, the interests of the West should receive consideration through including area as a factor of apportionment." 18/ A joint conference committee, formed to reconcile differences between the House and Senate versions of H.R. 7617, produced a final bill (retaining the AASHO plan) acceptable to both bodies. On July 11, 1916, the Federal-Aid Road Act was signed into law by President Wilson.

In its final form, the 1916 act represents a compromise of interests. Yet there is little doubt that the act, particularly in its fund distribution provisions, reflects a primarily rural orientation. Two of the apportionment factors, area and rural postal route mileage, benefit mainly the rural States, while only the population factor favors

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18/ Quoted in Hearings on H.R. 2426, 1944, pp. 445-46.

heavily urbanized States. The formula does not insure the most equitable redistribution of revenue, based upon respective State contributions to the Highway Trust Fund. 19/ Again, the rural States, particularly those in the West, are favored.

That the Federal-aid apportionment formula contains this inherent bias can be justified in terms of the immediate objectives of the 1916 act. At a time when "the inadequacy of the main intercity arteries represented the paramount highway needs of the Nation," it was only logical to focus attention and resources on the development of a rural highway network. 20/ Today the situation has changed; it may be argued that our highway priorities have shifted from rural to urban problem areas. Whether the original (and present) method of apportioning Federal aid reflects new priorities is open to question, and will be discussed in more detail later.

19/ There is always the problem of defining equity in any such redistributive situation. It may or may not be equitable for returns to be reasonably proportional to contributions, depending upon the relative needs involved. In the case of Federal-aid apportionment, the argument could be advanced that the apportionment formula does not insure equity from either standpoint.

20/ Philip H. Burch, Jr., Highway Revenue and Expenditure Policy in the United States (New Brunswick, New Jersey: Rutgers University Press, 1962) p. 219.

APPORTIONMENT IN THE 1921 FEDERAL HIGHWAY ACT

In its first few years of operation, the Federal-aid highway program became a highly controversial subject, often leading to Congressional demands for drastic changes in the program or for its discontinuance. Senator Townsend of Michigan called it a "pork barrel scheme," charging that "the money has been expended where there evidently was the greatest political influence," on roads "beginning nowhere and ending nowhere." 21/ Others agreed, alleging that (1) the Federal Government had inadequate supervisory power over the expenditure of its own revenues; and (2) the States were delegating too much authority to their counties, who had virtually no interest in a systematic highway network, preferring to improve purely local roads.

With these objections in mind, Townsend and other legislators introduced bills to replace the Federal-aid program with a controlled-length national highway system, to be built and operated by the Federal Government. An opposition measure (S.1072) was drafted to continue the Federal-aid program, although with certain revisions. Again, the controversy was heated by a basic rural/urban disagreement on the proper goals of the Federal Government in seeking highway improvement. AASHO and The American Farm Bureau Federation were influential supporters of the Federal-aid proposal, while the American Automobile Association and the National Automobile Chamber of Commerce (and many large-city newspapers) backed the national highway plan. 22/

21/ Quoted in Brooks, sec. 13g. pp. 1-2.

22/Ibid., p. 38 ff.

After much debate, and amid angry charges and counter-charges, the Federal Highway Act of 1921 (S.1072) was approved. Essentially a victory for rural interests, the act reaffirmed the Federal-State cooperative principle that produced the 1916 act. However, in recognition of some obvious faults, portions of the earlier act were amended, among them sections affecting apportionment. Although the fund distribution formula was retained, its usage was modified in three ways.

First, the 1921 act required each State to designate a primary system of highways upon which all Federal aid must be spent. This system, limited to 7 percent of the State's total highway mileage as of November 9, 1921, 23/ was authorized to insure that Federal funds would be spent on roads of more than strictly local importance. Although later legislation permitted conditional increments to the primary road network, the system is only moderately expanded from its 1921 mileage. Today, of course, the primary system is not the sole recipient of Federal aid; but it is the only system for which Federal aid is apportioned according to the original formula of population, area and rural postal route mileage.

23/ Originally, this 7 percent was broken down into two parts: A 3-percent primary or interstate system, and 4-percent secondary or intercounty system. These designations should not be confused with present system delineation. The 1921 statutory distinction between primary and secondary systems was largely ignored in practice, until it finally became known simply as the "Federal-aid highway system," or, as it is known today, as the primary system.

Second, apportionment was affected by a new clause that guaranteed each State at least one-half of 1 percent of the total appropriation in any year. This statutory floor was designed to circumvent an unfortunate feature of the apportionment formula: It allotted to a few small States virtually meaningless sums of money. This was particularly true at a time when Congressional appropriations for highways were rather meager. The four States that benefited from the provision--Delaware, New Hampshire, Rhode Island, and Vermont--each received less than $25,000 in Federal aid in 1917. 24/ The same four States (plus Hawaii, Puerto Rico, and the District of Columbia) today qualify for Federal aid under this clause, although their apportionment has increased to $2,437,875 apiece on the primary system alone.

The third way in which the 1921 Highway Act modified the original apportionment formula was more indirect. For years, even before the Federal-aid highway program became a reality, those western States containing large areas of untaxable Federally-owned land argued that they would be unable to match Federal funds in a cooperative financing plan. Since most States relied heavily on property taxes as a revenue source, the western States were at a distinct disadvantage in meeting their obligations. Although this was brought to the attention of Congress in 1915-16 by a determined western lobby, no remedy was provided in the earlier act, under the reasoning that those States affected would receive adequate compensation from the apportionment factor based on area.

24/ Burch, p. 219.

But the apportionment formula alone did not afford relief to the western States; in fact, it accentuated their revenue troubles. As long as the highway law required 50-percent State matching funds on Federal-aid projects, raising the apportionment only required the State to do the same. It became clear that the answer to this problem was not to increase Federal aid to the western States (although this would later be quite necessary), but to decrease the State funds needed to match Federal aid.

Accordingly, the 1921 act established a "sliding scale" matching ratio for those States containing large Federal land holdings. Any State in which unappropriated public lands comprised over 5 percent of the State's total area was authorized to reduce its share of the matching ratio by one-half of the percentage that the public lands did occupy of the total area. 25/ In the case of a State containing 40 percent Federal land, the matching ratio would be 70-30 (Federal-State), rather than 50-50. Although the sliding scale provision is not technically a part of the apportionment formula (since those States affected still receive the same percentages of the total highway appropriation), it operates in conjunction with the formula to determine the size of the Federal-aid program in each State.

25/ The term "unappropriated public lands" was used in the 1921 Federal Highway Act. Since then clarifications have defined the term more clearly to include "nontaxable Indian lands, individual and tribal, and public domain lands (both reserved and unreserved) exclusive of national forests and national parks and monuments." The Federal-Aid Highway Act of 1968 made optional a new procedure for computing matching ratios that included the area of national forests, parks, and monuments in "public lands." Those States electing to take advantage of the new procedure must agree to spend the savings (the difference between the amount the State formerly needed to match Federal funds, and what they presently need) on highway construction.

APPORTIONMENT CHANGES: 1924-44

In the history of Federal-aid legislation, the Federal Highway Act of 1921 is regarded as a landmark achievement for establishing the primary system of interstate roads. Likewise, the Federal-Aid Highway Act of 1944 is extremely important because it formally outlined new areas of Federal concern in highway matters--the secondary system and urban extensions of primary and secondary routes. The legislation enacted between these years, while not really of lesser consequence, nonetheless does not share the "status" of the 1921 and 1944 acts for two reasons: (1) Much of it consisted of minor and gradual revisions of earlier policies, and (2) much of it possessed a temporary nature associated with the Depression and World War II. The latter point is particularly relevant to Federal-aid apportionment, since the emergency legislation passed during this period often bypassed the traditional apportionment formula.

During the 1920's, few modifications were made that affected apportionment directly or indirectly. Hawaii, then a U.S. territory, was made eligible to receive Federal aid "upon the same terms and conditions as any of the several States" in 1924, making it the first territory to participate in the program. 26/ Some changes were made to broaden both the definition and the degree of Federal assistance

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26/ U.S., Congress, An Act to extend the provisions of certain laws to the Territory of Hawaii., Public Law No. 35, 68th Congress, 2d Session, March 10, 1924.

in "public lands" areas. A 1928 act allowed a State's Federal-aid system to exceed seven percent of its total road mileage by the mileage of roads in national forests and Indian (or other Federal) reservations. 27/

The Depression created the need for innovative economic policies, and Federal-aid appropriations became part of the larger effort to provide employment on public works projects. Emergency relief authorizations in 1930 and 1932 appropriated $200,000,000 to be expended on the Federal-aid system. These funds were apportioned according to the usual formula, but did not require immediate matching funds from the States. It was planned that the advance appropriations would be paid back by deductions from future Federal grants, although this was never to occur. The Emergency Relief and Construction Act of 1932 also made definitive the policy governing expansion of the Federal-aid system. A State was allowed to increase its 7-percent mileage by 1-percent increments whenever the previous mileage was 90-percent constructed and maintained. This clause clarified some vague language in earlier legislation.

The Federal-aid provisions of the 1933 National Industrial Recovery Act departed radically from tradition. In recognition of economic realities, Congress appropriated $400,000,000 for immediate expenditure (rather than on a two-year basis) without State matching

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27/ U.S., Congress, An Act to amend the Act entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes," approved July 11, 1916, as amended and supplemented, and for other purposes, Public Law No. 458, 70th Congress, 2d Session, May 21, 1928.

funds. Furthermore, the money was apportioned to the States differently: seven-eighths according to the old formula and one-eighth on population alone. This change was made "in the belief that the need of employment was greatest where population was most numerous," an analysis which indicates the relative priorities of the public works program. 28/ In terms of future policy, perhaps the most revealing aspect of the highway authorization was that Federal funds were, for the first time, provided for: (1) "emergency construction on secondary or feeder roads," subject to agreement between the State highway departments and the Secretary of Agriculture, and (2) extensions of the Federal-aid highway system "into and through municipalities." Although funds were not diverted for these purposes, it has been estimated that "about 25 percent of the funds were applied to sections of the Federal-aid system within municipalities, 50 percent to rural sections of the system, and 25 percent to secondary or feeder roads." 29/

Many of the precedents established by the National Industrial Recovery Act remained in effect through succeeding legislation. In 1934 Congress passed the Hayden-Cartwright Act, authorizing $200,000,000 in immediate appropriations without matching provisions. The "temporary" apportionment formula established the year before was continued for this authorization, with the important condition that "not less than 25 per

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28/ Hayden, p. 13.

29/ Ibid., p. 14.

centum of the apportionment to any State shall be applied to secondary or feeder roads, including farm to market roads, rural free delivery mail roads, and public-school bus routes" unless a lesser percentage were agreed to by the Secretary of Agriculture and the State. In effect, a specific appropriation had been made for secondary roads, even though these roads were not considered a part of the Federal-aid system.

In addition to the emergency appropriation above, the Hayden-Cartwright Act authorized future appropriations of $125,000,000 each for FY 1936 and 1937. This authorization was made in anticipation of a return to "normalcy," and was to be apportioned according to the original formula. Other relevant features of this comprehensive act included:

(1) A non-diversion clause specifying that a certain level of State highway user revenues must be spent for highway-related purposes. The penalty for non-compliance was the withholding of up to one-third of the State's apportionment.

(2) An authorized limit of $1\frac{1}{2}$ percent of the apportionment for highway planning and research, optional with each State.

(3) The removal of statutory restrictions on Federal-aid highway construction within municipalities.

A specific appropriation for "the elimination of existing hazards to life at railroad grade crossings" was made in the Emergency Relief Appropriation Act of 1935. The distribution of these funds was based upon a formula of one-half population, one-fourth Federal-aid road

mileage, and one-fourth railroad mileage, with no State matching funds required. Other emergency highway funds were allotted according to the new 7/8-1/8 formula, again without matching.

Two highway acts were passed in 1936. The first appropriated one-year emergency funds on the same basis as the two previous Emergency Relief Acts. The other followed the example of the Hayden-Cartwright Act in authorizing regular highway appropriations for future two-year periods (in this case, for FY 1938 and 1939). Rather than setting aside a percentage of the Federal-aid allocation for secondary roads, the 1936 act specifically authorized $25,000,000 for construction of these roads off the Federal-aid system. Federal-aid and secondary funds were to be apportioned on the original formula of area, population, and rural postal route mileage, weighed equally. Grade-crossing funds continued to be distributed as in 1935. Finally, Puerto Rico (1936) and the District of Columbia (1938) were brought into the regular Federal-aid program.

Under the provisions of the Federal Highway Act of 1940, "regular" appropriations (Federal-aid, secondary, and grade-crossings) were authorized through June 30, 1943. Although these authorizations continued in effect, they were supplemented by direction of the Defense Highway Act of 1941. As an emergency measure, the Defense Highway Act again departed from traditional Federal-aid practice in authorizing immediate distribution of funds "for construction of roads urgently needed for the national defense." The Federal-aid system was extended, regardless of statutory limitations, to include "any of the lines of the strategic

network of highways," as approved by the Federal Works Administrator. The act appropriated the following sums:

(1) For repair of the strategic highway network, $25,000,000 apportioned according to the usual formula, and $25,000,000 non-apportioned (to be distributed where needed). The Federal share payable was increased to three-fourths (more in public lands States)

(2) For defense access roads, $150,000,000 non-apportioned (later increased to $290,000,000). No required State matching funds.

(3) For construction of flight strips. $10,000,000 non-apportioned. No required State matching funds.

(4) For engineering surveys and plans "for future development of the strategic network of highways and bypasses around and extensions into and through municipalities and metropolitan areas," $10,000,000 apportioned according to the usual formula, with 50-50 matching (except in public lands States).

Between the 1940 Federal Highway Act and the 1941 Defense Highway Act (extended in 1942 and 1944), money was available to continue the highway program through World War II. These acts capped a rather remarkable flow of legislation designed to cope with the abnormal conditions caused by the Depression and the war. Because of their emergency status, many of the highway acts during this period were experiments in innovative finance methods. As may be expected, some concepts were better suited than others for adoption into a post-war highway program. Although the virtually non-standardized matching ratios and apportionment methods were not retained, many of the types of projects on which Federal funds had, for the first time, been spent, were carried over and systematized.

APPORTIONMENT IN THE 1944 FEDERAL-AID HIGHWAY ACT

Planning for a post-war highway program began as early as 1942. This proved to be fortunate, since it was almost 1945 before an acceptable bill withstood the pressures of Congress, the State highway departments, and road interest groups to become law. The process of developing the Federal-Aid Highway Act of 1944 entailed difficulties and bitterness unknown to earlier highway legislation (with the possible exception of the 1921 experience). Literally thousands of pages of public testimony, as well as a continuous flow of legislative drafts and redrafts, assured that all proposals were at least acknowledged, if not thoroughly reviewed.

A number of points could be mentioned to support the assertion that special and somewhat unique problems characterized the planning of the 1944 act. Not the least of these was the recognition by virtually everyone involved of the act's long-term significance in plotting future national highway development. However, for purposes of this paper, the following facts are particularly relevant: (1) Obvious internal dissention plagued groups, such as AASHO, that normally present a united front; (2) An unusually large number of different proposals received serious, prolonged consideration; and (3) The method of apportioning Federal aid was probably the subject of more attention than any other single issue.

The responsibility for organizing the ideas concerning a post-war highway program fell to AASHO, which in early 1943 drafted a bill for introduction in Congress. The Senate version, designated as S. 971,

was introduced on April 6, 1943 by Senator McKellar (Tennessee), chairman of the Senate Committee on Post Offices and Post Roads. An identical bill was introduced in the House one day later by Representative Robinson (Utah), chairman of the House Committee on Roads, and was designated as H.R. 2426. This number became the usual method of referring to the Robinson-McKellar bill, since almost all of the public hearings on the measure took place before the House Committee on Roads.

Only a brief summary of H.R. 2426 is possible. The bill authorized annual appropriations of $1,000,000,000 for three years, starting with the first post-war year. One-half of the appropriation was to be spent on the Federal-aid (primary) system, and the other half was to be divided between projects in urban areas ("an area including and adjacent to a city of ten thousand or more") and projects on secondary or feeder roads ("any road not on the Federal-Aid System"). Within each State, the division between urban and secondary fund allocations was to be made proportional to urban/rural population figures. The Federal-State matching ratio was 75-25, with a sliding scale in effect for public lands States. One apportionment formula served all systems; it was based one-half on population, one-fourth on area, and one-fourth on postal route mileage. H.R. 2426 also authorized, upon the recommendation of an appointed National Interregional Highway Committee, the designation of an interregional highway system not to exceed 40,000 miles, although no funds were provided for the system. 30/

30/ The purpose of the interregional highway system was to connect major population and industrial centers, and to serve national defense needs. Although the detailed routing of the system was left to the States (with Federal approval), the Interregional Highway Committee presented national highway maps showing general route locations. Eventually, of course, the interregional highway system developed into the present Interstate Highway System.

Because it was under consideration for so long, H.R. 2426 served as a focal point for all types of discontent related to proposed highway needs. Although the familiar rural/urban split soon became apparent, H.R. 2426, by proposing that additional weight be given to population in the apportionment formula, had actually shifted the entire dialogue slightly toward the urban side. As far as apportionment was concerned, a new "status quo" had been created; all but the most conservative highway groups (e.g. the American Farm Bureau Federation, the National Grange) conceded that this small step giving additional weight to urban areas was, at least, acceptable. Most of the western States grudgingly aligned themselves with the spokesman from Utah, who stated:

> Utah takes the position that the formula as provided in the Federal Aid Act, and as used since the adoption of Federal aid, is just, considering the nation as a whole. However, in order to create harmony among all of the States, Utah has agreed to accept the modified formula as contained in the bills before Congress. If the formula is to be contested, Utah will certainly fight for adoption of the present Federal aid formula. 31/

If the western States reluctantly accepted the apportionment provisions of H.R. 2426, the densely populated heavily industrialized eastern States rejected them as totally inadequate. Determined to secure additional revenue for what they felt to be urgent highway needs in urban areas, a tight, well-organized "urban lobby" (composed of highway representatives from Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania) pressed for legislation more reflective of their concerns.

31/ Statement of John S. Evans, Chairman, State Road Commission of the State of Utah, quoted in Hearings on H.R. 2426, p. 448.

Not only did this group argue that their area had the greatest need for road improvements, but also that it was going to be affected most seriously by post-war unemployment. 32/ In reserve were the expected statistics showing that these States, plus a few others, were consistently "penalized" in Federal highway appropriations, relative to their tax contributions. 33/

This evidence was used in support of a bill (H.R. 4170) introduced by Representative Miller of Connecticut in January 1944. Among its other provisions, the Miller bill contained an apportionment formula based one-fifth on the original formula (area, population, postal route mileage), one-fifth on motor-vehicle registration, and three-fifths on unemployment (from Labor Department demobilization figures). Strongly attacked by rural interests, the bill was rather quickly rejected by its original backers, who realized that unemployment considerations were not the most direct indicators of highway needs nor the most impressive rationale upon which to base future highway fund appeals.

32/ While post-war highway legislation was being prepared, a serious and, for the most part, useful discussion centered around the relative priorities that the legislation should serve. Some felt that the concept of the legislation as a public works program designed to curb unemployment (an extension of the Depression experience) was at least as important as the actual highway construction provisions. The prevailing view, however, was that the legislation served highway needs primarily and unemployment needs as a natural consequence.

33/ The impact of these statistics was diminished somewhat by other statistics showing that these States had, on the average, a lower motor fuel tax rate than the rest of the country, and that New York, New Jersey, and Pennsylvania were among the leaders in diverting user taxes to non-highway purposes.

A much firmer stance was taken behind H.R. 4628, introduced in April 1944 by Representative Wene of New Jersey. H.R. 4628 authorized appropriations of $670,000,000 per year for the first three post-war years. Of that sum $400,000,000 was for construction related to the proposed interregional highway system, apportioned "on the basis of the ratio which the motor-vehicle registrations in the counties traversed by the interregional highway system in each State bears to the total motor-vehicle registrations in the counties traversed by the interregional highway system in all the States." The other $270,000,000, one-half apportioned according to the original Federal-aid formula and one-half according to State motor-vehicle registration totals, was for construction on Federal-aid primary and secondary systems. The matching ratio for all systems was 50-50, with a sliding scale in public lands States.

A strong presentation on behalf of H.R. 4628 was made before the House Committee on Roads. But the bill stood little chance of passage because it represented an extreme position with little national popularity.

With most of its member organizations backing H.R. 2426 (the original AASHO bill), and a few supporting H.R. 4628 (the Wene bill), AASHO injected a note of confusion into the hearings by offering so so many amendments to H.R. 2426 as to effectively change the nature of their proposals. This was done at the same time that the president of AASHO was testifying that "the legislative committee of our association

has not receded in any particular in its support of the bill as introduced, except for these necessary clarifying amendments." 34/ Important changes were recommended in:

(1) The allotment of Federal funds to the several highway systems. Under H.R. 2426 only the Federal-aid (primary) system received a specific allotment, which was $500,000,000 per year. The other $500,000,000 was divided between secondary and urban systems, based on rural/urban population. Under the AASHO amendment, $450,000,000 was earmarked for Federal-aid (primary) roads, $250,000,000 for secondary roads, and $300,000,000 for principal highways in urban areas. This change gave more money to urban systems at the expense of the other systems.

(2) The apportionment of Federal funds to the States. H.R. 2426 had contained a formula of one-half population, one-fourth area, and one-fourth postal route mileage, applicable to all systems. This formula was discarded in the AASHO amendments. Federal-aid (primary) and secondary funds were now apportioned according to the original formula of one-third population, one-third area, and one-third postal route mileage. Urban funds were apportioned according to the population in each State of municipalities over 10,000.

AASHO, in supporting a greatly modified version of H.R. 2426, had actually staked out a middle position, avoiding strictly rural or urban alternatives. Since AASHO presented these amendments during the

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34/ Statement of Samuel C. Hadden, quoted in Hearings on H.R. 2426, p. 557.

same hearings in which its constituents were endorsing contradictory legislation, it appears that pressure for moderation came not so much from the States as from "outside" influences. It is worth noting that President Roosevelt, in a letter to the Administrator of the Federal Works Agency, called for the same method of apportioning Federal aid for highways as AASHO now proposed. 35/ Commissioner MacDonald of the Public Roads Administration also testified strongly in favor of the AASHO amendments. 36/

Hearings before the House Committee on Roads concluded in May 1944. In the following months the House and the Senate approved bills containing variations of the AASHO recommendations. However, the bills were basically contradictory to each other. A joint conference committee appointed to reconcile House-Senate differences reported favorably on a compromise version of S. 2105, originally introduced by Senator Hayden of Arizona. On December 20, 1944, the measure became the Federal-Aid Highway Act of 1944.

Once again, a balance had been stuck in favor of rural road interests, as many earlier urban-oriented provisions were altered. The size of the Federal-aid program was reduced from $1,000,000,000 per year to $500,000,000. Instead of a primary-secondary-urban allotment in the ratio of 45-25-30, the 1944 act specified 45-30-25. The population criterion for consideration as an urban area was lowered from 10,000

35/ Letter from Franklin D. Roosevelt to Philip B. Fleming, March 3, 1944, quoted in Hearings on H.R. 2426, p. 935.

36/ Hearings, pp. 960-61.

to 5,000 and included "urban places" as well as municipalities. Although the apportionment formula for primary funds remained as it had been since 1916, the secondary formula substituted as a factor rural population for total State population. The expenditure of secondary funds was prohibited in urban areas unless a State had a population density of over 200 per square mile (which only six States had in 1940). The Federal-State matching ratio remained at 50-50, and the one-half of 1 percent minimum apportionment was extended to the secondary, but not the urban program. Except for a few minor changes made since 1944, the funding provisions of the A-B-C program still operate according to the intentions of the 1944 act.

Federal-Aid Highway Act of 1944
(58 Stat. 838)

APPORTIONMENT: REVISIONS SINCE 1944

For all practical purposes, the A-B-C apportionment formula was completely developed in 1944. Since then only minor clarifications have been made in the already existing legislation related to apportionment. None of the clarifications have altered the principles upon which A-B-C funds are distributed, although they have at times resulted in some redistribution of those funds. This is perhaps best illustrated through a simple chronological listing of amendatory legislation.

The Federal-Aid Highway Act of 1954 redefined "urban extension" projects ("C" funds) to include "projects on approved extensions of the Federal-aid secondary system within urban areas." Previously, only urban portions of the primary system were eligible for assistance under this clause. The 1954 Act also authorized the States to transfer up to 10 percent of their primary, secondary, or urban funds from one Federal-aid system to another, in accordance with highway needs. This provision was an expansion of a 1944 transfer allowance, by which any State with all of its "public roads and highways" under State control could use secondary funds on the primary system.

In 1956, the transfer allowance was increased to 20 percent. The 1956 Act also brought the Territory of Alaska into the regular Federal-aid program; however, in determining the apportionment of primary and secondary funds only one-third of Alaksa's area was used as a factor. When Alaska became a State, this restriction on area was removed (Alaska Omnibus Act, June 23, 1959), thereby greatly increasing Alaska's percentage of the total Federal-aid apportionment.

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A minor amendment was included in the 1962 Federal-Aid Highway Act to permit expenditure of secondary funds on urban extensions of the secondary system if the extension either passed entirely through the urban area or connected to another Federal-aid road within the urban area. Since 1954, only urban funds had been available for this purpose. In light of the 20-percent transfer allowance, this provision represents little more than a technical clarification of previous legislation.

Other such clarifications were made in 1963, in response to recommendations made by the General Accounting Office, after a review of Federal-aid apportionment procedures. 38/ Most involved relatively minor corrections of then-existing policy; however, several of the GAO findings will be mentioned later in a discussion of present apportionment methods.

38/ U.S., The Comptroller General of the United States, Report to the Congress of the United States: Review of Apportionments of Federal-Aid Highway Funds, Bureau of Public Roads, Department of Commerce, for Fiscal Years 1956-1963. (Reproduced: Washington, August 1962).

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APPORTIONMENT OF INTERSTATE FUNDS

A detailed analysis of Federal-aid Interstate apportionment is beyond the scope of this paper, which is primarily oriented towards the ongoing A-B-C highway program. The Interstate system represents the tangible results of a unique concept: the construction of a superior, limited-mileage highway system within a definite time span. It is logical to assume that the present method of apportioning Interstate funds is satisfactory and will continue until the system is completed. Therefore, only a brief background sketch of Interstate apportionment is offered.

Although the Interstate system was officially established in 1944, no funds were authorized for its construction until 1952. Included in the 1952 Federal-Aid Highway Act was a $25,000,000 Interstate authorization (for FY 1954 and 1955), to be apportioned on the same basis as primary funds; that is, with equal emphasis upon area, population, and postal route mileage. The Federal-State matching ratio was made 50-50, with a sliding scale in effect, again an echo of regular Federal-aid practice.

The 1954 authorization (for FY 1956 and 1957) was enlarged to $175,000,000 and a new apportionment formula was utilized, based one-half on the old formula and one-half on population alone (with no State receiving less than three-fourths of 1 percent of the population factor). The Federal share payable was increased to 60 percent.

It was in 1956, of course, that the "real" Interstate program got under way, with the creation of the Highway Trust Fund, financed by pay-as-you-go Federal highway user taxes. The scope of the program

emphasized the importance of Federal-aid distribution. Earlier, two bills containing different apportionment provisions were being considered by Congress. One, introduced by Senator Gore of Tennessee, would have continued the 1954 formula of one-half population and one-half section 21 (the old formula). The other, introduced by Representative Fallon of Maryland, proposed that Interstate funds be apportioned according to needs, or the estimated cost of completing the Interstate system in each State. The States were to prepare their needs estimates in cooperation with the Secretary of Commerce, subject to Congressional approval. Underlying this proposal was the stated desire to see work on the system progress at an even pace throughout the country.

In the best tradition of the House and the Senate, a compromise was reached that enabled both plans to be enacted. The Gore formula was to govern apportionments for FY 1957-59, until a comprehensive needs report could be developed. From 1960 until the system was completed, apportionment was to be based on Interstate needs estimates, submitted periodically. In both cases, the Federal-State matching ratio was 90-10, with a sliding scale allowing up to 95 percent Federal participation.

Since 1960, only one change has been made in the apportionment of Interstate funds. The General Accounting Office recommended in 1962 that the basis of apportionment be made the Federal share of completing the system in each State, rather than the total cost of completion. This

recommendation was designed to correct certain inequities accruing to twelve public lands States, resulting from the interaction of the existing apportionment formula with the sliding scale matching ratio. It was shown that these States were not receiving the share of Federal funds to which they were entitled. 39/ Acting upon the GAO recommendation, Congress authorized that, starting in FY 1966, interstate apportionments would be based upon the Federal share of completing the system in each State.

39/ A detailed analysis of the situation can be found in ibid., pp. 19-25.

A REVIEW OF VARIOUS APPORTIONMENT FEATURES

The present A-B-C apportionment formulas are listed below for purposes of review:

(1) Federal-aid primary system ("A" funds),
One-third on area
One-third on population
One-third on rural postal route mileage

(2) Federal-aid secondary system ("B" funds),
One-third on area
One-third on rural population
One-third on rural postal route mileage

(3) Urban extensions of the primary and secondary systems ("C" funds),
The population, within each State, of urban places over 5,000.

As was mentioned earlier, certain features of the apportionment formulas may not be working well, either because of technical difficulties in the factors themselves, or because the factors no longer reflect the intentions of the legislation that enacted them. For many years, it appeared as though there was something "sacred" about the apportionment formulas that in itself was enough to rebuff suggestions for change. That this is no longer so is demonstrated by the fact that both AASHO and the Bureau of Public Roads are engaged in full-scale reviews of the relevance of the apportionment formulas to future highway needs. The following features are presently under consideration.

Land Area as a Factor

Little can be said about the use of land area as an apportionment factor in primary and secondary allocation. Of the factors used, it is the only one which remains constant over a given time period. Land

area was included in the original formula for two reasons: as a factor against which to balance population, and as a factor reflective of future highway mileage considerations in then-undeveloped regions. Neither of these rationales is entirely legitimate today. Rather than balance population, the use of land area has overwhelmed it, particularly since area is given equal weight in the formula. This practice has resulted in Alaska receiving more primary ($26,470,058) and secondary ($17,763,926) funds for FY 1970 than any State except Texas. Even when urban funds based on population alone are included--and Alaska ranks last in this category--Alaska receives a higher A-B-C apportionment than all but five States.

In addition, land area no longer bears a close relationship to mileage of highways that might be built in the future. With few exceptions, the major roads in the United States, including those in underdeveloped regions, were built some time ago. Almost all construction work today involves either reconstruction of existing highways or new construction parallel to old routes. It would seem that a factor more closely aligned to Federal-aid mileage or total road and street mileage would be more relevant to apportionment considerations. The Functional Highway Classification study will provide accurate data in this area, if it is felt that State-originated data are not accurate.

Population as a Factor

1. A segment of the rural population is excluded in computing secondary apportionment.

In 23 U.S.C. 101, urban areas are defined as those "including and adjacent to a municipality or other urban place having a population of five thousand or more, as determined by the latest Federal census, with boundaries to be fixed by a State highway department, subject to the approval of the Secretary [of Transportation]." Rural areas are "all areas of a State not included in urban areas." Both definitions were originally provided in the Federal-Aid Highway Act of 1944.

One of the apportionment factors for Federal-aid secondary fund distribution is rural population. It would appear, from the above definitions, that rural population would reside in rural areas; that is, it would include the population of all places under 5,000 that are located outside of urban fringes. Although this is the intent of the law, it is not followed in apportioning secondary funds. For apportionment purposes, rural population resides in places of under 2,500 population. Places in which the population ranges from 2,500 to 5,000 are simply ignored in computing rural population.

It is not clear how long this exclusion has been practiced. It was brought to light by the General Accounting Office in their 1962 review of Federal-aid highway apportionment, at which time both the GAO and the Bureau of Public Roads agreed that Congress should be informed of the matter. 40/ Whether they were or not is a mystery, since no further action was taken to correct the existing situation.

40/ Report of the Comptroller General, pp. 10-13.

According to the 1960 census, 6,434,049 people were excluded from the rural population for every apportionment from 1960 to 1970. If, in apportioning funds for FY 1970, the cutoff figure for rural population had been 5,000 instead of 2,500, 27 States would have their secondary apportionments increased in amounts from $356 (Colorado) to $259,136 (California). Eighteen States, plus Puerto Rico, would have experienced losses ranging from $3,580 (South Dakota) to $196,960 (North Carolina). Five States, plus the District of Columbia, would not have been affected. Although none of the gains or losses are extremely large, the adjustment of rural population figures would have some effect on almost all States. Table 1 compares the actual apportionment of secondary funds for FY 1970 with the projected apportionment based on revised procedures for computing rural population.

2. Faster-growing States are penalized by 10-year census restrictions.

Because the population figures used in A-B-C apportionment are derived from decennial censuses, no population changes within the various States can be accounted for, except at 10-year intervals. Although a State might be experiencing above-average population growth during the interim period, it can receive no credit for that growth in the apportionment formula, except as a lump-sum credit every 10 years. The opposite holds true for States with decreasing or stable populations.

The Bureau of the Census, in its Current Population Reports series, presents revised annual estimates of State population totals. The correlation between these estimates and the actual census counts is quite close. For illustrative purposes only, the estimated population changes for 1960-65 were examined. During this period the population of the United States (including Puerto Rico) increased by an estimated 8.15 percent. Thus, States which were on either side of this figure would receive proportionally greater or lesser allotments, depending on what percentage their population represented of the U.S. total population. In the same period, Nevada's population increased by 52.13 percent, whereas West Virginia's decreased by 2.17 percent. Both of these States have relatively small populations, so that in absolute dollar terms, their gain or loss would not be that great. But California grew (17.23 percent) at over twice the National average, while Pennsylvania increased (2.98 percent) at less than three-eighths of the average. The apportionment of both of these States would be substantially affected by the revised figures.

It would probably be impossible to agree on the use of population estimates, no matter how accurate, as apportionment factors. This is unfortunate because the estimates are developed by an impartial agency that has no stake in the results. It will also take more than this argument to bring about five-year censuses. The alternative to using unsatisfactory population figures is to use reasonably similar figures that can be collected and certified on an annual basis. The two factors most often suggested for use in apportionment formulas are highway motor

fuel consumption and motor vehicle registrations. Both correlate fairly closely with current population figures and are actually more representative of highway needs than is population. Although developed within the States, fuel consumption and vehicle registration totals are easily certifiable. Table 2 lists these totals for 1967, and compares them to the apportionment of A-B-C funds for FY 1970.

Rural Postal Route Mileage as a Factor

Rural postal route mileage is probably the most arbitrary and least relevant factor for determining Federal-aid primary and secondary apportionment. This would be true even if there were no inconsistencies in the data submitted to the Federal Highway Administration for apportionment purposes. As it is, an already questionable situation is made worse by the apparent lack of systematic analysis applied to the composition of rural postal routes.

First of all, it should be noted that postal route mileage represents neither post road mileage nor the mileage of vehicles traveling over postal routes in pursuit of their postal functions. The components of rural postal routes--rural free delivery routes and star routes--are treated differently when mileage data are compiled. Rural delivery mileage is reported for the round-trip length of each route, while star route mileage represents one-half of the round-trip length. Depending upon the ratio of star route mileage to rural delivery mileage within a particular State, rather large apportionment changes could result from consistent treatment of the two services. 41/ Furthermore, star route mileage does not

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41/ Report of the Comptroller General, pp. 26-32, 43-44.

take into account the frequency of travel over the route. A star route traveled once per week carries the same mileage weight as one traveled six times per week. In addition, star routes that cross State lines have their entire length credited to the State in which the route originates, even if that State contains only a small percentage of the total route mileage. Various other problems exist in reporting postal route mileage which are beyond the scope of this paper. 42/ It is hoped that the above examples provide some indication of the confusion surrounding the compilation of postal route mileage statistics.

Even if these inconsistencies did not exist, there would be no particular justification for using rural postal route mileage as an apportionment factor. Over two-thirds of the mileage is off the Federal-aid system, and the State percentages of total postal route mileage do not correspond to their percentages of Federal-aid mileage (see table 3). It has been shown that the ostensible reason for including this factor in the formulas was recognized as dubious in 1916. Certainly, it has not grown any less so since then.

42/ Two internal BPR papers document the problems involved. One, in the form of a memorandum from W. J. Page to R. T. Messer, is entitled "Post Road Mileage Apportionment Factor Study," and is dated April 16, 1965. The other, uncredited, is "Post Road Mileage Study: An Analysis for the Apportionment of Federal-aid Highway Funds." It appears to have been completed in early 1963.

The Concept of Equity and the Concept of Needs

Equity and needs play an important role in Federal-aid apportionment. In turn, they are mutually related; a flexible apportionment formula based on highway needs should insure an equitable distribution of Federal funds. But the apparent simplicity of these dual concepts is misleading. Equity and needs are relative guidelines, often made highly variable by the terms in which they are defined.

At least three interpretations can be attached to equity as it characterizes particular aspects of Federal-aid apportionment. First, an equitable distribution formula may take into account a State's ability to pay for the support of a program (in this case, highway construction), as measured by per capita income or some other means. In this principle, also known as equalization, an inverse relationship exists between ability to pay and amount of Federal aid received. 43/ A second form of equity recognizes relative State taxing efforts through a formula that minimizes the difference between individual State contributions to, and receipts from, the Highway Trust Fund. The theory behind such a plan is that no State should have to pay an overwhelming share of the cost of supporting the highway program in another State. Third, equity is obviously an integral consideration in a formula based upon the relative highway needs, in dollar terms, of the various States.

43/ Advisory Committee on Intergovernmental Relations, The Role of Equalization in Federal Grants (Washington: January 1964), pp. 45-85.

Within a limited context, each of the interpretations suggested above describes a quality of equity. The problem arises when equity must be applied more specifically to the goals and priorities of the national highway program. It is here that the interpretations become conflicting, if not mutually exclusive. If it were possible to develop an apportionment formula that treated every State equitably under every interpretation of equity, then that formula would certainly be implemented. Such a trick is impossible, of course, and Federal-aid apportionment for highways is subject to the same concessions and compromises as any other socio-economic measure.

This being the case, priority status cannot be assigned to every desirable objective of the Federal-aid formula. For example, equalizing provisions which attempt to compensate the less affluent States do not insure the optimal distribution of highway funds, and should not be incorporated in an apportionment formula. Equalization can better be achieved through a variable matching ratio that recognizes a State's ability to meet its financial obligations.

There is room in the formula to reflect a concern for the return that each State receives on its contribution to the Highway Trust Fund. Every effort should be made to guarantee an adequate rate of return, always recognizing that some States will necessarily be "donors" and others "receivers." To a certain extent, redistribution of Federal highway user revenues is inevitable; otherwise, the reasons for collecting the revenues and administering a Federal program are nonexistent.

The national interest in highway development lends emphasis to the assertion that "rate of return" considerations, although important, should play only a supporting role in Federal-aid apportionment.

This leaves highway needs as the most equitable basis upon which to apportion Federal funds. Again, it becomes a matter of national highway policy, rather than 52 separate policies. If, as a consequence of national policy, revenue redistribution is desirable, then Federal funds should logically flow to areas where highway needs are greatest. Today, our larger urbanized areas are experiencing complex transportation difficulties, and a good case can be made for an apportionment formula that recognizes the magnitude of the urban problem.

To say that apportionment should be based on needs does not dispose of many problems inherent in the needs approach. The very concept of needs is a subjective one; what would be considered actual highway needs (necessities) by one State may be regarded as extravagance by another. Variations in judgment of this type are not so important in long-range cost projections, but could prove crucial as bases for annual highway apportionments. The fact that a needs formula would, in effect, be developed by the individual States means that the grounds for criticism and suspicion would already exist, whether warranted or not. In such a situation, the "opportunity exists for manipulation by a State in order to gain a more favorable position in the amount of Federal-aid received." 44/

44/ The American Association of State Highway Officials, "A Progress Report on the 'After 75 Program'," quoted in U.S. Congress, Senate, Public Works Subcommittee on Roads. Hearings on S. 2888 S.3381, Federal-Aid Highway Act of 1968. 90th Congress, 2d Session, June 1968.

The threat of manipulation is not the only disadvantage of the needs approach. Even conscientious efforts to accurately portray highway needs must be reconciled with (1) the difficulty in keeping needs estimates current through continual revision, and (2) the fact that current and future needs are often dependent on past highway development and level of service.

It may reasonably be argued that the needs approach has proven to be a satisfactory basis for apportioning Interstate highway funds. The answer to this is that the Interstate System presents no relevant examples to follow. It is a "closed" system with Federally-alloted mileage quotas in each State. For apportionment purposes, Interstate needs are relatively easy to ascertain, being a function of the cost of completing the system within the various States. However, an ongoing or modified A-B-C program is different. The cost of completing the A-B-C systems is hardly predictable because these systems are, for the most part, open-ended. The only mileage limitations are expressed in general terms, such as the augmentable 7-percent primary system. Furthermore, the A-B-C systems are subject to almost limitless reconstruction to meet anticipated future traffic demands.

Because of these problems, the idea of a flexible apportionment formula based on needs is rejected. Yet the concept behind the idea--that, as accurately as possible, needs should be considered in the formula--is a sound one. An effort should be made to develop one or more formulas containing verifiable fixed factors more closely related to needs. Motor vehicle registrations and highway motor-fuel consumption

have been suggested as possibilities, although no attempt has been made here to develop a formula from these factors. It does appear that the present formulas--based on area, population, and rural postal route mileage--contain features possessing little equity and less logic. Future highway programs should be planned with a thorough comparative analysis of apportionment factors included.

Table 1.--Comparison of actual Fiscal Year 1970 Federal-aid secondary system apportionment under the current practice and the amount each State would receive if the population of places 2,500 - 4,999 were included as rural.

(dollars)

State	Apportionment		Gain (+) Loss (-)	State	Apportionment		Gain (+) Loss (-)
	With 2500 - 4999 group as rural	Under current practice			With 2500 - 4999 group as rural	Under current practice	
Alabama	7,287,633	7,314,672	- 27,039	Nebraska	6,164,815	6,183,213	- 18,398
Alaska	17,746,147	17,763,926	- 17,779	Nevada	3,692,343	3,679,774	+ 12,569
Arizona	4,662,645	4,624,164	+ 38,481	New Hampshire	1,625,250	1,625,250	-
Arkansas	5,717,813	5,746,100	+ 28,287	New Jersey	2,345,782	2,234,322	+ 111,460
California	11,282,898	11,023,762	+ 259,136	New Mexico	5,136,297	5,135,500	+ 797
Colorado	5,611,179	5,610,823	+ 356	New York	9,510,353	9,457,766	+ 52,587
Connecticut	2,406,476	2,397,506	+ 8,970	North Carolina	10,178,255	10,375,215	- 196,960
Delaware	1,625,250	1,625,250	-	North Dakota	4,643,805	4,710,391	- 66,585
Florida	6,036,995	5,882,894	+ 154,101	Ohio	10,032,155	10,125,522	- 93,356
Georgia	8,683,587	8,677,726	+ 5,861	Oklahoma	6,990,412	6,952,442	+ 37,970
Hawaii	1,625,250	1,625,250	-	Oregon	5,388,460	5,378,682	+ 9,778
Idaho	3,994,492	3,961,435	+ 33,057	Pennsylvania	11,214,764	11,244,591	- 29,827
Illinois	10,076,221	9,903,669	+ 172,552	Rhode Island	1,625,250	1,625,250	-
Indiana	7,632,886	7,674,524	- 41,638	South Carolina	5,411,401	5,502,652	- 91,251
Iowa	8,366,920	8,347,774	+ 19,146	South Dakota	4,977,954	4,981,534	- 3,580
Kansas	7,854,933	7,793,147	+ 61,786	Tennessee	7,764,966	7,879,490	- 114,524
Kentucky	6,787,877	6,886,855	- 98,975	Texas	19,165,238	18,913,520	+ 251,718
Louisiana	5,460,491	5,431,693	+ 28,798	Utah	3,389,607	3,378,604	+ 11,003
Maine	2,787,008	2,736,593	+ 50,415	Vermont	1,625,250	1,625,250	-
Maryland	2,818,108	2,895,835	- 77,727	Virginia	7,162,514	7,351,440	- 188,926
Massachusetts	2,559,574	2,551,391	+ 8,183	Washington	5,324,414	5,295,101	+ 29,313
Michigan	9,304,067	9,341,969	- 37,902	West Virginia	4,328,733	4,437,096	- 108,363
Minnesota	8,896,912	8,935,788	- 38,876	Wisconsin	8,050,389	8,047,834	+ 2,551
Mississippi	6,488,744	6,577,610	- 88,866	Wyoming	3,866,642	3,819,426	+ 47,216
Missouri	9,209,906	9,202,100	+ 7,806	Dist. of Col.	1,625,250	1,625,250	-
Montana	6,256,651	6,220,804	+ 35,847	Puerto Rico	2,628,993	2,711,655	- 82,662
				TOTAL	325,049,963 1/	325,050,000	

1/ Total is less than $325,050,000 due to technical limitations of the calculating machine.

Table 2.--Motor vehicle registration, highway motor fuel consumption, 1967, and total A-B-C-apportionment authorized by 1968 act for FY 1970.

State	Motor vehicle registrations	Percent	Fuel (thousands of gallons)	Percent	A-B-C apportionment (dollars)	Percent
Alabama	1,735,179	1.783	1,390,040	1.782	20,612,282	1.902
Alaska	110,382	0.113	72,927	0.093	44,414,536	4.099
Arizona	880,615	0.904	[illegible]	[illegible]	[illegible]	1.275
Arkansas	982,936	1.010	844,044	1.082	14,497,955	1.338
California	10,849,514	11.149	8,008,678	10.265	64,982,416	5.997
Colorado	1,241,870	1.276	877,428	1.125	17,048,200	1.573
Connecticut	1,544,761	1.587	1,076,857	1.380	10,971,984	1.013
Delaware	267,660	0.275	230,227	0.295	4,694,437	0.433
Florida	3,392,661	3.486	2,561,698	3.284	23,081,411	2.130
Georgia	2,164,367	2.224	1,953,292	2.504	24,545,516	2.265
Hawaii	336,498	0.346	189,736	0.243	5,083,833	0.469
Idaho	454,572	0.467	332,865	0.427	10,068,057	0.929
Illinois	4,818,259	4.951	3,998,771	5.126	45,700,013	4.218
Indiana	2,631,944	2.704	2,233,650	2.863	24,413,376	2.253
Iowa	1,651,549	1.697	1,235,515	1.584	22,511,199	2.078
Kansas	1,440,595	1.480	1,041,470	1.335	21,657,944	1.999
Kentucky	1,632,380	1.677	1,248,482	1.600	17,783,465	1.641
Louisena	1,633,802	1.679	1,306,286	1.674	17,304,614	1.597
Maine	452,083	0.465	413,878	0.530	7,269,191	0.671
Maryland	1,611,986	1.656	1,328,139	1.702	12,500,186	1.154
Massachusetts	2,223,472	2.285	1,844,203	2.364	17,958,935	1.657
Michigan	4,133,428	4.247	3,527,133	4.521	36,708,087	3.388
Minnesota	1,996,925	2.052	1,521,373	1.950	26,138,924	2.412
Mississippi	1,012,166	1.040	918,780	1.178	16,068,603	1.483
Missouri	2,211,187	2.272	2,019,013	2.588	28,766,029	2.655
Montana	451,337	0.464	340,860	0.437	15,815,061	1.460
Nebraska	887,809	0.912	677,564	0.868	16,433,411	1.517
Nevada	286,637	0.295	261,478	0.335	9,627,449	0.889
New Hampshire	348,717	0.358	276,225	0.354	4,790,549	0.442
New Jersey	3,200,454	3.289	2,550,052	3.269	20,743,573	1.914
New Mexico	571,239	0.587	525,761	0.674	14,076,791	1.299
New York	6,060,491	6.228	4,841,102	6.205	63,022,475	5.817
North Carolina	2,423,241	2.490	2,072,717	2.657	25,621,093	2.365
North Dakota	404,886	0.416	257,952	0.331	11,640,848	1.074
Ohio	5,305,391	5.452	4,054,699	5.197	41,953,153	3.872
Oklahoma	1,541,907	1.584	1,215,084	1.557	19,982,133	1.844
Oregon	1,190,006	1.223	933,421	1.196	15,379,589	1.419
Pennsylvania	5,335,237	5.482	4,010,141	5.140	46,303,475	4.274
Rhode Island	434,362	0.446	300,778	0.386	5,716,569	0.528
South Carolina	1,180,392	1.213	1,026,233	1.315	13,787,024	1.272
South Dakota	406,961	0.418	305,490	0.392	12,367,940	1.141
Tennessee	1,869,918	1.921	1,606,355	2.059	21,853,947	2.017
Texas	5,893,582	6.056	5,168,740	6.625	64,120,878	5.918
Utah	561,585	0.577	430,666	0.552	10,025,181	0.925
Vermont	194,120	0.199	180,399	0.231	4,357,688	0.402
Virginia	1,932,478	1.986	1,748,407	2.241	21,562,509	1.990
Washington	1,851,761	1.903	1,331,999	1.707	17,243,837	1.591
West Virginia	765,347	0.786	621,868	0.797	10,866,853	1.003
Wisconsin	1,954,112	2.008	1,596,723	2.047	24,803,779	2.289
Wyoming	226,403	0.233	217,659	0.279	9,758,587	0.901
Dist. of Col.	246,712	0.254	242,146	0.310	5,789,409	0.534
Puerto Rico	372,821	0.383	323,876	0.415	7,262,454	0.670
TOTAL	97,317,697	100.000	78,016,526	100.000	1,083,500,000	100.000

Table 3.--Traveled way of the rural Federal-aid highway systems compared to mileage of RFD and star routes, 1967.

State	Rural Federal-aid highway mileage						RFD and star route mileage	
	Primary 1/		Secondary		Total			
	Mileage	Percent	Mileage	Percent	Mileage	Percent	Mileage	Percent
Alabama	5,337	2.397	20,674	3.387	26,011	3.123	73,971	2.784
Alaska	2/ 1,596	0.717	1,789	0.293	3,385	0.406	6,260	0.236
Arizona	2,870	1.289	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.599
Arkansas	3,471	1.559	13,695	2.277	17,366	2.085	55,495	2.088
California	7,635	3.429	12,500	2.048	20,135	2.417	55,851	2.102
Colorado	3,938	1.769	4.112	0.674	8,050	0.966	41,430	1.559
Connecticut	721	0.324	910	0.149	1,631	0.196	29,811	1.122
Delaware	472	0.212	1,337	0.219	1,809	0.217	4,511	0.170
Florida	4,194	1.884	13,348	2.187	17,542	2.106	41,984	1.580
Georgia	7,396	3.322	19,454	3.187	26,850	3.223	88,857	3.344
Hawaii	445	0.200	581	0.095	1,026	0.123	1,114	0.042
Idaho	3,148	1.414	5,574	0.913	8,722	1.047	20,765	0.781
Illinois	9,566	4.297	13,929	2.282	23,495	2.821	112,748	4.243
Indiana	4,628	2.079	17,069	2.797	21,697	2.605	80,895	3.044
Iowa	9,173	4.120	33,144	5.430	42,317	5.080	104,971	3.950
Kansas	7,266	3.264	24,061	3.942	31,327	3.761	93,413	3.515
Kentucky	3,850	1.729	14,743	2.415	18,593	2.232	61,447	2.312
Louisiana	2,591	1.164	8,543	1.400	11,134	1.337	42,587	1.602
Maine	1,786	0.802	2,399	0.393	4,185	0.502	21,287	0.801
Maryland	1,473	0.662	6,681	1.095	8,154	0.979	23,903	0.900
Massachusetts	1,363	0.612	1,565	0.256	2,928	0.352	17,044	0.641
Michigan	5,585	2.509	25,918	4.246	31,503	3.782	90,514	3.406
Minnesota	7,086	3.183	30,153	4.940	37,239	4.471	99,436	3.742
Mississippi	5,767	2.590	16,051	2.630	21,818	2.619	64,072	2.411
Missouri	8,085	3.619	22,961	3.762	31,019	3.724	109,354	4.115
Montana	5,925	2.661	5,670	0.929	11,595	1.392	31,159	1.173
Nebraska	5,613	2.521	17,514	2.869	23,127	2.776	66,728	2.511
Nevada	2,234	1.003	3,542	0.580	5,776	0.693	6,661	0.251
New Hampshire	1,116	0.501	1,631	0.267	2,747	0.330	11,087	0.417
New Jersey	1,008	0.453	1,368	0.224	2,376	0.285	16,809	0.633
New Mexico	3,655	1.642	5,715	0.936	9,370	1.125	23,326	0.878
New York	8,771	3.940	17,667	2.895	26,438	3.174	82,168	3.092
North Carolina	3,831	1.721	28,100	4.604	31,931	3.833	88,193	3.319
North Dakota	4,611	2.071	13,409	2.197	18,020	2.163	46,072	1.734
Ohio	6,353	2.854	18,418	3.018	24,771	2.974	98,602	3.711
Oklahoma	6,926	3.111	13,094	2.145	20,020	2.403	80,830	3.042
Oregon	3,609	1.621	7,809	1.279	11,418	1.371	31,014	1.167
Pennsylvania	6,533	2.934	12,160	1.992	18,693	2.244	93,096	3.504
Rhode Island	132	0.059	285	0.047	417	0.050	2,454	0.092
South Carolina	4,479	2.012	20,346	3.333	24,825	2.980	47,357	1.782
South Dakota	5,565	2.500	13,030	2.135	18,595	2.232	47,984	1.806
Tennessee	5,583	2.508	11,558	1.894	17,141	2.058	84,046	3.163
Texas	14,619	6.567	36,993	6.061	51,612	6.196	161,183	6.066
Utah	2,188	0.983	3,653	0.599	5,841	0.701	11,290	0.425
Vermont	1,285	0.577	1,867	0.306	3,152	0.378	14,046	0.529
Virginia	3,928	1.764	18,857	3.090	22,785	2.735	69,040	2.598
Washington	3,261	1.465	10,675	1.749	13,936	1.673	38,481	1.448
West Virginia	2,386	1.072	10,578	1.733	12,964	1.556	37,885	1.426
Wisconsin	5,623	2.526	18,120	2.969	23,743	2.850	91,122	3.429
Wyoming	3,612	1.622	2,332	0.382	5,944	0.714	16,639	0.626
Dist. of Col.	-	-	-	-	-	-	-	-
Puerto Rico	364	0.164	1,041	0.171	1,405	0.169	2,308	0.087
TOTAL	222,625	100.000	610,324	100.000	832,949	100.000	2,657,217	100.000

1/ Includes Interstate mileage
2/ Excludes 754 miles of Ferry routes

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