

ARKANSAS HIGHWAYS

A Burned Shale Road



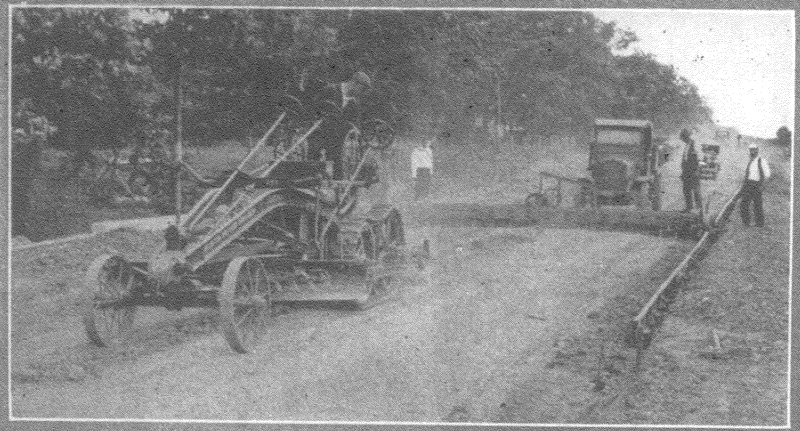
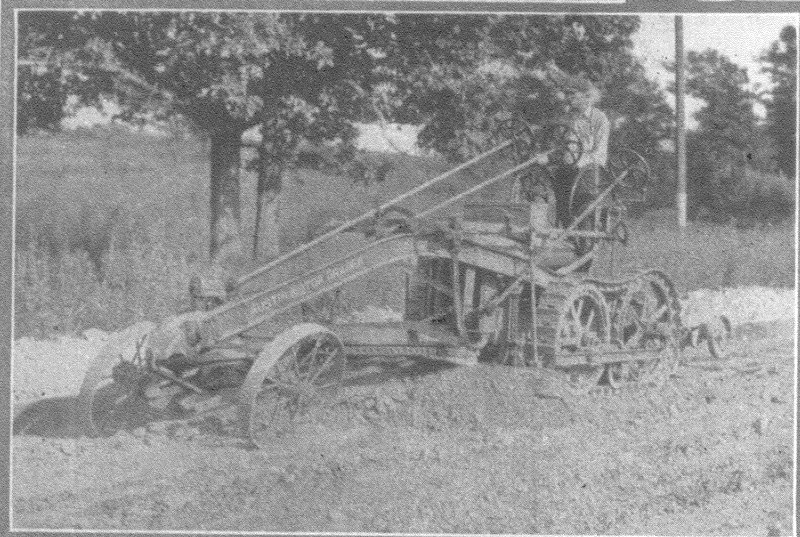
State Highway "A-4"
Ft. Smith-Greenwood

OCTOBER
VOL.2 1925 NO.10



AUSTIN MOTOR GRADER

ON SUBGRADE



THERE are at least six separate jobs for an Austin Motor Grader on subgrade—six places where it will save time, labor and, consequently, money for you.

1. On the spill when filling to rough grade.
2. Keeping the entire grade smooth for the trucks.
3. On the rough grade ahead of the subgrader.
4. Pulling the subgrader.
5. On the fine grade ahead of the mixer.
6. On the shoulders of the finished pavement.

Other uses will probably suggest themselves to you, but these six are enough to enable the machine to pay for itself in a short time.

In the upper illustration, the rear scarifier (an exclusive Austin feature) is being used to remove a hard and stony high spot on the rough grade. In the center illustration, the blade is piling up the scarified material for the shovellers—the leaning front wheels (another exclusive Austin feature) preventing the front end of the machine from skidding into the forms—while in the lower illustration, the subgrader is adding the finishing touch.

Austin Motor Graders are furnished with plain steel wheels, rubber-tired wheels, or Crawler Tread; and with center or rear scarifier. Space does not permit even a brief description of the many worthwhile features of these machines, but the coupon will bring you by return mail a copy of the catalog, which tells what we are sure you will find a most interesting story.

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STATE CAPITOL
Little Rock, Arkansas

ARKANSAS HIGHWAYS



Roads That Go Somewhere

Official Monthly Bulletin of the State Highway Commission

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VOL. II.

OCTOBER, 1925

NO. 10

Greatest Highway Meeting Scheduled for January

Highway Officials to Convene in Chicago.

THE coming convention of American Road Builders will be the greatest in the history of the organization, according to W. H. Connell, president of the association. The association will hold its annual convention in Chicago January 11-15, and arrangements have been made for a road show and a series of lectures and discussions of road matters.

The program for highway engineers and officials is in charge of Frank Sheets, State highway engineer of Illinois and treasurer of the American Association of State Highway Officials. The increasing importance of highway affairs to the entire nation has created such interest in highway work that engineers and officials take every advantage to learn of the latest and best practices in road construction and maintenance. The program arranged by Mr. Sheet will be for the special interest of those directing the highway work of the country. Since the designation of 50,000 miles of highways for a national system has been made by a joint board of State and highway officials, there will be a rapid tendency toward standardization in engineering and construction practices. The best informed men in the country will lead the discussion on various plans of highway affairs.

S. M. Williams, vice president of the Autocar Sales and Service Company, is in charge of the program for contractors and others engaged in the construction of roads and the production of road building materials and equipment. The expenditure for highways in the United States is approximately one billion dollars per year. It

has become one of our greatest industries and is attracting the ablest and best equipped construction organizations of the country. This part of the American Road Builders' program will bring out the problems of the contractor and the latest development in construction methods, management and equipment.

The Road Show has always been the great attraction of the Road Builders' Convention. For the past three years this has been under the management of Chas. M. Upham, State highway engineer of North Carolina. The Road Show in Chicago next January will be greater than ever before, says Mr. Upham. Already over 200 exhibitors have applied for space and it is believed that more than 400 applications for exhibits will be received. These exhibits cover everything from a hand pick to steam shovel and include as well machinery of the latest models, all kinds of road building materials and technical apparatus used in the highway industry. Engineers, contractors and public officials engaged in highway work will find the Road Show of great benefit in becoming acquainted with the most modern and efficient machinery and equipment.

The January meeting will also have an international aspect in that Central and South American countries will receive invitations to attend the convention. Frank Page, chairman of the North Carolina Highway Commission, will personally present this invitation. Mr. Page is now in South America as a delegate from the United States to the Pan-American Road Congress which con-

venes at Buenos Aires. He will visit practically every Central and South American country before returning to the United States and extend an invitation to these countries to take part in the Chicago meeting.

Mr. Page is vice president of the American Association of State Highway Officials and is past president of the American Road Builders. He is a brother of the late Walter Hines Page, ambassador to England during the World war.

CRAIGHEAD WORK CONTEMPLATED.

Among the projects before the State highway department that are scheduled for completion this fall is the grading and graveling of the state highway in Craighead county from the Lake City bridge through Black Oak and Monette to the Mississippi county line. This is an important "link" of State Highway "B-20," connecting Jonesboro and Newport with the "Scenic Highway" at Blytheville, and furnishing an outlet for the entire northeast section of the State to St. Louis and the fine Illinois system of highways.

As a part of the "job" the Lake City bridge will be increased to standard width and strength. Plans for the work have already been completed by the engineering department, and it is expected that it will be completed before bad weather.

FORREST CITY-MARIANNA ROAD.

A graded and graveled road soon will be completed from Forrest City to Marianna, a distance of about 15 miles. There never before has been a good road between the two towns and often in the winter motor traffic between Forrest City and Marianna was practically impossible.

New and substantial bridges are taking the places of the cheaply constructed and dilapidated structures. The new road also shortens the drive by about eight miles. The road is being built by the state highway department and is financed by the state and federal aid. A. W. Buford is district engineer and E. M. Bell is superintendent.

—Arkansas Democrat.

Are You a Contractor?

Here is the place to get your supplies—Wheelbarrows, Scrapers, Plows, Singletrees, Hoisting Engines, Pumps, Air Compressors, Concrete Mixers, Shovels, Spades, Picks, Structural and Concrete Steel, Bar Cutters and Benders, Hose, Pipe, Roofing and Tools of all kinds.

CENTRAL SUPPLY CO.

LITTLE ROCK, ARK.

IF---BE---

—Perry County News.

If you can't be the pine on top of the hill,
Be a scrub in the valley, but be—
The best little scrub by the side of the rill;
Be a bush if you can't be a tree.

If you can't be a bush be a bit of the grass—
And some highway happier make.
If you can't be a muskie, then just be a bass,
But the liveliest bass in the lake.

We can't all be captains, some have to be crew—
There's something for all of us here.
There's a work to be done, and we've all got to do
Our part in the way that's sincere.

If you can't be a highway, then just be a trail;
If you can't be the sun, be a star.
For it isn't by size that you win or you fail—
Be the best of whatever you are.

No wonder some parts of the highways in this country are bad with the fellow in front burning them up and the fellow behind eating them.—California Highways.



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The Relation of Road Surface to Tire Wear

From the "Concrete Highway Magazine."

IN comparing the cost of vehicle operation on different types of road surfaces engineers have, until recently, been handicapped by a lack of definite cost data. Tests to ascertain the fuel required to propel a vehicle over different types of pavements have been made from time to time. The last and most comprehensive of these was completed by the Iowa State College Engineering Experiment Station and showed that, considering the saving in gasoline alone, concrete pavements were cheaper than any other type of road surfacing, even including earth, when only 250 vehicles a day passed over the road. It seems reasonable to suppose that fuel is not the only thing saved by driving over concrete pavements. Both tire wear and vehicle depreciation should be less than on rougher road surfaces. There were no definite figures to prove this assumption, however, until the Engineering Experiment Station of the State College of Washington undertook a series of tire wear tests. Although these tests have not yet been completed, the first progress report, printed in the college's Monthly Bulletin recently, gives results which show even greater proportionate savings on concrete than were found in the fuel tests.

The tests were run on two types of roads—portland cement concrete and western macadam. Western macadam is a little different from ordinary macadam. The rock of which it is made is a hard basalt or lava, which crushes into sharp edged triangular fragments.

The bottom course is 1 to 2-inch stones bound together by clay. The top course is composed of all the material from one inch down. No water is used to bind this top and it is not rolled, but is left to be consolidated by traffic.

The ruts which form as the stones consolidate are filled by the maintenance patrol, and in a few weeks the surface becomes a smooth, uniform roadway covered with a thin layer of fine, loose broken stone.

Test runs were

made with 5-passenger, 4-cylinder touring cars, having a total loaded weight of 3,500 pounds. Both tire wear and gasoline consumption were determined at different air temperatures, for different speeds, and on concrete, good macadam and poor macadam.

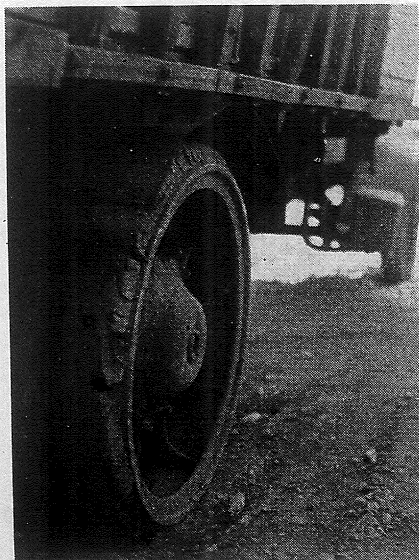
Tire wear was determined by weight. Before and after each run the tires were removed from the car, but not from the rims, thoroughly cleaned with brushes, wiped with a cloth, deflated and then weighed on a sensitive scale which gave results accurate to 1-2 gram. The average wear on the four tires of a car was taken as the wear for that run.

Gasoline consumption was determined by weighing the fuel in the tank at the beginning and end of each run.

In determining the effect of speed on tire wear, test runs at different speeds were made over the same section of macadam road. The tests revealed that tire wear increased from about 0.40 pounds of rubber per 1,000 miles of travel at 15 miles an hour to 0.52 pounds at 33 miles an hour, or about 30 per cent.

The greater wear at higher speeds is accounted for by two facts. First, at higher speeds the tire suffers more violent impact against obstructions in the road. Second, when a tire bounds clear of the road, as it does more frequently at higher speeds, it starts to spin; when it again comes in contact with the road, appreciable amounts of rubber are ground off before its speed is reduced to road speed. Both these causes of increased wear are minimized by an even road surface, like that of concrete pavements.

Early in the tests it was discovered that temperature affects tire wear, the wear increasing with increasing temperature. To determine just what this temperature effect was, a series of runs were made over same roads, but at different air temperatures. No attempt was made to determine the temperature of the tires themselves, as that depends on several



Tests made at the Engineering Experiment Station of the State College of Washington show that tires wear 17 times faster on good macadam and 56 times faster on poor macadam than on concrete.



things, such as the degree of inflation, speed, load, road condition, and the structure of the tire. It was found that the rate of wear at 90 degrees F. was almost four times that at 40 degrees F.

Comparing the runs made on the two types of surfaces when air temperatures and speeds are identical it was found that tires wear 17 times faster on good macadam and 56 times faster on very poor macadam than on concrete. The actual cost of tire wear in the tests was 98 cents on concrete, \$16.72 on the same length of good macadam and \$56.15 on very poor macadam. These figures are based on a cost of \$34.50 for a 33x4 inch tire and tube.

The tests also showed that if the gasoline required to drive a car over a certain length of concrete road cost \$10.00 it would cost \$11.13 on a good macadam road of the same length and \$15.07 on poor macadam.

The cost of tires and gasoline for an average 4-cylinder car driven on a concrete road, as shown by these tests, is \$12.80 per 1,000 miles. On a good macadam road it would be \$35.00 per 1,000 miles. The reduced cost of driving on concrete is, then, 2.23 cents per car mile, for tires and gasoline alone, with the price of fuel at 25 cents per gallon.

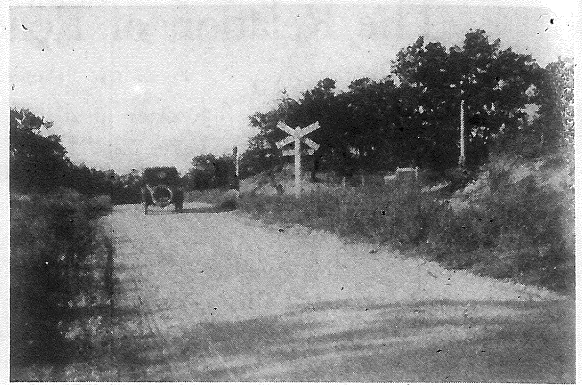
The average first cost of macadam in Washington is \$6,250 per mile. Maintenance, including resurfacing every three years, averages \$895 per mile per year. If the life of the surface is assumed to be 25 years which, because of grade reductions and relocations, is probably correct, then macadam surfaces cost the State \$1,339 per mile per year, which includes theoretical interest and amortization charges.

The average first cost of concrete roads in Washington is \$23,600 per mile, and maintenance costs average \$165 per mile per year. Estimating the life of a concrete pavement as 25 years, and allowing it no salvage value at the end of that time, the cost per year for this type of surface is \$1,840 per mile.

Concrete pavement, then, costs \$501 per mile per year more than macadam. If it costs each car using a road 2.23 cents less to drive a mile on concrete than on macadam it will require a traffic of 22,480



Water standing in ruts and potholes along an unpaved road hastens the destruction of motor vehicle tires.



Even on good macadam roads it was found that tire costs were many times greater than on concrete.

cars per year, or only 62 cars per day, over a road to earn this \$501 differential. In other words, if a highway carries more than 62 cars per day the reduced costs of gasoline and tires *alone make a concrete road actually cheaper for the user than a macadam road.*

THE DAY AFTER THE NIGHT BEFORE.

Westerner: "You say you found a rattlesnake in bed with you this morning? Why didn't you kill it?"

Easterner: "I didn't pay much attention to it. I thought I was just seeing it."—*Wisconsin Highways.*

The New Highway Law

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GOOD ROADS



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Little Rock, Ark.

A History of Federal Road Aid

By W. W. Zass, Office Engineer, Arkansas Highway Department.

TO the majority of those interested in highway development, in this or any other state, the words "Federal Aid" have a familiar ring. Yet many of those who are familiar with the term have but a vague understanding of the history of the Act, the manner in which the appropriation is apportioned among the several states or of the working rules and regulations promulgated for the purposes of administration.

From time to time during the earlier periods of our history the government, by means of Congressional appropriations, aided in the construction of certain toll roads, canals and railroads. As a local illustration of such earlier assistance we might cite the construction of the Memphis-Little Rock road, the history of which recently appeared in the pages of *Arkansas Highways*. However, the appropriations for such projects were spasmodic and followed no defined plan, nor were they equalized between the states, but were probably governed by immediate military necessity to as great an extent as for the purpose of developing the country as a whole.

In 1893, a small department was initiated in Washington and named the "Office of Road Inquiry." It was the function of this office to collect data and disseminate information relative to highway conditions in the United States. This department was later called the Office of Public Roads and increased rapidly in both volume of work and number of personnel and probably can be designated as the official forerunner of that branch of the Department of Agriculture which we now know as the Bureau of Public Roads. Then, as now this office played an important part in the development of the highway movement, although prior to 1916 this branch of the government service took but little active participation in local or state affairs, other than in investigation and research work, although it was largely through its recommendation that a provision was inserted in the original Federal Aid Road Act requiring that as a condition precedent to the receipt of Federal Aid an adequate State Highway Department be created and maintained.

What might be termed the first concerted action of our government toward assisting in the construction of highways was a Congressional act approved July 11, 1916, entitled "An Act to Provide that the United States shall aid the States in the Construction of Rural Post Roads, and for other Purposes." This first act known as the "Federal Aid Road Act" carried a \$75,000,000 appropriation which was to be allotted to the states in annual apportionments over a five-year period on a graduated scale, the apportionment for 1917 amounting to \$5,000,000, and increasing annually in the same amount

until in the year 1921 the sum of \$25,000,000 was to be available. These appropriations were placed under the jurisdiction of the Agricultural Department, the provisions of the Act to be administered by the Secretary of Agriculture, through the Bureau of Public Roads. The act provided that the States could participate in this appropriation only through their respective Highway Departments.

Considering the size and magnitude of our present day highway programs the appropriations made available by this Act now seem rather negligible, but it should be borne in mind that these appropriations were made prior to our participation in the World war, before we learned to think and act in such large sums as has now become prevalent, and before the volume of motor vehicles had reached the huge proportion it has now assumed, making the building of modern highways an economic necessity. Again, considering the fact that less than 40 per cent of the States had organized highway departments functioning at the time of the inception of this act perhaps due credit should be given to the framers of the act for the good judgment displayed by them in so regulating the initial appropriations as to allow the several states sufficient opportunity to create and maintain highway departments adequate and competent to handle the funds placed at their disposal to the best advantage.

The Federal Aid Road Act as approved in 1916 provided that the annual appropriations were to be apportioned among the several states in the following manner: One third in the ratio which the area of each state bears to the total 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, and 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 and star routes in all the States. Under this system of apportionment the State of Arkansas receives as its share about 1.72 per cent of the annual appropriation. The states do not receive their annual apportionments in lump sums but in the form of progress or final payments upon each individual project as the construction work upon that project proceeds in conformity with the plans and specifications as approved by the Secretary of Agriculture. ~~Such payments are made by the Secretary of the Treasury, on warrants drawn by the Secretary of Agriculture, to such officials or depository as may be designated by the State highway department and authorized under the laws of the State to receive public funds of the State.~~

This act also provided that only such roads as were

used for carrying United States mail were eligible for allotments, such allotments not to exceed 50 per cent of the construction cost, nor more than \$10,000 per mile exclusive of the cost of bridges of more than twenty foot span. It excluded streets or highways in municipalities of twenty-five hundred or over from participating except such portions of such streets or highways along which within a distance of one mile the houses averaged more than two hundred feet apart. It provided that roads constructed under the provisions of the Act would be free of tolls of any kind. It required that the State maintain all highways constructed with the aid of Federal funds in a suitable manner and defined the term "maintenance" as meaning the constant making of needed repairs to preserve a smooth surfaced highway. The act excluded the government from participating in any maintenance charges of whatever kind or nature, and it excluded from construction costs all costs incident to locating, surveying and mapping, as also costs of right-of-way.

Shortly after the close of the World war, Congress passed an amendment to the Federal Aid Road Act providing for an additional allotment of \$200,000,000, \$50,000,000 of which was to be made available in 1919 and \$75,000,000 in each of the years 1920 and 1921. This amendment was approved February 28, 1919. The primary motive in making this additional appropriation was to stimulate road building in order to provide employment for discharged soldiers and sailors. It will be noted that the total appropriations now made available for each of the years 1920 and 1921 were greater in amount than the original appropriation as made for the five-year period 1917 to 1921, inclusive.

This amendment made more liberal the interpretation of what might be classed as rural post roads and made possible the construction of practically any road which would tend to develop the country. The amendment also increased the maximum allowable aid per mile from \$10,000 to \$20,000, exclusive of the cost of bridges of more than twenty-foot span.

An act to amend the Federal Aid Road Act was approved November 9, 1921. This act was cited as the Federal Highway Act and carried an appropriation of \$75,000,000 for the fiscal year of 1922. This act in addition to carrying further appropriations provided for sweeping changes and was much more restrictive in character. The amendment to the Federal Aid Road Act approved in 1919, allowing a broader interpretation of what might be classed as rural post roads proved somewhat too loose in application. It was found that highways were being constructed that were purely local in character, this condition being accentuated even more so than when aid was granted on post roads only. In order to correct this condition the Federal Highway Act provided for a road system, national in scope, to consist of a definite connected system of highways in each state limited in extent to seven per cent of the total mile-

age of highways in that state. Three-sevenths of this mileage was to be primary or interstate in character, and four-sevenths was to be secondary or intrastate in character. The act provided that all future Federal Aid apportionments were to be expended upon this system and that not more than 60 per cent of such apportionments were to be expended upon the primary or interstate systems. It also provided that both the primary and secondary systems should be built up concurrently.

The seven per cent system in the State of Arkansas as approved by the Secretary of Agriculture comprises a total of some 5,007 miles, 1,769 miles being classed as primary roads and 3,239 miles as secondary roads. Our allowed maximum based on a public road system of 71,960 miles would amount to 5,037 miles. It should be remembered, however, that our State Highway System, in addition to embracing the mileage of the Federal Aid System, carries about 3,395 additional miles of road classed as State Connecting Roads. Under the provisions of the act, and as funds become available, portions of these state connecting roads may be added to the approved Federal Aid System whenever provision has been made by the State for the completion and maintenance of the present approved system.

This act to amend the original act did not change the method of apportioning the states, however, a new provision was inserted that no state should receive less than one-half of one per centum of the year's appropriation; there are four states which are benefited by this provision. As before, the United States' share was limited to 50 per cent of the total estimated cost except in those states containing unappropriated lands in excess of 5 per cent of all lands in the State. For those states the special provision is made that the government may participate to the extent of 50 per cent plus a percentage of the total estimated cost equal to one-half of the percentage which the area of the public lands bears to the total area of the State. There are some ten states which benefit from this latter provision by which the Federal participation increases from 50 per cent to amounts varying from 53 per cent to 87 per cent.

As before, the funds to match the government's contribution may be raised by the States or by any political or other subdivision of the States, but if the funds of a county or other local subdivision are to be used the new act requires that they shall be placed under the direct control of the State Highway Department. The new act is also more explicit in defining the requisite character of the Federal Aid roads. Instead of the term "substantial" used in the first act, the new act requires explicitly that only such durable types of surface and kinds of material shall be adopted as will meet the existing and probable future traffic needs and conditions. A new provision is also contained requiring that the width of surfacing shall not be less than 18 feet. The foregoing provision is modified to the extent that if in the opinion of the Secretary of Agriculture local considerations make the provision impractical either in the way of excessive cost, probable traffic requirements, or legal obstacles the restriction may be waived. Under the terms of the new act the Federal Aid apportionment will be available to the States only two years after the close of the fiscal year for which the money is appropriated. If not allotted by the State to any project within that time it shall be reapportioned among the States. The new act also provided for

the distribution of surplus war material among the States, the basis of distribution to be the same as for the apportionment of funds.

An amendment to the Federal Highway Act as approved in 1921, was approved June 19, 1922, and carried additional appropriations in the amounts of \$50,000,000 for the year 1923, \$65,000,000 for the year 1924 and \$75,000,000 for the year 1925. The amendment also reduced the limitation of \$20,000 per mile exclusive of the cost of bridges of more than twenty-foot span to a limitation of \$16,250 per mile in 1923 and \$15,000 per mile thereafter. This amendment also defined the term "bridges" as including railroad grade separations, either by means of overhead or underpass crossings.

An additional amendment was approved February 12, 1925, carrying an appropriation of \$75,000,000 for the year 1926. This amendment carried no further changes or restrictions of any kind.

The organization of the Bureau of Public Roads that is responsible for the administration of Federal Aid work consists of a Washington headquarters and twelve districts, each district headed by a district engineer assisted by a small corps of assistants. The districts are frequently subdivided into states, each state in charge of a representative, with his assistants, and reporting to the district chief.

Expenses incurred in administering the act, as well as for carrying on the necessary experimental and research work, are defrayed under a provision of the act which allows a maximum of 2½ per centum of the annual appropriation to be deducted for such expense.

Funds providing the revenue from which Federal Aid appropriations for road construction are made are not raised by means of any special tax or levy. However, excise taxes on motor vehicles and their accessories, first imposed as a war time measure, and still active, more than cover such appropriations as made to the Bureau of Public Roads to date. The latest available figures indicate that the Federal Automotive War Excise Taxes collected during the period 1917 to 1924, inclusive, exceed the Federal Aid appropriations made during the same period by some 37 per cent, the excise taxes amounting to \$739,000,000 and the Federal Aid appropriations for road construction amounting to only \$465,000,000.

The foregoing is but a brief summary of the Federal Aid Road Act as amended by the Federal Highway Act. Naturally the administration of such an act involves an enormous amount of detail as a great range and variety of conditions are to be contended with owing to the considerable territory represented by the United States. An analysis of this detail would very likely prove boring to the reader, however, a short account of the general procedure by which Federal Aid becomes available might prove interesting. This routine varies to a certain extent from time to time owing to the nature of the local conditions encountered.

The State Highway Commission wishes to improve a certain section of its approved system and desires to obtain Federal Aid in the construction of this section. By means of a government form known as a Project Statement it makes this desire known to the Bureau of Public Roads. The form states briefly the location of the improvement desired, an approximate estimate of cost and the amount of Federal Aid requested. Upon the receipt of the Project Statement a representative of the Bureau, accompanied by a representative of the State, makes what is known as a Route Inspection. Through means of this inspection a definite recommendation is made of the route to be followed in making a survey for obtaining the necessary data to prepare plans. The Route Inspection report, together with a sketch map illustrating it, is attached to the Project Statement and forwarded to the Secretary of Agriculture for approval. As soon as this approval is obtained a detailed survey is made by the Highway Department of the route recommended or agreed upon and from the survey notes the project plans are prepared. As quickly as these plans are "roughed in" a location inspection is made and any corrections or additional information necessary is noted. The plans are then completed, the quantities tabulated and an estimate of cost prepared. What is called a Plan-in-Hand Inspection is now made and if everything is satisfactory the plans, specifications and a detailed estimate of cost is then submitted to the Bureau for approval. After such plans, specifications and estimates

are approved, or recommended for approval, the work is advertised for bids, proposals are received, and the contract awarded. In the meantime another government form is prepared, known as the Project Agreement, which sets forth definitely the improvement to be made and the exact amount of Federal Aid requested. When convenient, the Project Agreement is not prepared until after proposals are received and the contract awarded, thus making it possible to base the Agreement on contract prices. In this agreement it is necessary for the State to show that its share of the funds necessary for construction are available and on deposit, and not based on anticipated revenues.

During the construction period monthly inspections are made by a representative of the Bureau for the purpose of ascertaining if the plans and specifications are being followed. If the work proves satisfactory the state prepares what is known as an intermediate or progress voucher. These vouchers contain a detailed estimate of the work completed to date and call for payment of the government's pro rata percentage. They are prepared not oftener than every 30 days or to call for a payment of less than \$1,000. When the project is completed a final inspection is made, and when accepted, a final voucher is prepared and forwarded. This completes the project on the part of the government excepting for periodical maintenance inspections.

For those who doubt the value and wisdom of Federal Aid it might be cited that the total appropriations made by the government since the inception of the original act, the years 1917 to 1926, inclusive, have amounted to \$615,000,000, of which the State of Arkansas has been allotted the sum of \$10,326,564.

However, it is not believed that the value of the acts to the several states can be estimated on a monetary basis alone. The far-reaching effects of a unified national highway system cannot be overestimated, and the standardizing of highway practice and methods throughout the different states has received an impetus that only a disinterested, technical and capable body could impart. There is no question but that some criticism can be made of the procedure and practice followed by and insisted upon by the Bureau, although it is believed that any friction so developed is caused to as great an extent by the human equation or personal element entering into the administration of the act as to any basic faults of the act itself. Moreover, it is believed that regardless of such criticism as may be directed to the act, or its administration, it may well be ranked as one of the most important pieces of constructive legislation ever enacted by our National Congress, and that the benefits accruing under the provisions of the act have developed the rural districts to a greater extent than any other agency.

CRASHED.

There was a young lady named Eleanor,
Whose auto turned over and feleanor;

'Twas ten minutes or so

Ere she seemed to know

The things that the people were teleanor.

Texas Highway Bulletin.

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Highway Legislation Long a Perplexing Problem

By Clio Harper.

GOOD roads legislation is not a new pastime in Arkansas. Because of the excessive amount of it, during the last six years, some may have imagined that it was a new thing. The records, however, prove that the Arkansas General Assembly has been legislating about roads for at least sixty-five years. An examination of the earlier statutes will, undoubtedly prove that it began many years before.

On January 21, 1861, Governor Rector approved an act establishing a turnpike through the counties of Hot Spring, Clark, Montgomery, Pike and Sevier. The first section of the act reads as follows:

"That Newport Floyd, Andrew J. Jone, and James Lows be, and they are hereby granted a charter to build, make, erect and establish a turnpike road commencing at the town of Hot Springs, thence with and contiguous to a route known as the Paris mail trace, to the line between the State of Arkansas and the Indian nation, five miles southwest of Mineral Springs postoffice, selecting for themselves what they deem a most practical route, as aforesaid, and shall have the right of way

through any person or persons' lands, by paying such person or persons the true value thereof."

The act further provides that the owners may erect toll gates upon the completion of each twenty-five miles of the roadway. The following schedule of tolls is given in the act:

"For each six-horse or ox wagon, 75c.

"For each four-horse or ox wagon, 50c.

"For each two-horse wagon or buggy, 30c.

"For each one-horse buggy, 25c.

"For each man or horse, 10c.

"For each loose horse, mare, mule, jack or jenny, 3c.

"For each cow, sheep or hog, 2c."

It would be interesting for some local historian to endeavor to trace this old turnpike.

This recalls the fact that only the last few years have seen the disappearance of the toll gates on Arkansas highways. There is not one left on the highway maintained by the State and the private toll gates are so rare that their very existence is doubtful. It has been only a few years since the last toll gate disappeared from the roads within a few miles of Little Rock.

HOXIE-WALNUT RIDGE PAVING.

A city paving job of interest to users of the State highway system is that now under way at Hoxie, in which Texas street is being graded, drained and paved with concrete from the business section to the northern limits of the city, where it connects with West Front street of Walnut Ridge, also being paved. These sister cities, each of which refers to the other as a "suburb," will soon be joined by a much-needed slab of concrete, which will form an important little link in State highway "A-2," better known as the "Arkansas-Missouri Highway," connecting the Missouri system with the Capital City via Corning, Pocahontas, Walnut Ridge, Hoxie, Newport, Bradford, Bald Knob, Beebe and Jacksonville.

The Highway Department is putting up splendid roads wherever they are at work in this part of the country.—*Madison County Record.*

LITTLE GIRL.

You've a very rattly car,

Little girl,

Are you going very far

Little girl?

You had better take some chains,

To be safe in case it rains —

It may save you lots of pains

Little girl.

—Nina Baker.

Russell Motor Patrol No.2

One Man Machine—Fordson Tractor for Power

A better built Motorized Patrol Grader. It meets the growing demand for a more highly finished maintenance grader. Has tight fitting machine cut gears, machined bearings with take-ups in the control connections, more accurate and easy adjustments and sturdy construction of oversize parts.

Has been tried and tested to the entire satisfaction of everyone—another demonstration of our claim—"If It's Russell Built It's Right."

Fordson tractor for power. Three speeds forward and a reverse. Large front wheels and long wheel base. Ball and socket in lifting links. Worm and gear fully enclosed. Length of blades 8, 10 and 12 ft. Weight 8050 pounds complete including tractor and scarifier. Canopy top if desired.

The complete Russell Line for road construction, road maintenance and road repairing includes—

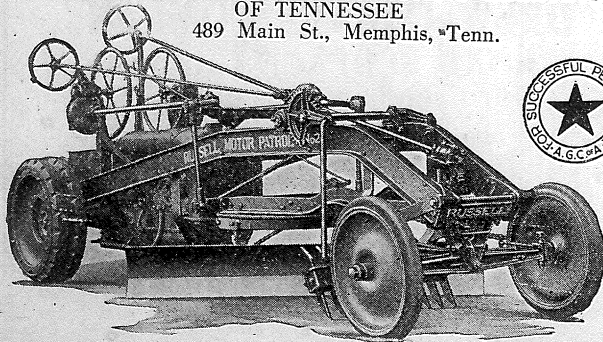
8 Sizes Road Machines—2 Sizes Elevating Graders—

Maintenance Patrol Machines for both Motor and Horse Power, Scarifiers, Road Drags and Wheel Scrapers, Drag Lines, Gravel Screening, Crushing and Loading Equipment, Steel Beam Bridges, etc.

Our 72 page catalog of special interest to all road builders—sent free and postpaid.

RUSSELL GRADER MANUFACTURING COMPANY OF TENNESSEE

489 Main St., Memphis, Tenn.



COUNTY INDEX

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Ashley
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Independence
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Scott
Searcy
Schäfer
Sevier
Sharp
St. Francis
Stone
Union
Van Buren
Washington
White
Woodruff
Yell

Arkansas Highway Data by Counties

Table with columns: COUNTY, Miles Proposed to Be Built on System, Miles Proposed to Be Built off System, Total Original Bonded Indebtedness, Total Bonds Outstanding Jan. 1, 1926, Federal Aid Received by R. I. Districts, State Aid Received by R. I. Districts, Average Annual Requirement for Interest and Bonds, Interest and Bonds Paid by State Each Year 1925-26-27, Received by County Highway Fund, Total Amount Due County, Per Cent Tax Reduction, Lowest and Highest Average Tax Per Acre, and State pay all and Cash surplus.

Federal Road Aid Not "Pork"

Minneapolis Journal.

THAT Federal road money is in no sense "pork," has been demonstrated in the case of the State of Kansas. The Federal government, as everybody knows, matches dollars with the States in the building and improvement of through highways that serve national needs.

The last Kansas legislature seemed to think this money was some sort of a government gift, carrying no strings whatever. It failed to finance and equip the State highway department as required by the law as a prerequisite for Federal aid. Washington's action was prompt and efficacious. Last April Federal aid was abruptly withdrawn. Allotments of a million and a half dollars for the present fiscal year, and more than two millions for the succeeding fiscal year, were involved.

Now Kansas sincerely wanted better roads and was ready honestly to match its money with the government's. But the legislature, in a spirit of short-sighted parsimony, had hamstrung the highway department. The rather drastic Federal action got quick results. Legislators saw their error, regretted it, and were willing to correct it. But a way out was found that obviated a special session. The banks agreed to come to the rescue with loans to

finance highway supervision that will be satisfactory to the Washington authorities this year and next. The banks are satisfied that the legislature to be elected next year will do no quibbling about appropriating money to repay the loans—aggregating some three hundred thousand dollars—and to finance the highway department on a proper scale in 1927 and 1928.

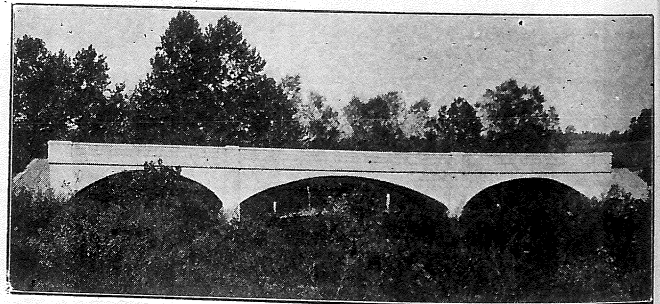
It is a foregone conclusion that Kansas, with this lesson of 1925 in mind, will not let the slip occur again. Nor will the lesson be lost on other states.

When silenced is the singer,
And broken is the Lute;
Say not the song was nothing,
And vain the far pursuit.

When Love's brief rose has failed,
Say never: "It was naught,"
Just say that every moment
Was worth the joy it brought.

—Anon.

LUTEN BRIDGE COMPANY



One of Our Arkansas Jobs

Clear Creek Bridge in Washington County
(Federal Aid Project No. 37)

Other projects of which we are proud in Arkansas may be seen in Crawford, Scott, Pope, Searcy, Garland and Hot Spring counties.

PLANS AND ESTIMATES FURNISHED FREE

Write us about your problems.

OFFICES AT:

LITTLE ROCK, ARK. KNOXVILLE, TENN.
CHARLOTTE, N. C. DALLAS, TEXAS

Service---for a Quarter Century

—For that length of time
the name "Gay" had stood
for the best in motor lubri-
cants and oils for scores of
other purposes.

GAY OIL CO.

LITTLE ROCK MEMPHIS

Service and Distributing

Stations in All Parts of the State

CONTRACT LET FOR BIG LAKE BRIDGE.

The contract for the rebuilding the B. M. & L. hard road district bridge over Big Lake, to replace the one now inadequate and in bad repair, has been awarded by the State highway commissioner and engineers, J. F. Mullens of Pine Bluff being the lowest bidder, his price being \$32,000.

Work is to commence on the construction as soon as the materials arrive. The contract calls for the work to be completed within one hundred days.

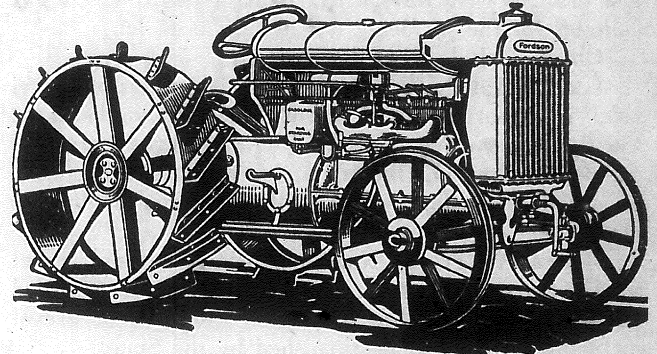
The bridge is to be a two-way structure, the highest type known for a wooden structure. The commissioners preferred a steel structure, but the price was prohibitive. The contractor obligates himself to keep traffic open during the construction, the majority of the work to be done at night, thus the public will not be inconvenienced by the old bridge being out of commission during construction.

A. S. Madding, former city engineer of Blytheville, will be the engineer in charge of construction, acting for the road commissioners, which means the work will be up to specifications.

The building of this two-way bridge on this important concrete highway, means much to the people using the highway, and to the towns served by the highway.—

Mississippi County Leader.

SEE US FOR
TRUCKS & TRACTORS
FOR ROAD WORK



**SHOEMAKER-BALE
AUTO CO.**

*Oldest and Largest Ford Dealers in
This Territory*
601-607 W. MARKHAM LITTLE ROCK, ARK.

Voss-Hutton Co.

Wholesale Distributors

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Garage Equipment**

214-16-18-20 W. Fourth St.

Long Distance Phone

4-0433, 4-0434

NEW WORK IN PROGRESS.

Among the new contracts recently awarded by the State Highway Commission is the Montrose-Hamburg Road, Federal Aid Project No. 231-A, consisting of 7.953 miles of gravel construction west of Montrose. R. J. Lynch of Little Rock was the low bidder on grading and drainage structures, for a total of \$21,138.67. The contract for the surfacing has not yet been let.

Others include the following:

Federal Aid Project No. 195-A, 6.893 miles of gravel road in Monroe county from Blackton southeast to Phillips county line, awarded to E. L. Terry and Company of Wilburton, Oklahoma, for \$34,324.94 exclusive of gravel surfacing, which will be furnished by the State.

Federal Aid Project No. 190-C, 10.376 miles of gravel road in Lee county between Moro and Wheatley. Awarded to Gaster & Howell for \$65,348.89 exclusive of gravel surfacing, which will be furnished by the State.

Federal Aid Project No. 219-A, 7.225 miles of gravel road in Woodruff county between McCrory and the Cross county line, awarded to E. L. Terry & Company, Wilburton, Oklahoma, for \$42,556.75, exclusive of gravel surfacing, which will be furnished by the State.

Nurse: "And did you enjoy Sunday School?"

Bobbie: "I was just going to when the teacher saw me."

Prompt Shipment on Contractors' and Road Builders' Equipment

Terms to Responsible Contractors

Advance-Rumely Tractors	J. T. Crawler Tractors
Fuller & Johnson Engines	Hercules Stump Pullers
Clyde Hoisting Engines and Derricks	Rex Mixers and Pavers
Schramm Compressors	Chuteing Equipment
Sand and Gravel pumps	Concrete Carts and Wheelbarrows
Baker-Maney Self-Loading Wheel Scrapers	American Wire Rope
	Northwest Cranes
	Shovels and Draglines
	Maintenance Equipment

The Blaw-Knox Lines

Road Forms	Batcher Plants
Truck Turntables	Clam Shell Buckets
Steel Bins	Steel Buildings

Write or Wire for Catalog and Information

Joe Lyons Machinery Co.

112 N. Louisiana St. (Marion Hotel Bldg.)
LITTLE ROCK, ARK.

ADVERTISERS EXHIBIT AT FAIR.

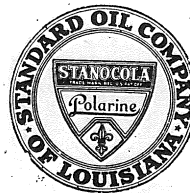
Several of *Arkansas Highways'* regular advertisers were represented by interesting exhibits at the Arkansas State Fair, October 12-20, among them being the Austin-Western Road Machinery Company, the Russell Grader Company and the Voss-Hutton Company.

Both the Austin-Western and the Russell Companies gave demonstrations of their newly-perfected one-man patrol graders, which proved of much interest. The Voss-Hutton Company had a large radio exhibit.

Some nice road work is being done on the Des Arc-Hazen road between Des Arc and the H. E. Bard plantation, four miles west of town. The State highway department is doing the grading and other work which is under the able supervision of Mr. Ed Screeton. Mayor T. E. Atkins is looking after the rock hauling and has a number of trucks and wagons on the job.—*Des Arc Advocate*.

Roads to State Institutions.

Monticello to Agricultural school, 3; Pine Bluff to Boys' Industrial School, 3; Pine Bluff to Negro Boys' Industrial School, 4; Jacksonville to Women's State Farm, 4; Little Rock-Hot Springs road to Training School for Girls, 2; Booneville to Tuberculosis Sanatorium, 6; Little Rock-Hot Springs road to Negro Tuberculosis Sanatorium at Alexander, 3.



"Better Stick to the Standard"

Stanocola Polarine

The "Standard" Motor Oil
and

Stanocola Gasoline

The "Standard" Motor Fuel

are the two Motor necessities so essential to the efficient operation of your Automobile or Motor Truck—Look for the dealer displaying Stanocola signs and call for Stanocola Polarine or Stanocola Gasoline by name.

ASPHALT

The Standard Oil Company of Louisiana, with its modern Refinery at Baton Rouge, is the largest manufacturer of Asphalt and Asphaltum products in the South.

Asphalt and good roads are synonymous, and you will find it used on better Highways from Maine to California and from Canada to the Gulf of Mexico.

STANDARD OIL CO. OF LOUISIANA

New Orleans, Louisiana.

A PRAYER.

We thank Thee for this place in which we dwell; for the love that unites us; for the peace accorded us this day; for the hope with which we expect the morrow; for the health, the work, the food, and the bright skies that make our lives delightful; for our friends in all parts of the earth.

Give us courage and gaiety and the quiet mind.
Spare to us our friends, soften to us our enemies.

Bless us, if it may be, in all our innocent endeavors. If it may not, give us the strength to encounter that which is to come, that we be brave in peril, constant in tribulation, temperate in wrath, and in all changes of fortune, and down to the gates of death, loyal and loving to one another.—*Robert Louis Stevenson.*

Many persons who felt that Arkansas was going a little too strong when she fixed the gasoline tax at four cents in 1923, the highest gas tax in the country, have been surprised and relieved at the subsequent progress of other states. A recent and significant action is that of the Utah legislature, just adjourned, which raised the Utah tax from 2½ cents to 3½ cents per gallon. Everywhere the gas tax is coming to be recognized as the only just and fair method of taxation for the maintenance of highways.

Of all inventions, with the exceptions of the alphabet and the printing press, those which abridge distances have done the most for mankind.—*Macaulay.*

P. F. CONNELLY PAVING COMPANY

Builders of

ROADS STREETS SEWERS WATERWORKS

We Specialize in

Asphalt Penetration and Carpet Coat Roads

Phone 4-1660 922 So. Trust Bldg.

Little Rock, Ark.

STEEL

FOR BRIDGES AND BUILDINGS

REINFORCING BARS

Over 500 tons in stock for immediate shipment.

"One Piece or a Carload"

Arkansas Foundry Company

1500 E. 6th St.

Little Rock, Ark.

*"We Can Repair or Duplicate any Piece of
Road Machinery"*

CROW CREEK GRAVEL COMPANY



High grade sharp sand,
washed and screened

Washed binder gravel

Road surface gravel our
specialty

Write or wire us for prices



Madison, Ark.

Phone 919F2-3

PRESS COMMENTS

Frank McGregor, well known barber at the O. K. shop of Tom Whitworth, who has spent two months at Hot Springs taking the baths for a malarial infection, returned the last of the week feeling like himself again. He says the Springs have enjoyed the biggest season in years, the new hard road being given much of the credit for this stimulus. Two miles out of the city someone has built a large, well apportioned tourist camp, equipped with all modern conveniences, including electric

lights, where a small charge is made for the care of tourists, and he says this has done much and will continue to bring tourists that way, who can have the benefits of the springs without the cost of hotel life.—*Blytheville Leader.*

It is estimated that it costs two cents a mile more to operate a motor vehicle on an unimproved road than it does on an improved road. If you have a turn for figures, calculate the amount Arkansas is spending this year on unimproved roads. This two cents does not include wear and tear on vehicle or time lost by reason of slow progress on the unimproved road. Some statistical fiend has estimated this at five cents a mile more than on a good road. Add the two together, and you can readily see that the unimproved road is costing more than is being spent on road improvement. And the tragedy of the cost of the unimproved road is that you have nothing for your money.—*Monroe County Citizen.*

Herbert R. Wilson, State highway commissioner, R. H. Wolfe, a member of the Board, and Messrs. Reynolds and Limerick, highway engineers, were in Wilmot Tuesday, looking after matters pertaining to the erection of the Bayou Bartholomew bridge, which will be erected soon.—*Wilmot Weekly.*

Southern Material & Construction Co.

624-27 Southern Trust Bldg. Little Rock, Arkansas.

When you employ this firm to build your streets and highways, you get the services of an experienced organization owning more construction equipment than any other Arkansas firm of contractors.

We own and operate the largest sand producing plant in the state, furnishing Arkansas river, washed, channel sand exclusively.

A combination of the material production with the construction business means an ultimate economy to the purchaser.

- A. C. BUTTERWORTH, President. CHAS H. MILLER, Vice President. J. A. GREGORY, Vice President. R. S. WILSON, Secretary and Treasurer.

TUCKER SAND AND GRAVEL CO.

Benton, Arkansas

WASHED AND SIZED GRAVEL CONCRETE SAND AND CONCRETE MIX

We furnished Sand and Gravel for the construction of 26 miles of the Little Rock-Hot Springs Highway.

Phone GUNNELS COMPANY-LITTLE ROCK

6116

Tires, Tubes, Accessories Painting and Upholstering

ROAD SERVICE

Yes, we are going to have some more good roads in Clark county, and they are important roads, too. The one that the people of this county are most interested in is the road from Okolona to the steel bridge across the Little Missouri river, where the Bankhead highway crosses between Arkadelphia and Prescott. This road, from Okolona to the bridge, has already been added to the State highway system, and that means that it will soon be constructed, and that it will be a first class road, similar to the road that we now have from Okolona to Arkadelphia.

And think about it. When this road is completed we will have the finest 60-mile drive of any single county in all Arkansas. Go from Okolona to the bridge—from the bridge to Bierne—from Bierne to Gurdon—from Gurdon to Smithton—from Smithton to Curtis—from Curtis to Richwoods—from Richwoods to Arkadelphia—from Arkadelphia to Boswell, and from Boswell back to Okolona.

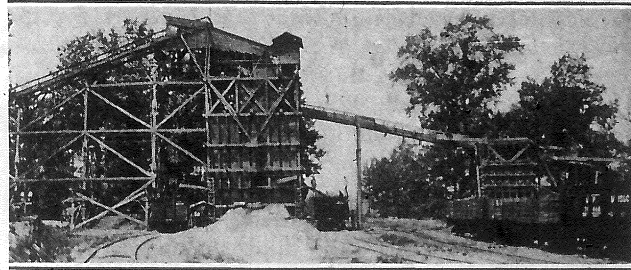
Sixty miles without changing the gear in your car—sixty miles through and by the richest farms in southwest Arkansas. Sixty miles provided with numerous drive-in service stations, and passing through a half dozen splendid towns and cities.

Is this not enough for Clark county to be proud of? Hurrah for Herbert Wilson and John McMillan.

—Okolona Messenger.

Ball-Benton Gravel Company

821 Southern Trust Bldg. Little Rock, Ark.



Plant: Benton, Ark.

REAL GRAVEL— FOR HIGHWAYS—FOR RAILROAD BALLAST —FOR CONCRETE CONSTRUCTION

Our road clay gravel, weighing 3,000 pounds per yard, is best by every test for road building purposes. Our capacity is from 50 to 60 cars per day, as a result of our separate road gravel loading organization using Bucyrus "70-C" shovels and Baldwin 50-ton locomotives.

Our capacity for washed ballast, washed concrete gravel or washed sand is from 60 to 70 cars per 12-hour shift.

Our service to road districts, railroad projects and large construction jobs is of proven dependability.

Call us over Telephone 4-3788 or Long Distance 133, Little Rock, or Benton 93, for quick action.

J. J. BALL, President
CHAS. M. KING, Secretary

W. D. CAMMACK,
Vice President & Treas.

Regardless of the Material You Select or the Price You Pay, There Is No Better Material Than

AMIESITE

**THE PERMANENT PAVEMENT MATERIAL
FOR REPAIR, MAINTENANCE AND CONSTRUCTION**

THERE ARE thousands of miles of old brick, Belgian block, asphalt, concrete and water bound macadam pavement in both city and country that can be saved for almost indefinite use by resurfacing with a proper resurfacing material.

Amiesite is an ideal resurfacing material for all types of worn-out pavements. Coming to the job ready mixed, in carload lots, for cold application, there is no job too small or too large. Forks, bars, truck and roller are the only equipment needed for construction of a permanent pavement.

Write to the Amiesite Asphalt Company for further data and for location of nearest mixing plant.

AMIESITE ASPHALT COMPANY

E. J. McINERNEY, G. M.
Company Office

814 Boyle Bldg.

Little Rock, Arkansas

PRESS COMMENTS

Machinery has been unloaded at Newport for the construction of 10 miles of road from Newport to Coffeeville, to which point the state highway has been completed from Bradford. When constructed, it will complete the gap in the state highway south to Little Rock. State Highway Commissioner Wilson has announced the work will be completed in 90 days. Newport recently raised \$10,000 in cash, as required by the commissioner to receive federal aid. The approximate cost will be \$93,000. The right of way has been cleared and follows the west side of the Missouri Pacific railroad the entire distance south of White river.—*Newark Journal.*

Mr. and Mrs. J. F. Carson were among the large number of Yellville people who attended religious services at Wild Cat last Sunday, and report a large crowd and appropriate services. Mr. Carson in speaking of the trip and roads, said the dragging of the highway between Yellville and Flippin had put it in fine condition. He also stated that the road built north out of Flippin toward Oakland by Overseers Rex McCracken and Dump Parker is as fine a piece of road as can be found in the county, almost, and that as soon as completed to Oakland, that that town will be added as a suburb of Yellville, as it will be only a few minutes' drive.—*Yellville Mountain-Echo.*

"Look for the Mo-Mile Sign"



More Miles Per Gallon

Others Claim it--
We Guarantee it!

E. R. Russell Oil Co.
Little Rock, Arkansas

HERMITAGE PORTLAND CEMENT SAND-GRAVEL-STONE

TRUSCON
STEEL
ROAD
MESH

*Our facilities for supplying
road building materials
are unexcelled*

CAREY'S
ELASTITE
EXPANSION
JOINT

FISCHER LIME and
CEMENT Co.

MEMPHIS

S. G. Adams Stamp & Stationery Co.

ST. LOUIS, MO.

Manufacturers of

ROAD MARKERS AND ROAD SIGNS—METAL
TAGS—EMPLOYEES' IDENTIFICATION BADGES
—RUBBER STAMPS — SEALS — STENCILS—
AUTO LICENSE PLATES, ETC.

A. G. LORENZ, Selling Agent

2419 Battery St.

Phone 4-6558

LITTLE ROCK, ARK.

Write for Catalog.

Rapid progress is being made on the hard surfaced road out of Marianna. With favorable weather conditions, the major portion of the work will be completed by November 1. Perdue & Co. are completing this section from Bonner's store to Moro and have taken over the contract for the construction from Fulton to Haynes.—*Helena World*.

Arkansas is on its way to be out of the mud in the winter months and out of the sand in the summer months, if the State Highway Department continues its work with the same intensity that it has within the past year and a half.—*Mansfield Messenger*.

BIG ROCK STONE CO.

OFFICE: 111 Center Street,
LITTLE ROCK, ARK.

Capacity 50 Carloads Daily

FAMOUS BLUE TRAP ROCK

All sizes of Crushed Stone, Rip-Rap and Sand—Best material produced in the South for Macadam, Concrete and Reinforced Concrete construction.

Write for prices and full information.

DIXIE CULVERT MANUFACTURING CO.

ARMCO CULVERTS

Look Under Your Roads for the Proof

there can be--there is only one
"PURE IRON" for Culverts

In almost every State and in Canada there are many ARMCO Culverts that have been in use from 10 to 18 years. Can other culverts claim as much?

There can be *only one* purest and most uniform iron made for culverts. The chemist, the metallurgist, the microscope ALL say this is genuine ARMCO Ingot Iron and NO OTHER. In every other culvert metal impurities are either purposely left in or purposely added.

In ARMCO Ingot Iron the Microscope shows a *uniform* ferrite grain structure—a solid, unbroken wall against corrosion.

If you want corrugated culverts exactly like those which have definitely established the economy of this construction during the past 18 years you will look for the Blue Triangle Trademark. They can be found under NO OTHER BRAND.

"ALWAYS AT HOME"

DIXIE CULVERT MANUFACTURING CO.

Armco Ingot Iron Culvert Pipe
Calco Automatic Drainage Gates
Armco Ingot Iron Tanks

Welded Gas and Oil Tanks

LITTLE ROCK,
ARKANSAS

Smith Concrete Mixers and Pavers
Great Western Slips
Plows, Wheelers and Fresnos

Page Hy-Way Guard

A MILE OF CONCRETE ROAD.

While the cost of concrete roadways varies with the locality and the pavement design, an average of \$30,000 a mile is often given for an eighteen foot pavement seven inches thick. Several thousand dollars fluctuation either way in the price would not be unreasonable, depending upon the locality in which paving is done.

For this sum the community gets nearly 2 1/4 acres of pavement containing 2,000 cubic yards of mixed concrete. This calls for 3,400 barrels of portland cement or seventeen carloads. It calls also for 1,100 cubic yards of sand, equalling thirty-two carloads. It calls likewise for 1,600 cubic yards of crushed stone, which is forty-six carloads. Into this mixture will have to be poured 300,000 gallons of water, which is thirty-eight tank carloads. The total weight of this concrete would then approximate 4,000 tons.

Requirements Are Huge.

Before the cement could be delivered 400 pounds of dynamite would be required to blast the rock which went into it. The fuel necessary to burn the rock would total 340 tons of coal, or its equivalent in oil or gas. While cement requirements are commonly measured by the barrel, it is usually delivered in sacks holding a cubic foot each. And 13,600 such sacks would be required for the cement in the mile of road. Thirteen bales of cotton would be needed for these. Into the cement would go nineteen tons of gypsum, which is necessary to regulate its time of setting.

Except for the great improvements in methods of building concrete roads developed during the last 15 year, converting this great mass of materials into pavements at the rate needed would be impossible. Where once a two-mile job was considered big, contracts are now largely let in 10 and 20 mile stretches. During 1924, Illinois alone completed more than 1200 miles of concrete highways.—*Michigan Roads and Pavements.*

Not more than "45 minutes from Broadway" a concrete crew was laying a road through a New York village recently, and in front of the home of an observant old lady the reinforcing steel mesh was being put in place. The placing of the wire mesh greatly impressed her.

Later in the day the old lady, discussing the new pavement with one of the village trustees, said:

"Now I know why concrete pavements are so easy to ride on. This morning I watched them lay the bed springs in the concrete."—*Highway Engineer and Contractor.*

Here's a little matter, a bit of carelessness, that local pride, if we have such a thing, should correct: The evil practice of dumping all manner of rubbish, trash and refuse along and adjacent to the highway. It is an unsightly, unclean and unnecessary thing to do. Arkansas is now spending vast sums of money trying to build up and beautify our highways and every citizen should do his part, not only in the matter of paying his highway and road tax, but in helping keep the highways attractive.

—*Cotter Record.*

Why Keep On Paying This Tax?

Everybody expects to pay some taxes, but why impose unnecessary taxes on yourself?

Do you realize that every time you drive your car on an unpaved highway you are actually taxing yourself one to four cents a mile?

This is the cost of increased repair, tire and gasoline bills.

Highway research has definitely established these facts.

Each year you tax yourself in this way a good many dollars.

Instead of spending this money for increased transportation costs, why not invest it in Concrete Highways and pay yourself some dividends?

Concrete Roads and Streets pay for themselves in the saving they effect on the cost of motoring.

Their maintenance cost is so low that this saving alone returns good dividends on the investment, year after year.

You are imposing an unnecessary tax on yourself from which you get no return, by failing to work for more Concrete Highways.

Not in a long time have general conditions been so favorable for carrying on such public work as permanent highway building.

Your highway authorities are ready to carry on their share of this great public work. But they must have your support.

Tell them you are ready to invest in more Concrete Highways, now.

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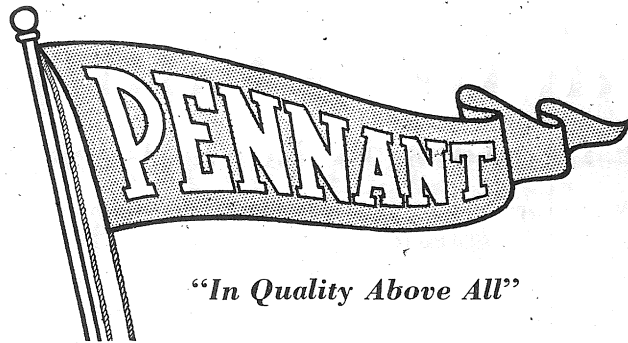


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A MILE OF CONCRETE ROAD.

While the cost of concrete roadways varies with the locality and the pavement design, an average of \$30,000 a mile is often given for an eighteen foot pavement seven inches thick. Several thousand dollars fluctuation either way in the price would not be unreasonable, depending upon the locality in which paving is done.

For this sum the community gets nearly 2 1-4 acres of pavement containing 2,000 cubic yards of mixed concrete. This calls for 3,400 barrels of portland cement or seventeen carloads. It calls also for 1,100 cubic yards of sand, equalling thirty-two carloads. It calls likewise for 1,600 cubic yards of crushed stone, which is forty-six carloads. Into this mixture will have to be poured 300,000 gallons of water, which is thirty-eight tank carloads. The total weight of this concrete would then approximate 4,000 tons.

Requirements Are Huge.

Before the cement could be delivered 400 pounds of dynamite would be required to blast the rock which went into it. The fuel necessary to burn the rock would total 340 tons of coal, or its equivalent in oil or gas. While cement requirements are commonly measured by the barrel, it is usually delivered in sacks holding a cubic foot each. And 13,600 such sacks would be required for the cement in the mile of road. Thirteen bales of cotton would be needed for these. Into the cement would go nineteen tons of gypsum, which is necessary to regulate its time of setting.

Except for the great improvements in methods of building concrete roads developed during the last 15 year, converting this great mass of materials into pavements at the rate needed would be impossible. Where once a two-mile job was considered big, contracts are now largely let in 10 and 20 mile stretches. During 1924, Illinois alone completed more than 1200 miles of concrete highways.—*Michigan Roads and Pavements.*

Not more than "45 minutes from Broadway" a concrete crew was laying a road through a New York village recently, and in front of the home of an observant old lady the reinforcing steel mesh was being put in place. The placing of the wire mesh greatly impressed her.

Later in the day the old lady, discussing the new pavement with one of the village trustees, said:

"Now I know why concrete pavements are so easy to ride on. This morning I watched them lay the bed springs in the concrete."—*Highway Engineer and Contractor.*

Here's a little matter, a bit of carelessness, that local pride, if we have such a thing, should correct: The evil practice of dumping all manner of rubbish, trash and refuse along and adjacent to the highway. It is an unsightly, unclean and unnecessary thing to do. Arkansas is now spending vast sums of money trying to build up and beautify our highways and every citizen should do his part, not only in the matter of paying his highway and road tax, but in helping keep the highways attractive.

—*Cotter Record.*

Why Keep On Paying This Tax?

Everybody expects to pay some taxes, but why impose unnecessary taxes on yourself?

Do you realize that every time you drive your car on an unpaved highway you are actually taxing yourself one to four cents a mile?

This is the cost of increased repair, tire and gasoline bills.

Highway research has definitely established these facts.

Each year you tax yourself in this way a good many dollars.

Instead of spending this money for increased transportation costs, why not invest it in Concrete Highways and pay yourself some dividends?

Concrete Roads and Streets pay for themselves in the saving they effect on the cost of motoring.

Their maintenance cost is so low that this saving alone returns good dividends on the investment, year after year.

You are imposing an unnecessary tax on yourself from which you get no return, by failing to work for more Concrete Highways.

Not in a long time have general conditions been so favorable for carrying on such public work as permanent highway building.

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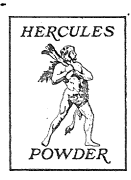
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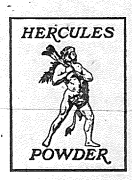
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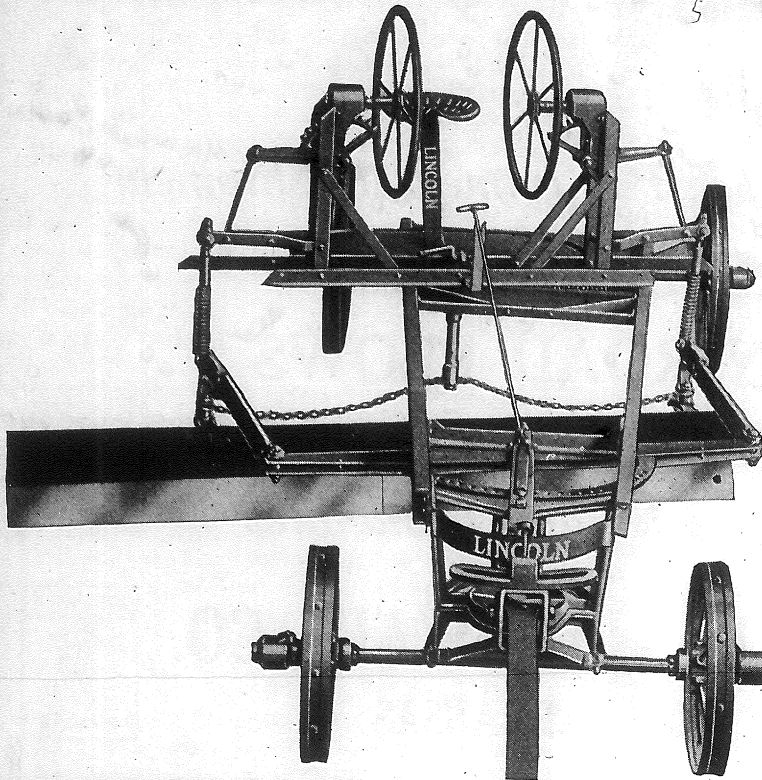
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