

STATE OF ARKANSAS

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**FOURTH BIENNIAL  
REPORT**

OF THE

**DEPARTMENT OF  
STATE LANDS, HIGHWAYS  
AND IMPROVEMENTS**

FOR THE

PERIOD ENDING  
SEPTEMBER THIRTIETH, NINETEEN TWENTY

*LETTER OF TRANSMITTAL*

Little Rock, Arkansas, November 1, 1920.

To the Governor and General Assembly of the State of Arkansas:

Gentlemen:

In compliance with Sections 29 and 34 of Act 302 of 1913, we submit herewith the Fourth Biennial Report of the State Highway Commission for the period of 1919, 1920, inclusive.

In spite of the adverse conditions prevailing during the past two years, great progress has been made in highway development and construction, there being under construction over 4,000 miles of road at the present time.

Your special attention is invited to the articles containing information on motor vehicle licenses, maintenance and recommendations.

Respectfully Submitted,

(Signed) Wm. B. Owen, Chairman,

J. S. Turner, Member,

R. R. Thompson, Member

DEPARTMENT OF STATE LANDS, HIGHWAYS  
AND IMPROVEMENTS

*State Highway Commission*

WM. B. OWEN, Chairman-----Little Rock  
J. S. TURNER, Member-----Ozark  
R. R. THOMPSON, Member-----Eureka Springs  
T. P. MURREY, Secretary-----Little Rock

*Highway Division*

V. P. KNOTT, State Highway Engineer-----Little Rock  
R. C. LIMERICK, First Assistant State High-  
way Engineer ----- Little Rock  
MRS. R. LIVELY, Chief Clerk-----Little Rock

*Advisory Board*

EDGAR BREWSTER, Chairman-----Pine Bluff  
G. P. STOCKER, Consulting Engineer-----Fayetteville  
V. P. KNOTT, State Highway Engineer-----Little Rock

*Land Division*

WM. B. OWEN, Commissioner of State Lands--Little Rock  
A. H. GLASSCOCK, Deputy Commissioner---Little Rock

*Automobile Division*

J.E. LITTLE, Deputy, Automobile Division----Little Rock

*RECOMMENDATIONS IN BRIEF.*

## WE RECOMMEND:

1. A law to effectively regulate traffic upon the highways of the State.
2. Amendments to the Alexander Road Law to permit raising the limit, by a majority vote of the cost of the work, and other features, as outlined elsewhere in this report.
3. To adopt a new schedule of automobile license fees, fixing them upon a more equitable basis according to horsepower, capacity or weight.
4. To set aside a sufficient sum from automobile license fees for maintaining State Highways under State supervision.
5. To adopt a limited mileage of main roads as a State Highway System.
6. To make provisions for the continuance of State and Federal aid to be expended only upon a limited State Highway System, as designated.
7. To set aside in the State Treasury a sufficient sum out of State aid funds, to provide for an adequate inspection force. (See "Ten Per Cent Fund.")



*THE FEDERAL AID ACT OF 1916, WITH  
AMENDMENTS APPROVED FEB. 28, 1919*

AN ACT To provide that the United States shall aid the States in the construction of rural post roads, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Agriculture is authorized to cooperate with the States, through their respective State highway departments, in the construction of rural post roads; but no money apportioned under this act to any State shall be expended therein until its legislature shall have assented to the provisions of this act, except that, until the final adjournment of the first regular session of the legislature held after the passage of this act, the assent of the governor of the State shall be sufficient. The Secretary of Agriculture and the State highway department of each State shall agree upon the roads to be constructed therein and the character and method of construction: *Provided*, That all roads constructed under the provisions of this act shall be free from tolls of all kinds.

Sec. 2. That for the purpose of this act the term "rural post road" shall be construed to mean any public road over which the United States mails now are or may hereafter be transported, excluding every street and road in a place having a population, as shown by the latest available Federal census, of two thousand five hundred or more, except that portion of any such street or road along which the houses average more than two hundred feet apart; the term "State highway department" shall be construed to include any department of another name, or commission, or officials, of a State empowered, under its laws, to exercise the functions ordinarily exercised by a State highway department; the term "construction" shall be construed to include reconstruction and improvement of roads; "properly maintained" as used herein shall be construed to mean the making of needed repairs and the preservation of a reasonably smooth surface considering the type of the road; but shall not be held to include extraordinary repairs, nor reconstruction; necessary bridges and culverts shall be deemed parts of the respective roads covered by the provisions of this act.

Sec. 3. That for the purpose of carrying out the provisions of this act there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending June thirtieth, nineteen hundred and seventeen, the sum of \$5,000,000; for the fiscal year ending June thirtieth, nineteen hundred and eighteen, the sum of \$10,000,000; for the fiscal year ending June thirtieth, nineteen hundred and nineteen, the sum of \$15,000,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty, the sum of \$20,000,000; and for the fiscal year ending June thirtieth, nineteen hundred and twenty-one, the sum of \$25,000,000. So much of the appropriation apportioned to any State for any fiscal year as remains unexpended at the close thereof shall be available for expenditure in that State until the close of the succeeding fiscal year, except that amounts apportioned for any fiscal year to any State which has not a State highway department shall be available for expenditure in that State until the close of the third fiscal year succeeding the close of the fiscal year for which such apportionment was made. Any amount apportioned under the provisions of this act unexpended at the end of the period during which it is available for expenditure under the terms of this section shall be reapportioned, within sixty days thereafter, to all the States in the same manner and on the same basis, and certified to the Secretary of the Treasury and to the State highway departments and to the governors of States having no State highway departments in the same way as if it were being apportioned under this act for the first time: *Provided*, That in States where the constitution prohibits the State from engaging in any work of internal improvements, then the amount of the appropriation under this act apportioned to any such State shall be turned over to the highway department of the State or to the governor of said State to be expended under the provisions of this act and under the rules and regulations of the Department of Agriculture, when any number of counties in any such State shall appropriate or provide the proportion or share needed to be raised in order to entitle such State to its part of the appropriation apportioned under this act.

Sec. 4. That so much, not to exceed three per centum, of the appropriation for any fiscal year made by or under this act as the Secretary of Agriculture may estimate to be necessary for administering the provisions of this act shall

be deducted for that purpose, available until expended. Within sixty days after the close of each fiscal year the Secretary of Agriculture shall determine what part, if any, of the sums theretofore deducted for administering the provisions of this act will not be needed for that purpose and apportion such part, if any, for the fiscal year then current in the same manner and on the same basis, and certify it to the Secretary of the Treasury and to the State highway departments, and to the governors of States having no State highway departments, in the same way as other amounts authorized by this act to be apportioned among all the States for such current fiscal year. The Secretary of Agriculture, after making the deduction authorized by this section, shall apportion the remainder of the appropriation for each fiscal year among the several States in the following manner: One-third in the ratio which the mileage of rural delivery routes area of all the States; one-third in the ratio which the population of each State bears to the total population of all the States, as shown by the latest available Federal census; one-third in the ratio which the mileage of rural delivery routes and star routes in each State bears to the total mileage of rural delivery routes and star routes in all the States, at the close of the next preceding fiscal year, as shown by the certificate of the Postmaster General, which he is directed to make and furnish annually to the Secretary of Agriculture.

Sec. 5. That within sixty days after the approval of this act the Secretary of Agriculture shall certify to the Secretary of the Treasury and to each State highway department and to the governor of each State having no State highway department the sum which he has estimated to be deducted for administering the provisions of this act and the sum which he has apportioned to each State for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and on or before January twentieth next preceding the commencement of each succeeding fiscal year shall make like certificates for such fiscal year.

Sec. 6. That any State desiring to avail itself of the benefits of this act shall, by its State highway department, submit to the Secretary of Agriculture project statements setting forth proposed construction of any rural post road or roads therein. If the Secretary of Agriculture approve a project, the State highway department shall furnish to him such surveys, plans, specifications and estimates therefor as

he may require: *Provided, however,* That Secretary of Agriculture shall approve only such projects as may be substantial in character and the expenditure of funds hereby authorized shall be applied only to such improvements. Items included for engineering, inspection, and unforeseen contingencies shall not exceed ten per centum of the total estimated cost of the work. If the Secretary of Agriculture approve the plans, specifications, and estimates, he shall notify the State highway department and immediately certify the fact to the Secretary of the Treasury. The Secretary of the Treasury shall thereupon set aside the share of the United States payable under this act on account of such project, which shall not exceed fifty per centum of the total estimated cost thereof. No payment of any money apportioned under this act shall be made on any project until such statement of the project, and the plans, specifications, and estimates therefor, shall have been submitted to and approved by the Secretary of Agriculture.

When the Secretary of Agriculture shall find that any project so approved by him has been constructed in compliance with said plans and specifications he shall cause to be paid to the proper authority of said State the amount set aside for said project: *Provided,* That the Secretary of Agriculture may, in his discretion, from time to time make payments on said construction as the same progresses, but these payments including previous payments, if any, shall not be more than the United States pro rata part of the value of the labor and materials which have been actually put into said construction in conformity to said plans and specifications; nor shall any such payment be in excess of \$10,000 per mile, exclusive of the cost of bridges of more than twenty feet clear span. The construction work and labor in each State shall be done in accordance with its laws, and under the direct supervision of the State highway department, subject to the inspection and approval of the Secretary of Agriculture and in accordance with the rules and regulations made pursuant to this act.

The Secretary of Agriculture and the State highway department of each State may jointly determine at what times, and in what amounts, payments, as work progresses, shall be made under this act. Such payments shall be made by the Secretary of the Treasury on warrants drawn by the Secretary of Agriculture, to such official, or officials, or depository, as may be designated by the State highway depart-

ment and authorized under the laws of the State to receive public funds of the State or county.

Sec. 7. To maintain the roads constructed under the provisions of this Act shall be the duty of the States, or their civil subdivisions, according to the laws of the several States. If at any time the Secretary of Agriculture shall find that any road in any State constructed under the provisions of this act is not being properly maintained he shall give notice of such fact to the highway department of such State and if within four months from the receipt of said notice said road has not been put in a proper condition of maintenance then the Secretary of Agriculture shall thereafter refuse to approve any project for road construction in said State, or the civil subdivision thereof, as the fact may be, whose duty it is to maintain said road, until it has been put in a condition of proper maintenance.

Sec. 8. That there is hereby appropriated and made available until expended, out of any moneys in the National Treasury not otherwise appropriated, the sum of \$1,000,000 for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and each fiscal year ending June thirtieth, nineteen hundred and twenty-six, in all \$10,000,000, to be available until expended under the supervision of the Secretary of Agriculture, upon request from the proper officers of the State, Territory, or county for the survey, construction, and maintenance of roads and trails within or only partly within the national forests, when necessary for the use and development of resources upon which communities within and adjacent to the national forests are dependent: *Provided*, That the State, Territory, or county shall enter into a cooperative agreement with the Secretary of Agriculture for the survey, construction, and maintenance of such roads or trails upon a basis equitable to both the State, Territory, or county, and the United States: *And provided, also*, That the aggregate expenditures in any State, Territory, or county shall not exceed ten per centum of the value, as determined by the Secretary of Agriculture, of the timber and forage resources which are or will be available for income upon the national forest lands within the respective county or counties wherein the roads or trails will be constructed; and the Secretary of Agriculture shall make annual report to Congress of the amounts expended hereunder

That immediately upon the execution of any coopera-

tive agreement hereunder the Secretary of Agriculture shall notify the Secretary of the Treasury of the amount to be expended by the United States within or adjacent to any national forest thereunder, and beginning with the next fiscal year and each fiscal year thereafter the Secretary of the Treasury shall apply from any and all revenues from such forest ten per centum thereof to reimburse the United States for expenditures made under such agreement until the whole amount advanced under such agreement shall have been returned from the receipts from such national forest.

Sec. 9. That out of the appropriations made by or under this act, the Secretary of Agriculture is authorized to employ such assistants, clerks, and other persons in the city of Washington and elsewhere, to be taken from the eligible lists of the Civil Service Commission, to rent buildings outside of the city of Washington, to purchase such supplies, material, equipment, office fixtures, and apparatus, and to incur such travel and other expense as he may deem necessary for carrying out the purposes of this act.

Sec. 10. That the Secretary of Agriculture is authorized to make rules and regulations for carrying out the provisions of this act.

Sec. 11. That this act shall be in force from the date of its passage.

Approved, July 11, 1916.

AN ACT Making appropriations for the Service of the Post Office Department for the fiscal year ending June 30, 1920, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

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Sec. 5. That 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, is hereby amended to provide that the term, "rural post roads," as used in section 2 of said act, shall be constru-

ed to mean any public road a major portion of which is now used, or can be used, forms a connecting link not to exceed ten miles in length of any road or roads now or hereafter used for the transportation of the United States mails, excluding every street and road in a place having a population as shown by the latest available Federal census, of two thousand five hundred or more, except that portion of any such street or road along which the houses average more than two hundred feet apart: *Provided*, That section 6 of said act be further amended so that the limitation of payments not to exceed \$10,000 per mile, exclusive of the cost of bridges of more than twenty feet clear span, which the Secretary of Agriculture may make, be, and the same is increased to \$20,000 per mile.

Sec. 6. That for the purpose of carrying out the provisions of said act, as herein amended, there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the following additional sums: The sum of \$50,000,000 for the fiscal year ending June 30, 1919, and available immediately; the sum of \$75,000,000 for the fiscal year ending June 30, 1920; and the sum of \$75,000,000 for the fiscal year ending June 30, 1921; said additional sums to be expended in accordance with the provisions of said act: *Provided*, That where the constitution of any State prohibits the same from engaging upon internal improvements or from contracting public debts for extraordinary purposes in an amount sufficient to meet the monetary requirements of the act of July 11, 1916, or any act amendatory thereof, or restricts annual tax levies for the purpose of constructing and improving roads and bridges, and where a constitutional alteration or amendment to overcome either or all of such prohibitions must be submitted to a referendum at a general election, the sum to which the such State is entitled under the method of apportionment provided in the act of July 11, 1916, or any act amendatory thereof, shall be withdrawn by the Secretary of the Treasury from the principal fund appropriated by the act of July 11, 1916, or any act amendatory thereof, upon receipt of the certificate of the governor of such State to the existence of either or all of said prohibitions, and such sum shall be carried by the Secretary of the Treasury as a separate fund for future disbursement as hereinafter provided: *Provided futher*, That when, by referendum, the constitutional alterations or amendments necessary to the enjoyment of the

sum so withdrawn have been approved and ratified by any State, the Secretary of the Treasury, upon receipt of certification from the governor of such State to such effect, shall immediately make available to such State, for the purposes set forth in the act of July 11, 1916, or any act amendatory thereof, the sum withdrawn as hereinbefore provided: *Provided further*, That nothing herein shall be deemed to prevent any State from receiving such portion of said principal sum as is available under its existing constitution and laws: *Provided further*, That in the expenditure of this fund for labor preference shall be given, other conditions being equal, to honorably discharged soldiers, sailors, and marines, but any other preference or discrimination among citizens of the United States in connection with the expenditure of this appropriation is hereby declared to be unlawful.

Sec. 7. That the Secretary of War be, and he is hereby authorized in his discretion to transfer to the Secretary of Agriculture all available war material, equipment, and supplies not needed for the purposes of the War Department, but suitable for use in the improvement of highways, and that the same be distributed among the highway departments of the several States to be used on roads constructed in whole or in part by Federal aid, such distribution to be made upon a value basis of distribution the same as provided by the Federal aid road act, approved July 11, 1916: *Provided*, That the Secretary of Agriculture, at his discretion, may reserve from such distribution not to exceed 10 per centum of such material, equipment, and supplies for the use in the construction of national forest roads or other roads constructed under his direct supervision.

Sec. 8. That there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending June 30, 1919, the sum of \$3,000,000, for the fiscal year ending June 30, 1920, the sum of \$3,000,000, and for the fiscal year ending June 30, 1921, the sum of \$3,000,000, available until expended by the Secretary of Agriculture in cooperation with the proper officials of the State, Territory, insular possession, or county, in the survey, construction, and maintenance of roads and trails within or partly within the national forests, when necessary for the use and development of resources of the same or desirable for the proper administration, protection, and improvement



of any such forest. Out of the sums so appropriated the Secretary of Agriculture may, without the cooperation of such officials, survey, construct, and maintain any road or trail within a national forest which he finds necessary for the proper administration, protection, and improvement of such forest, or which in his opinion is of national importance. In the expenditure of this fund for labor preference shall be given, other conditions being equal, to honorably discharged soldiers, sailors, and marines.

The Secretary of Agriculture shall make annual report to Congress of the amounts expended hereunder.

Sec. 9. That no officer or enlisted man of the Army, Navy, or Marine Corps shall be detailed for work on the roads which come within the provisions of this act except by his own consent: *And provided further*, That the Secretary of Agriculture, through the War Department, shall ascertain the number of days any such soldiers, sailors, and marines have worked on the public roads in the several States (other than roads within the limits of cantonments or military reservations in the several States) during the existing war and also the location where they worked and their names and rank, and report to Congress at the beginning of its next regular session: *Provided, further*, That when any officer or enlisted man in the Army, the Navy, or the Marine Corps shall have been or may be in the future detailed for labor in the building of roads or other highway construction or repair work (other than roads within the limits of cantonments or military reservations in the several States) during the existing war, the pay of such officer or enlisted man shall be equalized to conform to the compensation paid to civilian employees in the same or like employment and the amounts found to be due such officers, soldiers, sailors, and marines, less the amount of his pay as such officer, soldier, sailor, or marine, shall be paid to him from the 1920 appropriation herein allotted to the States wherein such highway construction or repair work will be performed.

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Approved, February 28, 1919.

*RULES AND REGULATIONS OF THE SECRETARY OF  
AGRICULTURE FOR CARRYING OUT THE FED-  
ERAL AID ROAD ACT. (EXCEPT SECTION 8  
THEREOF.)*

*Regulation 1.—Definitions.*

For the purposes of these regulations, the following terms shall be construed, respectively, to mean:

Sec. 1. The Federal aid road act, or the act.—An act of Congress 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 (39 Stat., 355), as amended by the act of Congress approved February 28, 1919, entitled "An act making appropriations for the service of the Post Office Department for the fiscal year ending June 30, 1920, and for other purposes" (Public, No. 299, 65th Cong.)

Sec. 2. The Secretary. The Secretary of Agriculture of the United States.

Sec. 3. Bureau of Public Roads. The Bureau of Public Roads of the United States Department of Agriculture.

Sec. 4. Ten per cent fund. Items for engineering, inspection, and unforeseen contingencies, not exceeding 10 per cent of the total estimated cost of the work.

Sec. 5. Authorized representatives of the Secretary. The Director of the Bureau of Public Roads and such other officials and employees thereof as he may designate from time to time.

*Regulation 2.—Application of Regulations.*

Sec. 1. These regulations apply to all provisions, except section 8, of the act and shall not be applied to section 8 unless hereafter authorized or required by order of the Secretary.

Sec. 2. Information requested by the Secretary or his the State can not constitutionally engage in any work of internal improvements as in any other case, when any number of counties in such State shall appropriate or provide the

proportion or share needed to be raised in order to entitle such State to its part of the appropriation apportioned under the act.

*Regulation 3.—Information for the Secretary.*

Sec. 1. Before an agreement is made upon any road to be constructed in a State, as to the character and method of construction upon request of the Secretary there shall be furnished to him, by or on behalf of the State, general information as to its laws affecting roads and the authority of the State and local officers in reference to the construction and maintenance of roads; as to schemes for future construction, and as to provisions made, or to be made, for constructing and maintaining roads upon which it is contemplated that the expenditure of money appropriated by or under the act will be proposed. The information furnished shall be sufficient to enable the Secretary to determine whether it is likely that the money apportioned to the State will be expended, and the roads constructed will be properly maintained, in accordance with the terms of the act.

Sec. 2. These regulations shall apply as fully where authorized representative relating to the maintenance of roads constructed under the provisions of the act shall be furnished, from time to time, by the State highway departments, on forms supplied by the Bureau of Public Roads.

Sec. 3. Data furnished by or on behalf of a State shall be supplemented by such reports of the Bureau of Public Roads as the Secretary may from time to time require before he decides whether the State has complied with the terms of the act or has presented a project statement which should be approved.

*Regulation 4.—Project Statements.*

Sec. 1. A project statement shall contain all information necessary to enable the Secretary to ascertain (a) whether the project conforms to the requirements of the act; (b) whether adequate funds, or their equivalent, are or will be available by or on behalf of the State for construction; (c) what purposes the project will serve and how it correlates with the other highway work of the State; (d)

the administrative control of and responsibility for the project; (e) the adequacy of the plans and provisions for proper maintenance of roads; and (f) the approximate amount of Federal aid desired.

Sec. 2. Suitable forms for project statements will be supplied by the Bureau of Public Roads.

Sec. 3. Project statements may be submitted at any time, but not in excess of funds previously apportioned to the State.

Sec. 4. Each project statement shall be accompanied by a sketch map, showing the location of the proposed project and all main contiguous transportation features.

Sec. 5. Where any part of the cost of a project is to be furnished by a county or other local subdivision or subdivisions of a State, the project statement shall be accompanied by certified copy of each resolution or order, if any, of the appropriate local officials respecting the funds which are or will be made available, or respecting the supervision of the construction of the road and of the expenditure of the money provided or to be provided for paying such cost.

*Regulation 5.—Surveys, Plans, Specifications and Estimates*

Sec. 1. Surveys and plans shall show, in convenient form and sufficient detail, according to accepted engineering practice, necessary data, in connection with the specifications and estimates, to enable the Secretary to ascertain and pass upon location, grades, drainage, bridges, other structures special and unusual features, the work to be performed, and the probable cost thereof, all in conformity with the standards governing form and arrangement prescribed by the Secretary, except that State standard specifications submitted and approved prior to July 1, 1919, need not conform to the standards prescribed by the Secretary, and such approved State standard specifications may continue in force after July 1, 1919, so long as they remain unchanged.

Sec. 2. Specifications shall set forth the proposed method of construction, type of construction, materials to be used, and other essentials, in such detail as to afford complete knowledge of all steps to be taken in the construction of the project.

Sec. 3. The estimate for the proposed type or types of construction for each project shall show the estimated quantity and cost of each item of construction in detail and separately, the 10 per cent fund, and shall not include any expense of advertising.

Sec. 4. Unless State standard contract and bond forms have been approved, there shall be submitted, with each set of specifications, for the approval of the Secretary copies of the form of contract, together with all documents referred to therein or made part thereof and of the contractor's bond which it is proposed to use on the project. No alteration of such form shall be made until it is approved by the Secretary.

Sec. 5. Rights of way necessary for any project shall be provided, and any incidental damages to adjoining property due to construction work paid by or on behalf of the State, and the expense thereof shall not be included in the estimate or paid in any part, directly or indirectly, by the Federal Government.

Sec. 6. Grade crossings shall be avoided where practicable. The estimated cost of eliminating a grade crossing shall not include any amount the State, county, or other civil subdivision has received, is to receive, or is entitled to receive, directly or indirectly, as reimbursement or payment from the owner of a public utility, for or on account of such elimination.

Sec. 7. No part of the expense of making surveys, plans, specifications, or estimates, by or on behalf of the State prior to the beginning of construction work, shall be included in the estimate or paid by the Federal Government.

Sec. 8. When plans, specifications, and estimates have been approved by the Secretary no alteration thereof shall be made without his approval, except that minor alterations which will not involve an increase in the cost of the project to the Federal Government may be made with the approval of the Director of the Bureau of Public Roads or of his authorized representative.

*Regulation 6.—Project Agreements.*

Sec. 1. A project agreement between the State high-

way department and the Secretary shall be executed in triplicate on the form furnished by the Secretary. No payment shall be made by the United States unless or until such agreements has been executed, nor on account of work done prior to the recommendation by the district engineer of the Bureau of Public Roads that the project plans, specifications, and estimates be approved.

*Regulation 7.—Contracts.*

Sec. 1. No part of the Federal money set aside on account of any project shall be paid until it has been shown to the satisfaction of the Secretary that edequate means, either by advotising or by other devices appropriate for the purpose, were employed, prior to the beginning of construction, to insure the economical and practical expenditure of such money.

Sec. 2. Immediately on publication of advertisments copies thereof shall be furnished to the Bureau of Public Roads.

Sec. 3. Bids shall conform to the standard proposal form, and the items shall be the same as those contained in the estimate provided for in regulation 5, section 3.

Sec. 4. Copy of the tabulated bid prices, showing the unit prices and the total of each bid for every project, shall be furnished promptly to the Bureau of Public Roads.

Sec. 5. In advance of the acceptance of any bid sufficient notice of the time and place the contract is ti be awarded shall be given to the Bureau of Public Roads to enable it, if it so desire, to have a representative present. When a bid has been accepted prompt notice thereof shall be given to the Bureau of Public Roads.

Sec. 6. If the contract be awarded to any other than the lowest responsible bidder the Federal Government shall not pay more than its pro rata share of the lowest responsible bid, unless it be satisfactorily shown that it was advantageous to the work to accept the higher bid.

Sec. 7. A copy of each contract as executed shall be immediately certified by the State highway department and furnished to the Bureau of Public Roads.

Sec. 8. The specifications and the plans shall be made a part of the contract.

Sec. 9. No alteration in such contract shall be made without the approval of the Secretary.

*Regulation 8.—Construction Work and Labor.*

Sec. 1. Suitable samples of materials to be used in construction work shall be submitted, by or on behalf of the State highway department, to the Bureau of Public Roads whenever requested.

Sec. 2. Unless otherwise stipulated in writing by the Secretary or his authorized representative, materials for the construction of any project shall, prior to use, be tested for conformity with specifications, according to methods prescribed or approved by the Bureau of Public Roads.

Sec. 3. Unless otherwise specifically stipulated in the project agreement, bridges, viaducts, and underpasses shall have clear width of roadway of not less than 16 feet, and clear headroom of not less than 14 feet for a width of 8 feet at the center.

Sec. 4. No part of the money apportioned under the act shall be used, directly or indirectly to pay or reimburse a State, county, or local subdivision for the payment of any premium or royalty on any patented or proprietary material, specification, process or type of construction unless purchased or obtained on open actual competitive bidding at the same or a less cost than unpatented articles or methods equally suitable for the same purpose.

Sec. 5. The supervision of each project by the State highway department shall include adequate engineering and inspection throughout the course of construction.

Sec. 6. Written notice of commencement and completion of work on any project shall be given promptly by the State highway department to the Bureau of Public Roads.

Sec. 7. Reports of the progress of construction, showing force employed and work done, shall be furnished, from time to time, whenever requested by the Secretary or his authorized representative.

Sec. 8. Force account work, or other labor, teams, ma-

terial, and equipment furnished by or on behalf of the State highway department on construction work shall be used only on terms and conditions as are set forth in the project agreement.

*Regulation 9.—Records and Cost Keeping.*

Sec. 1. Such records of the cost of the work, and of inspections and tests by or on behalf of the State, shall be kept, by or under the direction of the State highway department, as will enable the Secretary, or his authorized representative, at any time to determine the condition of the construction and maintenance of, and the cost to the State and the Federal Government of the construction work and labor done on any project.

Sec. 2. The accounts and records, together with all supporting documents, shall be open at all times to the inspection of the Secretary or his authorized representative and copies thereof shall be furnished when requested.

Sec. 3. Certified copies of pay rolls on force account work and of all vouchers for other expenditures shall be furnished whenever requested by the Secretary or his authorized representative.

Sec. 4. Whenever requested by the Secretary or his authorized representative, unit costs on any project shall be kept on forms furnished by the Bureau of Public Roads.

*Regulation 10.—Payments.*

Sec. 1. Papers and documents required by the act or tary and certified as therein prescribed, showing amounts expended on any project and amount claimed to be due from the Federal Government on account thereof, shall be submitted by the State highway department to the Bureau of Public Roads either after completion of construction of the project or, if the Secretary has determined to make payments as the construction progresses at intervals of not less than one month.

*Regulation 11—Bureau of Public Roads.*

Sec. 1. Papers and documents required by this act or these regulations to be submitted to the Secretary may be delivered to the Bureau of Public Roads, and from the date of such delivery shall be deemed submitted.



*APPORTIONMENT OF FUNDS.*

TABLE I.

State and Federal aid apportioned to Arkansas for the five year period—1917-1921, inclusive.

The Federal aid allotments to Arkansas for the years 1917-1921, are as follows:

Fiscal Year.	Amount
1917 -----	\$ 82,689.10
1918 -----	165,378.20
1919 -----	1,090,247.99
1920 -----	1,596,436.09
1921 -----	1,685,178.09

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Total -----	\$4,619,929.47
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State Aid, 1917-1920, inclusive:

Biennial Period.	Amount Apportioned
1917—1918 -----	\$ 405,911.06
1919—1920 -----	950,000.00

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Total State Aid -----	\$1,355,911.06
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Total State and Federal Aid, 1917-1921 -----	\$5,975,840.53
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*ALLOTMENTS OF STATE AND FEDERAL AID.*

(Reprinted from "Arkansas Out of the Mud" May 1919.)

To arrive at an equitable distribution of the available funds that apportioned to the State by the Federal Government and the funds appropriated by the Legislature of 1917 and 1919, were combined, amounting to approximately six million dollars. The sum of \$400,000.00 was then set aside to take care of the roads that may yet be created under the Alexander Road Law and a further sum of \$1,100,000.00 for unforeseen contingencies, and there is left an aggregate of \$4,297,398.70. The equitable division of this fund has presented considerable difficulty, but the Advisory Board of the State Highway Department agreed upon the following plan:

\$3,127,000.00 approximately, is distributed strictly upon a mileage basis.

The remaining \$1,100,000.00 is distributed as follows:

One-fourth in the ratio each county bears to the total number of seventy-five.

One-fourth in the ratio which the population of each county bears to the total population of the State.

One-fourth in the ratio which the area of each county bears the total area of the state.

One-fourth in the ratio the county seat roads leading to another county seat or into another state bears to the total mileage of such roads in the state.

The funds allotted each county under the two systems are then combined, to arrive at the actual amount to which each county is entitled.

The funds thus allotted will be available for the biennial period, ending March 31, 1921. This plan of allotment, devised by the Advisory Board, was approved by the State Highway Commission. In cases where counties have already exceeded their allotment, as has occurred in several instances, the allotment announced by the Board will stand and the difference will be made up out of the contingent fund. The allotments will be held for six months from April 1, 1919, and at the expiration of that time, if the district

or county to which an allotment has been made, fails or neglects to make a suitable showing that the roads will be built, the amount will revert to the contingent fund, so that it may be placed on roads under construction, thereby insuring the use of the money in the state, and preventing its reversion to the Federal Treasury.

The County or the road district must have the plans and specifications and estimates of cost approved by the State Highway Engineer, and the Attorney for the Highway Commission must approve the formation of the district as to its legality, before the request for aid can be considered, or aid can be allotted. Before the Highway Commission can apply to the Secretary of Agriculture for Federal aid, the county judge is required to make an order of court authorizing the State Highway Commission to act for him in entering into contracts with the Secretary of Agriculture. No State or Federal aid will be given any project in excess of 50 per cent of the total cost of construction; and because of the limited amount of funds available, aid to that extent can be allotted in only exceptional cases where the emergency is great. When any county or sub-division or improvement district contemplates building, constructing, or improving a state road with a view to obtaining Federal or State aid, or both, the first step is for the county judge or commissioners of the district to make application to the State Highway Commission.

If the district is to be formed under the general, or Alexander Road Law, upon the receipt of the application, the Highway Commission shall direct the State Highway Engineer to make the necessary surveys, plans, specifications, and estimates of cost. If the application has been made in conformity with the regulations prescribed by the State Highway Commission and has the approval of the State Highway Attorney, it shall be referred by the Commission to the Advisory Board. After an examination of the preliminary plans, specifications and estimates of cost, if the Advisory Board concludes to recommend that aid petitioned for, the Board shall make its recommendation to the Highway Commission, of such an amount as may be deemed just and equitable. The State Highway Commission is prohibited from allowing any aid, state or federal, to any county or district, except on the recommendation of the Advisory Board. When application for federal aid has been made by

the Highway Department, if the Secretary of Agriculture of the United States refuses to grant federal aid, the Advisory Board may withdraw its recommendation. It is further provided that the Advisory Board shall approve only such projects as may be substantial in character, and the expenditure of funds authorized by Act of the Legislature shall be applied only to such improvements.

The roads already constructed to which Federal or State funds have been given, and all projected roads created under the Alexander road law, or by special act of the Legislatures of 1917-1919 make a total of 7,054 miles, of which 5,250 miles is by special act. There are 164 highway districts in the state, created by acts of the last two sessions of the General Assembly. Everyone of the 75 counties of the state has one or more projects. Previous to the last Legislature, Calhoun was the only county that had made no progress in the organization of districts for the building of hard-surfaced roads, but now there are projects for 160 miles in that county. Benton County leads the state in the authorized mileage, 214 miles, Union being a close second with 200 miles and Pulaski third with 195 miles.

There has never been such an era of good-roads building throughout the country, and Arkansas is to be commended for the forward stand it has taken in the promotion of highways that will double or treble the efficiency of our farms, and solve many of the problems of profitable marketing that are now disturbing the agricultural conditions of the state. Very properly and without complaint upon their part, the greater part of the burden is being placed upon the owners of automobiles and motor-driven vehicles, which are reduced to a minimum of efficiency by bad roads. In 1914, the Legislature appropriated \$496,000.00 and in 1919, it appropriated \$950,000.00 from the automobile license fund for the purpose of meeting the requirements of the Federal Government for the extension of aid. This insures a stable source of revenue for carrying out the most comprehensive plans for a system of highways connecting all the county seats and sending out laterals into the farming and industrial communities.

The State and Federal aid available for highway construction will amount to about one-tenth of the total cost of a project, and the other nine-tenths must be provided by a tax on the property through which the road runs and

that adjacent to it and subject to its benefits. The cost of the roads varies greatly due to the character of the land traversed and the availability of road building material. The cost will range from \$3,000.00 to \$58,000.00 a mile. Bonds running from fifteen to thirty years, the average being 20 years, will be issued, at a rate of interest not to exceed 6 per cent. It has been estimated that in many sections of the state, an average of fifteen cents an acre per year, for a period of twenty years, will build the roads and retire the bonds. The tax will vary according to the location of the land, that nearer the road paying higher than that more remote. The tax cannot exceed the benefits nor the cost of the roads, and this tax must be equitably laid on all lands in the districts, including railroads, town property, wild lands, and improved lands.

The allotments that have been made by the Advisory Board are as follows, for the various counties:

County.	Amount
Arkansas	\$ 89,219.17
Ashley	33,710.52
Baxter	51,167.51
Benton	119,950.93
Boone	39,671.91
Bradley	62,648.87
Calhoun	83,502.05
Carroll	52,613.89
Chicot	66,275.20
Clark	76,438.62
Clay	82,460.93
Cleburne	12,544.97
Cleveland	37,736.90
Columbia	29,592.09
Conway	94,312.59
Craighead	92,336.16
Crawford	46,751.40
Crittenden	78,252.78
Cross	54,816.51
Dallas	93,548.03
Desha	89,228.81
Drew	71,934.17
Faulkner	53,849.44
Franklin	23,929.79
Fulton	33,452.00

Garland	30,937.24
Grant	50,773.84
Greene	48,914.04
Hempstead	87,881.04
Hot Spring	12,116.78
Howard	65,052.66
Independence	63,340.41
Izard	47,883.04
Jackson	53,919.48
Jefferson	83,997.23
Johnson	29,902.93
Lafayette	25,705.52
Lawrence	95,090.86
Lee	24,348.17
Lincoln	49,268.47
Little River	73,369.14
Logan	16,670.14
Lonoke	60,572.65
Madison	38,787.36
Marion	30,632.61
Miller	48,692.90
Mississippi	90,951.24
Monroe	25,977.21
Montgomery	56,727.86
Nevada	72,281.86
Newton	46,955.59
Ouachita	18,230.76
Perry	34,567.40
Phillips	72,757.08
Pike	61,738.72
Poinsett	56,122.65
Polk	37,536.07
Pope	37,427.07
Prairie	48,415.78
Pulaski	124,997.39
Randolph	76,139.11
Saline	32,583.34
Scott	55,844.18
Searcy	74,845.49
Sebastian	54,250.92
Sevier	63,164.87
Sharp	56,512.08
St. Francis	49,217.10
Stone	34,912.56
Union	109,880.19

Van Buren .....	53,557.92
Washington .....	92,842.79
White .....	48,808.20
Woodruff .....	37,131.76
Yell .....	65,140.37
Total .....	<hr/> \$4,297,398.70

#### ALLOTMENTS IN 1919-1920.

The Acts of Congress making the Federal aid appropriations of 1916 and 1919 made the funds available by fiscal years, and the Acts provided that all funds apportioned, but not covered by project agreements signed by the Secretary of Agriculture within the time during which they are available, should be reapportioned to the States in the same manner and on the same basis as the original allotments. State aid funds are restricted, in a similar manner, being available only during the biennial period for which the appropriations were made; otherwise reverting to the State.

These restrictions have made it impossible for the Board and Commission to adhere strictly to the tentative allotments to the various counties made in 1917 and 1919. Many of the projects organized at the time the allotments were made were unable to proceed, certain roads were of much greater importance than others; some were obliged to eliminate sections in order to build the more important roads; those that reached the construction stage found that costs had doubled over the original estimates made two or three years ago; many new projects were formed under the Alexander Law. In short, there were so many unknown factors entering into the allotment of State and Federal aid that no absolute rule or basis of allotment was found which was practicable and which could be made applicable two to four years in advance.

It is believed that the Board and commission adopted the most feasible plan under the restrictions and conditions imposed, and in order to pass intelligently upon applications for aid, in September 1919, adopted a plan of requiring all applications for aid to be accompanied by the plans, specifications estimates, a brief giving a description of the road, the assessed valuation and acreage of the district, the limitations imposed by the Act under which it was organized, and other information.

The plan has worked satisfactorily and under it all funds available during the past fourteen months have been allotted to the various districts. Taking into consideration the number of factors involved, the difference in type, location, cost and importance of projects, and the limitations imposed by law, it is believed that the allotments have resulted in as equitable distribution as could be made under the circumstances.

#### *FUTURE ALLOTMENTS:*

During the past two years it was possible to equalize many of the county allotments of the previous biennial period. As the method of allotment of funds must be sufficiently flexible to permit readjustment of apparent inequalities and to re allot all funds accruing from previous allotments made to districts unable to proceed, and as the process is a continuous one, those counties which are apparently under allotted will still have an opportunity to obtain their equitable share of future funds when they are able to make a showing of active projects.

#### *PRELIMINARY SURVEYS, PLANS AND ESTIMATES:*

In view of the large and unprecedented amount of road work already proposed and under construction, it was hardly anticipated that many new road improvement districts would be proposed under the Alexander Road Law during 1919-1920. However, during this period the department received and filed 130 petitions, and made surveys and furnished plans, specifications and estimates for 111 projects under the Alexander Road Law.

The roads surveyed aggregate 1548 miles in length and the work was estimated to cost approximately \$16,000,000. Petitions filed show that more than two-thirds of the counties were represented and that plans were sent out for roads in forty-eight counties, a number having petitions for several roads.



# TABLE II. ROAD SURVEYS —MADE IN—

1919 and 1920

BY THE STATE HIGHWAY DEPARTMENT, UNDER ALEXANDER ROAD LAW.

County.	Year	Description and Location.	Length Miles	Type of Road	Estimated Cost
Arkansas	1919	Humphrey-Hagler-Stuttgart	14.51	Gravel	\$ 167,267.76
Boone	1919	Valley Springs via Olive to Missouri Line.	5.81	Gravel	34,309.82
Clark	1919	Steel Bridge over Saline Bayou to Dallas County Line	22.9	Gravel	274,800.00
Cleburne	1919	Heber Springs-Batesville	25.37	Gravel	155,159.84
Cleveland	1919	Rison East and Laterals	12.36	Gravel	72,229.63
Columbia	1919	New Edinburg to Moro Creek	9.07	Gravel	93,017.48
Crawford	1919	Taylor-Bussey	4.32	Gravel	26,435.42
		Van Buren-Township to Cross, lanes and laterals	9.57	Waterbound Macadam	69,838.94
Crawford	1919	Mulberry to Mulberry Cr.	2.72	Penetration Macadam	38,584.26
Crawford	1919	Dripping Springs via Washington County Line and laterals	31.16	Earth	90,650.78
Crawford	1919	S. W. Cor. Sec. 36, T. 10 N., R. 33 W. void to Washington County Line	32.36	Earth	339,601.79
Crawford	1919	Van Buren and Vicinity	2	Earth	23,660.67
Crawford	1919	S. E. Cor. Sec. 22, T. 9 N., R. 31 W. to Catcher	4.26	Gravel	316,239.60
Cross	1919	Alma to Meadows	7.26	Gravel	48,453.62
Dallas	1919	Parkin South to Laterals	10.75	(b)	
Faulkner	1920	Sparkman-Nix	24.71	Gravel	108,838.40
Franklin	1919	Conway West	16.24	Earth	76,547.90
Franklin	1919	Franklin-Johnson via Altus—Ozark relocation	31.09	Earth	54,376.75
Fulton	1919	Ozark via Lone Elm to Crawford County Line	10.31	Gravel	73,753.13
Fulton	1919	Wild Cherry to Batesville and Mammoth Springs Highway			
Fulton	1919	Wild Cherry-Elizabeth			

## FOURTH BIENNIAL REPORT

County.	Year	Description and Location.	Length Miles	Type of Road	Estimated Cost
Fulton	1920	Salem to Arkansas-Missouri Line	10.12	Gravel	121,114.45
Garland	1919	Hot Springs, East to Hot Springs County Line	8.8		(a)
Garland	1919	Garland-Hot Spring County Line to Steel Bridge over Ouachita River	4.26	Waterbound Macadam	\$ 40,623.55
Garland	1919	Hot Springs-Mountain Valley, Jessieville	30		(a)
Grant	1919	Cross Roads School Road-Sheridan-Morning Ferry East	14.38	Gravel	66,717.64
Grant	1919	Sheridan-Benton Road, Sheridan to Saline County Line	13.32	Gravel	85,024.17
Grant	1919	Leola-Poyenand Laterals	24.19	Gravel	149,143.61
Grant	1919	Sheridan-Jenkins Ferry Lateral to Cross Roads School	19.73	Gravel	89,812.20
Grant	1919	Saline-Grant County Line to Prattsville		Gravel	37,880.31
Grant	1920	Sheridan to Jefferson County Line N. E.	13.42	Gravel	152,431.29
Grant	1920	Cleveland County Line North to Pike No. 3 and Laterals	20.51	Gravel	158,121.86
Greene	1919	Marmaduke to Sec. Cos. 22-23-37-38, T. 18 N., R. 7 E.	4.50	Gravel	62,868.96
Greene	1919	Paragould-Gainsville Road	13.8	Waterbound Macadam	176,370.94
Greene	1919	Marmaduke-South and East	10.74	Gravel	115,346.44
Hempstead	1919	Hope to Washington	7.97	Gravel	47,183.84
Hot Spring	1919	Grant County Line via Gifford to Malvern	7.92	Gravel	65,325.09
Hot Spring	1919	Clark-Hot Spring County Line to Garland- Hot Spring County Line	13.96	Gravel	88,969.04
Howard	1919	Forks of New Hope and Burg Road to Pike County Line	6.02	Gravel	37,606.80
Independence	1919	Cushman-Walls Ferry and Laterals	10.96	Waterbound Macadam	\$ 107,107.33
Izard	1919	Calico Rock to Wild Cherry	11.28	Bituminous Macadam	180,533.32
Jackson	1919	Tuckerman-Swifton	14	Gravel	198,780.00
Jefferson	1919	Linwood-Goreston	4.50	Gravel	42,670.80
Johnson	1919	Slies-Lutherville-Cabin Creek and Laterals	15.37	Earth	43,578.37
Johnson	1919	Clarksville-Horse Head Creek	9.32	Waterbound Macadam	59,668.18
Johnson	1919	Clarksville to Ludwig	3.66	Macadam	26,379.35
Johnson	1919	Hagersville to Pope County Line	6.06	Earth	31,439.76
Lafayette	1919	Kizer-Bradley to Louisiana Line	10.09	Gravel	100,178.54

## STATE HIGHWAY COMMISSION

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County.	Year	Description and Location.	Length Miles	Type of Road	Estimated Cost
Lee	1919	Marianna, West	3.67	Gravel	28,556.10
Lee	1919	Marianna and Vicinity	95.38	Gravel, concrete, asphalt	1,813,689.35
Lincoln	1919	Star City, Palmyra and to Cleveland Co. Line	15.18	Gravel	99,196.40
Lincoln	1919	Star City via Cornville to County Line	19.62	Gravel	123,835.47
Lincoln	1919	Star City to Drew County Line via Reif's Bluff	11.38	Gravel	51,298.06
Lincoln	1919	Grady-Long Lake and Lateral	11.50	Gravel	228,168.60
Lincoln	1920	Star City to Avery	16.14	Gravel	136,805.98
Logan	1919	Booneville to State Sanitorium	4.03	Earth	8,624.00
Logan	1919	Paris to Roseville	7.47	Macadam surface treated	54,136.61
Logan	1919	Victory Highway District from Franklin Co. Line via Paris to Yell County	39.03	Bituminous	493,787.61
Lonoke	1919	Carlisle to Hamilton	14.41	Macadam	156,423.91
Lonoke	1919	Road in T. 1 N., R. 9 W.	2.62	Gravel	22,194.15
Lonoke	1919	Coy-via Brummitt to Bayou Meto, Prairie County	13.31	Macadam, Bit. surface treated	\$
Marion	1919	Yellville-Everton Road	15.87	Waterbound	139,644.12
Miller	1919	Garland City West N. W. & S. W.	8.05	Macadam	195,000.96
Miller	1919	Garland City, East and South	11.98	Gravel	96,382.49
Mississippi	1920	Joiner-Road, District	16.02	Gravel	(a)
Monroe	1919	Clarendon-Blackton	18.10	Earth	45,250.60
Monroe	1919	Indian Bay P. O. to Clarendon-Blackton Road	22.11	Waterbound	169,235.33
Monroe	1919	Keevil Township Road	6.38	Macadam	346,997.36
Ouachita	1919	Tate's Bluff-Chidister	10.48	Gravel	48,818.00
Ouachita	1919	Camden and Vicinity	41.09	Gravel	56,292.06
Ouachita	1919	Stephens to Ouachita-Columbia County Line	14.96	Gravel	335,803.91
Perry	1919	Stephens, Mt. Holly, Camden	12.54	Waterbound	112,476.48
Perry	1919	Hollis to Perry, Yell County Line	20.58	Macadam	79,652.21
Polk	1919	Mena-Oklahoma Line	11.02	Bituminous	251,492.79
Polk	1919	Hartfield N. W. to State Line and Laterals		Macadam	92,311.01
Pope	1919	N. Dardanelle-Russellville, Dover, Scottsville-			

County.	Year	Description and Location.	Length Miles	Type of Road	Estimated Cost
Pope	1919	Hector and Laterals	40.72	Bituminous	437,288.44
Prairie	1919	Pottsville-Reeds Ferry	7.77	Macadam	93,463.59
Prairie	1919	Bankhead-Screeton Switch to S. W. Cor. Sec. 25, T. 1 N., R. 6 W.	12.71	Waterbound	36,637.86
Prairie	1919	Vicinity of Fredonia	3.97	Macadam	163,761.69
Prairie	1920	Hazen South and Lateral	8.55	Gravel	59,968.37
Prairie	1920	Des Arc-Mesa	13.12	Gravel	192,379.26
Pulaski	1920	L. R., H. S. Highway to Saline County Line.	4.89	Gravel	78,578.06
Itandolph	1919	Ravenden Springs to Cedar Grove Schoolhouse	17.08	Penetration	220,299.86
Saline	1919	Upper Little Rock and Sheridan Road to Pulaske, Grant County Line	6.78	Waterbound	41,075.94
Saline	1919	Benton-Grant County Line and Laterals	15.73	Macadam	134,389.30
Saline	1919	Benton-Bauxite-Sardis to Intersection Little Rock-Sheridan Road	15.32	Gravel	120,164.48
Saline	1919	Saline County Improvement District No. 2	17.05	Gravel	40,350.53
Saline	1919	Turtis Store to Hot Springs Pike	12.46	Gravel	80,605.80
Scott	1919	Okl. State Line to Waldron and Eagle Gap	9.09	Waterbound	84,404.21
Searcy	1919	Baker Station South and East District No. 5	5.50	Macadam	40,760.77
Sebastian	1920	Port Smith	40.39	Surface Penetration	885,327.19
Sevier	1919	Kings-Lebanon Road	13	Asphalt	140,319.20
Sevier	1919	Horatio-Belleville, Horatio-Brownstown	38.36	Stone base	447,336.00
Sevier	1919	William-Cheatham to Oklahoma State Line	11.23	Gravel	103,448.12
St. Francis	1919	Widener-Chatfield Road and Laterals	9.52	Gravel	89,319.89
St. Francis	1919	Hughes to Blackfish Bayou and Laterals	14.21	Gravel	145,867.59
St. Francis	1919	S. Line Sec. 34, T. 4 N., R. 4 E., running in N. W. direction to N. Line Sec. 18, T. 4 N., R. 3 E.	1.91	Gravel	32,280.05
St. Francis	1919	Line between 8x17 4 N., R. 5 E., running N. W. direction R. I. R. R. near Madison	17.15	Gravel	226,397.05
St. Francis	1919	Big Mound via Blackfish Bayou, 15-mile Bayou and Laterals	2.75	Gravel	43,611.53

# STATE HIGHWAY COMMISSION

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County.	Year	Description and Location.	Length Miles	Type of Road	Estimated Cost
St. Francis	1919	Hughes and Vicinity	15.15	Gravel	233,079.71
St. Francis	1919	Burnt Cane to Rosston	7.85	Gravel	103,023.03
St. Francis	1919	Sec. 4, T. 3 N., R. 1 W.; Sec. 4, T. 4 N., R. 1 W.	8.56	Gravel	135,635.31
St. Francis	1919	R. R. Sec. 1, T. 5 N., R. 6 E. to Military Road	5.39	Gravel	102,218.56
St. Francis	1919	Tarsus Spur and Laterals	8.99	Gravel	101,114.20
St. Francis	1919	Crittenden County Line to Lucerne	9.75	Gravel	177,248.83
Stone	1919	Whitmore to Jonquil to Crittenden County Line	12.08	Gravel	355,351.97
White	1919	Rushing via Fox to Timbo.	49.81	Gravel, Asphalt	62,955.00
White	1919	Griffithville No. 1 N. A. via Watters to Hig-	14.07	carpet	718,164.00
White	1919	Judsonia to Ten Mile Cr.	9.28	Waterbound	193,609.35
White	1919	Judsonia East	17.05	Macadam	20,048.82
Woodruff	1919	Higginson to Jasmine	4.77	Gravel	237,366.36
Woodruff	1919	Four Forks-Garrett's Ford		Waterbound	
		Macadam			79,949.70
		Grand Total	1547.71		\$15,954,254.13

NOTE:—(a) Roads started under Alexander Road Law but plans not completed when district was re-organized by Special Act.  
(b) Special work, re-surveys, and checking estimates.

*ENGINEERING PERSONNEL*

Early in 1919 there was so much highway work under way, not only in Arkansas, but in every state in the Union, that experienced engineers, instrumentmen and draftsmen were in great demand everywhere. Owing to the limited appropriation for salaries of engineering assistants in the Department, it was not unexpected that at this time practically all of the assistant engineers of the department resigned to accept employment elsewhere at much higher salaries than possible under the scale established by the Department.

Some of the positions made vacant by resignations were filled with difficulty, and in certain cases it was necessary to take men of limited experience because of the small salary offered.

During the year 1919-1920 there were twenty-two vacancies created, this number covering the following positions on the force:

First Assistant Engineer 2, transitman 8, levelmen 6, draftsmen 5, Inspectors 1.

The average length of employment for all engineers was 8.9 months while the average length of employment for assistant engineers below the rank of first assistant was 7.6 months. Compared with salaries paid by other employers in this and other states it was found that the department was able to offer only 60 to 70 per cent of the salaries paid elsewhere for the same rank and services.

*CORRESPONDENCE*

The great amount of routine work necessary to comply with State and Federal requirements has caused an extremely heavy correspondence between the Highway Division and Board of Commissioners, Engineers, Attorneys, and the Bureau of Public Roads in connection with preliminary surveys and plans, and State and Federal Aid Projects.

In addition to the routine work mentioned scores of letters have been received daily from firms and individuals outside the State seeking information regarding road work;

from contractors, bond buyers, material men, manufacturers and from other Highway Departments. During the past two years the mail received by the Highway Division has averaged forty-two separate letters or papers per day. This means that, counting the necessary replies, eighty pieces of mail have been handled by the Highway Division each day, or a total of 47,000 for the biennial period, not counting plans and specifications.

While, from point of numbers, this amount of correspondence does not seem out of proportion, yet when it is considered that the great majority of the letters involve technical matters, requiring considerable time to be spent in computations, preparing statistics and searching through files, plans and specifications before replies may be made, it is seen that the work in this connection has been heavy indeed.

### STATE STANDARD PLANS

In order to have bridges and structures designed and built to meet present and future traffic and to comply with the Federal aid requirements, it has been necessary during the past two years to revise some of the old standard plans and to make many new plans.

Loans have increased to such an extent that the bridges and culverts upon all main roads must be designed to carry safely a load not less than that of a 10-ton truck, and in many cases a 15 ton truck, together with the impact caused by these heavy loads moving rapidly over the structures.

Below is given a list of the State Standard plans made during the past two years:

Steel 1 Beam Bridge	11-34 ft. spans
Low Riveted Trusses	40-50-60-70-80-90 ft. spans
High Riveted Trusses	100-110 ft. spans
High Pin Connected Trusses	120-130-140-150-170 ft. spans.
Timber Pile and Timber Bent Bridges	15 ft. Panels
Plain Concrete Abutments, for State Standard Steel Bridges.	Heights 6-34 ft.
Reinforced Concrete Abutments, Heights 8-10-12-14-16 18 20 24 ft.	

*STATE HIGHWAY MAP:*

In August 1919, a map of Arkansas, drawn to a scale 1-inch equal to six miles, was prepared and upon it were shown all roads constructed, under construction, and proposed under regular and special legislation.

At that time the surveys had not been made upon many of the roads, and consequently only the approximate location could be given.

The Department is now working upon a revised map, and the main highways are being accurately plotted from actual surveys which have been made and the plans filed. In this way, an up to date and correct map of the State Highway System will, for the first time, be available.

This map is necessary, under the requirements of the Bureau of Public Roads, to show the five-year building program, and also will be of great benefit to the public. The Department has had many calls for maps of this kind during the past two years, but none were available for distribution.

It is recommended that a cut to a smaller scale be made and a sufficient number of the maps printed. This could be done at a small expense and would be of great benefit to the traveling public and to the State.

*PLANS AND SPECIFICATIONS FILED:*

During the years 1919 and 1920 there have been filed in the Department a total of 496 sets of plans and specifications or an average of 6.6 sets to the county, this number covering the following types:

Preliminary plans by Department .....	113
Plans filed by Districts .....	266
Federal Aid plans .....	70
Miscellaneous plans, for relocations, structural plans, etc., .....	47
Total .....	496

The filing of this large number of plans has made the work of approving and checking extremely heavy, as well as the correspondence and conferences with engineers and commissioners with reference to them.



*FEDERAL AID PLANS:*

Separate plans are required for the Federal Aid sections of projects, and these plans must be checked over and approved before being submitted to the Bureau of Public Roads. To date over seventy sets of such plans have been forwarded, and the work of checking these plans, preparing estimates for the projects, preparing project statements, and other necessary papers, have taxed the capacity of the limited engineering force of the department to the utmost.

In addition to the plans, complete specifications, contracts, proposals and bonds must be furnished, together with cost analysis, resolutions, etc. Previous to and during construction, inspection reports of Federal Engineers are received by the Department and must be forwarded to the various engineers and commissioners affected. All of this has made the correspondence in connection with the Federal aid projects very heavy, but it has been carried on by the regular force of the department with as little delay as possible under the circumstances.

*ROAD LETTINGS:*

The Department has endeavored to have an engineer present at all lettings to make a tabulation of bids and a report, and to assist the commissioners and engineer in every way possible. When the lettings were held in the various counties, it was not possible in many cases, especially at a distance, to have a representative present on account of the expense involved and the small force available.

The Department has given all possible assistance to the various districts in obtaining competition at lettings by furnishing information to contractors, and to the press in this and other states, and by promptly answering all inquiries in regard to the nature, location and amount of the work advertised by the boards.

*STATE STANDARD SPECIFICATIONS:*

During the summer of 1920, it was found necessary to revise the state specifications, and in order to have the bene-

fit of the experience of the various district engineers and others a conference was called and the details discussed at length. As a consequence, it is believed that the new specifications will be an improvement over the old ones, which, while satisfactory in general, contained certain typographical errors, duplications and contradictory clauses. It was also considered advisable to make additions to the specifications to include certain kinds of work not previously included, and to adopt new bridge specifications to replace those which have been used for the past five years. New requirements as to loading and design to meet the demands of heavy traffic call for the revision of specifications covering all bridge and culvert work of steel, concrete and stone.

The standard specifications are for use upon all state and federal aid projects; will embrace the requirements of the Bureau proposed since the last specifications were printed, and will have to be approved by the Bureau of Public Roads before being adopted for Federal aid projects.

#### *APPLICATIONS FOR STATE AND FEDERAL AID:*

The law and regulations of the Highway Commission and Advisory Board require improvement districts Commissioners to file certain information, in addition to plans, specifications and estimates, with the formal application for aid. This information, which shows the length, cost, assessed valuation and acreage, was checked over, tabulated, and presented to the Advisory Board and Highway Commission in a form calculated to give all the essential features at a glance.

This method of considering applications has proved very satisfactory and has enabled the Board and Commission to pass intelligently upon a much greater number of applications that would have been possible otherwise.

Over 340 applications for aid or for additional aid were filed and considered during the biennial period, and of this number, 256 allotments were made.

In many cases it was necessary to have an inspection and report made by an engineer from the department before the applications could be passed upon. This engineer

obtained the desired information at first hand, and was thus able to make a complete and unbiased report as to the proper location, importance, and feasibility of the project. On account of an adequate number of engineers not being available, these reports could be made in only a small percentage of the districts, but it is believed that this should be done in all cases where there is any uncertainty as to the road being able to comply with the requirements for State and Federal aid, or where the information filed is not authentic, or where there are conflicts between two or more roads in the same territory.

### *INSPECTION OF CONSTRUCTION WORK:*

Before money is paid out upon projects receiving aid, it is necessary for the department to have an engineer inspect the work, check over the quantities and prices upon the estimates submitted, and prepare an estimate upon which payment is to be based for work covered by the allotment.

The department has also attempted to have inspections made at regular intervals of one to two months upon all aid projects as well as upon roads which applications were pending. However, when it is considered that there are over 200 active state and federal aid projects distributed over the state and only two to three inspecting engineers, it is apparent that only those projects could ordinarily be inspected where work had reached such a stage that the district could begin drawing upon the aid funds.

In addition to filing a complete report of the inspection, these engineers were frequently called upon by the districts to assist in settling controversies, check the surveys, plans, and estimates, give advice in regard to the many details arising during location and construction, and, in preparing the various papers required for filing with the department and Bureau.

It is believed that such inspection is one of the most important duties of the department, and that as the work increases additional competent and experienced engineers should be added to the force.

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*STATE HIGHWAY SYSTEM.*

It is recommended that the Legislature adopt a State System of Highways, not less than 3,000 and not over 6,000 miles in length upon which all state and federal aid would be concentrated. Such a system as outlined would take care of 80 per cent to 90 per cent of all the traffic and benefit 90 per cent of the population, and the territory directly benefitted would contain 80 per cent to 90 per cent of the assessed valuation of the State.

When it is considered that the traffic upon such trunk line system will be extremely heavy; that the cost of a road capable of carrying this traffic will certainly be not less than \$30,000 per mile and more probably \$40,000 to \$50,000 per mile; that the assessed valuation of real property in the Road Improvement Districts is, on an average, only \$36,-600.00 per mile, it can be readily seen that it is beyond the resources of the average district or county to build and maintain an adequate system of trunk line highways for the State.

*Not Entirely a Local Problem.*

The construction and maintenance of the trunk line highways is a State and National duty and not strictly a local one, even if the Counties could properly finance it. At the present time, with the motor car and truck in general and ever-increasing use, there must be a direct, safe, and sure line of communication between farm and market, between counties and even states. If the task of constructing and maintaining this system were left to the counties, the roads would not be adequate for the traffic, there would be no connected system, and a few backward counties would, by not providing for improvement of the necessary connecting links, prevent the use of the roads constructed in adjacent counties for through traffic.

Most of the states, realizing the importance of a connected system of state trunk lines, have adopted a definite restricted system upon which all State and Federal aid is concentrated. The mileage of such a system is usually 5 per cent to 10 per cent of the total mileage of public roads in the state, and is built and maintained wholly or in part by the State.

At present, over 2509 miles of the primary and secondary system of roads are under construction, but in many cases the type of road is inadequate for even present traffic. Such roads will either have to be properly maintained at a large expense, or there must be constructed within a short time a new surface capable of carrying the traffic likely to come upon the roads.

*Funds for State Highway System:*

In the majority of the States the State's share of the cost of construction is usually provided for by (1) A State Bond Issue, (2) A general Tax upon all real and personal property, (3) by automobile and special privilege taxes. The Arkansas Constitution does not provide for either the first or second methods, so that at present the 3rd is the only source of State road funds in our State.

*Automobile License Fund:*

For the first two-year period during which the Federal aid was in effect, the automobile fund was the only source of obtaining sufficient money to meet the Federal Aid allotment to the State; during the past two years, however, there have been so many road improvement districts organized that the local funds have been sufficient in many cases to meet the Federal aid appropriation.

Serious objections are raised by the Federal authorities to the "matching" of local funds against Federal aid, and the great majority of states use only state funds, derived from State bond issues, general taxes or automobiles taxes, to meet Federal Aid, and all of the funds so obtained are applied upon State Trunk lines.

It is very probable that if future appropriations for Federal aid to the States are made by Congress, the funds will be restricted for use upon a limited mileage of state highways and available only when a strictly State appropriation is made to meet the Federal allotment.

*ROAD LEGISLATION:*

The Alexander Road Law, Act 338 of 1915, has been in operation for over five years and more than 200 districts have been initiated or formed under it.

This law provides that the cost of the improvement shall not exceed 30 per cent of the assessed value of the real property in the district, and, owing to the greatly increased cost of construction, this limitation has prevented the organization of districts in many cases during the past two years.

Many of the districts which were started under the Alexander Road Law found it necessary to have the limit of assessment raised by Special Act in order to build the type of road planned, or to complete work started under pre-war prices and conditions.

Complete figures are not available for all of the districts in the State, but from the records of sixty-three districts making application in 1919-1920 and for which complete information is available, the following statement is of interest:

Number of Districts (Alexander and Special Acts)	
(Federal and non-Federal aid) -----	63
Number of miles embraced -----	1,842
Average length of road to district -----	30.2 Mi.
Average Estimated cost per mile -----	\$14,500.00
Average Assessed valuation per mile ---	36,600.00
Average Acreage per mile -----	3,180.00
Average Assessed valuation per acre	
of land in district -----	11.52

Under the Alexander Road Law, the average maximum cost per mile could not exceed 30 per cent of \$36,600.00 or \$10,980.00 per mile. As this amount will not, on the average, build anything better than a gravel road where shipped material is used and when there is an average amount of grading and bridges, it is very apparent that in the average district it is either necessary to build a cheaper road or have the limit of assessment raised.

This is further evidenced by the fact that the average cost of all types from graded earth to concrete road is \$14,500.00 per mile, or, 32.1 per cent in excess of the average cost per mile permissible under the Alexander Road Law. The figures further show that the average cost per mile is 39.6 per cent, or approximately 40 per cent of the average assessed valuation per mile, instead of the 30 per cent as limited by the above law.

The assessed valuation per acre of land embraced in the average district is \$11.52, but this figure includes the assessed valuation of public utilities and cities and towns, all prorated upon an acreage basis. The actual valuation of the land is somewhat less than \$11.52; probably not over \$9.00 per acre, but the actual figures are not available.

#### AMENDMENTS TO LAW:

It is believed that the Alexander Road Law should be amended:

First: To raise the limit which the percentage of cost of improvement bears to the assessed valuation from thirty to forty per cent, and to make it possible, by a majority vote, to increase the limit where necessary to construct the type of road desired.

Second: To shorten the time required to form a district and get the benefit assessments approved.

Third: To make the County Judge an ex-officio member of all road improvement boards of commissioners.

Fourth: To fix the compensation of attorneys at a reasonable amount for the necessary legal work involved, and a schedule of fees for extra services; to provide that in cases of unusual or excessive claims or in case of inability to agree upon a basis of settlement for legal services, the matter be referred to the Chancellor of the District in which the road is situated.

Fifth: To assure proper maintenance of improved roads by permitting a sufficient annual tax to be levied, and for districts having roads upon State Highways, to accept maintenance by the State from the highway improvement or other funds, said funds to be expended under State Supervision.

Sixth: To fix the method of sale of bonds and require that all bond sales be approved by the State Auditor, Treasurer, or Attorney General before being valid.



*SPECIAL ACTS:*

It is common knowledge that in line with everything else, the items of labor, materials and freight rates have increased to such an extent during the past three years that the cost of road improvements has more than doubled, while the assessed valuation of the property has been increased only slightly, if at all.

This is unquestionably one of the principal reasons for the introduction and passage of such a great number of special acts.

Early in 1919 Arkansas, in line with all the other states of the Union, showed great enthusiasm over the road program and, in addition to the districts formed under the Alexander road law there were created by Special Acts of the regular session of the legislature, over 133 road improvement districts, and in January 1920, in extra-ordinary session, 140 new districts were authorized.

The great interest in the good roads movement was caused by the prosperous condition of the country, the general use of the automobile and truck, and by the appropriations of Federal and State aid. Many of the districts formed under the Alexander road law found it necessary to have special legislation passed to permit an increase in the assessments and to allow charges to be made in the location and extent of the work, and to cure defects in the organization of the districts.

Many of the special acts creating districts provided for the re organization of districts previously organized, so that it will be impossible to give accurate statistics as to mileage etc. of the new districts formed until surveys have been made and plans filed.

In another part of the report will be found a statement showing the statistics for all of the road improvement districts by counties.

TABLE III  
DISTRICTS CREATED BY SPECIAL ACTS OF  
GENERAL ASSEMBLY

Year	Number of Acts Creating New Districts	Number of Curative And Amendatory Acts.	Total
1913	9	3	12
1915	15		15
1917	15	5	20
1919	133	44	177
1920 (Special)	140	140	280
TOTALS	312	192	504

#### *MAINTENANCE OF IMPROVED ROADS:*

Proper maintenance of improved roads is of utmost importance in view of the great mileage of new work under construction or completed in the State, and is especially urgent in those districts which have raised all possible funds for the first cost of construction, leaving no further revenues for maintenance or reconstruction.

Maintenance of a road should begin the day the road is completed and opened to traffic. The problem in highway work is similar to that of a railroad company, which not only recognizes the absolute necessity of constant and systematic maintenance, but which also provides from the beginning an efficient organization for maintenance and appropriates sufficient funds from annual income for this purpose.

Poor judgment would be shown by anyone who would erect a building at great expense, and permit the roof to deteriorate and damage the other parts of the building without making some provision for repairs and renewals. Yet this is what is happening, and will continue to happen to the roads in this state unless some immediate action is taken.

#### *LAWS AFFECTING MAINTENANCE:*

The Alexander Road Law provides in section 29, Act 338 of 1915, that the County Court shall maintain the improved roads from general revenue funds of the County,

supplemented by the three-mill tax collected within the district, and that the Commissioners may, upon an order from the county court, issue additional bonds for maintenance purposes.

Act No. 105, approved March 1917, passed in compliance of the Federal Aid Act, provides (see section 9) that no State or Federal aid shall be given to any county or any sub-division thereof unless the County Court set aside the three-mill road tax collected within a distance not exceeding three miles of the road constructed, or so much thereof as may be necessary to properly maintain such road to the satisfaction of the State Highway Department and the Federal Government, or unless the County Court make other satisfactory orders or provisions for the proper maintenance of roads receiving State or Federal aid.

The Federal Aid Act is very clear in its provisions regarding maintenance, and states, in section 7, that unless Federal aid roads are properly maintained "the Secretary of Agriculture shall thereafter refuse to approve any project in the State or civil sub-division thereof, as the fact may be whose duty it is to maintain said road, until it has been put in a condition of proper maintenance."

In line with the Federal Aid Law, the State, in Act 105 of 1917 (Section 13) pledged its good faith to maintain the roads constructed under the provisions of the Act and to make adequate provisions for carrying out such maintenance.

#### *FUNDS WHOLLY INADEQUATE:*

In spite of the laws mentioned, the evidence shows that the improved roads are not being properly maintained, and further, that they cannot be maintained in many cases because of inadequate funds and lack of system for the purpose.

It is shown elsewhere in this report that in the average road improvement district the assessed valuation of the property is only \$36,600.00 per mile of improved road. If all of the 3-mill tax collected in the district were to be used for maintenance, there would be available annually only \$109.80 per mile. This sum will not maintain the average road, even for the first few years after construction.

*REVENUE FOR MAINTENANCE:*

To issue bonds for maintenance is a grave economic error, unless the money is necessary for reconstruction. For a person to borrow money for a long term to erect a building for business purposes would be perfectly legitimate, but to mortgage this store for money to cover annual expenses would mean financial ruin. It is the same with a road district or county.

*THE THREE MILL TAX:*

The total assessed valuation of all real and personal property in the State was reported to be \$586,692,075.67 in 1919. If all of the 3-mill tax were collected, it would return, annually, only \$1,760,076.00. But when it is considered that this money must be distributed over more than 52,000 miles of public roads in the State, not to mention the thousands of culverts and small bridges, or, an average of only \$33.39 per mile of road, it is apparent that the three-mill tax is insufficient to maintain this mileage of public highways in a passable condition.

If all of the three-mill tax were concentrated on the 6,000 miles of main roads, adequate maintenance would be obtained but nothing would be left for the other 46,000 miles of public road.

*INCREASED ASSESSMENTS:*

Provisions has been made in some of the laws to allow additional levies to be made in improvement districts for maintenance. However, in the average district this can not be done without making the total tax excessive, the district having reached the limit permissible under the law.

*AUTOMOBILE LICENSE FUNDS FOR  
MAINTENANCE OF IMPROVED ROADS:*

Under the present Constitution and Laws, the only source for sufficient funds for maintenance of improved roads is that of Motor Vehicle license fees. It is believed that it is also the most feasible and equitable source of reve-

nue for this purpose.

The real property in the various road improvement districts is paying over 90 per cent of the cost of construction of improved roads. These roads, or at least all those forming trunk lines, are used by through traffic as well as local traffic, and the motor vehicle is, without doubt, the most destructive agency with which we must contend.

The property adjacent to improved roads is unquestionably enhanced in value by reason of the improvement. At the same time, the motor vehicle owner who used the improved road is directly benefitted in the great saving in gasoline, tires, oil, wear and tear on cars and in time required to cover a given distance.

The motor vehicle, therefore, should be taxed in an amount sufficient to properly maintain the roads, or to pay back, as nearly as may be an amount equal to what it takes from the road.

#### *MOTOR VEHICLE LICENSES:*

While it is not possible to determine exactly the amount of wear upon roads caused by the various types and sizes of vehicles, this can be arrived at closely enough for practicable purposes by adopting a schedule of fees covering the horsepower, capacity or gross weight, and gasoline consumption.

Present license fees are too low and are manifestly inequitable. A small touring car is assessed the same fee as a large truck, yet the truck may weigh with, its load, ten or twelve tons, while the light pleasure car would weigh only one or two tons, and one may run 1000 miles per year and the other 15,000 miles.

#### *MOTOR VEHICLE LICENSES IN OTHER STATES:*

From reports published recently by the Federal Bureau there are only five states of the Union in which a flat license fee is collected. These states are Arkansas, Kansas, Minnesota, South Dakota and Wisconsin.

All of the remaining states have adopted some kind of a "sliding scale" for fees. The great majority of them

tax automobiles upon the basis of horsepower, and commercial vehicles upon the basis of capacity or gross weight, or upon a combination of horsepower and capacity.

#### *AMOUNT OF FEES:*

The average rate in the thirty-four states using horsepower alone as the basis of fees for automobiles is approximately 46c per horsepower. On commercial vehicles the average of twenty-six states using capacity alone as a basis is approximately \$10.00 per ton capacity for trucks under four tons with higher rates on trucks up to seven tons. The rate is much higher for trucks having a capacity greater than the maximum which should be allowed upon the road. Many of the states have fixed the fees in such cases so that trucks of over seven tons capacity will be kept off the roads, the license in one state being as high as \$1,125.00 for a seven ton truck, and in a number of states each ton over five to seven ton capacity is taxed \$50.00 to \$100.00.

There are forty-three states which now use either the capacity or gross weight alone, or the capacity and horsepower, as a basis of fees for commercial vehicles, while only five states adhere to the flat rate for cars of this type.

#### *FUNDS REQUIRED FOR MAINTENANCE:*

Within the next two years, Arkansas will probably have completed over 4,000 miles of improved roads, and approximately 3,000 miles will be upon trunk lines. The amount of money necessary to properly maintain this 3,000 miles of State Trunk Highways is estimated to be not less than \$100 per mile per year, and the average will be nearer \$200 as much of the mileage is of the cheaper types of construction.

From the experience in some of the other states when improved roads have been built and maintained for many years, it has been found that it may cost \$1,000.00 to \$1,500.00 per mile per year to maintain a macadam or gravel road under excessive traffic. However, under such conditions, these types should not be used at all, as it is more economical to build a better road at a higher first cost than to pay such excessive maintenance or reconstruction charges. During 1919, Michigan expended \$259.08 per mile on

Trunk line maintenance, while Connecticut expended approximately \$700.00 per mile on the trunk lines, where the traffic was extremely heavy, averaging 4,000 vehicles per day. These figures are typical and show the conditions to be expected in Arkansas within a few years.

### FEDERAL AID PROJECTS:

As shown by the tables elsewhere in this report, there are now 120 Federal Aid Projects in various stages of completion or organization. During the past two years so much road work has been under way that for every dollar of Federal aid the State and districts have been able to show ten dollars or more available, so that the per centage of aid has been far below the maximum allowable.

TABLE IV.

The following summary shows the status of the Federal Aid Projects:

Total Project Statement submitted to Bureau	116
Projects Cancelled	5
Projects withdrawn	10
Projects approved	91
Projects to be submitted	19
Total Plans, specifications and estimates submitted	75
Total Plans to be submitted	45
Total Plans approved	67
Project agreements executed	49
Total number of Projects likely to be approved under present five year program	120

From the information available from the files for 99 Projects, the following summary shows the mileage and cost:

No. of Projects	Length Miles	Estimated Cost	Estimated Cost per mile
99	3,003.2	\$47,153,875.	\$15,707.22
	Total length		
99	1,185.80	11,734,352.	9,885.73
	F. A. Section only		

The average total cost per project is \$476,301.80 and the average aid per project \$36,046.00, or only 7.57 per cent of the cost.

It is estimated that the final figures for the period 1917-1921 will show 120 Federal Aid Projects, the estimated cost of which will be \$56,584,650.00 and the Federal aid \$4,619,929.47, or approximately 8.00 per cent of the cost.

*STATUS OF STATE AND FEDERAL AID PROJECTS,  
NOVEMBER 1, 1920.*

TABLE NO. V, shows the status of State and Federal aid projects to date, as well as available statistics regarding the location, type, length, cost, etc.

The table shows that there are 203 active State and Federal aid projects in various stages of completion, involving the construction of 4,700 miles of road at a cost of \$61,100,000.00, and upon which \$5,975,840.53 of aid has been allotted.



TABLE V.  
State and Federal Aid Projects, 1917 to 1920, Inclusive.

Project No.	Local Dist. No.	LOCATION.	TYPE	Length in Miles	Estimated Cost	Aid Allotted	Length Federal Aid Section	Per Cent Completed Nov. 1, '20	
								Grading	Surfacing
14	1	ARKANSAS COUNTY.	Gravel	6.50	\$ 19,380.00	9,000.00	.....	100	100
154	5		Gravel	23.55	1,720,735.55	113,250.00	15.69	40	.....
155			Pen. Macdm.	50.69	.....	.....	.....	.....	.....
			Asp. Conc.	11.13	.....	.....	.....	.....	.....
			Gravel	43.20	.....	.....	.....	.....	.....
199		Northern District	Asp. Conc.	32.70	1,739,973.09	107,500.00	12.62	80	5
		Roberts Dist. (Ark. & Jefferson Co.)	Gravel	.30	3,500.00	264.32	.....	.....	.....
59		ASHLEY COUNTY.	Gravel	28.50	300,030.00	55,791.64	28.5	88	32
205			Gravel	2.00	99,250.00	1,300.94	.....	.....	.....
		Arkansas and Louisiana Highway	.....	.....	.....	.....	.....	.....	.....
		Bennett, Jerome and Robinson	.....	.....	.....	.....	.....	.....	.....
116	1	BAXTER COUNTY.	Macadam	35.40	554,332.00	55,000.00	6.82	50	.....
194	5		Macadam	30.38	283,406.30	30,000.00	.....	.....	.....
29	1	BENTON COUNTY.	Gravel	6.05	45,274.26	22,637.13	6.05	100	100
181	2		Gravel	96.93	837,433.55	58,800.00	39.98	100	10
180	3		Gravel	34.50	325,000.00	49,500.00	23.15	100	40
182	4		Gravel	29.47	145,546.22	9,000.00	.....	.....	.....
44	1	BOONE COUNTY.	Macadam	37.18	175,988.00	47,500.00	.....	50	.....
110	2		Graded	16.00	12,000.00	5,000.00	.....	95	.....

## STATE HIGHWAY COMMISSION

149

61	BRADLEY COUNTY. Saline River Bridge.....	Steel .....	.....	20,000.00	7,500.00	.....	100	100
202	CALHOUN COUNTY. .....	Gravel .....	73.26	384,834.46	60,000.00	.....	.....	.....
90	CARROLL COUNTY. .....	Gravel .....	15.74	152,300.00	69,846.58	15.74	100	100*
165	.....	Graded .....	29.15	158,756.60	25,000.00	.....	100	.....
166	.....	Gravel .....	16.72	74,651.77	7,650.00	.....	100	.....
167	.....	Graded .....	16.80	53,784.26	7,650.00	.....	100	.....
149	Madison-Carroll Counties .....	Gravel .....	6.00	21,250.00	5,142.84	.....	40	.....
59	CHICOT COUNTY. Arkansas and Louisiana Highway.....	Asp. Conc. ....	57.51	1,324,140.00	112,310.52	57.51	84	33
205	Bennett Jerome and Robinson.....	Gravel .....	9.53	473,613.78	6,199.06	3.94	.....	.....
206	Gaines Landing Road .....	Concrete .....	6.34	156,366.26	4,200.00	2.00	.....	.....
227	Dermott, Collins, Chicot and Drew Co.'s.....	Asp. Conc. ....	1.00	56,600.00	10,349.66	.....	.....	.....
77	CLARK COUNTY. .....	.....	.....	.....	.....	.....	.....	.....
135	Southwest Ark. No. 1.....	Gravel .....	98.82	982,610.34	101,438.00	47.51	90	25
.....	.....	Gravel .....	2.00	18,430.00	2,738.09	.....	17	.....
222	CLEVELAND COUNTY. .....	.....	.....	.....	.....	.....	.....	.....
131	.....	Gravel .....	23.00	247,000.00	35,000.00	.....	.....	.....
133	.....	Gravel .....	12.26	125,000.00	8,700.00	4.00	90	40
107	.....	Gravel .....	7.62	120,000.00	38,000.00	7.62	100	.....
52	COLUMBIA COUNTY. .....	.....	.....	.....	.....	.....	.....	.....
53	.....	Gravel .....	13.50	134,800.00	16,046.04	.....	.....	.....
.....	.....	Gravel .....	14.85	141,967.87	40,046.05	14.65	100	60
62	CONWAY COUNTY. .....	.....	.....	.....	.....	.....	.....	.....
121	.....	Pen. Medm. ....	32.27	688,000.00	47,156.59	14.15	100	20
132	.....	Pen. Medm. ....	25.77	483,000.00	64,156.00	6.04	100	15
133	.....	Gravel .....	12.27	148,447.40	12,500.00	6.02	100	15
134	.....	Pen. Medm. ....	40.00	579,166.00	40,000.00	11.44	60	.....
137	.....	Pen. Medm. ....	28.50	388,394.07	56,600.00	8.29	60	5
56	CRAIGHEAD COUNTY. .....	.....	.....	.....	.....	.....	.....	.....
.....	.....	Surface Tr. ....	.....	510,486.96	51,000.00	24.62	75	20
223	.....	Macadam .....	24.62	.....	.....	.....	.....	.....
.....	.....	Surface Tr. ....	.....	277,686.20	25,000.00	.....	50	6
30	Jonesboro-Nettleton .....	Macadam .....	17.00	253,000.00	30,836.16	5.00	100	50
.....	.....	Asp. Conc. ....	9.00	.....	.....	.....	.....	.....

189	Tri-County District	Macadam	36.00	722,125.40	35,722.40	.....	.....*
204	CRAWFORD COUNTY.	Graded	6.00	20,000.00	1,000.00	100	.....*
75		Macadam	33.58	292,195.00	95,801.40	33.58	.....*
86	CRITTENDEN COUNTY.	Graded	10.50	20,000.00	4,000.00	100	.....*
87		Gravel	7.30	37,944.50	8,000.00	.....	.....*
85		Gravel	57.50	610,387.20	113,000.00	85	40
168		Gravel	31.18	530,752.00	30,000.00	13.85	80
187		Gravel	62.00	335,920.00	35,000.00	7.56	100
175		Gravel	26.60	313,000.00	8.70	75	5
176		Concrete	14.30	718,396.00	43,000.00	.....	.....
177		Gravel	42.60	798,540.00	40,000.00	9.40	80
		Gravel	24.00	336,000.00	.....	.....	25
		Concrete	25.00	1,176,390.00	73,500.00	8.51	50
6	CROSS COUNTY.	Gravel	18.47	246,000.00	41,716.51	18.47	90
131		Gravel	4.85	78,027.60	12,500.00	4.79	15
151	DALLAS COUNTY.	Gravel	27.80	168,000.00	55,000.00	19.19	85
152		Gravel	26.20	148,000.00	40,000.00	21.75	100
153		Gravel	25.50	190,000.00	30,000.00	14.31	100
34	Ramsey and Dalark Road.	Graded	27.20	36,026.90	12,584.03	.....	100*
82	DESHA COUNTY.	Gravel	11.00	46,103.00	5,000.00	.....	.....*
59	Arkansas and Louisiana Highway	Asp. Conc.	45.87	1,086,450.00	89,579.21	45.87	88
144	Lincoln-Desha	Gravel	5.30	41,900.00	6,693.55	2.08	100
2	FAULKNER COUNTY.	Gravel	9.07	48,596.53	15,000.00	.....	.....*
36	County System	Gravel	77.00	40,400.00	10,149.74	.....	.....*
191	Conway-Vilonia	Pen. Medm.	18.52	392,411.23	33,247.42	4.83	10
192	Conway-Damasous	Pen. Medm.	26.59	616,336.27	44,631.20	7.23	4
193	Conway-Palarn	Pen. Medm.	13.57	325,416.92	31,315.80	5.49	6
103	FRANKLIN COUNTY.	Gravel	23.88	350,000.00	107,000.00	22.62	100
81	FULTON COUNTY.	Gravel	29.00	193,237.45	60,576.00	.....	.....*
	North Arkansas No. 2.						

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228	4	Fulton and Izard Road	Gravel	32.42	372,000.00	54,214.04	.....	.....	.....
<b>GARLAND COUNTY.</b>									
79		Hot Springs-Mt. Ida Road	Graded	14.70	44,400.00	12,200.00	.....	100	*
117		Little Rock-Hot Springs Road	Gravel	12.80	387,000.00	20,463.84	.....	90	.....
135		Southwest Arkansas No. 1	Gravel	18.00	166,000.00	24,630.10	.....	17	.....
<b>DREW COUNTY.</b>									
59		Arkansas and Louisiana	Asp. Conc.	8.8	195,690.00	19,136.60	9.8	88	33
237		Dermott-Collins	Asp. Conc.	7.00	395,915.06	72,447.34	.....	.....	.....
<b>GRANT COUNTY.</b>									
28	1	.....	Gravel	27.25	163,000.00	13,523.84	.....	100	100
113	2	.....	Gravel	14.00	82,000.00	15,000.00	12.50	95	71
112	3	.....	Gravel	10.49	65,357.82	10,000.00	.....	100	100
164	4	.....	Gravel	22.00	200,000.00	24,400.00	4.80	80	30
142	5	.....	Gravel	13.78	30,546.10	10,640.00	7.71	93	34
114	6	.....	Gravel	14.38	100,000.00	15,000.00	14.38	80	38
143	7	.....	Gravel	19.75	148,967.53	16,000.00	12.57	80	.....
<b>GREENE COUNTY.</b>									
54	1	Tri-County District	Gravel	14.00	64,000.00	14,000.00	.....	.....	*
189		.....	Macadam	13.00	286,000.00	12,899.77	.....	.....	.....
<b>HEMPSTEAD COUNTY.</b>									
127		Hope, Fulton and Emmett	Gravel	24.00	333,652.60	44,000.00	8.07	90	44
128		Saratoga-Fulton-McNab	Gravel	11.00	147,351.94	12,500.00	5.04	100	33
146		Washington-Hope-Columbus	Gravel	21.00	180,869.00	19,000.00	9.51	30	.....
170		Cross-Roads (See Nevada Co.)	Gravel	18.00	127,022.00	12,000.00	.....	100	100
157		Prescott-Blevins	Gravel	15.00	99,436.53	12,835.89	.....	100	100
<b>HOT SPRING COUNTY.</b>									
135		Southwest Arkansas No. 1	Gravel	3.75	34,800.00	5,132.30	.....	17	.....
<b>HOWARD COUNTY.</b>									
23		Ben Lomand Road	Gravel	1.75	7,294.54	4,036.80	.....	100	100
98	1	.....	Gravel	18.58	180,543.00	25,000.00	.....	67	67
218	7	.....	Gravel	10.00	337,803.00	26,000.00	.....	90	.....
132		Howard-Sevier District	Gravel	4.70	103,542.76	13,666.70	.....	50	.....
<b>INDEPENDENCE COUNTY.</b>									
161	1	.....	Gravel	20.15	112,311.50	15,000.00	.....	90	*
160	2	.....	Macadam	35.70	359,116.45	21,300.00	.....	.....	*
159	3	.....	Gravel	12.03	80,308.00	7,380.00	.....	.....	*
162		North Arkansas No. 1	Gravel	26.90	392,443.00	20,250.00	.....	.....	*

81	North Arkansas No. 2	Macadam	14.50	188,000.00	30,286.55	.....	.....	.....
81	IZARD COUNTY.							
228	North Arkansas No. 2	Macadam	25.75	295,000.00	53,786.75	.....	.....	.....
	Izard-Fulton District	Gravel	12.43	141,093.00	20,785.96	.....	.....	.....
47	JACKSON COUNTY.							
173	.....	Gravel	10.33	102,000.00	33,000.00	100	100*	.....
48	.....	Gravel	39.75	590,000.00	23,400.00	90	15*	.....
230	Arkansas-Missouri Highway	Gravel	26.39	374,577.17	80,000.00	95	60	.....
	.....	Gravel	43.00	1,000,000.00	36,000.00	.....	.....	.....
71	JEFFERSON COUNTY.							
165	.....	Gravel	9.00	30,000.00	3,000.00	100	100*	.....
49	.....	Gravel	7.00	25,000.00	3,000.00	100	100	.....
50	.....	Gravel	22.67	100,000.00	15,000.00	100	100	.....
100	.....	Pen. Medm.	21.00	190,000.00	30,000.00	100	25*	.....
15	.....	Pen. Medm.	20.56	300,000.00	101,200.00	100	100	.....
19	.....	Pen. Medm.	43.00	214,261.00	30,000.00	100	100	.....
221	.....	Gravel	18.60	102,900.00	15,000.00	100	100	.....
51	Industrial School Road	Gravel	18.00	155,000.00	20,000.00	100	100	.....
199	Roberts Road District	Gravel	1.50	18,087.82	2,000.00	100	100	.....
	.....	Gravel	6.37	70,500.00	4,285.68	.....	.....	.....
93	JOHNSON COUNTY.							
	.....	Pen. Medm.	33.57	469,432.00	105,000.00	77	21	.....
141	LAFAYETTE COUNTY.							
51	.....	Gravel	10.06	139,265.64	8,800.00	100	100	.....
	.....	Gravel	21.15	137,110.62	29,705.52	100	100	.....
13	LAWRENCE COUNTY.							
11	.....	Gravel	21.77	108,049.61	33,590.86	80	65	.....
45	.....	Gravel	5.50	20,646.50	9,311.69	100	100	.....
46	.....	Macadam	12.86	114,139.61	19,350.00	100	25	.....
184	.....	Macadam	11.48	77,179.54	33,700.00	100	100	.....
39	.....	Gravel	5.88	35,860.41	3,500.00	100	50	.....
184	.....	Gravel	10.00	105,634.65	12,600.00	25	25	.....
99	Western District	Macadam	96.00	550,000.00	80,000.00	40	10	.....
183	Walnut Ridge-Alicia	Gravel	28.00	586,382.00	20,000.00	.....	.....	.....
55	LEE COUNTY.							
120	County Bridges	Timber	.30	21,654.60	10,000.00	100	100	.....
	Delta District	Concrete	13.50	400,867.95	50,000.00	.....	.....	.....



	MONTGOMERY COUNTY.	Graded Gravel	19.00	17,000.00	8,000.00	.....	100
17	.....	Gravel	31.50	132,809.22	42,000.00	.....	100
150	Southwest Arkansas No. 1 .....	Graded	47.03	45,100.00	20,000.00	.....	100
26	.....	Gravel	5.80	53,400.00	7,936.06	.....	17
135							
	<b>NEVADA COUNTY.</b>						
156	Prescott-Blevins Road .....	Gravel	22.00	550,000.00	68,000.00	16.36	100
157	.....	Gravel	5.50	36,000.00	7,844.11	.....	100
	<b>NEWTON COUNTY.</b>						
33	National Forest Road.....	Graded	15.00	38,500.00	6,000.00	.....	100
74	.....	Gravel	16.50	44,000.00	10,300.00	.....	100
73	.....	Graded	26.07	77,632.96	17,000.00	.....	85
72	.....	Graded	29.00	79,531.78	20,000.00	.....	85
169	Marshall-Witt Springs Road .....	Macadam	11.00	130,000.00	16,766.58	.....	.....
	<b>OJACHITA COUNTY.</b>						
97	Camden-Kent Road .....	Gravel	2.27	16,223.17	7,000.00	.....	100
129	.....	Gravel	12.00	75,000.00	9,500.00	.....	.....
	<b>PERRY COUNTY.</b>						
27	Pulaski-Perry Counties .....	Gravel	26.25	114,600.00	18,410.40	.....	41
179	.....	Macadam	29.81	180,300.00	17,250.00	.....	.....
	<b>PHILLIPS COUNTY.</b>						
83	Helena-West Helena .....	Asp. Conc.	4.87	197,000.00	55,000.00	.....	100
108	Helena-Old Town .....	Asp. Conc.	14.50	487,338.02	37,800.00	8.00	25
109	West Helena-Marvell .....	Asp. Conc.	34.80	1,011,436.85	55,000.00	7.74	98
217	Helena-Ferguson Road .....	Concrete	73.00	1,964,427.00	60,000.00	.....	20
	<b>PIKE COUNTY.</b>						
135	Southwest Arkansas No. 1 .....	Gravel	31.00	284,871.40	42,419.04	27.47	17
	<b>POINSETT COUNTY.</b>						
31	Ozark Trails Road .....	Gravel	8.84	61,738.50	30,000.00	8.84	80
178	.....	Gravel	6.20	.....	.....	.....	.....
189	Tri-County District .....	Concrete	9.80	524,950.00	42,000.00	4.33	65
	<b>POLK COUNTY.</b>						
201	.....	Macadam	35.30	776,000.00	35,027.79	.....	.....
216	.....	Macadam	.....	.....	.....	.....	.....
1		Gravel	49.03	602,895.00	55,036.07	.....	6
2		Gravel	23.00	200,000.00	16,500.00	.....	.....

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POPE COUNTY.									
32	1	Russellville-East-West	Graded	16.00	31,000.00	15,127.07	.....	.....	119
33		National Forest Road	Graded	28.50	41,178.46	80,000.00	8.29	100	100
119		Russellville-East-West	Pen. Mcdm.	15.23	637,401.19	23,233.42	17.54	72	.....
169		Marshall-Witt Springs Road	Gravel	.....	154,576.75	.....	.....	.....	.....
PRAIRIE COUNTY.									
106	1	Macadam	Macadam	12.00	100,000.00	17,000.00	.....	100	100
24	3	Macadam	Macadam	2.20	16,419.59	5,000.00	.....	100	100
5	4	Gravel	Gravel	9.19	196,970.40	85,000.00	9.19	100	100
105	5	Gravel	Gravel	9.98	105,111.60	22,326.27	.....	100	100
102	6	Macadam	Macadam	21.00	574,867.00	19,875.00	.....	100	100
212		Gravel	Gravel	8.80	72,000.00	9,000.00	.....	100	.....
207	12	Stuttgart and Western	Graded	3.00	64,000.00	3,000.00	.....	95	.....
204		Hazen, Lagrue and Slovak Road	Gravel	12.00	219,623.34	21,400.00	2.09	100	50
PULASKI COUNTY.									
12		Cantonment Road	Asp. Conc.	5.30	117,171.84	117,171.84	5.30	100	100*
66		Perkins Twp. Road	Macadam	7.00	60,000.00	30,000.00	.....	100	100
80		Pierion Road	Asp. Conc.	2.70	73,000.00	60,000.00	.....	100	100*
92	7	Eagle Twp. Road	Gravel	7.00	49,865.70	10,000.00	.....	90	25
117		Little Rock-Hot Springs Road	Asp. Conc.	10.70	514,000.00	20,463.84	8.81	95	70
179		Pulaski-Perry Road	Macadam	14.00	84,700.00	4,000.00	.....	.....	*
225		Galloway Road	Asp. Conc.	10.80	693,161.00	21,000.00	.....	95	50
226		Spring Lake Road	Asp. Conc.	27.50	810,248.00	22,691.00	.....	80	.....
229		Arkansas and Missouri Highway	Asp. Conc.	47.00	1,349,687.19	30,000.00	.....	35	5
RANDOLPH COUNTY.									
18	1	Gravel	Gravel	5.00	5,854.87	1,500.00	.....	100	100
57	3	Gravel	Gravel	9.35	90,810.08	28,439.11	.....	75	.....
210		Western District	Gravel	135.00	857,066.00	40,000.00	.....	5	.....
SALINE COUNTY.									
117	4	Little Rock-Hot Springs Road	Gravel	30.80	1,005,000.00	46,572.32	.....	90	.....
200		Little Rock-Sheridan Road	Gravel	6.40	56,456.31	4,550.00	.....	80	.....
226		Spring Lake Road	Asp. Conc.	14.50	409,000.00	25,309.00	.....	100	.....
SCOTT COUNTY.									
21	1	Gravel	Gravel	46.00	67,000.00	15,000.00	.....	.....	*
94		County System	Graded	42.00	133,569.00	23,000.00	.....	.....	*
138		Albert Pike District	Macadam	72.00	639,708.00	50,000.00	.....	.....	*
139		Poteau District	Macadam	16.19	128,000.00	13,000.00	.....	.....	*
SEARCY COUNTY.									
40	1	Graded	Graded	28.40	54,000.00	14,545.49	.....	75	.....



125	3		Macadam	12.84	74,827.50	7,200.00	2.50		
126	4		Macadam	25.20	100,273.80	15,600.00	4.00		
215	5		Gravel	23.00	154,000.00	12,000.00			
<b>SEBASTIAN COUNTY.</b>									
43	1		Pen. Medm.	72.50	1,400,000.00	19,600.92		*	
78			Asp. Conc.	4.19	44,036.00	25,000.00	100.00	*	
<b>SEVIER COUNTY.</b>									
8	1		Gravel	25.50	166,507.00	12,764.87	19.00	100	
115	2		Gravel	17.25	175,000.00	25,500.00		100	35
219	3		Gravel	18.60	178,672.12	12,700.10		100	15
190	4		Gravel	17.00	185,000.00	33,000.00	9.50	100	75
132			Gravel	16.50	420,000.00	34,333.30	10.00	50	
<b>SHARP COUNTY.</b>									
35	1		Macadam	13.09	86,422.05	47,862.08	13.17	100	*
<b>ST. FRANCIS COUNTY.</b>									
37	1		Gravel	45.08	340,000.00	30,000.00	45.08	90	40
38	2		Gravel	20.00	148,162.00	14,667.10	20.00	100	30
111	3		Gravel	34.47	715,000.00	70,000.00	18.58	100	90
209	4		Gravel	16.75	213,000.00	10,000.00	4.26	70	20
224	5		Gravel	12.00	210,000.00	10,000.00		30	10
<b>STONE COUNTY.</b>									
60	2		Graded	25.00	117,461.00	35,000.00		80	
<b>UNION COUNTY.</b>									
196	1		Gravel	21.50	331,811.20	17,000.00	6.73		
197	2		Gravel	34.78	573,763.09	31,000.00	11.90		
198	3		Gravel	41.50	512,638.00	26,000.00			
140	4		Gravel	68.36	764,556.16	50,000.00	23.79		*
<b>VAN BUREN COUNTY.</b>									
68	1		Graded	30.40	164,786.94	51,000.00	100.00		
<b>WASHINGTON COUNTY.</b>									
67	1		Gravel	22.27	147,000.00	24,000.00	14.44	75	30
70	2		Macadam-						
			Gravel	52.00	484,930.00	100,000.00	43.74	50	
220	3		Gravel	62.00	522,000.00	28,350.00			
172	5		Gravel	19.00	141,591.56	15,200.00			*
171	7		Gravel	31.06	186,000.00	15,500.00	18.30		

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188	WHITE COUNTY.								
174	North Arkansas No. 1	Gravel	50.00	718,164.00	36,300.00	11.05	80	16	
	Beebe-Antioch and Lonoke	Gravel	12.36	160,000.00	12,500.00		32		
	WOODRUFF COUNTY.								
58	Cache River Bridge	Steel	.05	10,000.00	4,631.76		100		
22		Macadam	8.49	79,268.35	27,300.00	8.49	100		
158		Gravel	16.66	147,236.72	12,400.00	8.15	91	100	
102		Macadam	21.00	574,807.60	5,825.00	8.15	91	48	
211		Macadam	33.60	540,299.40	20,800.00	5.45	75		
	YELL COUNTY.								
101	County Work	Macadam	59.90	726,907.50	20,000.00	32.76	100	10	
95		Bridge	.25	52,004.00	1,890.37		100		

\*Allotments not taken advantage of, in part or as a whole, within time for which aid was available.  
†See project.

<sup>t</sup>See project.

*LOCAL CONTROL:*

The various laws under which the road improvement districts were formed and under which they operate, place the control of the work absolutely in the hands of the board of commissioners. They select all employees, decide upon the roads to be improved, the type of construction, sell the bonds, make all contracts and all payments for work and materials.

In some districts, the approval of the County Judge must be obtained upon certain features of the work. His approval is also necessary in making changes in location, as he must dedicate the new routes as public roads before they can be improved. This power is given the County Judge by the Constitution and has made it very difficult in some counties for changes to be made in locations in order to obtain better alignment and grades, for by refusing to approve such changes, the County Judge could force the old line to be followed, thus preventing the improvement and increasing the cost of the road.

*CO-OPERATION OF DEPARTMENT WITH LOCAL  
AUTHORITIES:*

While the Department has nothing whatever to do with the management of the road work in the districts, many of the acts creating them require plans, specifications and estimates to be approved by the Department. As the Federal and State Aid Acts require such approval upon Federal and State aid projects, it is probable that the requirements for approval, was included in many of the acts to make it possible to comply with the conditions if the road should later be made an aid project.

Under the circumstances, such approval is only formal, and is not regarded as final or binding, since the laws do not give the Department any power to approve or reject a project except so far as the State or Federal aid is concerned.

This local control over the work and the divided authority among local officials, has made co-operation very difficult upon many of the State and Federal aid Projects. The Federal Government deals with the Department; the Department must then deal with the Commissioners, engineers, attorneys and the County Judge. It frequently happens that no action can be taken until the matter has been passed upon by all of them, in turn, which causes much confusion and delay.

The various local officials have generally shown a spirit of co-operation and have furnished all necessary papers and information promptly. However, there are many exceptions, and there are some notable examples when, after repeated requests, the aid was lost to the districts because of failure to submit the project in time to have the funds set aside during the period for which they were available.

#### *ACCURATE FINAL PLANS AND CROSS-SECTIONS:*

The laws should be amended to require that all road districts file in the County Court prior to the letting of any contracts, accurate final plans together with cross-sections showing the computed quantities of earthwork, and that all revised plans and cross-sections be filed for all changes made during construction.

In order to hasten the work in many cases the contracts have been let by the districts before the work had been cross-sectioned, and the earthwork and other items exceeded the preliminary estimate by a large percentage.

It is believed that such a requirement as that mentioned would not only be instrumental in obtaining lower prices, but would also enable the cost of the work to be known in advance and would prevent a great deal of misunderstanding and controversy between boards, engineers and contractors.

*AMOUNT AND PROGRESS OF HIGHWAY WORK.*

The following tables show the status of all highway work in the State, corrected to date from information filed in the Department or as furnished by the various districts:

TABLE VI.

*Summary of All Road Projects in State, November 30, 1920.*

	Miles	Percentage
Abandoned -----	272.21	2.7%
Organized, not surveyed -----	1149.93	11.6%
Surveyed, no contracts let -----	3315.29	33.5%
Contracts let, work not started -----	581.35	5.9%
Under construction -----	4037.06	40.6%
Completed -----	564.84	5.7%
Total -----	9920.68	100 %

TYPE, MILEAGE AND ESTIMATED COST OF STATE  
AND FEDERAL PROJECTS.

Type	Total Mileage.	Milage Com.	Est. Cost pr mi
Earth -----	540	180	\$ 2720.60
Gravel -----	2715	273	10535.16
Macadam -----	526	47	11050.20
Penetration-Mac. --	361	48	16513.80
Asph.-Concrete ----	348	17	30731.30
Concrete -- -----	218		40895.19
Totals -----	4708	565	

TABLE VII.

## FINANCIAL STATEMENT---State and Federal Aid.

This statement covers the period beginning July 2, 1917, when the first State Aid voucher was issued, up to and including, September 30, 1920.

COUNTY.	District.	ALLOTTED			DISBURSED			Balance	
		State Aid	Federal Aid	Total	State Aid	Federal Aid	Total	Allo-	ments
Arkansas	1	\$ 9,000.00	\$ 113,250.00	\$ 9,000.00	\$ 7,103.34	\$ 8.24	\$ 7,103.34	\$	966.66
Arkansas	5	10,000.00	22,637.13	22,637.13	9,246.58	4,946.65	14,193.24	11,241.76	
Benton	3	22,000.00	27,500.00	49,500.00	22,000.00	49.27	22,049.27	8,443.89	
Boone	County	5,000.00	5,000.00	5,000.00	3,829.65		3,829.65	27,450.73	
Boone	1	47,500.00	7,500.00	47,500.00	21,645.29		21,645.29	1,170.35	
Bradley	Bridge	7,500.00	7,500.00	7,500.00	7,500.00		7,500.00	25,854.71	
Carroll	1	43,958.31	13,878.27	57,846.58	43,958.31	13,878.27	57,846.58		
Carroll	2	25,000.00	25,000.00	25,000.00	16,786.50		16,786.50	8,213.50	
Carroll	3	7,850.00	7,850.00	7,850.00	5,000.00		5,000.00	2,650.00	
Clark	1		101,438.00	101,438.00				101,427.87	
Cleveland	4		38,000.00	38,000.00		10.13	10.13	34,200.81	
Columbia	2		40,046.05	40,046.05		4,799.19	4,799.19	32,126.58	
Conway	1		47,156.59	47,156.59		7,919.47	7,919.47	47,143.39	
Conway	2		64,156.00	64,156.00		13.20	13.20	64,142.17	
Conway	5		31,000.00	31,000.00		13.83	13.83	20,995.14	
Craighead	4		30,836.16	30,836.16		4.56	4.56	20,892.08	
Crittenden	2	3,009.14		3,009.14	3,009.14		3,009.14	91,096.29	
Crittenden	4	23,000.00	90,000.00	113,000.00	22,903.80		22,903.80	36,406.38	
Cross	1	10,250.44	31,466.07	41,716.51	5,309.53		5,309.53		
Dallas	Ramsey-Dalark	4,884.06		4,884.06	4,884.06		4,884.06	54,984.06	
Dallas	1		55,000.00	55,000.00		15.94	15.94	34,148.00	
Faulkner	2		40,000.00	40,000.00		5,852.00	5,852.00	107,487.62	
Franklin	County	5,622.45		5,622.45	5,622.45		5,622.45	7,596.77	
Garland	1	137,000.00	107,000.00	244,000.00	29,500.00	12.38	29,512.38	5,753.07	
Grant	County	10,613.58		10,613.58	10,613.58		10,613.58	24,391.51	
Grant	1	7,249.46		7,249.46	7,249.46		7,249.46	3,988.43	
Grant	2	15,000.00		15,000.00	3,000.00		3,000.00		
Grant	3	3,000.00		3,000.00	4,246.93	4,403.23	7,403.23		
Grant	4	10,000.00		10,000.00		8.49	8.49		
Grant	7	16,000.00	24,400.00	40,400.00	12,011.57		12,011.57		

## FOURTH BIENNIAL REPORT

COUNTY.	District.	ALLOTTED			DISBURSED			Balance Allot- ments
		State Aid	Federal Aid	Total	State Aid	Federal Aid	Total	
Hempstead	Hope- Fulton- Emmet Prescott- Blair County	20,680.00	44,000.00	44,000.00	7,353.26	17.64	17.64	43,982.36
Nevada	.....	.....	.....	.....	3,966.30	.....	7,393.26	13,286.74
Hempstead	.....	4,036.80	.....	4,036.80	28,205.00	.....	3,966.30	70.50
Howard	.....	28,205.00	.....	28,205.00	10,135.00	.....	28,204.40	60
Jackson	.....	20,000.00	60,000.00	80,000.00	5,000.00	25,093.66	35,218.66	44,781.34
Jefferson	.....	5,000.00	10,000.00	15,000.00	9,000.00	10,000.00	15,000.00	.....
Jefferson	.....	9,000.00	.....	9,000.00	15,000.00	.....	9,000.00	.....
Jefferson	.....	15,000.00	.....	15,000.00	25,125.00	.....	15,000.00	.....
Jefferson	.....	30,000.00	.....	30,000.00	587.00	.....	25,125.00	4,875.00
Jefferson	.....	587.00	.....	587.00	3,000.00	.....	586.31	69
Jefferson	.....	3,000.00	.....	3,000.00	1,350.00	.....	1,350.00	1,650.00
Jefferson	.....	30,000.00	.....	30,000.00	17,125.00	.....	17,125.00	12,875.00
Johnson	.....	105,000.00	.....	105,000.00	.....	.....	4,487.26	100,512.74
Lafayette	.....	22,205.52	.....	22,205.52	6,501.45	4,487.26	15,665.49	14,040.03
Lawrence	.....	11,530.86	.....	33,590.86	23,797.44	9,164.04	28,835.19	4,755.67
Lawrence	.....	7,411.69	.....	9,911.69	17,111.69	5,031.75	9,929.39	6,823.30
Lawrence	.....	11,850.00	.....	19,350.00	17,350.00	1,817.70	11,933.79	7,413.61
Lawrence	.....	33,700.00	7,500.00	33,700.00	32,700.00	86.39	32,700.00	1,500.00
Lawrence	.....	3,500.00	.....	3,500.00	2,000.00	.....	2,000.00	.....
Lincoln	.....	10,000.00	.....	10,000.00	10,000.00	.....	10,000.00	.....
Little River	.....	1,878.25	.....	1,878.25	3,500.00	.....	3,500.00	700.00
Little River	.....	4,200.00	.....	4,200.00	4,607.00	.....	4,607.00	813.00
Logan	.....	5,420.00	.....	5,420.00	2,826.93	.....	2,826.93	14,113.07
Lonoke	.....	16,670.00	.....	16,670.00	4,880.89	.....	4,880.89	122.76
Lonoke	.....	5,003.65	.....	5,003.65	3,169.00	.....	3,169.00	.....
Lonoke	.....	3,169.00	.....	3,169.00	19,000.00	.....	19,000.00	.....
Lonoke	.....	19,000.00	.....	19,000.00	.....	.....	4.60	20,995.40
Miller	.....	21,000.00	.....	21,000.00	.....	.....	13,066.84	6,933.16
Monroe	.....	41,328.17	.....	41,328.17	22,528.17	10,228.87	32,757.04	46,042.16
Montgomery	.....	37,471.83	.....	78,800.00	15,257.44	.....	15,257.44	.....
Montgomery	.....	15,257.44	.....	15,257.44	7,907.91	.....	7,907.91	92.09
Montgomery	.....	8,000.00	.....	8,000.00	1,730.00	.....	1,730.00	.....
Montgomery	.....	1,730.00	.....	1,730.00	.....	.....	.....	.....
Newton-Pope	Forest Reserve	20,000.00	.....	20,000.00	20,000.00	.....	20,000.00	3,379.78
Newton	.....	10,200.00	.....	10,200.00	6,820.22	.....	6,820.22	5,290.65
Newton	.....	17,000.00	.....	17,000.00	11,709.35	.....	11,709.35	.....
Quachita	County	5,500.00	.....	5,500.00	5,500.00	.....	5,500.00	.....

## STATE HIGHWAY COMMISSION

[illegible]



## APPROPRIATIONS.

The following is a true and correct statement of the status, at the close of business, September 30, 1920, of the several appropriations made by the Legislature of 1919, for the support and operation of this Department.

Title of Appropriation	Amt. Approp.	Expended	Balance
<i>Land Division.</i>			
Salary of Commissioner	\$ 5,000.00	3,750.00	1,250.00
Salary of Deputy Commissioner	4,200.00	3,150.00	1,050.00
Salary of 3 clerks	9,000.00	6,750.00	2,250.00
Postage, etc	300.00	300.00	
Telephone rent	144.00	123.00	21.00
Clerks Recording fees	350.00	281.89	68.11
Register and Receivers fees	325.00	93.80	231.20
<i>Automobile License Division.</i>			
Salary of Deputy	4,200.00	3,150.00	1,050.00
Salary of 2 clerks	6,000.00	4,500.00	1,500.00
Salary of 3 clerks 3 mo. ea. yr.	3,200.00	1,200.00	2,000.00
Auto tags, etc.	35,000.00	19,362.97	15,637.03
Postage, etc.,	2,000.00	800.60	1,199.40
Telephone rent	144.00	123.00	21.00
<i>Highway Division</i>			
Salary of Secretary	4,500.00	3,375.00	1,125.00
Salary of Engineer	10,000.00	7,500.00	2,500.00
Salary of 1st. Asst. Engineer	4,500.00	3,375.00	1,125.00
Salary of 2nd. Asst., Engineer	3,600.00	2,700.00	900.00
Salary of Accountant	4,200.00	3,150.00	1,050.00
Salary of 2 clerks	6,000.00	4,500.00	1,500.00
Telephone rent	192.00	161.00	31.00
Postage, etc.,	1,000.00	756.50	243.50
Preliminary surveys	20,000.00	16,815.55	3,184.45
Contingencies, etc.,	20,000.00	14,869.71	5,130.29
Per diem, etc.,	6,000.00	3,469.59	2,530.41
Salary of Chairman	1,500.00	1,125.00	375.00
Salary of Attorney	10,000.00	8,000.00	2,000.00
State Aid to Roads	950,000.00	789,029.21	160,970.79
	\$1,111,355.00	902,411.82	208,943.18

*FORESTRY ROAD WORK IN THE STATE OF ARKANSAS UNDER THE DIRECTION OF THE BUREAU OF PUBLIC ROADS*

The Bureau has made a number of investigations and has several projects under construction as follows:

1. Ozark Forest Road, Ozark National Forest
2. Buck Knob Oden-Road, Arkansas National Forest
3. Foran Gap Road, Arkansas National Forest
4. Sand Gap-Witt Springs, Ozark National Forest.

1. Ozark Forest Road: This road starts at the Southern Boundary of the Ozark National Forest and extends in a northerly direction through Pope and Newton Counties to the northern forest boundary near Pleasant Hill and is a link in the Russellville-Harrison Road, also the Jefferson Highway.

This road is an earth graded road 16ft. wide between ditches, native stone culverts and approximately 34 miles long. Construction work was started by day labor in August 1918 and road completed November 1920, at a total cost of \$86,825.00. The project is a co-operative road and the allotments were as follows:

Total Federal Allotment.....	\$ 67,651.00
Total State Aid Allotment .....	20,000.00
	-----
Total Allotment .....	\$ 87,651.00

2. Buck Knob-Oden Road: This road is a link in the Albert Pike Highway and is section of the road passing through Arkansas National Forest. It starts about 4 miles north-west of Oden at the Forest boundary and extends in a westerly direction to western Forest boundary near Buck Knob, passing through Montgomery and Scott Counties. It is an earth graded road, 16 feet wide between ditches and 10 miles long.

Work was started by day labor February 1920 and grading completed November 1920. This project is now complete with the exception of the construction of three

steel bridges of 115 feet, 90 feet and 60 feet spans respectively. The entire project will be completed about January 1921.

Balance .....	\$ 13,348.11
Expended to Nov. 1, 1920 .....	56,651.89
Federal Allotment .....	\$ 70,000.00

3. Foran Gap Road, Proposed: This road lies in Arkansas National Forest and is a link in the road from Mena, Arkansas to Waldron, Arkansas. It is to be an earth graded road, approximately 10 miles long. Investigation made but construction work not started.

4. Sand Gap-Witt Springs Road: Preliminary investigation made on this project but no construction started.

Signed: Edw. P. Shuman,  
Senior Highway Engineer.

### *HUGE SUMS AVAILABLE FOR HIGHWAYS IN OTHER STATE*

That over \$1,000,000,000.00 has been authorized for highway construction and that \$550,000,000.00 is available for expenditure during 1921 in the United States is shown by official reports.

At the general election in November 1920, five states voted bond issues aggregating \$192,000,000.00. The State of Kansas removed the constitutional prohibition regarding internal improvements, while Virginia authorized the legislature to vote bonds up to \$50,000,000.00 and California voted to increase the interest rate from four and one-half to six per cent in order that the \$40,000,000.00 of State bonds could be sold at par.

The following tables show the amount of money available by States:

#### *STATE HIGHWAY BONDS VOTED IN 1920.*

Alabama .....	\$ 25,000,000.00
Idaho .....	2,000,000.00
Oregon .....	10,000,000.00

## STATE HIGHWAY COMMISSION

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Colorado .....	5,000,000.00
Maryland .....	3,000,000.00
Minnesota .....	75,000,000.00
West Virginia .....	50,000,000.00
Missouri .....	60,000,000.00
New Jersey (Vehicular Tunnel) .....	29,000,000.00
Virginia .....	50,000,000.00

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Total ..... \$309,000,000.00

*OTHER STATE ISSUES SINCE 1918:*

California .....	\$ 40,000,000.00
Oregon .....	12,500,000.00
Nevada .....	1,000,000.00
South Dakota .....	4,500,000.00
Wyoming .....	2,800,000.00
Maine .....	10,000,000.00
Michigan .....	50,000,000.00
Utah .....	4,000,000.00
Illinois .....	60,000,000.00
Pennsylvania .....	50,000,000.00

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Total ..... \$234,800,000.00

*Grand Total of State Funds Available:*

Passed during 1918, 1919 .....	\$234,800,000.00
Passed during 1920 .....	309,000,000.00
Available Federal aid .....	160,000,000.00

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Grand total ..... \$703,800,000.00

In addition to the funds available for expenditure by the States upon state highway, there is a total of \$362,000,000.00 available by county and local bond issues in 36 states, making the grand total of funds available for highway work greater than one billion dollars.

*LAND DIVISION*

Land disposed of by sale and redemption and the amounts received therefor, together with all fees received by the office from Jan. 1st., 1919 to November 1st., 1920:

	Area	Amount
Forfeited Lands sold -----	\$33,218.29	\$41,522.86
Forfeited Lands redeemed ----	35,361.71	6,275.70
Forfeited Town Lots sold -----		11,477.58
Forfeited Lands Donation Deeds	5,113.16	
Int. Imp. Sem. Sal. R. E. Bank, Swamp and Island Lands sold_	15,790.28	33,050.97
Receipts from patents, Deeds, Certificates, Copying Field Notes, Transcripts, etc., -----		8,562.30
Total -----	\$89,483.94	\$100,889.41

The records do not show area of town lots, only the fees shown above are paid into the Highway Improvement Fund.

*AUTOMOBILE DIVISION*

Gross receipts from Automobile License fees	\$1,083,300.00
Receipts from Penalties -----	3,648.00
Total Gross Receipts -----	\$1,086,984.00
Cost of Assession @ 25c each----	\$26,249.50
Cost of collecting @ 25c each----	26,249.50
Total for assessing and collecting -----	52,499.00
Total amount paid into and due the Highway Improvement Fund for 1919-1920 -----	\$1,034,485.00

*WAR EQUIPMENT DIVISION*

At the close of the war great quantities of equipment, such as trucks, tractors, etc., most of which is very valuable in road construction was by an act of Congress donated to the states to be distributed by the same plan and in the same proportion as federal aid. This Act was amended by a later law requiring the states to pay the Secretary of Agriculture twenty per cent of the value of this equipment.

Seventeen states refused to accept equipment for the reason there had been no appropriation made to pay freight and the twenty per cent. Arkansas was the eighteenth state to face the same condition but did not refuse the equipment. This Commission being made the recipients of the equipment authorized the Chairman to handle the same in a manner which he thought best for the best interest of the State. Mr. Owen, the Chairman on his own account borrowed \$20,000.00 to begin the handling of this property. Several millions of dollars worth of this property has been received and distributed over the state without a penny of cost except the amount necessary to cover freight, the twenty per cent and repairs on used equipment.

We can not make a detailed statement in this report for the reason the books can not be closed until the last day of December.

TABLE VIII.

Number of automobil licenses issued in various counties for the biennial period beginning January 1, 1919, and ending November 1, 1920.

COUNTY	Number of Licences Issued, 1919	Number of Licences Issued, 1920	Total for 1919, 1920	Total Amount of Fees for 1919-20
Arkansas	1,063	1,145	2,208	\$ 22,080.00
Ashley	466	528	994	9,940.00
Baxter	52	58	110	1,100.00
Benton	1,505	2,438	3,943	39,430.00
Boone	344	502	846	8,460.00
Bradley	386	416	802	8,020.00
Calhoun	272	285	557	5,570.00
Carroll	289	449	738	7,380.00
Chicot	552	601	1,153	11,530.00
Clark	678	769	1,447	14,470.00
Clay	527	654	1,181	11,810.00
Cleburne	139	175	314	3,140.00
Cleveland	242	248	490	4,900.00
Columbia	681	706	1,387	13,870.00
Conway	553	690	1,243	12,430.00
Craighead	1,015	1,234	2,249	22,490.00
Crawford	681	810	1,491	14,910.00
Crittenden	541	542	1,113	11,130.00
Cross	390	359	749	7,490.00
Dallas	398	511	909	9,090.00
Desha	397	409	806	8,060.00
Drew	521	600	1,121	11,210.00
Faulkner	828	935	1,763	17,630.00
Franklin	565	694	1,259	12,590.00
Fulton	106	142	248	2,480.00
Garland	962	1,429	2,391	23,910.00
Grant	210	286	496	4,960.00
Greene	673	659	1,332	13,320.00
Hempstead	805	856	1,661	16,610.00
Hot Spring	365	439	804	8,040.00
Howard	488	520	1,008	10,080.00
Independence	521	616	1,137	11,370.00
Izard	30	58	88	880.00
Jackson	805	932	1,737	17,370.00
Jefferson	2,111	2,611	4,722	47,220.00
Johnson	633	693	1,326	13,260.00
Lafayette	368	459	827	8,270.00
Lawrence	464	604	1,068	10,680.00
Lee	637	624	1,261	12,610.00
Lincoln	264	346	610	6,100.00
Little River	388	436	824	8,240.00
Logan	823	983	1,806	18,060.00
Lonoke	1,204	1,344	2,548	25,480.00
Madison	82	134	216	2,160.00
Marion	56	57	113	1,130.00
Miller	852	986	1,838	18,380.00
Mississippi	1,094	1,392	2,486	24,860.00
Monroe	459	477	936	9,360.00
Montgomery	135	170	305	3,050.00
Nevada	498	532	1,030	10,300.00

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Newton	12	25	37	370.00
Quachita	626	757	1,383	13,830.00
Perry	159	193	352	3,520.00
Phillips	1,289	1,463	2,752	27,520.00
Pike	199	226	425	4,250.00
Poinsett	443	392	836	8,360.00
Polk	305	433	738	7,380.00
Pope	774	854	1,628	16,280.00
Prairie	501	592	1,093	10,930.00
Pulaski	7,421	9,249	16,670	166,700.00
Randolph	218	269	487	4,870.00
Saline	423	562	985	9,850.00
Scott	279	303	582	5,820.00
Searcy	49	89	138	1,380.00
Sebastian	3,026	3,798	6,824	68,240.00
Sevier	583	654	1,237	12,370.00
Sharp	72	110	182	1,820.00
St. Francis	648	727	1,375	13,750.00
Stone	44	62	106	1,060.00
Union	508	640	1,148	11,480.00
Van Buren	158	210	368	3,680.00
Washington	1,185	1,577	2,762	27,620.00
White	897	960	1,857	18,570.00
Woodruff	622	785	1,407	14,070.00
Yell	587	681	1,268	12,680.00
Totals	49,145	59,185	108,330	\$1,083,300.00

*TRAFFIC REGULATIONS:*

Many of the improved roads are being damaged from the use of excessive loads on trucks and other vehicles and from tractors and engines having cleats or lugs upon the wheels, and from the excessive speed of some of these vehicles, as well as from heavy pleasure cars.

The great majority of the bridges in the State were designed for loads far below those passing over them; in some cases, the bridges being safe for less than five tons while today a seven to ten ton truck is common and frequently loads of twelve to fifteen tons pass over them.

It is very urgent that one of two things be done; either the bridges must be replaced with adequately designed structures and the types of road built at great cost to withstand this traffic, or a general law passed limiting the weight and speed of vehicles.

It is recommended that this law fix the minimum total weight, the maximum wheel weight and the maximum weight per inch of tire, as well as to prohibit lugs, cleats or other projections upon steel-tired wheels, and to limit the speed of loaded and unloaded vehicles.



*TRAFFIC CENSUS:*

It is very essential that a study be made of the traffic upon any particular highway before the proper type of road can be selected, and to obtain valuable data as to the life of the different types of surfacing under varying conditions of traffic and other features, and to be able to forecast future requirements.

The weight and speed of loaded vehicles using the roads is also of great importance, as the selection of the type of road and its life and often construction will depend largely upon accurate information along these lines.

Nothing of this kind has been attempted in this State for lack of funds, but it is believed the money would be well spent in an investigation of this nature upon at least the main roads. This report would show valuable information as to the origin of traffic, the percent of local traffic, and, if made at intervals, would indicate the increase to be expected in other communities under like conditions as the roads are improved.

*AUTOMOBILE STATISTICS:*

On January 1st, 1920, there was less than one automobile to each mile of public rural road in Arkansas, as against 21 per mile in Rhode Island and 13 in Massachusetts and New Jersey. Arkansas has only one car to 36 people, while in Iowa there is one car for 6 people, and in California, Iowa, Kansas, Nebraska and South Dakota, there is one car to every 6 or 8 people.

The average figures for the whole United States show that there is one car for each 3 miles of road, and for each 14 people. In view of the Arkansas figures, it is probable that the number of cars will show an increase each year until this state has a number of cars somewhere near the average for the whole Country.

During the year 1919, the gross receipts from motor vehicle licenses in the United States reached the total of \$64,697,000.00 and of this amount approximately 70% was devoted to highway work under the direct supervision of the State Highway Departments, while the remainder was ex-

pending for road work by local authorities, with or without state supervision.

In most states the motor-vehicle fees are devoted to maintenance of improved state highways, and these states have found this use of the funds to be a solution of the difficult problem of securing sufficient funds for maintenance of more important roads under the ever increasing traffic requirements, as both the income from licenses and the amount of traffic, or wear and tear upon the roads, increase with the number of cars, it should be possible to adjust the rates from time to time to keep pace with the maintenance charges.

#### *NATIONAL LEGISLATION:*

Two measures affecting highways are pending in Congress at the present time. One of them, the Chamberlin Bill, proposes to continue Federal Aid substantially upon the plan of the original Bankhead Law. The other, the Townsend Bill provides for the creation of a National Highway Commission and would make appropriations from the National Treasury for the direct and independent construction of a system of National Highways, with two such highways in each state.

The effects of the Townsend Bill would probably be to discontinue Federal aid to the states, and for this reason there is considerable opposition to it.

#### *GRADE CROSSINGS:*

There are still hundreds of dangerous grade crossings upon the main roads in the state, and these should be eliminated, wherever possible, by relocations or by the construction of underhead or overhead crossings.

Where grade crossings can not be eliminated, appropriate signs and signals should be installed and the approaches to the track should be so made that a clear view of the track may be had for a considerable distance in both directions.

*INCREASED COST OF ROAD WORK*

The demand for labor, materials and equipment was so great in all lines of construction following the war that prices rapidly increased until the cost of road improvement in 1919 and 1920 averaged over 100 per cent in excess of that in 1917. This increase was general over the United States and affected all industries alike.

Early in the fall of 1919, it was apparent to those familiar with the conditions in this state that to continue asking for bids upon road projects on a large scale meant that districts would only be bidding against each other for men and materials, and that the effects would be to further increase the prices.

The Department, therefore, in a statement in "Out of the Mud" and in the press, called attention to the true condition of affairs, showed that it would be impossible to build all of the work proposed within so short a time and urged the various districts to abandon or postpone part of the work until better prices could be obtained and more competition had at lettings.

During the year 1920 the amount of work placed under contract has been much less than that in the year previous, prices for road construction continuing high, while bonds could not be sold except at a discount. It is believed the districts have acted very wisely in not letting any work except in the most urgent cases, under such adverse conditions, and especially so until some of the older contracts have been completed and labor, material and transportation facilities are nearer normal.

*CONTRACTS FOR ONLY PART OF WORK:*

Under conditions prevailing during the past two years, it is believed to be advisable to let contracts for only as much work as can be done in one year or working season. For example, a district having a twenty mile road of high-type surface would probably find that a considerable saving would be possible if the first contract were let for the grading and structures only, letting the surfacing six months to one year later. In this way, sufficient time will elapse for

the subgrade to become thoroughly settled before the surfacing is placed, and full advantage may be had of any decrease in prices which may occur in the interval between the first and second letting.

### *SMALLER CONTRACTS:*

Very few of the older contracts are being completed within the time limit, due to the adverse conditions of the past three years. It is believed that a great deal of the losses to districts and contractors could be avoided by letting contracts in sections of such length that the work covered by each contract could be completed in one working season.

### *CONTRACTS FOR AMOUNTS IN EXCESS OF FUNDS AVAILABLE:*

In a few instances during the past two years, districts have let contracts and permitted work to start before bonds were sold or money available, and some have made obligations in excess of funds in sight.

Such proceedings always lead to litigation, abandonment of the work, or to increased cost and should, it be believed, that for the best interests of both the district and the contractors, laws should be amended so as to prohibit the practice.

### *RETAINED PERCENTAGE:*

Most of the construction contracts provide that a percentage of each estimate shall be retained until the work is completed, and accepted, when it shall be paid to the contractor.

This retained percentage of ten to fifteen percent of the cost of the work is an obligation which must be met and should be set aside each month and not used for other purposes.

In spite of these facts, contractors have made com-

plaints that some of the districts had expended part or all of the retained percentage and could not make payment upon completion of the road, having to wait indefinitely for funds to be secured from other sources.

In fairness to all parties concerned, it is believed that some restrictions should be placed upon the use of this fund by the necessary legislation.

#### *ROAD MATERIAL SURVEY:*

The increased costs of construction and the shortage of transportation facilities and higher freight rates can be largely offset in many cases by developing local sources of road materials. Frequently new sources may be discovered and such materials are often equal to those imported, but the cost is much lower.

A road material survey of the State would be of much service to the counties and districts. If the materials discovered were tested and information published showing the location, kind of material, results of tests and for what use they are recommended, it would be of great economic value to the State.

It is believed that a survey of this kind should be made and it is probable that it could be made in co-operation with the State University and United States Geological Survey at a relatively small cost.

#### *THE TEN PER CENT FUND:*

The Federal Aid Law of 1916 provides, in Section 6, that "Items included for engineering, inspection and unforeseen contingencies (as submitted upon estimates by the State upon Federal aid projects) shall not exceed ten per centum of the total estimated cost of the work." The law passed by the General Assembly and approved March 1917, Act No. 105, contains the same provision, in Section 6, which provision was necessary in the enabling act to permit the State to accept Federal aid.

The financial statement accompanying this report shows

that expenditures by the State for engineering, inspection and contingencies in connection with projects allotted aid has amounted to far less than ten per cent of the estimated cost of the improvements. However, a great deal of detail in auditing the accounts is necessary under the present system of handling the ten per cent fund, as the expense of inspection must be prorated among the various projects, it sometimes happening that one item would have to be divided and charged up to a dozen or more projects.

It is estimated that the inspection work can be carried on with less than one-third of this fund, and while it is still necessary under the law to leave the ten-per cent provision intact, to simplify the handling of it, not only in the Highway Department, but also in the Auditor's and Treasurer's office, it is recommended that the State Treasurer be authorized to set aside, in a lump sum, three (3) per centum of the aid funds appropriated, to be drawn upon only for this purpose.

It is necessary under the law that inspections be made upon aid projects during construction and before payments are made to determine whether the work is being done according to the plans and specifications. This is regarded as an extremely important provision and it would be unwise to contribute aid without adequate inspection being made periodically.

The present method of handling this work could be greatly improved in the manner outlined above and it is strongly recommended that it be done, and as the number of inspectors necessary depends upon the amount of construction work in progress, this would permit the force to be increased or decreased at any time to meet the conditions existing at that time.