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U. S. DEPARTMENT OF AGRICULTURE.

OFFICE OF ROAD INQUIRY.

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PROCEEDINGS

OF THE

GOOD ROADS CONVENTION OF TEXAS,

HELD AT

TURNER'S HALL, IN HOUSTON, TEXAS,  
FEBRUARY 19, 1895.



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1895.



BULLETIN No. 15.

U. S. DEPARTMENT OF AGRICULTURE,  
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## LETTER OF TRANSMITTAL.

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UNITED STATES DEPARTMENT OF AGRICULTURE,  
OFFICE OF ROAD INQUIRY,  
*Washington, D. C., April 1, 1895.*

SIR: I have the honor to transmit the proceedings of the first good roads convention held in Texas. The addresses made at this convention contain much valuable practical information on road construction under varying conditions, and I recommend the publication of these proceedings as Bulletin No. 15 of this office.

Very respectfully,

ROY STONE,  
*Special Agent and Engineer.*

Hon. J. STERLING MORTON,  
*Secretary of Agriculture.*

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# GOOD ROADS CONVENTION OF TEXAS.

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## MORNING SESSION.

The good roads convention called to meet in Houston by Capt. J. S. Daugherty, member from Texas of the central committee of the National Good Roads Association, assembled at Turner Hall at 10 o'clock, February 19, 1895.

The meeting was called to order by Captain Daugherty, who then read his address as follows:

### ADDRESS OF CAPTAIN J. S. DAUGHERTY.

GENTLEMEN AND FELLOW-CITIZENS OF TEXAS: To each epoch in the progress of civilization is given a live question to solve. The great question of the nineteenth century is that of annihilating space by improved methods in the transmission of thought and power and the transportation of material. By means of the telegraph and cable all portions of the earth are brought in hailing distance of each other, so that if the pantry is short of any kind of food on any part of the globe, and there is money with which to buy, it is only necessary to touch the electric keys and from the reserve centers move off train and ocean steamer loads to supply the desired need. Whether these reserve centers are along the rivers and upon the broad plains of Russia, India, and South America, or upon the fertile valleys and expansive plains of our own country, depends upon the cost, other things being equal, at which the commodity can be laid down at the point of consumption. The cost of production depends upon climatic conditions, fertility of soil, the use of machinery, the quality of seed, methods in production, methods in preparing for market, mediums of exchange, and transportation facilities.

And we are here to-day to consider the most important of these: How to improve our transportation facilities. The people of the United States have expended about \$10,000,000,000 in railway construction. The Government has been annually spending millions of dollars upon its waterways and harbors, and notwithstanding this we find our commodities being driven from the world's markets by foreign competition. And you hear from one class of economists, coming up from all over the land, the cry, "Cut down your cotton crop and produce what you consume at home." To cut down production is to retire before competition and permit our opposition to develop and permanently plant their industries and exclude us from the market for all time; be forced to put a permanent restraint upon our desires and live more economically, while other people, who improve their soil, their seed, their machinery, their methods of production and marketing, their mediums of exchange and transportation facilities, revel in the lap of plenty and lead the vanguard of civilization. To cut down our cotton crop and produce what we consume at home in the South is to close the South to the West as a market, to cut down the volume of traffic of our railways, and multiply their bankruptcies. When cotton was \$50 per bale the trans-



portation charge from North Texas to the Gulf was \$3.50 per bale, or 7 per cent of its value. When it is \$25 per bale the transportation charges are still \$3.50 per bale, or 14 per cent of its value. To cut down the present charges is to bankrupt the railways; to continue them is to bankrupt the farmers or revolutionize the industries of the country. The only safe rule that the farmer can present in cutting down his production in any crop is whether he can make more money at something else, and when this is brought about by foreign competition it means that the prosperity of the industrials of our country is seeking a lower level. We must look for relief in some other quarter, and let us see what assistance good public roads will give us.

It is estimated by the secretary of the National Farmers' Congress that the wagon transportation of the country amounts annually to 500,000,000 tons; that this has to be moved an average distance of eight miles; that it costs an average of \$2 per ton to move it; that this is 60 per cent more than it would cost to move it if we had good roads all over the country, or an extra cost in production and marketing of our agricultural products of \$600,000,000. And when we consider that the total annual value of all agricultural products is but \$2,500,000,000, we see that practically one-fourth of the home value of all our farm products is lost by bad roads—25 per cent. Is it any wonder that, when we consider this in connection with other causes, we should be driven from the world's markets by foreign competition? Take for illustration the cotton crop of Texas—and it takes less expense for road transportation to market it than any other commodity of equal value—and let us see. There are 750,000 tons of lint and 1,500,000 tons of seed, making 2,250,000 tons, which at \$2 per ton equals \$4,500,000, which is 60 per cent more than it should; or, with good roads, we could save \$2,700,000 in the cost of wagon transportation. This would pay an annual interest on \$54,000,000 of 5 per cent bonds. This money expended in roads at \$1,280 per mile—and I think it will be shown before the adjournment of this convention that by adopting proper methods good roads can be built at a cost not exceeding \$1,280 per mile—would build, in round numbers, 42,000 miles of road, or if it were decided to keep out of debt and pursue the slower method, would build annually 2,100 miles of good roads.

In 1892 Gen. Roy Stone, Dr. Ripley, and Mr. Gillender, of New York City, having studied the public road question and being inspired with patriotic motives, took advantage of the gathering of the people at Chicago at the dedicatory services of the great World's Columbian Exposition to call a mass convention for the purpose of starting a movement to promote the building of good roads. At this mass convention there was formed what was known as the temporary organization of the National League for Good Roads. This organization held a meeting in Washington, D. C., January 17 and 18, 1893, and petitioned Congress to make an appropriation of \$50,000 to make a proper display of roadmaking machinery and to illustrate the methods of road construction during the World's Fair, and to attach to the Agricultural Department the Office of Road Inquiry, the object of which is to collect, compile, and disseminate information as to the best material and most economical methods to be adopted in building good roads. These views have been adopted by the National Government, and for the purpose of propagating the movement and comparing experiences there was held at Asbury Park, N. J., July 5 and 6, 1894, a National Road Conference, composed of delegates from the different States of the Union. This conference has a central committee, of which I am one, constituted in the following manner:

UNITED STATES DEPARTMENT OF AGRICULTURE,  
OFFICE OF ROAD INQUIRY,  
*Washington, D. C., October 15, 1894.*

SIR: In response to a letter addressed to the governor of your State, a copy of which is inclosed, you have been named by him, and confirmed by the central committee of the National Road Conference (of which Governor Fuller, of Vermont, is chairman) as the member of that committee from your State.

Trusting that you will accept the duty, if you have not already done so, I take pleasure in sending you the publications of this office. Will you look them over, select such as you approve for your locality, and let me know what number you can use?

I shall be glad to hear from you, with any suggestions you may make for the prosecution of the work.

Very respectfully,

ROY STONE,  
*Special Agent and Engineer.*

[Inclosure.]

OCTOBER 12, 1894.

I am requested by the central committee appointed by the National Road Conference recently held at Asbury Park, N. J., to communicate with your excellency, and ask you to name a gentleman in your State who is active in the movement for good roads, and who will cooperate with said committee in distributing road improvement literature furnished by the United States Government and in promoting the successful assemblage of a National Good Roads Conference in 1895.

I have the honor to be, very respectfully, yours,

ROY STONE,  
*Special Agent and Engineer.*

Acting on this authority, I issued the following call, and forwarded copies of it to the Houston Post, Galveston and Dallas News, the San Antonio Express, and the Fort Worth Gazette, and requested the newspapers of the State generally to give publicity to the call. I mailed copies of the call to prominent men in different portions of the State, and requested them to be present and contribute to the success of the movement. I invited Gen. Roy Stone, special agent of the United States Agricultural Department of Road Inquiry, who is here. I obtained a one-fare rate to delegates to the convention from all the leading railways of the State. I mailed copies of the call to every county judge in the State, and I followed up the call with the following circular, giving extracts from the unpublished report of Prof. J. A. Holmes, State geologist of North Carolina, on the use of convict labor in that State.

#### CIRCULAR.

Prof. J. A. Holmes, State geologist of North Carolina, in his annual report, not yet published, on the use of convict labor in road improvement, says:

"The use of convicts on public roads has been so intimately connected with the growth of the movement in North Carolina that it deserves some special mention in this connection. Even prior to the first adoption of the Mecklenburg road law the general assembly of the State had made provision (1867, 1873, 1875, 1877, 1879, and later in 1889) for the use of convicts in case any county should desire it. But little was done in this direction, however, until the work was begun in Mecklenburg County. From that day down to the present the use of convicts has been an essential feature in Mecklenburg and in the majority of counties of North Carolina which have joined in the movement. Indeed, this use of convicts has, in the majority of cases, been the most important factor in deciding these counties to vote a tax for the improvement of the public roads. And the result of the experiment in this State has been altogether favorable to the system, both in point of efficiency and economy and in the health of the convicts.

"The returns from eighty counties in the State show that the average cost of convicts when they are confined in the county jail is a little more than 30 cents per day, whereas the average cost per day per convict, including feeding, clothing, medical attention and guarding, when they are employed on the public roads is as follows in several of the more prominent counties: Mecklenburg, using 80 convicts, 20 to 22 cents per day; Wake, 57 convicts, 20½ cents per day; Durham, 40 to 50 convicts, 17 to 20 cents per day; Cabarrus, 20 convicts, 42 to 45 cents per day; Buncombe, 65 convicts, 35 cents per day; Alamance, 22 cents per day; Davidson, 20 cents per day; Forsyth, 25 cents per day, and Lenoir, using from 10 to 15 convicts, 15 cents per day—a general average of 24 cents.

"In the case last mentioned (Lenoir) only short-term convicts are employed. These are carefully described and photographed; they are offered certain inducements in the way of reward or shortening of terms if they remain at their posts and faithfully discharge their duties. And with this they are employed on the public roads very much as hired labor would be, under the control of a superintendent or foreman, but without any guard, and they are allowed to remain at their homes from Saturday night to Monday morning. This novel experiment has been in operation for a year, and not a convict has attempted to escape or declined to labor faithfully, and the result has been a decided improvement in public roads.

"An examination of the records of all the counties that are using convict labor on the public roads show that but few convicts have escaped; that the health of the convicts has been much better when at work on the road than when formerly imprisoned in the jail; that their labor has proved much more efficient than that which can be employed in the country at ordinary prices of 50 to 75 cents per day, and that, as these figures show, it not only costs less to use the convicts on the public roads than it does to employ hired labor, but that furthermore it costs less to maintain these convicts when at work on public roads than when confined in the county jail."

From this report it appears that North Carolina is building her macadamized roads and getting them and an average of 6 cents per day on each convict more than she would receive if she permitted the convicts to remain in jail and do nothing.

Commercial Agent Loomis, stationed at St. Étienne, France, says:

"The road system of France has been of far greater value to the country as a means of raising the value of lands and of putting the small peasant proprietors in easy communications with their markets than have the railways. It is the opinion of well-informed Frenchmen who have made a practical study of economic problems that the superb roads of France have been one of the most steady and potent contributors to the material and marvelous financial elasticity of the country. The far-reaching and splendidly maintained road system has distinctly favored the success of the small landed proprietors, and in their prosperity and the ensuing distribution of wealth lies the key to the secret of the wonderful financial vitality and solid prosperity of the French nation."

Would you secure for your State like comforts and prosperity? If you would, then aid me to secure a successful road convention at Houston, on February 19, 1895, one whose action will be taken as the voice of the people of the State. There is no public fund out of which to pay expenses, therefore whatever expense is incurred is a contribution to the public on the part of the citizen who does it.

And by prompt, unanimous, and effective action we should cut down the expense and secure the enactment of a road law that will place the movement on a basis that will enable self-interest, on an equitable plan, to work out the desired end—good roads. Consider this communication as a personal appeal to you as a patriotic Texan to do your part. All the principal railroads of the State have made a rate of one fare for the round trip to delegates attending the convention.

J. S. DAUGHERTY,

*Member for Texas of the Central Committee of the National Road Conference.*

This circular I mailed to every county judge and newspaper in the State and to the members of the legislature, as well as many prominent citizens of the State. I invited the chairman of the road committee of the house of the Texas legislature to be present and take part in the proceedings of the convention, and fearing that sufficient interest might not be taken in the subject by the commissioners' courts of the State, I telegraphed the presidents of the commercial clubs and boards of trade of Galveston, Dallas, and Fort Worth, and a prominent and enterprising citizen of San Antonio, and called on the president of the Cotton Exchange of Houston, and requested them all to appoint representative delegations to attend this convention. The result is before you, and the first thing in order is the nomination and election of a temporary chairman.

At the conclusion of the address Judge Robson, of Fayette County, was chosen temporary chairman. In accepting the chair Judge Robson said it was the second time he had been chosen to preside over a good roads convention in the city of Houston. He spoke of the need and advantages of good roads, and especially of the social advantages which would be secured to the people of the rural districts. The black lands of Texas, he said, kept the country people apart and prevented that sort of free social intercourse which is so conducive to the mental and physical well-being and happiness and prosperity of the people. Good roads would enable them to mingle more freely and greatly enhance the pleasures and attractiveness of farm life.

Mr. H. G. Lidstone was unanimously chosen secretary.

At the suggestion of Mr. Leo N. Levi, of Galveston, General Stone was asked to address the convention.

General Stone spoke briefly of the progress of road construction in other States, and said Texas has made less headway than any other State in this direction. This was probably due in some measure to the fact that Texas is such a big State that it takes a long while to get the people stirred up. He spoke of the progress in Massachusetts, where the State had taken hold of the matter of providing good roads by contract labor; in North Carolina, where the work was being done by convicts, and in many other States where the counties were constructing roads on their own account. In New Jersey the farmers had been aroused. Kentucky, he said, had made more progress than any other State in the extent of its good roads system, having begun away back in Jackson's time. When these are provided the people are prosperous, and realize the great advantages that have accrued to them in the improved and less expensive system of travel and traffic over good hard roads, and have found that the cost of securing such roads was a mere bagatelle. Texas reminded him of France in everything except in her roads. In France it is considered a patent of nobility to be a farmer, and the man who lives in town is hopeful of making enough money to enable him to live in the country, as country life is considered so much more desirable. It might be so in this country. He suggested some matters for reference to committees, among which were the following:

To change highway taxation from the working out to the money system. This plan had been tried elsewhere and had proved entirely successful.

The best means of using county prisoners on the roads.

Hiring State convicts to the counties and the use of convicts by the State itself.

Management of road building, how it shall be ordered and directed.

Width of wagon tires, the regulation of which has been undertaken in several of the States.

He read extracts from the message of Governor Markham to the legislature of California in reference to the importance of good roads, and spoke of the progress being made in that State where road building is done by districts.

The chairman suggested that it would be well to have a list of the delegates by which he might be governed in the appointment of committees.

Captain Daugherty moved that all present be invited to participate in the deliberations, and the following names were handed to the secretary:

J. P. Hall, county judge of Cooke County; J. H. Fowler, Nolan County; J. B. Hine, W. H. Carth, Harris County; W. E. Copeland, Rockdale, Milam County; Charles Dupree, Harris County; George E.

Ollard, Cypress Top, Harris County; E. Moskowitz, Harris County; W. A. Polk, county surveyor of Harris County; C. S. Penfield, J. S. Swope, H. D. Gohlman, H. E. Fuller, Harris County; R. C. Patterson, Omaha, Nebr.; W. S. Smith, Garden City, Kans.; John G. Tod, county judge of Harris County; H. B. Rice, J. G. Eberhardt, commissioners of Harris County; J. S. Daugherty, Dallas County; E. T. Heiner, L. T. Noyes, H. G. Lidstone, Harris County; Roy Stone, Department of Agriculture, Washington, D. C.; A. M. Darling, Harris County; Judge W. S. Robson, Fayette County; Leo N. Levi, Galveston County.

While awaiting the appointment of committees Mr. Leo N. Levi, of Galveston, upon invitation, addressed the convention as follows:

#### ADDRESS OF MR. LEO N. LEVI.

MR. CHAIRMAN: No one more highly appreciates the advantages of good roads than I. For years I have realized the importance of having good roads in Texas, and the disadvantage of being without them. As occasion offered, I have read such literature upon the subject as was available, and during the past few weeks I have devoted some time to the study of documents issued by the Office of Road Inquiry of the United States Department of Agriculture. Beyond such information as I have thus obtained, I am not acquainted with any practical questions connected with road building. In fact, I am simply an amateur, and I therefore have great diffidence in speaking to this convention upon the subject of roads and road building. Perhaps, however, I can direct your minds into certain profitable channels by adverting to some facts connected with the situation in Texas.

In the construction of roads it is requisite, first, to determine where to locate them and how to construct them. To do this intelligently it requires professional skill of the highest order, and as it is next to impossible to procure this character of talent for each county, I deem it highly advisable to have in this State, as they have in other States, a State engineer possessed of the highest qualifications and removed as far as possible from political influence whose duty it shall be to examine, modify, disapprove, or indorse plans for road construction that may be submitted to him by the different counties under the State-aid plan, of which I shall speak hereafter. The second great requisite in road building is cheap material, conveniently located, and transportable at a low price. The third great requisite is cheap labor to handle the material, both at the place of output and upon the roads themselves. The benefits of roads accrue, primarily, to those who live on property that abuts upon the highway; secondarily, to those who live in the county and, thirdly, to the entire State. The benefits being thus distributed, the burden of expense involved in the construction of roads should likewise be distributed. The State should aid, the county should aid, and the abutting property holders should aid in constructing permanent roads.

In determining the location of a road, each of the contributing parties should have a voice, as also in the character of its construction. The road should be constructed only upon the petition of the abutting property holders. It should be decreed to be advisable by the county commissioners' court, and should be approved by the State engineer, thus giving a representation to each of those who are taxed. The cost should be borne in such proportions as wisdom may determine, by the abutting property holders, in accordance with the benefits they derive, and by the county, each of which shall contribute its portion of the expense in cash (and not in road work under a farcical law, such as we have heretofore had in this State); and the State should contribute its portion of the expense by utilizing its surplus convict labor.

The financial affairs of the State at present are such that it can not be reasonably hoped to obtain a cash appropriation to aid in road building. In order to secure State aid, the legislature will have to be convinced that the State will not be out of pocket.

The report of the superintendent of the penitentiary shows that there are now on hand under his control some 4,200 convicts, and in his report he calls attention to the fact that, judging from past experience, in 1896 there will be over 5,000 convicts in this State. The capacity of the penitentiary has long since been exhausted, and it for years has been found necessary to employ them outside the walls of the penitentiary in the face of an oft-repeated declaration of policy that the State should confine the convicts within the walls. Various expedients have been resorted to to make the convicts self-supporting. Those within the walls support themselves by manufactures, which come in direct competition with free labor, and against which there is already a considerable hue and cry. A very large number have been hired out to sugar and cotton planters, and from the means thus derived the State has been able not only to support the convicts, but to make a slight profit. Others have been hired out to railroads upon a plan which is unsatisfactory and to some extent unprofitable. Another contingent is hired out on share farms, the State in return for their labor receiving a share of the crops. This plan is also unsatisfactory. Another contingent is located upon two farms owned by the State and the products of which belong to the State altogether. The State superintendent finds this last plan the most satisfactory of all, and has repeatedly urged the legislature to furnish means to acquire other farms upon which to work the surplus convicts. The State has been unable to furnish means for this purpose, and I apprehend that even if it had the farmers of the country would protest against having to compete with convict labor in the production of the fruits of agriculture.

Certain it is that the problem of disposing of our surplus convict labor grows greater every day, and that something will have to be done to make them self-supporting and at the same time keep them from being a menace to society and competitors with honest free labor.

In every country it has been shown that the construction of roads involves a class of labor best suited for convicts. Free labor does not gravitate voluntarily to road building, and free labor does not protest against the employment of convict labor upon roads.

I therefore suggest that there should be located at convenient places in the State of Texas road material supply camps, to be worked by convict labor, the object of which shall be to furnish cheap material for permanent road construction. Stone quarries, gravel and shell pits, should be located at convenient places, where permanent camps can be established of, say, 100 convicts each. Here the convicts can be carefully and safely guarded, could live in permanent quarters, become accustomed to the climate, and do efficient work, without being a burden to the State or competing with free labor. One-half of the output of these camps should be donated free on board cars, boats, or other means of transportation to such counties as make application for road material to construct permanent roads in accordance with plans authorized and approved by the State engineer. The furnishing of free material in this manner will be the State's contribution to the construction of permanent roads in the counties. The other half of the output of these supply camps should be sold by the State to railroads for ballast and to counties not complying with the law to secure State aid or desiring a supply of material in excess of the allotment under the free State-aid plan, the price for the second half of the product to be so fixed as to defray the expense of maintaining convicts and the camp. The half of the product that would be sold could be sold at a figure so low as to induce its ready sale, and, moreover, as a consideration for this low price, railroads could be prevailed upon to make a very low rate in behalf of counties upon material that was to be transported from the camps to the place of use. The State engineer could readily arrange for

these cheap rates so as to make them inure to the benefit of the counties supplied. The movement should be inaugurated by the establishment of one camp forthwith, which could be supplemented by others located in different portions of the State, until the entire territory is covered.

No county should be allowed more material than sufficient to construct 10 miles of road in any one year, unless there be an excess of material on hand after satisfying the application of all counties desiring State aid.

By the inauguration of this plan we will further the good roads movement all over the State and solve the great convict problem in Texas without bringing convict labor in competition either with factory labor or farm hands.

Following the plan above outlined, it is manifest that almost any average county in the State can construct 4 or 5 miles of permanent road each year without having to resort to bonds, and, as values in each county constructing roads will materially increase, in the course of fifteen or twenty or twenty-five years the counties inaugurating such a policy would have a good roads system paid for without any incumbrance in the shape of bonds. More progressive counties may avail themselves of the privilege and tax themselves an extra 15 cents on the \$100 to pay interest and sinking fund on bonds for road purposes, and construct a considerable system of roads at once.

This forecast would be rendered all the more certain if the managers of the penitentiary could arrange, in addition to furnishing labor for the supply camps, to furnish also convict labor to the counties for the purpose of packing, spreading, and rolling the road material after it arrives at the place where it is to be used.

The basis on which these convicts should be employed in the supply camps and on roads would be their maintenance. The penitentiary as a whole is simply self-supporting, and it should not be operated with a view to making a profit out of it. So long as the convicts of the State can be properly cared for, without competing too much with free labor and without involving the State in an expense for maintenance, the convict problem may be said to be satisfactorily solved.

The views thus briefly outlined, if they do not meet with your favor, will at least afford a basis of discussion in the committee room or on the floor of the convention, and will serve to call the attention of the legislature to the importance and extent of the questions which we have come together to consider.

Judge Robson suggested that the present law in this State, which permits a county to vote an additional tax of 15 cents for road improvement, should be so changed that the vote might be taken by precincts. In his county one precinct had voted overwhelmingly for the tax, but the other precincts had overcome the majority in that precinct. He thought each precinct should be permitted to speak for itself.

After some further discussion Captain Daugherty moved the appointment of committees to define the work of the convention, and they were named as follows:

On defining work: Gen. Roy Stone, Judge Tod, W. E. Copeland, J. P. Hall, and J. H. Fowler.

On resolutions: J. S. Daugherty, Leo N. Levi, H. B. Rice, H. E. Fuller, and J. S. Swope.

### AFTERNOON SESSION.

The convention reassembled in the afternoon at 3 o'clock, with Judge Robson in the chair, and he announced that the convention was ready to hear the reports of the committees appointed at the morning session.

Gen. Roy Stone, as chairman of the committee on defining the work of the convention, then presented the following report on behalf of the committee:

Your committee on defining the work of the convention respectfully suggest the following order of business:

1. The exchange of experiences in practical road construction in Texas, to be opened by Judge Robson, of Fayette County.
2. Discussion of the present road laws and amendments thereto, including the commutation of poll tax to the sum of \$3.
3. Discussion of State control and State aid by convict labor or otherwise.
4. Discussion of the plan for organizing a permanent good roads association and appointment of a committee to prepare plans for the same.
5. The appointment of a committee to wait upon the legislature and to endeavor to secure the necessary measures; the said committee to confer with the State penitentiary board and the State railroad commission.

Respectfully,

ROY STONE.  
J. P. HALL.  
JOHN G. TOD.

The report was adopted.

In pursuance of the report just adopted, Judge Robson took the floor and gave his experience in the practical construction of roads in Texas. He said:

#### PRACTICAL CONSTRUCTION OF ROADS IN TEXAS.

GENTLEMEN: I will say to you that I commenced the study of this road problem about ten years ago, when Mr. McGuire, now in charge of the reformatory at Gatesville, was a member of the legislature from our county. In connection with him, I drew up the first bill in the legislature which provided for the labor of short-term convicts on the road. Ever since then I have been giving the subject more or less thought from an amateur standpoint, grappling with the details of the subject as they presented themselves.

In 1890 I was elected county judge; then it became my duty to deal with roads actually and not theoretically, and I took special charge of that branch of the work for our county. Up to that time we had built between 6 and 8 miles of what we call gravel roads. They had cost us nearly \$5,000 a mile, having been built in a very expensive manner. The whole road was graded up, ditched, and drained, and gravel put on from 2 or 3 feet thick—hardly any place under 2 feet—an expensive waste of material—very expensive, since we have to haul it with wagons and teams and put it on by day labor. Although this made excellent roads and are to-day as fine roads as there are anywhere in the world, without showing any wear at all, they were too expensive, and it was apparent that the county could not build roads at that cost.

After we got out of the debt that was hanging over us we again commenced to build roads. The first road we built cost \$1.90 a lineal yard, being 16 feet wide with an average depth of gravel 16 inches—18 inches in the center and 12 inches on each side—with earth backing, or berms, on the outside, tapering down to the



ditch. Of course, to make this road perfect, it should at once be rolled, but as we did not have a roller, and the packing was done simply by the travel, it generally takes two good seasons to make the road compact. We have roads in our county now that have become compact, and you may go on them to-day after this snow and not see the print of a wagon wheel. The gravel is extra fine, however, and most of the counties do not have it—only those lying in that part of the State. It contains a small quantity of red clay (not the red clay of the hills of Georgia, however). A friend of mine says that this clay contains a small quantity of the oxide of iron, which cements the gravel together and makes it a compact mass. I know nothing of it from a scientific standpoint.

We have completed 5 or 6 miles of this kind of road recently. We have cut the road down, however, from 16 to 14 feet in width, and some of it to 12 feet. Every 200 or 300 yards we placed in a "turnout," or switch, which is made wide enough to enable a four-horse team to turn out without destroying the earth banks. Our idea was to give the people as much road as we could by lengthening it out. These roads recently finished have not been tested by travel; they have been down only since last November and December. At first some of them gave considerable dissatisfaction, for the gravel was put on loose, and until the rains came on the farmers complained that in hauling their cotton over them their wagons sank down deeper in the gravel than in the mud. But after the first rain was over and it had been traveled awhile no more complaints were heard.

This spring the intention of the commissioners' court is, after the winter rains are over and the ground gets in condition so that they can travel the dirt roads, to take the scraper and go over these gravel roads, scraping the loose gravel on the sides back to the center, thereby filling all the holes made by travel. When this is done and the road packed down again it will be perfect. The packing of the summer and fall rains will make that a perfect road like the others. This is the plan we have pursued, and we have been successful with it.

These roads are costing us an average of \$3,100 a mile, and I do not believe we will ever get them down to less than \$2,800 a mile.

The average haul of our material is not over a mile and a quarter. This is an estimate merely; to be exact you would have to figure on each section from the pit.

We have not computed the cost per cubic yard; it is easily done, however. The material costs us nothing, except the hauling, taking it out of the pits, and loading it on the wagons. The average haul has been about ten loads a day, and I believe 21 cubic feet are hauled at a load; that is about three-quarters of a cubic yard; ten loads a day would be  $7\frac{1}{2}$  cubic yards. That will cost, for the team and driver, \$3 a day; that is, a good team; of course, you can get a team for \$2.50 a day, but it will not haul that much. The teamster does not do the pit handling; in most cases we built a platform and loaded with scrapers. Loading in that way costs the railroads \$2 a car; so it can be estimated that it will cost about 10 cents per wagonload.

The top of the gravel pits have to be plowed before loading can be done with scrapers. The platform is built with a little incline to it high, enough for the wagon to pass under it, and the gravel is dumped from the scraper right into the wagon; in that way it takes only a few minutes to load a wagon. As soon as one is loaded it passes out and another takes its place. From this you will see that the material costs about 50 cents a load delivered.

The average thickness of permanent roadway will be about 15 inches, the gravel packing down after three years of wear and tear to about that. When first built the roads are about 12 inches thick on each side where there is earth backing, and 18 inches in thick the center. The earth berms give 12 inches on the side, and we drive an 18-inch stake in the center, and the contractor must bring up his work to that. The crown looks too high when first built, but after it is traveled over it gradually settles down until it is about right.

As to the cost of material and labor for the gravel road, contractors figure on the whole thing, and our bids run from \$1.50 to \$2.25 per lineal yard. The highest bid we had was \$2.50, and that was only for about 50 yards of gravel road, at a place where the gravel had to be hauled nearly 3 miles.

I have been wanting to roll the roads as we made them, but we have needed all the money we could get to put down the gravel; so we let the people do the rolling.

I will say this, that we have lately contracted for a road of this sort; we contracted with a man just last Friday for 1,810 yards of road, on what is known as the \* \* \* road, and he will have to cut the bluff down (I believe the contractor will break at it, but that is none of my business); the bluff rises 242 feet, and is to be cut down to a 7-foot grade—7 feet to the 100—for a 24-foot roadway, including drain ditches, and embraces nearly 10,000 cubic yards of cutting and filling. There is to be 18 feet of gravel roadway of an average depth of 9 inches, all of which this contractor has agreed to do for \$1,375. The gravel is to be put on in two layers of  $4\frac{1}{2}$  inches each, and is to be packed by the contractor passing over it with each load of gravel as he puts it on the road; he is required to drive, not in any one place, but evenly all over the road. He is to so arrange his work as to allow the general public to travel all over the gravel at the same time. He is to lay the first course of  $4\frac{1}{2}$  inches over the entire road before he adds the last  $4\frac{1}{2}$  inches. In this way it will be packed as well as if it was rolled, because the teams driving over it will pack it thoroughly.

We are doing this partly as an experiment, to find out how much gravel is necessary to make a good road. If we find that 9 inches is enough, we can cut down 3 inches off the 15, to be put on in two layers.

We have proceeded in this way, and I must say our roads, while expensive, are good roads. How long they are going to last I do not know, but there is no wear and tear except in a few places where there is too much sand in the gravel, and this can be remedied with clay gravel at a very small cost.

Another thing we have found in our country is this: If the road is well made, the drainage does not amount to much. We had insisted on having our roads perfectly drained, and always provided for it, sometimes digging ditches half a mile long to convey the water away; but one place we had no power under the statute to go into the man's property, so we built the road right through a marsh and left the water standing  $2\frac{1}{2}$  feet or 3 feet deep on each side. This is as fine a piece of road as we have. The water comes right up to each side of the gravel, the top of gravel being, I suppose, a foot or 15 inches above the water. The subsoil is the blackest "hog-wallow" land you ever saw—one hog-wallow after another—and it does not look as though there was a foot of level ground on it; it is one of those river hog-wallow stretches, on which the water stands. I told them I thought it would ruin the road. They have put in culverts, so that if the water gets too high on one side it can equalize itself on the other.

I will leave it to scientific gentlemen to say what does it, but it is a fact that you can drive over that road having water on each side 2 feet deep, and it is just as good a road as where there is no water. I believe it is owing to the character of the soil, it being impervious to water after it is puddled. It evidently does not get wet under the road, as that would render the road bad.

As to the character of the gravel, it is not a large, it is a small, mixed with a kind of red clay. The gravelstones are round, water washed, but not clean, like most of the water-washed gravel. We do not find this gravel anywhere except in the valleys. The average size of the gravel is about as big as the end of my thumb; of course you find larger gravel among it, but we throw that out. This gravel was evidently washed in there, and the clay washed in afterwards. We generally find the best gravel on top, although sometimes it is found 5 or 6 feet thick—sometimes only 5 or 6 inches. The lower gravel has more sand in it, and it does not pack as compactly as that from the top.

We have tried grading the roads in black land, and have found it to be a failure. It makes the mud deeper. Possibly it dries out faster. A road can be graded up as prettily as one of these streets out here, then let a rain come on and about forty teams pass over it, and it becomes impassable. I hear that in Bell County, Ellis County, and other counties in northern Texas, black land makes pretty good roads, but it will not do at all with us.

We have two scrapers which cost us \$600 or \$700. One of them has only done two days' work, and the other we use only for leveling the gravel on the roads.

That is about all I can say in the road line. We have been doing something in the bridge line, which I would advise you to take under consideration. My advice is to throw out every piece of wood in a bridge that you can and substitute iron for it. We have taken our wooden stringers out, and put in iron I-beams. When we first started doing this, we were laughed at, but now we don't use any other kind in our county. We put in 6-inch iron I-beams and bolts 2 by 6 through them. On a 12-foot roadway we use two I-beams and three channel beams. The channel beams of course receive the core or spiking blocks in the channel. We put one on each side and one in the center, and generally use hook bolts to hold the spiking block and nail the floor in three places only, because if the bridge is not going to stand independent of the nails it will not stand anyway. We use 3 by 10 inch planks, and only put one row of nails in the center. Those I-beams last forever, and when the planks wear out all you have to do is to go under there with a crowbar, take the hook bolts off, pry them loose from the plank, put a new bar on, nail the roadway down, and your bridge is fixed. You can do it with half the work and half the trouble and it does not cost much more.

We are having delivered at Lagrange, which is 98 miles west of here on the Southern Pacific Railroad, iron bridges with three iron I-beams—the whole thing iron—30-foot span (the underposts are about 12 feet high from the floor down) for \$350. All we have to put on is the wood. We have been figuring on an iron floor, but have never had in that country a man with science enough to get it up yet. I have plans which I want to submit to General Stone, and let him take them to Washington and see what he thinks about them.

There is a bridge across the Colorado River that is 1,780 feet long, 250 feet main single span, and two side spans 75 feet each. The approaches are of cedar piles, cut in that county, but we can not get any more cedar there.

Not long since we had to replace the bents under a bridge with new ones. The bridge was 19 feet in height. I went to work to see what I could get iron bents for. I secured them, caps and all, for \$100 each. At that price you can not afford to build cypress, cedar, or any other kind of bents.

In that bridge we used 8 bents and 6 barrels of cement to put them in. The cement cost us, laid down on the ground, \$42. Divide that amount by 8, and add it to the cost of each bent, and you see that they cost us a little over \$105. In putting in the cedar piles you have to have a pile driver, etc., and I don't believe you can put them in for less than \$50 apiece, and I know that iron at double the cost is ten times as cheap.

As to the length of life of an iron bridge, we do not know; the Baltimore and Ohio Railroad has some standing yet which were built when that road was first built. We scrape and repaint our iron bridges every three years.

Judge HALL. My experience is limited; I have been in the business only a very short time, as I was elected county judge last November. Our county has twenty-two mules, worth \$125 a head, and two road scrapers, and my observation so far is that it is almost a needless expenditure of money. The roads have been worked scatteringly all over the county, and with the exception of 4 or 5 miles that have

been built on the plan stated by Judge Robson, of Fayette County, we have no permanent roads. We have an abundance of material scattered over different portions of the county; plenty of sand rock, with some streaks of lime through it; it is a good rock for building purposes. In three different sections of the county we have an abundance of gravel, different, however, from that found in Fayette County. It is washed gravel, but is mixed with sand principally; it is taken out of the bottoms of the creeks and the — Fork of the Trinity. There is very little gravel mixed with clay. We have found by experimenting that it bears out what Judge Robson has said about it, that gravel mixed with clay is much better, lasts longer, and seems to cement together after being put on the road, and after traveling on it a short time it packs together and gets perfectly solid and firm, while gravel with sand in it has a tendency to cut up with travel over it, and in a short time is carried off by the wheels, thus requiring constant attention and filling in.

My observation is exactly the same as Judge Robson's in regard to the grading of black lands. In our county we have a diversity of soil as well as of building material. The western portion of our county is black hog-wallow land; the eastern portion is sandy land, a timbered country, and we have as much difficulty traveling in the sandy country as we do in the black lands. The sand is 2 or 3 feet deep in some places. We do not know what to do with our sandpits. In dry weather it is almost impossible to pull a load through them. The commissioners' court, twelve or fourteen months ago, scraped out the sand and hauled rock and put in there, still it is almost impossible to travel over it unless you beat them up. There is almost always clay where the sandpits are. There is an abundance of rock close by, and almost any place it is convenient to these sandpits in sufficient amount to build all the roads necessary. We tried to clean the sand off, and let them use the sand road in wet weather and the clay road in dry weather, but the sand filled right back in. We have also been discussing recently the plan of hauling the clay on top of the sand.

General STONE. Some of the best roads in Wisconsin are made by hauling sawdust on top of the sand, especially sawdust made from sawing shingle blocks, which makes a long, fibrous dust, something like excelsior. That makes the finest roads in the world; they put about one foot of it on the sand and then some sand on top of that, and those roads have lasted, some of them, four or five years. They are somewhat elastic, and the sand drains the water away. It is something like traveling on a hard mattress.

Judge HALL. As to the cost: I asked my predecessor as to the cost during the previous year, but he has never been able to give me the actual cost of the work. I got up the best statement I could, and found that we had been expending for the last two years from \$800 to \$1,000 a month.

We are working our county convicts, of which we have an average of six or seven; sometimes we have ten or fifteen, sometimes only five or six. Their labor is supplemented with hired labor, and we have hands employed to do our plowing, grading, and driving. Our convict labor is employed in loading gravel, digging up stumps, and anything of that kind. It seems to me that for the amount expended in feeding convicts and paying for labor, there has been great extravagance in comparison with the amount of permanent roads we have to show for it.

As I said before, we have two scrapers and teams sufficient. The custom of the commissioners has been heretofore to divide the time throughout the county. One commissioner would take the outfit for a month, and at the expiration of that time would turn it over to another commissioner; hence the work is scattered all over the county, and very little permanent work is to be seen as a result.

I don't know how it is elsewhere, but our road overseers throughout the county have almost quit work. There is very little work done by the overseers and hands; they depend entirely on this road gang, unless it is some little section which they can not reach with the road gang.

We have a tax of 15 cents on the \$100, and it is all used with us, and money is transferred from the general fund, or court-house fund, to the road and bridge fund.

Under our present law every man between the ages of 18 and 45 years is required to do five days' work on the public roads. The overseers have charge of this work in their respective precincts, and they pretend to call out the people. Some of them report having worked one day, some two days, some none—"roads in good condition." Of course they are in good condition—no rain to amount to anything in two years! If the people all turned out, their work on the roads would amount to considerable—at least \$20,000 more than the 15-cent tax.

I want to have the privilege of allowing not only each county throughout the State, but each precinct in the county, to levy an additional road tax. I believe that if submitted to our people to-day, two or three precincts in our county would vote for an additional road tax, which would relieve them of road service. And then other precincts, seeing the good effect resulting from it, would soon fall into line. I know this to be true from the fact that two or three years ago, when the law was passed allowing the different school districts to levy an additional school tax of 20 cents on the \$100 worth of property to supplement the school fund, the people at first did not seem to fall in with it at all—did not seem to like it—but they commenced levying it in certain districts, and now there are about one-fourth of the districts in our county levying that additional school tax, and at nearly every meeting of the commissioners' court there is a petition asking for an election for this purpose.

This poll tax of five days' road service is a law, uniform throughout the State, and yet I do not know of a county in which the five days'

service is levied. The road overseer can call them out whenever he sees proper, so long as he does not work them more than five days in the year, and he is compelled to work them twice a year.

I understand there is a bill before the legislature now for Fannin County and perhaps other counties. I asked our representative to have Cooke County put in the bill. This bill proposes to allow any citizen to go to the county treasurer at any time before the 1st of January, and by paying \$3 into the county treasury get excused from serving on the road. The bill also provides that each county commissioner shall be an ex officio road commissioner. I suggested to our commissioners that they buy additional mules and road scrapers, and turn a scraper and sufficient mules over to each commissioner, and let each one have his own road gang in his own precinct, but they said that, inasmuch as they received no pay for it, they could not have a road gang on hand all the year round; that one month at a time was enough. This bill permits them to have supervision of their roads, and I am satisfied that if it is passed our commissioners' court will adopt that plan.

General STONE. A plan similar to the one suggested by Judge Hall has been tried in California with very unsatisfactory results. The law provided no safeguard for the proper expenditure of the funds, as the supervisors had complete control and were responsible to no one.

Why would it not be a good idea in your county, instead of expending all this money in road scrapers, to buy a rock crusher, and get some miles of your road surfaced with rock every year, and gradually improve their condition in that way? You can get a rock crusher for about \$700; some kinds for less than that; but one of a capacity that I think would suit your district would cost about that amount. The engine is nearly always hired for the occasion to go with it; but you can get the whole outfit for about \$2,500—portable crusher, engine, and everything you need. They do not use a rock sifter now, according to the best plan; of course, in putting on two layers of rock the top layer is crushed a little finer. The reason for not sifting it, but laying it on in this manner, is that the fine pieces mix in with the larger and form a more compact mass than by mixing in any artificial binder. It is better to put in the natural binder, because then the mass compacts into more nearly its natural condition. I think that the amount of \$1,700 or \$1,800 ought to cover the cost of the engine and crusher.

In the town of Canandaigua, N. Y., they bought a road crusher. The road commissioner is a farmer, an energetic person. The neighboring farmers brought the rock and put it in batches alongside the road—brought enough to keep the road crusher running for ten days in a place, and it costs them only 18 cents a cubic yard to crush the rock. They pay the farmers, where they pay them anything, 20 cents a load delivered; they call it a cubic yard, but it is probably about three-

fourths of a cubic yard. In many cases where a farmer brings a load of stone he will take back a load of broken stone, so that it costs about 38 cents a cubic yard for the crushed stone, delivered on the road. The entire cost is not over 50 cents, and they build some roads there for \$500 or \$600 a mile—not over \$900 a mile in any case. They build them 8 feet wide, with a thickness of 8 or 10 inches.

Judge Tod addressed the convention as follows:

#### MOVEMENT FOR GOOD ROADS IN HARRIS COUNTY, TEX.

**GENTLEMEN OF THE CONVENTION:** At the request of Mr. J. S. Daugherty, the member for Texas of the central committee of the National Road Conference, I have prepared the following brief statement of the movement for good roads in Harris County:

Five years ago the question of good roads was agitated in our community, but it then took the direction only of improvement in our existing or future dirt roads, so that they might be made into good dirt roads. With the difficulty and expense of getting material to pave our roads, it seemed that permanent roads were and would be for many years beyond reach. The first step forward was when a road-working force, known as the convict camp, was organized by the commissioners' court of Harris County and placed at work upon the dirt roads. This camp consisted of a superintendent, with the necessary guards, and a working force composed of prisoners convicted of misdemeanors and committed to the county jail in default of payment of their fines. These prisoners, or those of them whose physical abilities were such as to allow them to do severe manual labor, constituted the working force of the camp. This camp, supplied with necessary road-working utensils, was put to work upon the dirt roads of our county in building new roads and in repairing old ones. The work done by them met with general satisfaction, as the roads constructed and repaired by them were great improvements over those previously in use, they having been almost entirely worked by the five days' personal-service system generally in use in this State.

The improvement made in our dirt roads by this method was sufficient to give a large portion of our citizens the desire for still better roads, and the question of the possibility of obtaining at least a few permanent roads became agitated and met with the support of many of our progressive citizens. Situated as the county then was financially, it was regarded as still too expensive an investment for the county to construct such roads. A number, however, of the progressive citizens of our county obtained an estimate from competent authority of the amount of shell that would be required to build a shell road from the city of Houston to the town of Harrisburg. They then obtained a bid from a responsible contractor for the furnishing of such material upon the ground, which bid was for the sum of \$12,000. The amount of \$10,000 for the purpose of supplying the material was raised by the subscriptions of liberal and progressive citizens upon condition that the county would, with the convict camp or other labor, do the work necessary for the construction of such road. A delegation then waited upon the commissioners' court with the subscription list and offering to collect the money subscribed and turn over the same to the county for the purpose of making one paved road in Harris County. A petition largely signed by citizens of Houston and the county praying that the offer be accepted was also presented at the same time. Strange to say, the offer was not accepted, and Harris County thereby lost probably the best opportunity ever offered any county in this State to obtain a permanent road with little expenditure of public funds.

Nothing daunted by this, however, the friends and advocates of good roads commenced a campaign of education, which had been quietly and persistently carried

on and finally bore fruit at the May term, 1893, of the commissioners' court, on petition of over 200 tax-paying voters. An election was ordered to be held under the act of April 1, 1891, to determine whether a special road tax of 15 cents upon the \$100 should be levied. This election was held on May 29, 1893, and the tax was carried by a good majority. An analysis of the vote shows that on the total vote cast 65 per cent was in favor of the tax. As to the relative vote cast by city and county, it appears that, counting by precincts, the city was equally divided. Of the six voting precincts in the city, three voted for the tax while three voted against it. Of the thirty-three county precincts, one precinct failed to make any returns, while thirteen voted against the tax, eighteen voted for the tax, and in one precinct it resulted in a tie vote. By the popular vote, however, both city and county went for the tax by a good majority. At the succeeding term the commissioners' court, in compliance with the instructions of the people, as declared by such election, levied a tax of 15 cents upon the \$100 of taxable values for road purposes. This was not, of course, collected until the beginning of 1894.

At the January term, 1894, the commissioners' court advertised for bids for the construction of permanent roads upon two of their most important public thoroughfares, the Washington and Harrisburg roads. The specifications called for bids upon shell, gravel, brick, macadamized rock, and combined shell and gravel. Bids were opened at the February term from fourteen contractors from all parts of the State, and after careful consideration the contract was awarded to W. S. Nipp for the construction of about 2 miles on the Washington road and  $3\frac{1}{2}$  miles on the Harrisburg road. The contract called for a roadbed composed of 7 inches of shell upon a well graded and rolled dirt foundation with 5 inches of gravel, both materials when the road was completed and thoroughly rolled to be not less than 10 inches. To retain the material in position, curbing of 2-inch heart cypress planks were to be used. The contract also required that all wooden bridges or culverts upon the road constructed should be replaced with vitrified sewer pipe drains set in brick retaining walls. The contract price for such roads was not to exceed \$8,000 per mile. The Washington road was constructed in accordance with said specifications of 7 inches of shell and 5 inches of gravel. The Harrisburg road was changed for the first two-thirds from gravel and shell to 12 inches of shell alone, and the last third to 10 inches of shell, thereby reducing the cost to \$7,100 and to \$6,200 per mile, respectively. These two roads are now substantially completed, and it is the intention of the commissioners' court at its present term to advertise for bids for the construction of paved roads upon its two next most important thoroughfares—the East Montgomery and the Fort Bend County roads—it being the settled policy of the court to improve the four most important public roads leading north, south, east, and west and continue their improvement until the county line is reached. Such roads as are already done being our first efforts in that direction, without past experience to guide us, permanent roadmaking being practically an entirely new business to this county and in this section of our State, it is likely that we may have made mistakes that experience may enable us to guard against them in the future; still we have the satisfaction of knowing that they meet with the unanimous approval of those who travel over them and give satisfaction to the large majority of those who have to pay for them—the taxpayers.

I will not take up the time of the convention in undertaking to state any of the many benefits of good roads, nor in attempting to give directions or advice for their construction, for although, by reason of my official connection with the work in the roads of Harris County during the past year, I have necessarily learned something of both, I know there will be others present in this assembly better qualified than myself to speak upon these subjects. But I will call attention to these facts, which, in my opinion, show very clearly the importance of good public roads. These facts are that, during the past year, which has been one of extreme financial depression, and has been characterized by a general shrinkage of values throughout



the United States, Harris County has received an immigration unparalleled in the history of southern Texas, and its taxable values have increased from \$25,927,449 in 1893 to \$28,141,103 in 1894, being an increase of nearly \$2,250,000. These facts, in my judgment, are clearly attributable to the efforts made by Harris County for good roads.

Judge TOD. I understood Judge Robson this morning and Judge Hall this evening to speak favorably of allowing each precinct to levy its own tax. I do not agree with them so far as Harris County is concerned; it will not work in our county, because if you allow each precinct to levy a tax it follows as a matter of justice and right that the tax so levied should be used in that precinct. Now, in Harris County the city is the most valuable part of the county, and three-fourths of the taxable value of the county is included within that one precinct. Now, if this law advocated by these gentlemen should be passed, in three or four years the first precinct of Harris County, in which the city of Houston is situated, would have all the roads she needed, and the outlying precincts would not get the roads needed by them in forty years. I don't think that in such a county as Harris such a law would work well; it might in smaller or less thickly populated counties.

Judge ROBSON. My idea was that where the whole county would not adopt it to let them commence it, if they would, in any of the precincts. "Better half a loaf than no bread." Of course, where this tax was levied, deference would be paid to the needs of those paying the most toward it; here in Harris County, for example, if they want a road toward Harrisburg and another one to Montgomery, and if the Harrisburg people pay the most money, consideration should be given them first.

Judge TOD. The great trouble we have to contend with here in Harris County is the great dearth of material; we have to import it; we have only dirt with which to build roads in the county. The cheapest material we can get is shell from the shores of the bay. In regard to the plan suggested by Mr. Levi—the State furnishing a certain amount of crushed rock free and more on paying for it—why Harris County could build a good deal of road. It is a question of getting material with us.

The amount of money available to us for the purpose of road building is in the neighborhood of \$30,000 a year, and is gradually increasing.

The five-days' road work is a farce in this county. In fact, during the last year, since we have had the special road tax, we have not tried to work the roads at all with personal service. We told the road overseers not to call out the hands, it was just a waste of time. There was a picnic or something going on; at least, no work was done; and if the people were paying money to keep up the roads we would try to keep them up with the money. I do not believe it would do to require them to pay \$2 or \$3 per year into the county treasury as a per capita tax, because only those would pay it who have property, and those are

already paying about as much as they will stand on assessed values. I believe it is better to depend on the ad valorem tax.

A MEMBER. In your opinion, which makes the best road, the mixed shell and gravel, like the Washington road, or shell alone?

Judge TOD. My personal preference is the shell road. In my opinion it makes a better road while it lasts, and I think it will last pretty well. It may not last as well as the gravel, but it makes a smoother and better road to drive over.

Mr. DARLING. The Washington road is so much better than the shell road to Houston Heights, which has worn out so badly, that I think its plan of construction ought to be adopted.

Judge TOD. That shell road to Houston Heights is not a fair test. It is about a mile long, and no repairs have been made on it, and my opinion is that any road ought to be repaired as soon as it gets out of order.

A MEMBER. What has been the result in regard to the lands traversed by the new roads built by Harris County—say the Harrisburg road? Have they been taken up and occupied?

Judge TOD. A good deal of the land is still vacant, but several new residences are being built.

A MEMBER. What has been the average cost per mile in this county?

Judge TOD. The average cost has been about \$7,000 per mile, but we have a very wide roadway.

Mr. LEVI. Has it not been the intention to narrow the roadway as you get away from the city?

Judge TOD. It has been in contemplation, but I think when the time comes to extend the roads the people will want them 20 feet wide.

Mr. LEVI. It seems to me that 2 miles of 9-foot road are better than 1 mile of 18-foot road. Roads constructed as in Fayette County are not only just one-half as expensive in their original construction, but the cost of maintenance is only about half as great. In good weather the people will prefer the dirt roads, and in wet weather they will naturally travel on the rock roads.

General STONE. If you were to follow the plan pursued in New Jersey, where for each mile of road the adjoining 1,280 acres is taxed one-third of the cost of the road, even under the expensive system followed in this county it would amount to only about \$2,500 a mile tax against the benefited district, or about \$2 an acre. This would be distributed over ten years, which would make the payment about 20 cents a year. Now, the lands that these roads traverse are very valuable already, and \$2 an acre would hardly average over 10 per cent of their value, and the enhancement in value would certainly be greater than that.

Judge ROBSON. I don't believe that when the commissioners of Harris County have gone a little further along they will undertake to build many miles of road at that price. They will build much more

road if they will reduce the width of the roadway to 8 or 9 feet. In Fayette County we started at 16 feet and cut it down to 12 feet, and some of our roads are now only 9 feet.

General STONE. Most States, I think, have gradually narrowed the width of their roads; narrowed the double track roads from 20 to 16 feet, to 14 feet, and some are even getting along with 12 feet. Many of them are satisfied with a single-track stone road, with a good dirt road alongside; sometimes they put gravel on the dirt road, sometimes not, and they do not even have passing places. In dry weather you will find that they prefer the dirt road, and in wet weather, of course, they keep off of it, and use the stone road, consequently the dry road is always kept in good shape, and no trouble is experienced in turning a wheel off on it when passing on the stone road. In most cases the grass grows up on the side of the road, so that a team can turn a wheel out on the grass and the other wagon has only to turn a wheel out on the dirt side of the road: it never happens, of course, that two wagons turn out at exactly the same place, consequently there is no tracking or cutting up of these roads, and they find that not only have they diminished the first cost of the roads, but they have diminished the cost of maintenance a good deal more than one-half, because the stone road, which wears out badly in dry weather by the loosening and powdering of the stone, is not used in dry weather, as the people prefer the dirt roads; and, during wet weather, when the dirt road would be ruined, they are on the stone road, consequently the dirt road will wear forever while it is dry, and the stone road will wear its best when only used while it is wet. Consequently, not one-fourth of the cost of repairs is required where a stone road is built with a dirt road alongside of it as where a double-track stone road is built.

The farmers object to the stone roads, because they have to shoe their horses; for this reason I have known the farmers to drive down in the ditches where they had a 16-foot road. A 20-foot road is too wide; 14 feet is enough. As long as the city district is paying for it, the country will not complain, but when the country has to pay for it, you will find that they will think 14 feet is plenty.

In building a combination dirt and rock road, there is no drain between the dirt and rock road, as that would make it impassable. The rock road has a separate crown of its own and on the side next the ditch it is shorter, and on the side next the dirt road it is sloped off, just enough for the water to drain off of it.

Judge ROBSON. Out of deference to two of our commissioners we put in turnouts, but there is not as much passing on the country roads as people think; the heavy teams nearly all go in at the same time, and go back home at the same time in the evening.

Judge ROBSON. Out of 176 road overseers in my county there are two for whom I have a word of commendation. Both of these have inaugurated permanent roads by constructing a few miles of gravel

roads, but at the last term of court a petition with forty signers was presented asking that they be removed. But they were not removed, and they told me that before the end of the term they would complete some more graveled roads.

Mr. J. S. Daugherty, of Dallas, on behalf of the committee on resolutions, then submitted the following report:

*To Hon. W. S. Robson, Chairman Good Roads Convention for Texas.*

DEAR SIR: Your committee on resolutions begs leave to submit and recommends for adoption the following resolutions:

*Resolved*, That it is the sense of this convention—

First. That there should be established by the State of Texas a commission to be known as the State road board, to be composed of the governor, the superintendent of the State penitentiaries, and a professional engineer and geologist, who shall be appointed by the governor; that the engineer and geologist should be attached to one of the existing departments or be at the head of the department of roads and geology to be created; that the State road board should cause a careful examination of the State to be made for materials available for permanent roads and should exercise general supervision over plans for road construction conducted with State aid.

Second. That the State should establish as speedily as possible road material supply camps in different portions of the State, to be operated with convict labor, and that a liberal proportion of the output of such camps, not to be less than one-half, should be furnished at the camps free to counties for permanent road construction according to plans approved by the State road board; that the balance of the output should be sold and the proceeds turned into the penitentiary fund.

Third. That said board, among other things, should arrange for cheap transportation of said output to the counties requiring same, which arrangements should be available to such counties.

Fourth. That as far as practicable the State penitentiary board should hire short-term convicts to counties for road construction upon terms that will render such convicts self-sustaining, and that existing obstacles to such hiring out should be removed as far and as soon as possible, to the end that the greatest possible number of convicts may be employed in road construction; that as far as can be done convicts should be removed from competing with free labor in factories and on farms.

Fifth. That no State aid should be furnished to any county except after submission to and approval by the State road board of the plans of the proposed work, and further that the State shall not be obligated to furnish material beyond one-half the output of supply camps.

Sixth. That the legislature of Texas should forthwith establish at least one such supply camp.

Seventh. That there be organized during this convention a State League for Good Roads by the election of a president, vice-president, secretary and treasurer, and that the president be authorized to appoint commissioners to organize county leagues, that a State convention be called by the president, to assemble in 1896—or earlier if deemed by him advisable—the basis of representation to be fixed by him in the call.

Eighth. That a committee of three be selected by this convention to present these resolutions to the governor, the State penitentiary board, and the legislature, and to urge legislation in harmony with these resolutions.

## OFFICERS OF THE STATE ROAD LEAGUE.

The following named persons were elected officers of the State Road League:

President, Judge Robson.

Vice-president, Judge Hall.

Secretary and treasurer, H. G. Lidstone.

Messrs. Levi, Tod, and Daugherty were appointed a committee to draft a bill to be presented to the legislature, the bill to provide in some way for the use of convicts on the public roads.

After a vote of thanks to the Secretary of Agriculture, through General Stone, and also to Mr. J. S. Dougherty, the convention adjourned sine die.





