

REPORT
OF THE
STATE ENGINEER
OF THE
STATE OF ARIZONA

JULY 1, 1909 to JUNE 30, 1914



Published by Board of Control, by authority of Chapter
53, Session Laws of the Second Special Session
of the First State Legislature

Arizona. Highway Dept

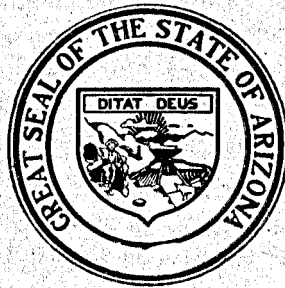
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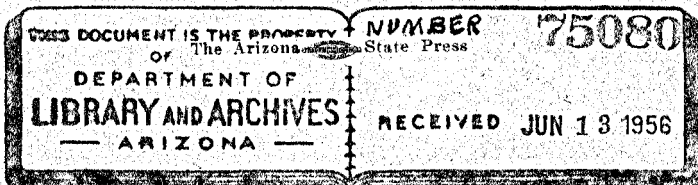
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State of Arizona

OFFICE OF State Engineer PHOENIX

June 30, 1914.

To His Excellency, George W. P. Hunt, Governor,
To The Honorable Board of Control,

George W. P. Hunt, Chairman,
J. C. Callaghan, State Auditor and Member,
Charles R. Osborn, Secretary and Citizen Member.

I have the honor to submit the report covering the operations of this department since it was created by an act of the Territorial Legislature, approved March 18, 1909, to June 30, 1914.

Mr. Girand was appointed Territorial Engineer April 1, 1909, and served in that capacity until Arizona was admitted to Statehood, February 14, 1912, and as State Engineer until March 12, 1912, being succeeded by the present incumbent.

As the report of the Territorial Engineer has never been published, it has been incorporated in this report.

The Act of March 12, 1909, provided a specific tax for the purpose of raising a "State Road Tax Fund" for the years 1909-1910 and 1910-1911, which was continued in operation for the year 1911-1912 by an Act of Congress approved June 20, 1910. The Act of March 12, 1909, was repealed by the present State Road Law, approved June 20, 1912, which provided an annual running appropriation of \$250,000 that will continue in operation without further legislation until repealed.

Very respectfully,

LAMAR COBB,
State Engineer.

STATE HIGHWAY DEPARTMENT

June 30, 1914

LAMAR COBB, State Engineer

E. P. ADAMS,
Chief Clerk

T. F. NICHOLS,
Office Engineer

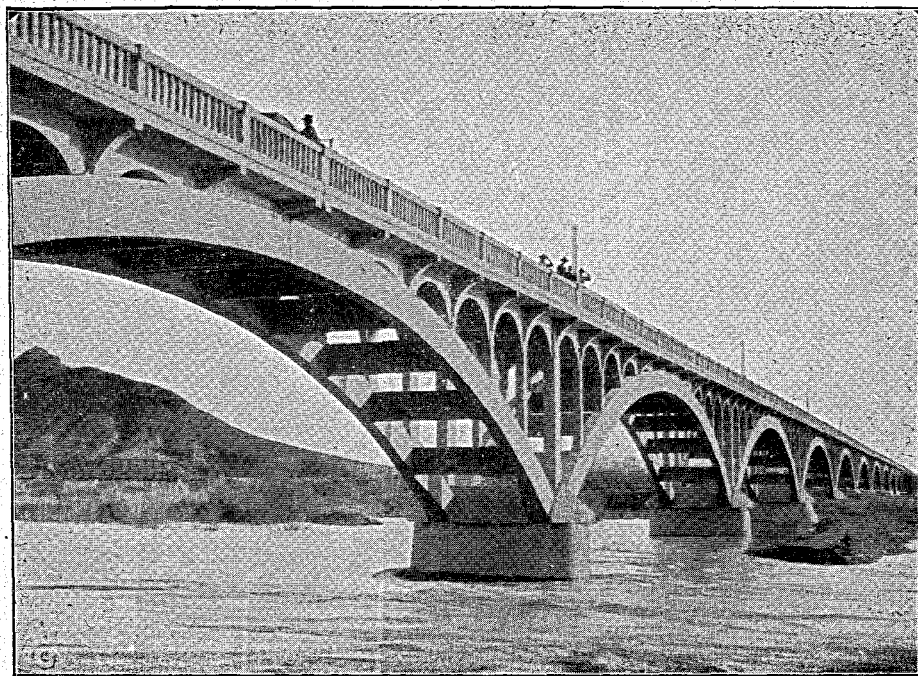
F. R. GOODMAN, } Apache, Coconino, Mohave,
Division Engineer } Navajo and Yavapai Counties.

J. S. BARLOW, } Greenlee, Pima and
Division Engineer } Santa Cruz Counties.

J. C. RYAN, } Cochise and
Division Engineer } Yuma Counties.

F. G. TWITCHELL, } Gila, Graham and
Division Engineer } Pinal Counties.

Office Engineer } Maricopa County.



TEMPE BRIDGE
Prison Labor

STATE HIGHWAY DEPARTMENT.

PREFACE

When this administration assumed office, February 14, 1912, a tentative State Highway System had been adopted, consisting of a road from Yuma to Clifton and one from Douglas to the Grand Canon. The routes selected had become fixed to a certain extent by the construction of several units of their length and, though not meeting with entire approval, they had also become fixed in the public mind as the State Highways. It was, therefore, thought best not to make any changes in their location as it would undoubtedly lead to others by succeeding administrations, resulting in State Highways "that would start nowhere and end nowhere," thus defeating one object of the State Road appropriation—a State system of roads composed of coordinating county units connecting every county seat in the State. After the passage of the present State Road Law, June 20, 1912, which divides the State Road Fund among the various counties, it was necessary to select other State Highways traversing those counties not on the two previously selected routes. This has been done by the several Boards of Supervisors and the State Engineer. This proposed system of State Highways comprise approximately 1500 miles of roads connecting all the county seats and nearly all the principal towns in the State. Under the operation of the Territorial and State Road Laws, improvements made and approximate cost thereof are as follows:

Territorial Road Law

To June 30, 1912.

108 miles of road improved.....	\$448,000.00
1812 lin. ft. of bridges constructed (over 100 ft. in length)	144,000.0

State Road Law

To June 30, 1914.

143 miles of road improved.....	330,000.00
1608 lin. ft. of bridges constructed (over 100 ft. in length)	101,000.00

Note: Depreciation of equipment included in cost.

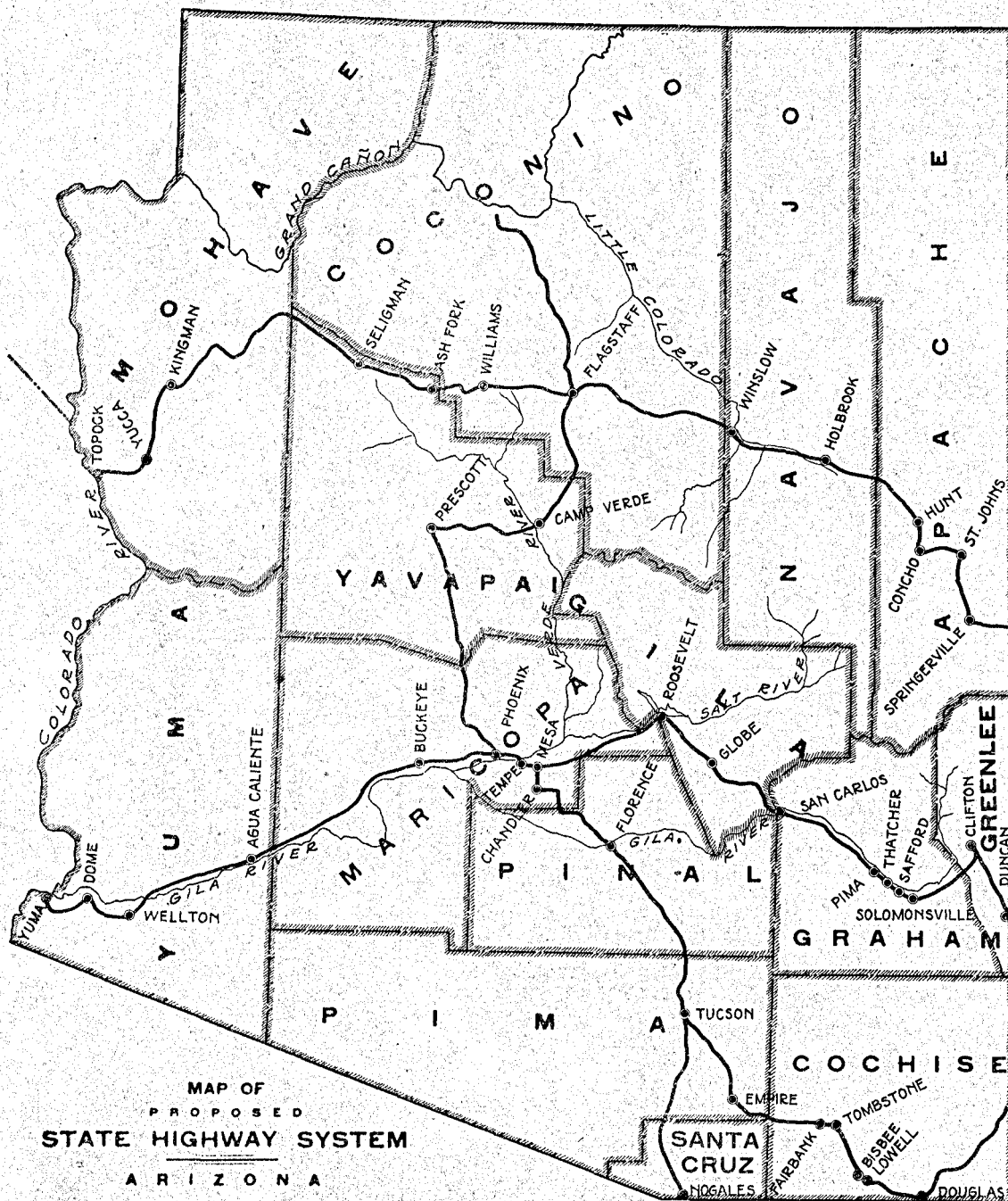
The mileage of roads improved with the State Road Fund is small considering the total mileage of the proposed system and

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their completion with the present annual Road Fund is far removed; however, the worst places between counties and those bearing the greatest amount of traffic are gradually being improved by permanent construction; so, even without additional means, they will be put in much better condition year by year and some day be completed.

The value of this department to the taxpayers of the State cannot be measured by the roads that have been built under its administration, for the examples of proper road construction it furnishes in every county is of greatest value to officials charged with the expenditure of county road funds. The Boards of Supervisors in eight of the fourteen counties have called upon this office for advice relative to road and bridge construction, four for plans and specifications, and four for our engineers to locate or superintend county road construction covering expenditures of approximately \$100,000.00. Since the creation of this department, there has been a marked improvement in the type of road work in every county in the State which is largely attributable to the demonstration work done by this office. This improvement is shown both in location and construction; however, the former, which is of the greatest importance, has not received the consideration it should have. Few county roads are now located in natural water courses, grades exceeding 10% are rare and more attention is being given to protection ditches and other drainage; however, their drainage openings are as a rule entirely too small, as for instance a 36 inch culvert to carry the water necessitating a 50 foot railroad bridge. In 1909 less than \$200,000.00 was expended on road work in Arizona. In 1915 over \$500,000.00 will be expended by Boards of Supervisors on county roads, exclusive of bond issues, of which \$630,000 have been voted in the past two years.

If the work of this department for the past two years has been successful, it is due to the cordial cooperation of the Board of Control and Boards of Supervisors; to the press and the public, irrespective of political faith, who have endeavored to assist in every possible manner in the building of a State Highway System; to the Territorial Engineer whose good work was an inspiration; and to



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the efficient services of the members of the organization of the Highway Department, Chief Clerk E. P. Adams, Engineers T. F. Nichols, J. C. Ryan, F. G. Twitchell, J. S. Barlow and F. R. Goodman.

Upon request of the State Engineer to the Office of Public Roads, Washington, D. C., for an engineer to inspect and report upon the State Road work in Arizona, Mr. W. A. Crossland, Senior Highway Engineer, was assigned to this work. He arrived January 3d, completed the inspection February 15th and the following is his report to the Director of the Office of Public Roads:

Phoenix, Arizona, February, 1914.

Mr. V. M. Peirce,

Chief Engineer, Office of Public Roads,

Department of Agriculture,

Washington, D. C.

Sir:—

With Hon. Lamar Cobb, State Engineer, I traveled by automobile, visiting the cities of Phoenix, Tempe, Tucson, Fairbanks, Tombstone, Bisbee, Douglas and Nogales on one trip and Roosevelt, Globe, San Carlos and Miami on another. In addition to these we made numerous short trips over the roads about Phoenix. Mr. Cobb wanted to visit Prescott and Clifton, where work is under way, but other duties kept him at his office in Phoenix. We were unable to go into Northern Arizona for fear of bad weather, and especially of snow. The weather encountered on our trips was perfect.

CONTRACT WORK.

Near Tucson I saw some road and culvert work being done by contract under the supervision of a division engineer. When I was there they were doing some grading on mountain work. About 20 miles had already been completed over the nearly level country between Tucson and Vail. This is the best unsurfaced (or probably the most appropriate term would be, naturally surfaced) road that I have seen. The soil there is, in itself, an excellent material for light traffic and the only work required was crowning and ditching. The location is excellent, practically the whole line being on the

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crest of a ridge from which water is shed from both sides. The grades are light. This is a good automobile road, but already it is being used as a speedway by speeders from Tucson. None but a hard road surface can resist such wear, and this one will soon begin to rut. It cost about \$300.00 per mile for construction. Water crosses it at only a few places. For small openings circular corrugated iron culverts with rubble masonry headwalls are used, while in the larger ones reinforced concrete bridges are being built.

CONVICT LABOR

I saw three convict camps. Near Bisbee and near Douglas are two camps under direction of the same division engineer. In both, men are kept under guard. Between Globe and Roosevelt there is a camp working under the honor system, i.e., without guards either in camp or on the work. There are about 130 guarded convicts and about 35 honor men.

At all the camps the convicts are comfortably sheltered, well fed and well treated. Guarded prisoners are kept in barbed wire stockades, under guard when not at work. As far as I could learn, work performed by guarded convicts costs probably more than it could be done by contract, but that prison labor could compete with day labor or force account work. The fact that prison labor under guard cannot as a rule compete with contract work is due to many reasons. The work must be such as to require the employment of at least one hundred men to keep the overhead and subsistence charges to a reasonable minimum. Regardless of the number of prisoners, it requires at least six guards, two to each eight hour shift and one captain of the guard. It requires about eight or nine guards to handle one hundred prisoners.

The other overhead expense, such as salaries of Superintendent of Construction and bookkeeper does not increase and that of foremen in about the same proportion as guards, with an increase in the number of prisoners. Cost of subsistence decreases with an increase in the number of men, as does various other items of expense, such as camp labor (prison), cooks, flunkies, etc.

The cost per working prisoner per working day with a camp of

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one hundred prisoners, Cochise County, is about one dollar and sixty cents (\$1.60). This covers every item of expense in connection with the employment of a prisoner, clothing, subsistence, medical attention, transportation (considerable owing to distance from prison), cost of escapes, guarding, stockade, etc.; of this the prison pays approximately twenty-three cents (23c)—the cost of clothing, subsistence and medical attention within that institution. This leaves a cost to the State per working man per day of \$1.37. It is estimated that their efficiency is about 66 2-3% or a cost as compared with hired labor of \$2.05. Such hired labor can be secured for not to exceed \$2.50 per day.

This difference in favor of prison labor is more apparent than real for in the case of contract work in a camp of this size the boarding house would probably return a profit as large as this difference, and in addition the commissary also return a profit. To sum it all up, the cost of prison labor in small numbers is prohibitive. In forces of approximately one hundred, the cost (considering efficiency) per working man per day is very nearly the same as is actually paid to a hired laborer, taking into consideration contractors' profit from boarding house and commissary. Under favorable conditions, including continuous employment for long periods at or near the same place, prison labor under guard can compete with contract work. Under other conditions it is extremely doubtful if it can do so. Attached are copies of monthly reports of cost data from the Bisbee-Tombstone Highway.

THE HONOR SYSTEM

Convicts working under this system do not live in stockades, but in tents as do free laborers. They are never under guard, either in camp or at work. In fact, no guards nor anything suggesting a prison camp is seen about their place. These are picked men or "trusties." They are about as efficient as hired labor, while it costs between one-third and one-half as much to work them. The report of the engineer in charge shows, cases of insubordination, none; escapes, none; attempted escapes, none. The men seem cheerful and satisfied. They evidently consider it worth while to qualify as honor men.

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So far as that camp is concerned, the experiment up to date is clearly a success and will probably continue successful, but it cannot be regarded as a solution of the convict labor problem as the proportion of convicts who have qualified as honor men is, to date, too small. Attached are copies of monthly reports from the Globe-Roosevelt honor camp.

All the prison labor is employed on grading and culverts. The grading is generally hill side work, a large proportion of it being solid rock.

GRADING AND DRAINING

All locating was carefully and well done. The grade limit is 6%. Regular profiles were prepared and the grading accurately done. It looks extremely well and reflects credit on the engineer in charge.

Culverts are generally of corrugated iron with headwalls of rubble masonry. These walls are heavy, well built and present a very pleasing appearance. Stone and sand are conveniently near and this work is very economically done.

Because of the light annual rainfall in Arizona, it is generally supposed by outsiders that drainage is an unimportant matter. That supposition is erroneous. Practically all the rainfall occurs in a few weeks and during that time the daily rainfall is heavy. The rate of precipitation and duration, which govern the size of drainage openings, is about the same in Arizona as elsewhere in the United States. The soil generally washes easily and all the hill sides are badly secured. On many of the roads drainage is the only important item.

SURFACING

No surfacing was being done, but preparation was being made to surface a portion of the Bisbee-Douglas Road, near Douglas, with slag and caliche. About four inches of slag will be used with a one and one-half inch surface of caliche. It is expected that the caliche will be driven in by the roller and, to a certain extent, act as a binder for the slag. I think it will make a good surface.

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MAINTENANCE

No regular system of maintenance has yet been introduced, though the importance of such is fully appreciated by the State Engineer and his assistants. They are giving careful study to the problem now and when they do begin systematic maintenance it will be under a system carefully planned, and will undoubtedly be the one best suited to the condition peculiar to Arizona. The principal difficulty is the extensive mileage and scarcity of settlements or houses along the roads. Twenty-five mile stretches of road without a single house on them are common. The few ranchers who do live on the roads either do not care to undertake the work of road maintenance, or have no teams or other equipment suitable for such work. In some instances where they have been hired to do the work, they have neglected it. The State Engineer and his assistants are not able to inspect a given section of road more than two or three times a year.

The engineer is now considering the feasibility of employing a few gangs of men trained and equipped for the work, who will be carried from point to point, visiting each section at such intervals as experience may demonstrate are necessary. Under conditions prevailing in Arizona, this seems to be the only feasible plan.

STATE SYSTEM

The State authorities have outlined a system of state roads and its completion is the goal to which their efforts are directed. The system consists of two roads crossing the State from east to west, one in the north and one in the south, and one running through the State from north to south. To these have been added one short road in order that each county seat may be touched.

STATE ROAD FUND

The State Road Fund of \$250,000.00 per annum, plus the automobile tax, about \$25,000, is expended under the direction of the State Engineer. Seventy-five per cent of it is divided among the counties in proportion to valuation. In each county this is under the joint control of the State Engineer and County Board of Super-

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visors; twenty-five per cent of the fund is allotted to projects, jointly by the State Board of Control and State Engineer. The engineer's policy is to insist on the expenditure of the whole fund on roads which are to form parts of the State system.

This method brings the engineer in close touch with all the county boards and is having an excellent effect in that it is impressing the latter with the value of competent engineering supervision of road work.

The State Engineer is responsible for all work done by his department. He appoints and discharges all employees.

The principal assistant, or office engineer, has charge of all engineers and draftsmen in the office. There all maps, profiles and estimates are checked and plans for roads, bridges and culverts are prepared.

The chief clerk and his assistant are in charge of the accounting, cost keeping, correspondence and purchasing of material and supplies. This work is evidently well done, though improvements in the system are being made.

FIELD WORK

Field work is in charge of four engineers called division engineers, though the State is not divided into divisions. Each of these engineers is assigned to projects without regard to their location. The State Engineer thinks a saving in expense might be effected by dividing the State into districts and is considering the advisability of doing it.

The State and the State Engineer are both fortunate in having the services of the men they have for office and division engineers. Without exception, they impressed me as being unusually strong men and capable engineers. Each man understands his work and is determined to do it better than the others are doing theirs. All are enthusiastic road men and I was pleased to note the esteem in which each of the engineers is held, personally and professionally, by the citizens amongst whom they live and for whom they work.

I saw very little of the assistant engineers. Judging them by the work done, there must be some good men amongst them.

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THE WORK

I have no criticism to offer regarding the work. Some suggestions that occurred to me were made to the State or division engineers and were generally agreed to by them.

RECORDS

Records appear to be kept in good shape. Cost data to a limited extent are kept. When they begin employing hired labor they will probably find it worth while to inaugurate a more elaborate system of cost keeping. The auditing of expenditures seems to be very carefully done. There is, however, no adequate system for the auditing of equipment, material and supplies, though I understand a more comprehensive system than now in use is being formulated and will soon be put in operation.

PAYING BILLS

The payment of accounts against projects are not promptly made as vouchers must be approved by the engineer in charge, the State Engineer and the County Board. This takes time and, in some cases, causes embarrassment. Some creditors cannot wait for their money. In such cases the division engineer pays the account from personal funds and is later reimbursed by the treasurer. In this way the division engineer is sometimes out as much as \$1,300.00 at a time. That works an imposition on the engineer. If those men are under bonds, there should be some way by which funds for such purposes could be advanced them on their memorandum receipts. It is expected that the next legislature will make such provision.

COUNTY WORK

Counties do not avail themselves to any great extent of the services of the State Engineer. This is due to no disinclination on their part, but to the fact that the engineer's organization is limited and he cannot always furnish the assistance requested of him.

ROAD BONDS

There is no authority under the constitution for the issuance by the State of bonds for public improvements. The latter part of

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this year the people will vote on a constitutional amendment authorizing the people to issue bonds for such purpose, not to exceed \$10,000,000.00.

Laws authorizing county bond issues were passed but cannot be effective until the next legislature corrects certain flaws in them.

When the debt of a county exceeds four per cent of the assessed property valuation, the people of the county may vote on a road bond issue. The debt of no county, with possibly one exception, is anywhere near this four per cent. Nor would the proposed issue of bonds increase the debt to that figure. So the counties are in this peculiar position: Because their indebtedness is too small they cannot issue bonds, there being no specific authority for such issue under the circumstances. A number of counties were preparing for large issues—one of \$1,500,000.00—when this legal technicality was discovered. There is no doubt but that the legislature will correct it. That will be too late for them to complete their roads in time for the automobile traffic that the 1915 expositions are expected to bring.

In the near future many millions of dollars will be expended on roads in Arizona. The State system of roads as agreed upon will serve its purpose, i.e., furnish the most and best roads possible for the most people possible, while the communities not touched by them will be served by the county roads. The added duties and responsibilities that will devolve upon the State Highway Department will be heavy. The State Engineer and his present small but effective force will form an excellent nucleus for the large organization that will be required.

The work being done by them, the experience and familiarity with local conditions being gained by them—all make it advisable to keep the men now in the service together—keep them on the work. An increase in salaries might have that effect.

The engineers do not see enough of each other. Nor does one know enough about the work being done by the others. Some ar-

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arrangement by which each might see the work of the others occasionally, and by which all might come together occasionally would be of much value to them and to their work.

Very respectfully,

W. A. CROSSLAND,
Senior Highway Engineer.

1909-1912

A N A C T

RELATING TO THE CONSTRUCTION, MAINTENANCE AND IMPROVEMENT OF TERRITORIAL ROADS AND CREATING THE OFFICE OF TERRITORIAL ENGINEER.

Be It Enacted by the Legislative Assembly of the Territory of Arizona:

Section 1. All highways and parts of highways and bridges which shall hereafter be constructed or improved under the provisions of this Act shall be Territorial highways and bridges.

Section 2. All such highways and bridges shall be constructed, improved and maintained according to the plans and specifications made for such purpose by the Territorial Engineer hereinafter provided for.

Section 3. The office of Territorial Engineer is hereby created, and there shall be appointed by the Governor, by and with the consent of the Council, a territorial engineer who shall hold his office for two years from the date of his appointment and until his successor shall be appointed and qualified. Such Territorial engineer shall be a practical competent civil engineer. The salary of the territorial engineer shall be Three Thousand Dollars (\$3,000.00) a year payable monthly, together with the necessary actual axpense, not to exceed Two Thousand Five Hundred Dollars (\$2,500.00), required to perform the duties of his office.

Section 4. The territorial engineer shall, before entering upon the discharge of his duties, execute a bond, with two or more sureties, to be approved by the Governor of the Territory of Arizona, and payable to the Territory of Arizona, in the sum of Five Thousand Dollars (\$5000.00) conditioned for the faithful discharge of his duties as such territorial engineer and be responsible for all public property in his possession and that he will turn the same over to the Board of Control on demand.

Section 5. The duties of the Territorial Engineer shall be to aid the Board of Control from time to time in such manner as they may require in the selection and designation of Territorial highways, and when so selected, and designated to take charge thereof and construct, maintain and keep the same in proper repair at the expense of the Territory of Arizona. It shall also be the duty of the Territorial Engineer to aid by his advice the County Superintendents of roads of the various counties of the Territory relative to the method of construction and maintenance of the county roads and bridges.

Section 6. The Board of Control shall, in addition to their present duties, perform the duties prescribed in this Act. They shall require the Territorial Engineer, from time to time as may be deemed requisite, to

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select, map, plan and furnish estimates of cost of construction of territorial highways and extensions thereof then proposed to be constructed as territorial highways, and upon the performance of said duty by the Engineer, they shall designate such road or extension thereof as they may deem proper and expedient to construct and maintain as a Territorial Highway.

Section 7. The Board of Control shall for the years 1909 and 1910 fix and determine the amount of Territorial road tax, not to exceed five cents on each One Hundred (\$100.00) Dollars of the assessed valuation of taxable property, which shall be levied by the Territorial Auditor in all counties where no road work is being done or to be done on Territorial road during the period for which such tax is levied and the Board of Control shall for the years 1909 and 1910 fix and determine the amount of the Territorial road tax, not exceeding twenty-five cents on each One Hundred (\$100.00) Dollars of the assessed valuation of taxable property, which shall be levied by the Territorial Auditor in all counties where Territorial roads are to be constructed during the period for which such levy is made, which said levy shall be assessed for the purpose of improving the existing Territorial roads and highways, and the building of new highways and bridges as the same may be necessary, and shall report the same to the Territorial Auditor. Provided, that thereafter all levies made under the provisions of this Act shall be such as may be fixed by Legislative Enactment.

Section 8. It shall be the duty of the Territorial Auditor to levy the said road tax in accordance with the amount determined in such report of the said Board of Control, and he shall cause such road tax to be levied and collected by the various counties in the Territory in the same manner, as other Territorial taxes are levied and collected, and when collected, the same shall be placed by him in a fund to be known as the Territorial road fund, to be expended for the benefit of the Territorial highways and bridges in accordance with the provisions and objects of this Act.

Section 9. Upon the adoption by the Board of Control of the plans and specifications for the construction of any Territorial highway or extension thereof, it shall be the duty of the Board of Control, to advertise in some newspaper published in the county in which such work is to be done, or in which any portion of such work is to be done, and calling for sealed proposals for the doing of such work. Such notice shall be given for at least thirty days prior to the opening of such sealed proposals, which shall be directed to the Board of Control of the Territory of Arizona, and marked "Territorial Highway Contract". Upon the opening of such proposals, the contract for the doing of the work shall be let to the lowest responsible bidder. Provided, however, that the Board of Control shall have the right to reject any and all bids. And further provided, that upon the awarding of the contract, the successful bidder shall enter into a contract with the

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Territory of Arizona, as may be prescribed by the Board of Control, a copy of which contract shall accompany the plans and specifications.

Section 10. All work done upon Territorial highways and bridges shall be under the supervision of the Territorial Engineer, and upon the completion of the same in accordance with the plans and specifications made therefor, the Territorial Engineer shall issue to such contractor, or his assignee, a certificate of acceptance stating the exact work accepted and the amount to be paid therefor by the Territory under the terms of the contract. Upon presentation of such certificate of acceptance, the Territorial Auditor shall issue his warrant for the payment of such work, in accordance with the terms of such certificate of acceptance, and such warrant shall be paid out of the Territorial road fund, in the same manner as other Territorial expenditures are made.

Section 11. It shall be the duty of the Territorial Auditor to keep a complete and accurate account of all moneys received for and expended out of the Territorial road fund, and to keep and preserve all contracts accepted by the Board of Control relative to the doing of any work upon the Territorial highways and bridges, and to keep and preserve all documents, books and papers which may be filed with him relative to such highways and bridges.

Section 12. Lands adjacent to a Territorial highway may be entered upon and occupied for the purpose of opening or constructing a drain or ditch so as to properly drain such highway;

1. By a Contractor or any of his agents or employes, whenever, under the specifications of the work being done by him, it shall be necessary to open or construct a drain or ditch for that purpose;
2. By the Territorial Engineer or his servants or agents or employes at any time for the purpose of making surveys for such drain or ditch;
3. By the Territorial Engineer, his agents or servants, or by the contractor or his servants, whenever, in the discretion or judgment of the Territorial Engineer, after the completion and acceptance of the highway, for the purpose of opening, constructing or maintaining ditches or drains upon such lands, necessary for the proper maintenance of such highway.

Section 13. The Board of Control may agree with the owner of lands entered upon and occupied, as provided in the preceding section, for the payment of damages caused by such entry or for the payment of damages for the taking and using of any rock, earth or timber from any adjacent unimproved land, or if unable to so agree, the right to enter and occupy such lands, or to take and use such rock, earth and timber may be acquired

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and the damages therefor shall be ascertained as provided in the condemnation law. Such damages shall in the case of a territorial highway be paid out of the moneys available for that purpose in the Territorial Road Fund.

Section 14. No street, surface, steam or electric road shall be constructed upon any portion of a territorial highway which has been, or may be, constructed or improved under the provisions of this Act, nor shall any person, firm or corporation enter upon or construct any such works in or upon any such highway of the Territory, other than crossing, and any person, firm or corporation violating the provisions of this Section shall be liable to a fine of One Thousand Dollars (\$1000) for each day of such violation, to be recovered at the suit by the Board of Control and paid to the Territorial Treasurer to the credit of the Territorial Road Fund, and may also be removed therefrom as a trespasser by the Board of Control on petition to the District Attorney of the County or Counties in which such trespass shall have been committed.

Section 15. All Acts and parts of Acts in conflict with the provisions of this Act are hereby repealed.

Section 16. This Act shall take effect and be in force on and after its passage.

Approved March 18th, 1909.

OPERATIONS OF TERRITORIAL AND STATE HIGHWAY DEPARTMENT, PERIOD JULY 1, 1909-JUNE 30, 1912

Prior to adoption of the foregoing law all road work in Arizona was under direction of District Road Overseers appointed by the County Boards of Supervisors. The annual expenditure for this work was approximately \$200,000.

While the establishment of the Territorial Highway Department was made with the appointment of Mr. J. B. Girard as Territorial Engineer, April 1, 1909, due to funds not being available before the latter part of the year 1909, very little construction work was undertaken before the year 1910. However, acting under direction of the Board of Control, a tentative system of Territorial Highways was laid out, consisting of a North and South Highway beginning at the City of Douglas in Cochise County and running in a northerly direction through the Counties of Cochise, Pima, Pinal, Maricopa, Yavapai and Coconino and terminating at the Grand Canon, and an East and West Highway beginning at the City of Yuma, in Yuma County and running in an easterly direction through

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the Counties of Yuma, Maricopa, Gila and Graham, terminating at the Town of Clifton in Graham County. Preparation of general plans and specifications for highways and bridges was carried on.

Upon funds becoming available, the construction work on sections of the North and South and East and West Territorial Highways was commenced and carried on, as far as possible with the funds available, up to the advent of Statehood, February 14, 1912.

REPORT OF TERRITORIAL ENGINEER AS FOLLOWS:

February 10, 1912.

Hon. Richard E. Sloan,
Governor, Territory of Arizona,
Phoenix, Arizona.

Dear Sir:

I have the honor to submit herewith my report covering the operation of this department from its organization to the present time.

SURVEYS

PRELIMINARY:

Prescott to Phoenix	131.5 miles
Globe to Roosevelt	90.0 "
Phoenix to Yuma	201.6 "
Globe to San Carlos	32.0 "
San Carlos to Clifton	114.3 "
San Carlos to Douglas	170.6 "
Douglas to Bisbee	23.3 "
Bisbee to Tucson	106.0 "
Tucson to Florence	66.0 "
Dewey to Camp Verde	45.0 "
Camp Verde to Flagstaff	75.0 "
Glendale to Mesa	24.0 "
Bisbee to Tombstone	24.0 "

TOTAL 1003.3 miles

LOCATION:

Prescott to Phoenix,	
Mt. Union Division	52.0 miles
Silver Mt. Division	6.0 "

STATE HIGHWAY DEPARTMENT.

Globe to Roosevelt	37.0 "
Glendale to Mesa	11.0 "
Tucson to Bisbee	16.0 "
Bisbee to Douglas	22.7 "
Camp Verde to Flagstaff	13.0 "
Tucson to Florence	65.7 "

TOTAL..... 223.4 miles

CONSTRUCTION

ROADS:

Prescott to Phoenix,	
Mt. Union Division	20.0 miles
Silver Mt. Division	3.0 "
Glendale to Mesa	13.5 "
Tucson to Florence	22.0 "
Florence to Bridge	2.0 "
Tucson to Bisbee	12.5 "
Bisbee to Douglas	22.7 "
Globe to Roosevelt	37.4 "
Camp Verde to Flagstaff	11.5 "

TOTAL 144.6 "

In addition to the above, there are uncompleted portions upon which work has been done on the following sections:

Mt. Union Division, Silver Mt. Division, Tucson-Bisbee, and Camp Verde-Flagstaff. We are also at present constructing the balance of the uncompleted road between Tucson and Florence, amounting to 18 miles.

BRIDGES

Florence. A 700-ft. reinforced concrete girder type across the Gila River.

Verde. A 300-ft. pin connected three-truss steel, with concrete abutments.

Hassayampa. A 80-ft. frame trestle. Built by Force Acct.

Tombstone Canon. A 60-ft. arch of reinforced concrete. Built by Force Acct.

Forest Wash. A 100-ft. frame trestle. Built by Force Acct.

In addition to the above we have constructed numerous small

STATE HIGHWAY DEPARTMENT.

reinforced concrete bridges of the slab type, varying from 10 to 16 feet, and we have under construction a 1500-ft. reinforced concrete bridge across the Salt River at Tempe, of the arch rib type, consisting of eleven 125-ft. clear spans. Also a 212-ft. deck truss bridge is now under course of construction across the Black River.

REPAIRS

We have put in repair the road from Phoenix to Yuma. Also the road from Phoenix to Glendale, and from Phoenix east to the Cross-cut canal. Also a portion of the Prescott-Phoenix Highway from Prescott south, including a section between the Senator and Silver Mt. divisions. Also the road from the end of our constructed portion of the Camp Verde-Flagstaff Highway to Flagstaff, and a section between Tucson and Bisbee.

EQUIPMENT

Annexed hereto is an inventory of all the territorial property purchased by this department and on hand on this date. Also equipment and material on hand for the construction of the Tempe Bridge and other material.

OFFICE WORK

All office work in connection with the surveying, mapping and construction has been done without outside assistance. The office force consisting of a Chief Clerk, Office Engineer and one draftsman, constitutes the present force. Their work consists principally in auditing and preparing claims for payment, making monthly estimates of work done, and mapping and platting as same was required, which includes the detail work in connection with the designing of the numerous structures erected under the direction of this Department.

In addition to the foregoing work, this Department has been called upon frequently to aid and assist the Board of Control in engineering matters outside of the scope of the territorial highway department, such as designing and installation of a sewage system for the prison, water supply for the prison, territorial fair grounds, capitol grounds, Benson Industrial School, etc.

STATE HIGHWAY DEPARTMENT.

Attached hereto is a complete financial statement showing in detail cost of operation from March 23, 1909, to February 10, 1912, inclusive.

Respectfully submitted,
(Signed) J. B. GIRAND,
Territorial Engineer.

PRESCOTT-PHOENIX HIGHWAY

Mt. Vernon Street Section.

Final Estimate, October, 1911, to December, 1911, inclusive.

J. A. Trenberth, Contractor.

Foreman	59.8 @ \$3.00	\$ 179.40
Laborers	326.4 @ 2.25	734.40
Drillers	40 @ 2.25	90.00
2-horse team and driver.....	4.5 @ 5.00	22.50
4-horse team and driver.....	226.4 @ 8.00	1,811.20
Wagons, plows and scrapers.....	242.9 @ .10	24.29
Blasting powder	10 kegs @ 2.30	23.00
Blasting powder	2 boxes @ 7.50	15.00
Blasting powder	4 boxes @ 8.00	32.00
Blasting caps	2 boxes @ .66	1.32
Blasting caps	1 box @ .75	.75
Blasting fuse	500 lin.ft. @ .51 per 100	2.55
Blasting fuse	300 lin.ft. @ .58 per 100	1.74
Total.....		\$ 2,938.15
Plus 10%		293.81

Total estimate\$ 3,231.96

Less previous estimates paid..... 2,688.38

Amount due contractors\$ 543.58

BISBEE-DOUGLAS HIGHWAY

Final Estimate, December, 1910, to January, 1912, inclusive.

R. Toohey & Sons, Contractors.

Earth	44,626.4 cu. yds. @ \$.18	\$ 8,032.75
Loose Rock	23,771.7 cu. yds. @ .49	11,648.13
Solid Rock	2,250.5 cu. yds. @ 1.10	2,475.55
Macadam (furnishing gravel).....	3,959.0 cu. yds. @ 1.00	3,959.00
Sand (furnishing & spreading)....	2,246.27 cu. yds. @ 2.00	4,492.54
Oiling	160,014.8 sq. yds. @ .06	9,600.89

STATE HIGHWAY DEPARTMENT.

Rolling	240,022. sy. yds. @ .04	9,600.88
Force account, plus 10% as per statement attached		16,586.04
Total.....		\$66,395.78
Less previous payments		53,123.56
Balance		\$13,272.22

MATERIAL.

Material furnished, not included in force account.....	\$7,329.19
Less payment on account.....	6,892.55
	436.64
Amount due	\$13,708.86

BISBEE-DOUGLAS HIGHWAY

Final Estimate, Force Account, December, 1910, to January, 1912.
R. Toohy & Sons, Contractors.

Foreman (bridge)	14	@ \$5.00	\$ 70.00
Foreman (grade)	182.5	@ 3.75	684.38
Foreman (grade)	251	@ 2.75	690.25
Foreman (grade)	41.5	@ 2.50	103.75
Laborers	1610.5	@ 1.75	2,818.37
Laborers	733.5	@ 1.50	1,100.25
Laborers	1129	@ 2.00	2,258.00
Carpenters, foremen	103.5	@ 5.00	517.50
Carpenters	172.5	@ 3.75	646.87
Carpenters	7.25	@ 3.25	23.56
Carpenters	28	@ 2.75	77.00
Teams & drivers, 10-horse and road grader	41.4	@ 20.00	830.00
Teams and drivers, 8-horse.....	36	@ 11.00	396.00
Teams and drivers, 6-horse.....	4.5	@ 10.00	45.00
Teams and drivers, 4-horse.....	376	@ 8.00	3,008.00
Teams and drivers, 2-horse.....	275	@ 5.00	1,375.00
Supplies, form lumber, cement and steel			191.13
Supplies, cement and steel.....			83.00
Supplies, cement and form lumber.....			130.16
			\$15,078.22
Plus 10%			1,507.82
Total force account, plus 10%.....			\$16,586.04

STATE HIGHWAY DEPARTMENT.

PRESCOTT-FLAGSTAFF HIGHWAY

Final Estimate.

J. A. Trenberth, Contractor.

Earth	21,142 cu. yds. @ \$.19	\$ 4,016.98
Loose rock	3,670 cu. yds. @ .49	1,798.30
Solid rock	4,804 cu. yds. @ 1.15	5,524.60
Macadam, furnishing gravel, 1083 cu. yds., 1 mile @ 1.50		1,624.50
Macadam, furnish'g gravel, 564.6 cu. yds., 1½ mi. @ 1.75		988.05
Macadam, furnishing gravel, 212.7 cu. yds., 2 miles @ 2.00		425.40
Macadam, furnishing gravel, 149 cu. yds., 2½ mi. @ 2.25		335.25
Force account, plus 10%, as per statement attached		15,057.21
Total.....		\$29,770.29
Less amount paid		23,816.21
Amount due contractor		\$ 5,954.08

PRESCOTT-FLAGSTAFF HIGHWAY

Total Force Account, June, 1911, to December, 1911, inclusive.

J. A. Trenberth, Contractor.

Sub-foreman	148.9 @ \$2.75	\$ 409.48
Sub-foreman	42.0 @ 2.50	105.00
Laborers	18.3 @ 2.25	41.17
Laborers	3937.4 @ 2.00	7,874.80
Blacksmiths	34.6 @ 4.00	138.40
Blacksmith helper	54.2 @ 3.50	189.70
Stone masons	51.5 @ 5.00	257.50
2-horse teams and drivers.....	343.4 @ 5.00	1,717.00
4-horse teams and drivers.....	110.9 @ 8.00	887.20
6-horse teams and drivers.....	127.7 @ 11.00	1,404.70
8-horse teams and drivers.....	14.8 @ 14.00	207.20
Wagons	163.3 @ .10	16.33
Plows	113.7 @ .10	11.37
Fresnos	59.1 @ .10	5.91
Slips	370.4 @ .10	37.04
Blasting powder	45 lbs. @ .16½	7.43
Blasting powder	443.5 lbs. @ .16	69.36
Blasting powder	647 lbs. @ .15½	100.00
Blasting powder	1036.2 lbs. @ .13½	139.89
Blasting caps	743 @ .70 per 100	5.20
Blasting caps	368 @ .90 per 100	3.31
Blasting caps	1675 @ .65 per 100	10.89

STATE HIGHWAY DEPARTMENT.

Blasting fuse	6033 ft. @ .75 per 100 ft.	45.25
Blacksmith coal	175 lbs.	3.95

Total	\$13,688.37
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Plus 10 per cent	1,368.84
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Total force account, plus 10%	\$15,057.21
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PRESCOTT-PHOENIX HIGHWAY

Silver Mountain Division.

Final Estimate of Force Account, November, 1911, to January, 1912, inclusive.

Foreman	23 @ \$3.00	\$ 69.00
Laborers	295.7 @ 2.25	665.32
2-horse team and driver	3.5 @ 5.00	17.50

Total	\$ 751.82
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Plus 10%	75.18
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Total force account, plus 10%	\$ 827.00
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PRESCOTT-PHOENIX HIGHWAY

Silver Mountain Division.

Final Estimate, November, 1911, to January, 1912, inclusive.

J. A. Trenberth, Contractor.

Earth	7,162 cu. yds. @ \$.20	\$ 1,432.40
Solid rock	14,092 cu. yds. @ 1.20	16,910.40
Clearing and grubbing	16.1 acres @ 25.00	402.50
Force account, plus 10%, as per statement attached		827.00

Total estimate	\$19,572.30
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Less previous estimates paid	15,657.84
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Amount due	\$ 3,914.46
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PRESCOTT-PHOENIX HIGHWAY

Senator Mountain Division.

Final Estimate, September, 1911, to January, 1912, inclusive.

J. A. Trenberth, Contractor.

Earth	16,127.28 cu. yds. @ \$.20	\$ 3,225.46
Loose rock	4,945.95 cu. yds. @ .55	2,720.27
Solid rock	13,290.86 cu. yds. @ 1.25	16,613.58

STATE HIGHWAY DEPARTMENT.

Gravel, furnishing and laying.....	77 cu. yds. @ 1.50	115.50
Force account, plus 10%, as per statement attached		8,519.02
Total.....		\$31,193.83
Less previous estimates paid.....		24,955.08
Amount due contractor.....		\$ 6,238.75

PRESCOTT-PHOENIX HIGHWAY

Senator Mountain Division.

Final Force Account Estimate, September, 1911, to January, 1912, inclusive.

J. A. Trenberth, Contractor.

Foreman	185.7 @ \$3.00	\$ 557.10
Mason	32.4 @ 5.00	162.00
Mason	26.0 @ 4.00	104.00
Blacksmith	18.5 @ 4.00	74.00
Blacksmith helper	2.7 @ 2.25	6.07
Laborers	2301.95 @ 2.25	5,179.39
Water boys	16.5 @ 2.25	37.13
2-horse teams and drivers.....	151.3 @ 5.00	756.50
4-horse teams and drivers.....	57.75 @ 8.00	462.00
Wagons, plows and fresnos.....	133.05 @ .10	13.31
Powder	25 lbs. @ .16	4.00
Powder	5 boxes @ 8.00	40.00
Power	25.5 boxes @ 7.50	191.25
Caps	15 boxes @ .61	9.15
Fuse	1200 feet @ .46 per 100 ft.	5.52
Fuse	1200 feet @ .57 per 100 ft.	6.84
Lumber	32 feet @ 40.00 per M.	1.28
Steel	526 lbs. @ .09½ per lb.	49.97
Cement	67½ sacks @ 1.26	85.05
Total.....		\$ 7,744.56
Plus 10%		774.46
Total force account, plus 10%.....		\$ 8,519.02

TUCSON-FLORENCE HIGHWAY

Final Estimate, October, 1911, to January, 1912, inclusive.

Griffin & Pacheco, Contractors.

Foreman	83 @ \$3.65	\$ 302.95
Sub-foreman	164 @ 2.65	434.60
Time-keeper	83 @ 3.25	269.75
Corral boss	82 @ 2.50	205.00

STATE HIGHWAY DEPARTMENT.

Blacksmith	83	@	3.50	290.50
Laborers	2772.5	@	1.65	4,574.62
2-horse team and driver.....	178	@	3.70	658.60
4-horse team and driver.....	396	@	6.00	2,376.00
Saddle horse	79	@	1.00	79.00
Plows	166	@	.20	33.20
Fresno scrapers	249	@	.10	24.90
Slip scrapers	185	@	.07	12.95
Wagons	334	@	.25	83.50
Water wagons	91	@	.80	72.80
Water (days)	29	@	3.00	87.00
Water (days)	2	@	2.00	4.00

MATERIAL.

Dynamite.....	50 lbs.	@	.16	8.00
Powder	100 lbs.	@	.16	16.00
Blasting caps, 5-x.....	200	@	1.25	2.50
Blasting caps, 5-x.....	3 boxes	@	1.00	3.00
Blasting fuse	900 ft.	@	.50	4.50
Lumber	987	gt. B. M.	@ 40.00	39.12
Cement	24	sacks	@ 1.10	26.40

Total.....\$ 9,608.89

Plus 10% 960.89

Total.....\$10,569.78

Less previous payments 8,466.76

Amount due, contractors.....\$ 2,103.02

TUCSON-BISBEE HIGHWAY

Final Estimate.

Griffin & Pacheco, Contractors.

Forman	226.5	@	\$3.65	\$ 972.73
Sub-foreman	333	@	2.65	940.75
Laborers	9055	@	1.65	14,940.75
10-horse team and driver.....	5	@	12.00	6.00
8-horse team and driver.....	14.5	@	10.00	145.00
6-horse team and driver.....	359.5	@	8.00	2,876.00
4-horse team and driver.....	743.5	@	6.00	4,461.00
2-horse team and driver.....	498.5	@	3.70	742.00
Saddle horse	69	@	.50	34.50
Blacksmith	212	@	3.50	742.00
Blacksmith helper	75	@	1.65	123.75

STATE HIGHWAY DEPARTMENT.

Plows	346.5 @ .20	69.30
Fresno scrapers	671 @ .10	67.10
Slip scrapers	469 @ .07	32.83
Drag scrapers	13.5 @ .10	1.35
Wheel scrapers	4 @ .22	.88
Wagons	170.5 @ .25	42.63
Water wagons	108 @ .80	86.40

Total force account.....	\$27,387.42
Plus 10 per cent.....	2,738.74
Total, plus 10%.....	\$30,126.16

Culvert Pipe Furnished and Laid.

310 lin. ft. of 12 inch @ \$1.22	\$378.20	
426 lin. ft. of 18 inch @ 1.60	681.60	
216 lin. ft. of 24 inch @ 2.10	453.60	
120 lin. ft. of 36 inch @ 3.10	372.00	
		1,885.40

Total.....	\$32,011.56
Less amount paid.....	26,397.29
Amount due	\$ 5,614.27

MATERIAL.

Material furnished	\$1,322.39
Less amount paid	1,219.37
Balance due on material.....	103.02
Amount due contractors	\$ 5,717.29

Tabulated statement showing receipts and expenditures by Counties, June 30, 1909, to June 30, 1912, as follows:

COUNTY	1910 Assessed Valuation	1911 Assessed Valuation	1912 Assessed Valuation	Paid into Road Fund	Expended to 6-30-12	Deficit
Apache	\$ 1,398,035.91	\$ 1,481,309.94	\$ 1,227,470.44	\$ 1,809.49	\$	\$
Cochise	18,692,704.82	18,714,652.13	19,336,876.85	120,041.12	87,701.95	
Coconino	4,463,174.89	3,902,889.85	4,330,203.58	29,839.64	23.75	
Gila	5,721,392.74	6,311,355.33	6,783,401.64	44,510.54	87,004.47	
Graham	8,182,337.97	8,429,520.34	2,993,019.20	9,393.97	1,804.42	
Greenlee			7,221,335.00	2,832.11		
Maricopa	15,641,411.66	17,388,067.99	21,418,734.24	130,435.65	70,337.62	
Mohave	1,661,246.23	1,975,795.29	2,475,890.93	3,295.59	16.85	
Navajo	1,467,979.97	1,902,001.36	2,541,466.00	6,693.30	19.35	
Pima	7,737,374.74	7,754,945.33	8,117,253.05	49,119.30	37,906.95	
Pinal	2,491,760.02	2,689,128.71	3,542,011.45	20,443.55	63,731.87	
Santa Cruz	2,178,114.33	2,241,182.54	2,438,942.11	3,135.08		
Yavapai	9,536,200.41	9,617,565.88	11,534,321.21	70,776.15	192,225.24	
Yuma	3,512,328.87	3,717,311.66	4,071,782.84	26,674.76	3,251.30	
	\$82,684,062.56	\$86,126,226.35	\$98,032,708.64	\$ 519,000.25	\$ 544,023.77	
Misc. Receipts				26,804.76		
Equipment						
General Expense				\$ 545,805.01	\$ 559,272.80	\$ 13,467.79
					13,830.56	
					1,418.47	

STATE HIGHWAY DEPARTMENT.

ENGINEERING AND CONSTRUCTION WORK BY COUNTIES,

JULY 1, 1909, TO JUNE 30, 1912

APACHE COUNTY

There was no engineering or construction work carried on in this county.

COCHISE COUNTY

Globe-Douglas Highway:

Reconnaissance survey of proposed highway between the City of Globe in Gila County and the City of Douglas in Cochise County completed. This survey consisted only of a stadia line for the purpose of determining the general feasibility of the route.

Cochise County proportion.....\$986.00

Lowell-Douglas Highway:

Survey between these two points completed. This survey consisted only of a stadia line for the purpose of determining general feasibility of route.

Cost of survey.....\$1,908.12

Bisbee-Tombstone Highway:

Inspection of proposed route of highway between Bisbee and Tombstone made by Territorial Engineer.

Expenses\$ 71.95

Bisbee-Douglas Highway:

Preliminary and final locations completed for Territorial Highway between City of Bisbee and City of Douglas and contract for construction by force account, after due advertisement, awarded to R. Toohy & Son, October 18, 1910.

This construction consisted in forming road bed, spreading thin layer of gravel on sub-grade, rolling and applying one-half gallon

STATE HIGHWAY DEPARTMENT.

of crude asphaltic oil per square yard and covering with thin layer of sand. The construction of a one hundred foot frame trestle, a sixty foot reinforced concrete arch, and numerous smaller bridges and culverts, also protection ditches; width of roadway 12 ft

Engineering	\$6,638.16	
Construction	77,581.59	
		\$84,219.75

Segregated Costs.

Earth	44626.4 cu. yds.	@ .18	\$ 8,032.75
Loose Rock	23771.7 "	@ .49	11,648.13
Solid Rock	2250.5 "	@ 1.10	2,475.55
Gravel	3959.0 "	@ 1.00	3,959.00
Sand	2246.27 cu. yds.	@ 2.00	4,492.54
Oiling	160014.8 sq. yds.	@ .06	9,600.89
Rolling	240022.0 "	@ .04	9,600.88

\$49,809.74

Carried forward\$49,809.74

Culverts, etc. 27,771.85

\$77,581.59

Engineering 6,638.16

\$84,219.75

Cost per mile..... 3,710.00

The above work was completed December, 1910, and there was expended for maintenance to June 30, 1912.....\$516.13

COCONINO COUNTY

Flagstaff-Grand Canon Highway:

Inspection made by the Territorial Engineer for proposed route of this highway.

Expenses\$ 23.75

STATE HIGHWAY DEPARTMENT.

GILA COUNTY

Globe-Roosevelt Highway:

Survey of this section of the Territorial Highway extending from the Town of Roosevelt to the City of Globe completed and after due advertisement for bids contract awarded April 6, 1910, to R. Toohey & Son, construction consisting of using cuts to make the fills without any attempt to procure any particular class of material for the roadbed.

Total number of miles surveyed 38.4, total miles constructed 32.4. Width of roadway 12 ft.

Engineering	\$ 6,774.59	
Construction	74,207.86	
	<hr/>	\$80,982.45
Cost per mile	\$ 2,499.00	

This work was completed February, 1911, and there was expended for maintenance to June 30, 1912, \$3,730.62.

Black River Bridge:

Upon representations made to the Territorial Board of Control, September, 1911; by the Board of Supervisors of Gila County, the Superintendent of the San Carlos Indian Reservation, Superintendent of the White Mountain Indian Reservation, and the Superintendent of the Arizona Eastern Railroad Company, appropriation was made of four thousand dollars from the Territorial Road Fund toward the construction of a 214.5-ft. wooden bridge over the Black River on the Globe to Ft. Apache road.

Expenditures to June 30, 1912:		
Engineering	590.33	
Construction	1,701.07	
	<hr/>	\$2,291.40

GRAHAM COUNTY

Globe-Douglas Highway:

Proportion of stadia survey.....\$ 985.99

STATE HIGHWAY DEPARTMENT.

Clifton-San Carlos Highway:

Preliminary survey between Clifton and San Carlos, a distance of 114 miles, completed.

Engineering \$ 818.43

MARICOPA COUNTY

Prescott-Phoenix Highway, Grand Avenue Division:

This section consists of that part of Grand Avenue extending from the city limits of Phoenix to Glendale. Portions of this road were surfaced with caliche, gravel and disintegrated granite at a cost of \$2,130.57.

There was expended on this section of highway \$4,612.32 for maintenance work to June 30, 1912, two teams and three men being employed for the joint maintenance of this section and the Phoenix-Tempe Highway.

Phoenix-Tempe Highway:

There was expended to June 30, 1912, on this section of highway \$6,920.64. This expenditure covering surfacing with caliche in some places and general maintenance work.

Phoenix-Yuma Highway:

Reconnaissance and some preliminary survey work made on the highway extending from the City of Phoenix to the Town of Yuma in Yuma County, a distance of 202 miles.

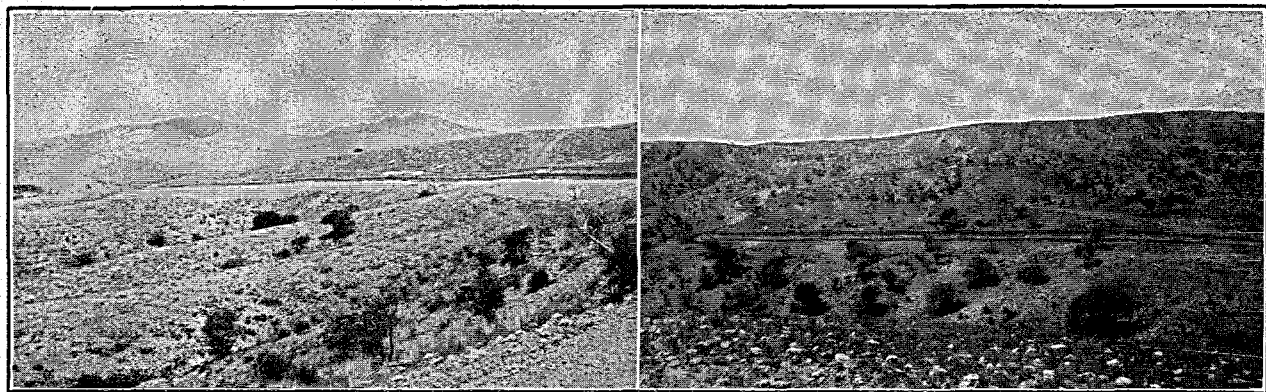
Proportion Engineering costs.....\$ 650.26

Tempe Bridge:

Plans and specifications prepared for the construction of a bridge over the Salt River at Tempe and construction under way with prison labor June, 1911.

Expended to June 30, 1912.....\$56,023.83

For detail, see Prison Labor section of this report.



PIMA COUNTY
Tucson-Bisbee, Davidson Canon Section
Borderland Highway

STATE HIGHWAY DEPARTMENT.

MOHAVE COUNTY

Expense of inspec'n of proposed highway routes. \$16.85

NAVAJO COUNTY

Chevelon Creek Bridge:

Inspection of site for proposed bridge over Chevelon Creek, about 12 miles east of Winslow made.

Expense \$ 19.35

PIMA COUNTY

Tucson-Bisbee Highway, Davidson Canon Division:

Preliminary survey made between the Cities of Tucson in Pima County and Bisbee, in Cochise County, and permanent location for a ten mile section from a point about 10 miles east of Vail through the Santa Rita Mountains. After due advertisement for bids contract was awarded May 23, 1911, to Griffith & Pacheco, of Tucson, for construction of 9.5 miles of this section on a force account basis. This construction consisted of grading and dragging and the placing of 1,072 feet of corrugated iron pipe culverts. Width of roadway 12 feet.

Engineering	\$ 4,525.40	
Construction	33,381.55	
		\$37,906.95
Cost per mile	\$ 3,990.00	

PINAL COUNTY

Tucson-Florence Highway:

Survey from the City of Florence in Pinal County to the City of Tucson in Pima County, a distance of 66 miles, completed. After

STATE HIGHWAY DEPARTMENT.

due advertisement for bids contract awarded Griffith & Pacheco on a force account basis October, 1911, for construction of this highway as far as the Pima County line, a distance of 38.4 miles; the work to consist of grading only. Width of roadway 12 feet.

Engineering\$ 3,715.16

Construction12,327.33

\$16,042.49

Cost per mile.....\$ 417.00

Globe-Ray Highway, Section One:

Preliminary survey made from Ray towards Globe to the Gila County line, a distance of 9.2 miles and later final location made of 7.1 miles.

Engineering\$1,388.60

Florence Bridge:

Expenditure\$45,417.36

For detail, see Prison Labor section of this report.

Maintenance\$ 883.42

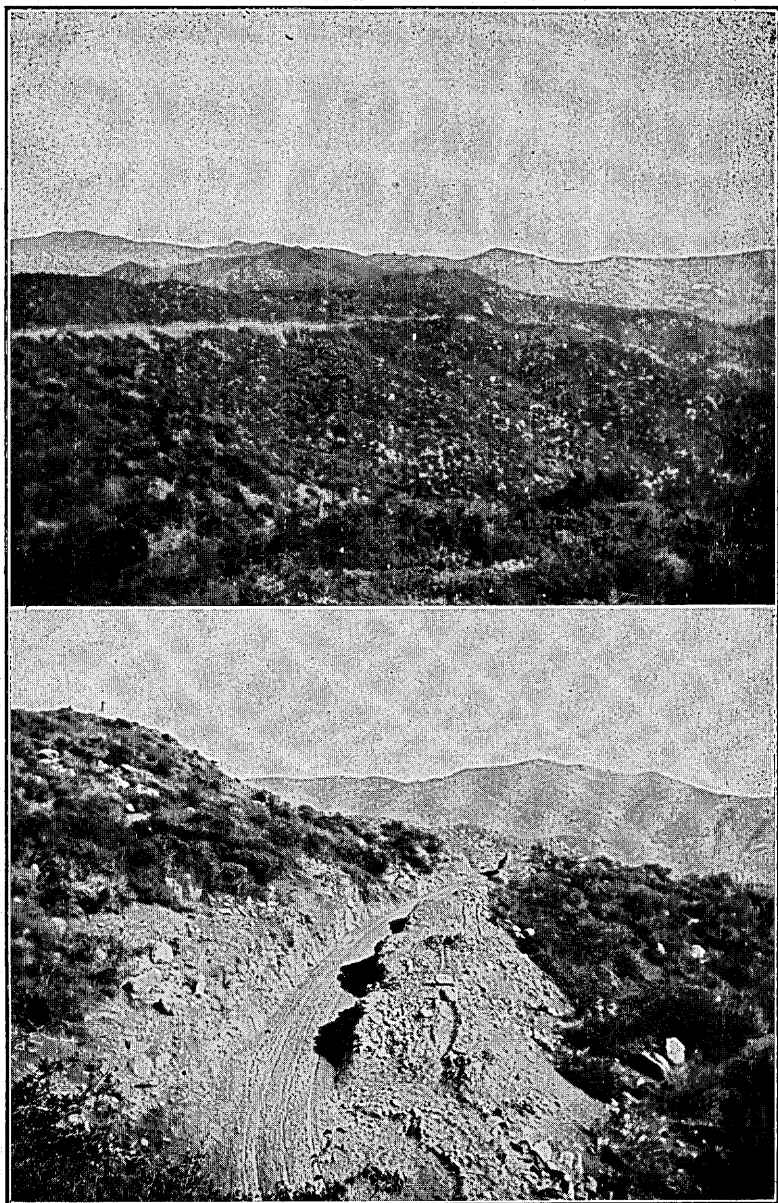
SANTA CRUZ COUNTY

There was no construction work or engineering undertaken in this county.

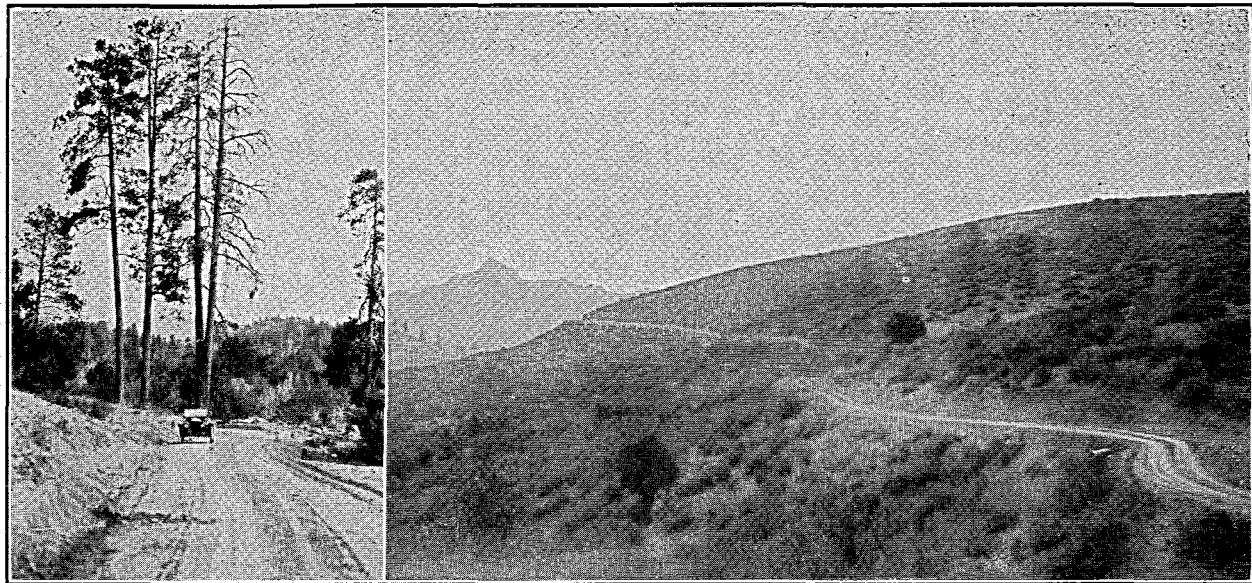
YAVAPAI COUNTY

Prescott-Phoenix Highway, Prescott Division:

Preliminary survey made from the City of Prescott to the City of Phoenix, a distance of 131 miles, expense of which was applied to this division. Final location made from Prescott toward Phoenix.



YAVAPAI COUNTY
Prescott-Phoenix, Silver Mountain Division
Grand Canon-Nogales Highway



YAVAPAI COUNTY
Prescott-Phoenix, Prescott Division
Grand Canon-Nogales Highway

STATE HIGHWAY DEPARTMENT.

a distance of 8.9 miles. After due advertisement for bids, contract awarded Johnson-Shea Company, April 29, 1910. The construction to consist of grading and surfacing with gravel or disintegrated granite rolled where necessary. In addition to this contract a supplementary agreement was entered into covering the construction of 76 small culverts and bridges including two 16-foot span concrete structures. Width of roadway 12 ft.

Engineering	\$ 6,365.61
Construction	48,970.97
	\$55,336.58

Cost per mile (construction only) \$5,502.00

Maintenance expense on this division to June 30, 1912, \$3,521.55.

Prescott-Phoenix Highway, Senator Mountain Division:

Final location extending from the end of completed construction on the Prescott division, 9.5 miles completed, and force account agreement entered into September, 1911, with J. A. Trenberth for construction of 8.5 miles. Same type of construction as the Prescott division. There were placed on this division 50 corrugated pipe culverts, 2 feet in diameter or less, 6 30 to 36 inch and 1 60 inch, also 3 small concrete culverts, 3 dry wall culverts and 1-5 span timber trestle. All these structures placed under supplementary force account agreement. Width of roadway 12 feet.

Engineering	\$ 7,961.61
Construction	35,187.71
	\$43,149.32

Cost per mile.....\$ 5,076.00

Prescott-Phoenix Highway, Silver Mountain Division:

Beginning about 30 miles south from the end of construction on the Senator Mountain Division final location made of 2.75 miles toward Phoenix, and force account agreement made September, 1911, with J. A. Trenberth. This construction consisted mainly of rock cut through disintegrated granite or similar material. While this work was completed, final estimate amounting to \$6,494.46 was not paid until after June 30, 1912, which would make total cost complete \$31,367.67, or \$11,202.00 per mile.

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Expenditures to June 30, 1912:

Engineering	\$ 5,300.91	
Construction	19,572.30	
		\$24,873.21

Prescott-Phoenix Highway, Mount Vernon Division:

One-half mile connection was made with Mount Vernon Street of the City of Prescott and the Prescott division, October, 1911, to December, 1911, by force account.

Construction	\$ 3,283.22
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Verde River Bridge:

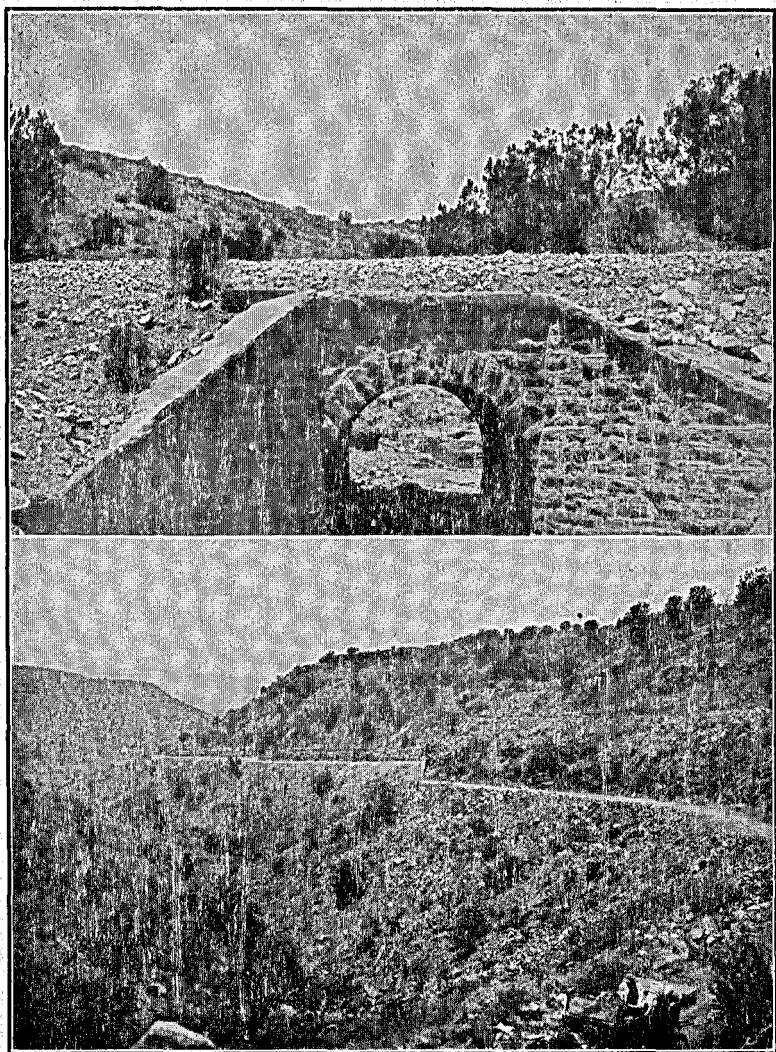
Plans and specifications prepared for a steel bridge over the Verde River near the Town of Camp Verde on the proposed Prescott-Flagstaff section of the Territorial Highway. Bids were requested and on September 27, 1910, contract was awarded the Missouri Valley Bridge & Iron Company, for the construction of three 100 foot spans steel thru Pratt truss for \$22,055.97. Construction completed and bridge accepted October 19, 1911. Width of roadway 12 feet.

Engineering	\$ 3,149.60	
Contract	22,056.03	
		\$25,205.63

Prescott-Flagstaff Highway, Section One (Mogollon Hill Division):

Preliminary survey from the City of Prescott to the City of Flagstaff, a distance of 134 miles made and cost thereof charged to this division. Final location made of 8.7 miles beginning at a point 7.1 miles north of the Verde Bridge and extending toward Flagstaff. After advertisement for bids force account contract awarded J. A. Trenberth, May 23, 1911, construction consisting of grading and surfacing of four miles with natural broken rock and 4.7 miles with local material. Supplementary agreement made covering placing of about 40 culverts and also ditching. Width of roadway 12 feet.

Engineering	\$ 6,576.01	
Construction	30,279.72	
		\$36,855.73
Cost per mile.....	\$ 4,237.00	



YAVAPAI COUNTY
Prescott-Flagstaff, Mogollon Hill Division
Grand Canon Highway

STATE HIGHWAY DEPARTMENT.

YUMA COUNTY.

Phoenix-Yuma Highway:

Reconnaissance and preliminary survey made between Phoenix and Yuma, a distance of 202 miles.

Proportion engineering cost.....\$1,300.53

Maintenance expense on this section to June 30, 1912, \$1,950.77.

General Expense.

Miscellaneous engineering expense which cannot be distributed.....\$ 1,418.47

Administrative.

Salary and expenses of Territorial Engineer paid from General Fund:

Salary\$9,000.00

Expenses 7,857.38

\$16,857.38

1912-1913

AN ACT

RELATING TO THE CONSTRUCTION, MAINTENANCE AND IMPROVEMENT OF STATE ROADS AND BRIDGES; CREATING THE OFFICE OF STATE ENGINEER, PRESCRIBING THE DUTIES THEREOF AND COMPENSATION THEREFOR; FIXING A TAX LEVY AND MAKING APPROPRIATION TO CARRY OUT THE PROVISIONS OF THIS ACT, AND AUTHORIZING AND DIRECTING THE EXPENDITURE OF SUCH APPROPRIATION.

Be It Enacted by the Legislature of the State of Arizona:

Sec. 1. All highways and parts of highways, and bridges which were heretofore constructed by the Territory, or the State of Arizona or which shall hereafter be constructed or improved under the provisions of this Act, shall be State highways and bridges.

Sec. 2. All highways and bridges constructed, improved or maintained under the provisions of this Act shall be constructed, improved and maintained according to the plans and specifications made for such purpose by the State Engineer, herein provided for, subject to the restrictions and limitations of this Act, and shall be only for the industrial development of the State.

Sec. 3. The office of State Engineer is hereby created, and there shall be appointed by the Governor, by and with the advice and consent of the Senate, a State Engineer, who shall hold his office for two years (2) from the date of his appointment and until his successor shall be appointed and qualified. Such State Engineer shall be a practical, competent Civil Engineer. The salary of the State Engineer shall be Three Thousand (\$3,000.00) Dollars a year, payable semi-monthly, together with the necessary actual expense, not to exceed Two Thousand Five Hundred (\$2,500.00) Dollars per year, required to perform the duties of his office.

Sec. 4. The State Engineer shall, before entering upon the discharge of his duties, execute a bond, with two or more sureties, to be approved by the Governor of the State of Arizona, and payable to the State of Arizona, in the sum of Five Thousand (\$5,000.00) Dollars, conditioned that he will faithfully discharge his duties as such State Engineer, be responsible for all public property in his possession, and turn the same over to the Board of Control on demand.

Sec. 5. The duties of the State Engineer shall be to aid the Board of Control, and the Board of Supervisors of the several counties in such manner as the Board of Control may require, in the selection and designation of State Highways. It shall also be the duty of the State Engineer to aid

STATE HIGHWAY DEPARTMENT.

by his advice the County Superintendent of roads and bridges of the various counties of the State relative to the method of construction and maintenance of the county roads and bridges.

Sec. 6. The Boards of Supervisors of the several counties shall act with the State Engineer in the selection of the highways and bridges to be constructed under this Act, within the limits of their respective counties, and said State Engineer shall, on the request of the Board of Control of the State, or any Board of Supervisors of any County be required to select, map, plat and furnish estimates of the cost of construction of, State highways and bridges, or extensions thereof, proposed to be constructed under the provision of this Act, which data and information, as specified above, shall be furnished free of charge to such Boards requesting same.

Sec. 7. There shall be annually levied and collected in the manner in which other State taxes are levied and collected, by a levy by the officials provided by law, a sufficient tax to raise the sum of Two Hundred and Fifty Thousand (\$250,000.00) Dollars annually, said levy to be made upon the taxable property within the State, for the purpose of raising a fund to be known as the State Road Tax Fund, to be expended for the construction, re-construction, repairing, improving and maintaining public highways, roads and bridges as follows:—

Twenty-five per cent (25%) of the "State Road Tax Fund," herein provided for, shall be subject to be paid out upon the authority and under the direction of the State Board of Control and State Engineer, who are hereby charged with such responsibility.

Provided, that twenty-five per cent (25%) of the State Road Tax Fund herein provided for, for the fiscal year beginning July 1st, 1912, and ending July 1st, 1913, shall be subject to be paid out, upon the authority and under the direction of the State Board of Control, upon claims approved by the State Engineer and the Board of Control and audited by the State Auditor, for any work done under the authority of the Territory of Arizona or the State of Arizona, in the construction, re-construction, repairing, improving and maintaining of public highways, roads and bridges prior to July 1st, 1912; Provided further, that such part of the said twenty-five (25%) per cent for the fiscal year from July 1st, 1912, to July 1st, 1913, as is not expended for said purpose shall be expended for the construction, re-construction, repairing, improving and maintaining of public highways, roads and bridges under the provisions of this Act, within the fiscal year from July 1st, 1912, to July 1st, 1913. The Board of Control and the State Engineer are hereby charged with the responsibility of making said expenditure.

Seventy-five (75%) per cent of such State Road Tax Fund, herein provided for, shall be apportioned to the several counties in the amount to each county of seventy-five (75%) per cent of the taxes collected under this Act by said county, and such amount shall be subject to be paid out for

STATE HIGHWAY DEPARTMENT.

the construction, re-construction, repair, improvement and maintenance of public highways, roads and bridges in the manner as in this Act provided, for the work in this Act provided for within such county, upon the authority and under the direction of the County Board of Supervisors of such County and the State Engineer, who are hereby charged with such responsibility.

Provided, that no obligation shall be assumed or expense incurred under the provisions of this Act, within any fiscal year, in the amount of any sum in excess of the levy herein provided for and the money actually collected under said levy.

Provided that Maricopa County shall be entitled to have the proportion of the State Road Tax Fund paid into said State Road Tax Fund for the fiscal year 1912-1913 by said county, expended upon that portion of the State Bridge now incomplete, and known as the "Tempe Bridge".

Sec. 8. Upon the adoption by the Board of Control or the Board of Supervisors, under whose direction the work is to be done, of the plans and specifications for the construction of any State Highway or Bridge, or extension thereof, it shall be optional with the Board of Control or Board of Supervisors, as the case may be, to have any or all work provided for by this Act done either by contract or under a wage system. In case the work is to be done by contract it shall be the duty of the Board of Control, or Board of Supervisors, to advertise in a newspaper published in such county, where the proposed work is located, for sealed proposals for the doing of such work. Such notice shall be given for at least thirty (30) days prior to the opening of such sealed proposals, which shall be directed to the said Board of Control, or the Board of Supervisors, as the case may be, and marked "State Highway Contract." Upon the opening of such proposals, the contract for the work shall be let to the lowest responsible bidder; provided, however, that the said Board of Control, or Board of Supervisors, shall have the right to reject any or all bids and may proceed to construct said work under their own supervision, without contract. In case the contract is awarded, as herein provided, the successful bidder shall enter into such a contract with the State of Arizona, or the county in which the work is to be done as may be prescribed by the said Board of Control or the Board of Supervisors, a copy of which contract shall accompany the plans and specifications. The successful bidder shall also file with said Board of Control, or the Board of Supervisors, a good and sufficient bond, payable to the State of Arizona, or to the county, in a sum not less than twenty-five (25%) per cent of the contract price of said work, conditioned upon the faithful performance of said contract.

Sec. 9. No person not a citizen or ward of the United States or who has not declared his intention to become a citizen, shall be employed upon, or in connection with, any State, county, or municipal works or employment; Provided, that nothing herein shall be construed to prevent the

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working of prisoners by the State, any county, or by any municipality thereof, on street or road work, or other public work; and provided further, that the Board of Control shall require all contractors, under the provisions of this Act, to comply with the restrictions in this section contained.

Sec. 10. All roads and bridges, when constructed, shall thereafter be maintained and improved when necessary, at the expense of the county in which located, out of the seventy-five (75%) per cent of the taxes collected under this Act from said county, under the joint auspices and direction of the State Engineer and Board of Supervisors of such county.

Sec. 11. It shall be the duty of the State Engineer, upon request of the Board of Supervisors of any county where the work is being done under the provisions of this Act, to furnish such Board of Supervisors with a duplicate copy of the plans and specifications for such work.

Sec. 12. It shall be the duty of the State Auditor to keep a complete and accurate account of all moneys received for and expended out of the State Road Tax Fund and to keep and preserve all documents, books and papers which may be filed with him relative to such highways and bridges.

Sec. 13. Lands adjacent to a State highway may be entered upon and occupied for the purpose of opening or constructing a drain ditch so as to properly drain such highway.

1. By the State Engineer or his servants or agents or employes at any time for the purpose of making surveys for such drain or ditch.

2. By the State Engineer his agents or servants, whenever, in the discretion or judgment of the State Engineer, after the completion and acceptance of the highway, for the purpose of opening, constructing or maintaining ditches or drains upon such lands, necessary for the proper maintenance of such highways.

Sec. 14. The Board of Control, with the consent and approval of the Board of Supervisors of the county where the work is being done or the property affected is situated, may agree with the owner of lands entered upon and occupied, as provided in the preceding section, for the payment of damages caused by such entry, or for the payment of damages for the taking and using of any rock, earth or timber, from any adjacent unimproved land, or, if unable to so agree, the right to enter and occupy such lands or to take and use such rock, earth and timber may be acquired, and the damages therefor shall be ascertained as provided in the condemnation law. Such damages shall in the case of a State highway be paid out of the seventy-five (75%) per cent of the total sum levied under this Act in the County wherein said work is being done or the property is situated, and subject to be paid out under the authority of the County Board of Supervisors and the State Engineer as in this Act provided.

Sec. 15. No street, surface, steam or electric road shall be constructed or improved under the provisions of this Act, nor shall any person, firm or

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corporation enter upon or construct any such works in or upon any such highway or bridge of the State, other than crossing said highway, and any person, firm or corporation violating any provision of this Act shall be liable to a fine of Five Hundred Dollars (\$500.00) for each such violation, to be recovered by suit by the Board of Control and paid to the State Treasurer to the credit of the State Road Tax Fund, and may also be removed therefrom as a trespasser by the Board of Supervisors of the county or counties in which such trespass shall have been committed.

Sec. 16. All Acts and parts of Acts in conflict with the provisions of this Act, and especially that certain Act entitled, "An Act relating to the Construction, Maintenance and Improvement of State Roads and Bridges, Creating the office of State Engineer and Prescribing the Duties thereof and Compensation therefor", approved May 18th, 1912, are hereby repealed.

Sec. 17. Whereas, an urgent necessity exists for the construction, maintenance and improvement of State Roads and Bridges and for the creation of the office of State Engineer, and,

Whereas, urgent necessity exists for making an appropriation to carry out the provisions of this Act, and

Whereas, the provisions of this Act are necessary to the public peace, health and safety, an emergency is hereby declared to exist and this Act shall be in full force and effect from and after its approval by the Governor and is hereby exempt from the operation of the Referendum provision of the State Constitution.

Approved June 20th, 1912.

A N A C T

APPROPRIATING THIRTY THOUSAND DOLLARS, OR SUCH PORTION THEREOF AS MAY BE NECESSARY, FOR THE PURPOSE OF COMPLETING THE ERECTION AND CONSTRUCTION OF THE TEMPE BRIDGE, THE APPROACHES THERETO, AND A SECTION OF ROAD CONNECTING THE NORTH APPROACH OF SAID BRIDGE WITH THE PRESENT STATE HIGHWAY, IN MARICOPA COUNTY, AND FOR SUCH OTHER PURPOSES AS THE BOARD OF SUPERVISORS OF MARICOPA COUNTY MAY DIRECT.

WHEREAS, the First Legislature of the State of Arizona, at its First Special Session, by an Act, entitled: "An Act Relating to the Construction, maintenance and Improvement of State Roads and Bridges, Creating the Office of State Engineer, Prescribing the Duties Thereof and Compensation Therefor; Fixing a Tax Levy and Making Appropriation to Carry Out the Provisions of This Act, and Authorizing and Directing the Expenditure of Such Appropriation", providing that Maricopa County should be entitled to have the proportion of the State Road Tax Fund, for the fiscal year

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1912-1913, by said County, expended upon that portion of the State Bridge, now incomplete, and known as the Tempe bridge; and,

WHEREAS, the provision and appropriation so made for the work upon said bridge has proved insufficient for the completion of said bridge; and,

WHEREAS, the fund so appropriated has become exhausted and the State Engineer and the Board of Supervisors of said County are without resources, under the present statutes, to carry on and complete said work; and,

WHEREAS, the amount which will accrue to the State Road Tax Fund, from the levy therefor, from Maricopa County, for the current fiscal year will amount to not less than the sum of Forty-five Thousand Dollars. Now, therefore,

Be It Enacted by the Legislature of the State of Arizona:

Sec. 1. That there be, and there is hereby, appropriated, from the State Road Tax Fund, the sum of Thirty Thousand Dollars, or so much thereof as may be necessary, for the purpose of completing the erection and construction of the Tempe bridge and the approaches thereto, in Maricopa County, in accordance with the plans and specifications therefor, upon which the work of construction has so far progressed, and for such other purposes as the Board of Supervisors may direct, to be paid out upon claims duly certified by said Board of Supervisors, and approved by the State Engineer; Provided, however, that all moneys so paid out shall be charged to that portion of said fund collected from said County of Maricopa, and by law, apportioned to said County and reserved for the construction, re-construction, repair, improvement and maintenance of State roads, highways and bridges, in said County; Provided, however, that if, at any time, there should be an insufficient amount in said State Road Tax Fund derived from the collection of the levy for that portion of said fund collected in said County of Maricopa, by law apportioned to said County, being seventy-five per cent of the total levy for said fund collected in said County, to pay any claim made under the provisions herein, that then such claim shall be paid out of the General Fund of the State.

Sec. 2. Should any money appropriated herein be paid out of the General Fund, then said fund shall be reimbursed, for money so drawn from it, from the State Road Tax Levy collected therefor in Maricopa County for the fiscal year 1913-1914, and apportioned as the said seventy-five per cent and subject to be paid out for the construction, re-construction, repair, improvement, and maintenance of State highways, roads and bridges, within said County, as provided by law, from the first money paid into said fund upon account of the State Road Tax Fund for the fiscal year 1913-1914.

Sec. 3. All Acts and parts of Acts in conflict with the provisions of this Act are hereby repealed.

Sec. 4. Whereas, an urgent necessity exists for the construction, com-

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pletion and maintenance, of said bridge, the approaches thereto, and that section of road connecting the north approach of said bridge with the present State highway; and,

Whereas, an urgent necessity exists for making an appropriation to carry out the provisions of this Act; and,

Whereas, the provisions of this Act are necessary to the public safety;

An emergency is hereby declared to exist, and this Act shall be in full force and effect from and after its passage and its approval by the Governor, and is hereby exempt from the operation of the Referendum provisions of the State Constitution.

Approved April 3, 1913.

A N A C T

TO AUTHORIZE THE STATE OF ARIZONA TO ADVANCE MONEY OUT OF THE GENERAL FUND TO THE SEVERAL COUNTIES FOR THE PURPOSE OF CONSTRUCTING BRIDGES, AND PROVIDE FOR THE REPAYMENT OF ANY MONEY SO ADVANCED OUT OF THE STATE ROAD TAX FUND.

Be It Enacted by the Legislature of the State of Arizona:

Sec. 1. The State of Arizona is hereby authorized to advance to any county a sum of money, not exceeding twenty thousand dollars to any one county, for the purpose of constructing one or more bridges in such county.

Sec. 2. The board of supervisors of any county desiring to construct any bridge, may make application to the Board of Control for an advancement of money to such county, by the state, for the purpose of constructing such bridge. Before any such application shall be made, a resolution shall be adopted by board of supervisors, directing that such application be made and authorizing the chairman and clerk of said board to make such application.

Such application shall be in writing, and under the seal of the board, signed by the chairman and attested by the clerk and shall set forth fully the location of the proposed bridge, the dimensions thereof, the estimated cost of constructing the same, and a full statement of all the facts concerning such bridge.

Sec. 3. Upon the receipt of any such application, the Board of Control shall consider the same at its next meeting and if it deem it proper to grant such application, said Board of Control shall make an order, and enter the same in its minutes, directing that a sum of money to be specified in said order, not exceeding twenty thousand dollars, be advanced by the State to the county making such application for the purpose of constructing a bridge as specified in such application. Such order shall direct that the sum

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mentioned therein be paid out of the general fund of the State at such times and in such amounts as the Board of Control may direct.

Sec. 4. Upon presentation to the Auditor of the order of the Board of Control and all the directions of said Board as to the time and amount of payments, the State Auditor shall draw his warrant or warrants, payable out of the General Fund of the State in favor of such county, and the State Treasurer shall pay the same as other warrants are paid.

Sec. 5. The State Treasurer shall keep a separate account of all warrants so drawn and presented. Whenever any moneys shall be received in the State Treasury to the credit of the seventy-five per cent of the State Road Tax Fund belonging to such county, the State Treasurer shall transfer the same from the said State Road Tax Fund to the general Fund of the State, and shall from time to time continue to make such transfers until the said General Fund shall be fully reimbursed, and the amount paid out of said General Fund, pursuant to the provisions hereof, shall be fully repaid.

Approved May 15th, 1913.

TITLE L.—CHAPTER VII.

USE OF PUBLIC HIGHWAYS BY MOTOR VEHICLES.

(Chapter 68, Laws 1913, Third Special Session.)

5132. The words and phrases used in this chapter shall, for the purposes of this chapter, unless the same be contrary to, or inconsistent with, the context, be construed as follows:

(1) "Motor vehicle" shall include all vehicles propelled by any power other than muscular power, provided that nothing herein contained shall, except the provisions of subdivisions 3, 4, and 5 of Section 3 (Paragraph 5134) and subdivision 1 of Section 4 (Paragraph 5134) of this chapter, apply to traction engines or road rollers;

(2) "Public highways" shall include any highway, county road, state road, public street, avenue, alley, park, parkway, driveway, or public place in any county, or incorporated city or town;

(3) "Closely built up" shall mean—

(a) The territory of any county, or incorporated city or town, contiguous to a public highway, which is at that point built up with structures devoted to business;

(b) The territory of any county, or incorporated city or town contiguous to a public highway not devoted to business, where, for not less than one-quarter of a mile, the dwelling-houses on such highway average less than one hundred feet apart; provided, that the local authorities having charge of such highway shall have placed in a conspicuous place on one side thereof, at both ends of such closely built up sections, signs of suffic-

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lent size to be easily readable by a person using the highway, bearing the words "Slow down to Miles," inserting in the blank space the number of miles to which the speed is to be reduced, and also an arrow pointing in the direction where the speed is to be reduced;

(4) "Local authorities" shall include all boards of supervisors, trustees or councils, committees and other public officials of counties, or incorporated cities and counties, cities or towns;

(5) "Chauffeur" shall mean any person operating a motor vehicle as mechanic or employee or for hire.

5133. (1) Every owner of a motor vehicle shall, for every such motor vehicle owned by him, file annually in the office of the secretary of state, on a blank to be prepared and furnished by such secretary of state for that purpose, a statement of his name and address, with a brief description of the vehicle to be registered, including the name of the maker, factory number, style of vehicle and motor power. An annual license shall be assessed of five dollars for motor vehicles of twenty-five horse power and under, A. L. A. M. rating; ten dollars for motor vehicles of more than twenty-five and not more than forty horse power, A. L. A. M. rating; fifteen dollars for motor vehicles of more than forty horse power, A. L. A. M. rating and two dollars for motorcycles. The provisions hereof with respect to the payment of registration fees shall not apply to motor vehicles owned by this state, the United States, a county or city or any of the departments thereof. Such state, county and city motor vehicles shall display a distinctive number plate showing the ownership thereof, but in all other respects the provision of this chapter shall be applicable. The license hereunder granted when the same is applied for and granted on or after July first of each year, shall be at the rate of one-half the annual fee charged for such motor vehicle provided herein.

(2) The secretary of state shall thereupon file such statement in his office, register such motor vehicle in a book or index kept for such purpose, and assign it a distinctive number.

(3) The secretary of state shall forthwith on such registration, and without other fee, issue and deliver to the owner of such motor vehicle a seal of aluminum or other suitable metal, which shall be circular in form, approximately two inches in diameter, and have stamped thereon the words "Registered motor vehicle No., State of Arizona," with the registration number inserted therein; which seal shall thereafter at all times be conspicuously displayed on the motor vehicle, to which such number has been assigned.

(4) Upon the sale or transfer of a motor vehicle registered in accordance with this section, the vendor thereof shall immediately give notice of such sale with the name and residence of the vendee to the secretary of state, and the vendee shall, within ten days after the date of such sale or

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transfer, notify the secretary of state upon a blank furnished promptly by him for that purpose, stating the name and business of the previous owner, if known, the number under which such motor vehicle is registered and the name and residence, including the county and business address, of the vendee. Upon filing such statement, duly verified, such vendee shall pay to the secretary of state a fee of two dollars for motor vehicles other than motorcycles, and a fee of one dollar for motorcycles, and upon receipt of such statement and fee the secretary of state shall file such statement in his office and note upon the registration book or index in his office such change of ownership.

(5) Every motor vehicle shall also at all times have the number assigned to it displayed on the front and back of such vehicle in such manner as to be plainly visible, the numbers to be in Arabic numerals. Such number plates shall be of a distinctly different color each year, and there shall be at all times a marked contrast between the color of the number plate and that of the numerals and letters thereon, each letter shall not be less than three inches in height, and each stroke thereof shall be of a width of not less than half an inch. There shall also be, as a part of such number, the abbreviated name of the state, in colors similar to the rest of the number plate, such letters to be no less than one inch in height. The secretary of state shall designate the colors of the plates for each year, and shall furnish these two number plates, without extra charge, to every person registering a motor vehicle. This subdivision shall apply to motorcycles in all respects except that they are required to have a number displayed in the rear only, and the letters and numerals thereon shall be of two inches in height, and each stroke thereof one-quarter of an inch in width.

(6) A manufacturer of, or dealer in, motor vehicles, shall register one vehicle of each style or type manufactured or dealt in by him, and be entitled to as many duplicate registration seals for each type or style so manufactured or dealt in as he may desire, on payment of an additional fee of fifty cents for each duplicate seal. If a registration seal and the corresponding number shall thereafter be affixed to and displayed on every vehicle of such type or style, as in this section provided, while such vehicle is being operated on the public highways, it shall be deemed a sufficient compliance with subdivisions 1, 3, 5 and 8, of this section, until such vehicle shall be sold or let for hire. Nothing in this subdivision shall be construed to apply to a motor vehicle employed for private use or for hire by a manufacturer of or dealer in automobiles.

(7) Every manufacturer of, or dealer in, motor vehicles shall upon the sale of a motor vehicle notify the sheriff of the county in which said motor vehicle is sold and is to be operated of such sale, and the said sheriff shall see that such purchaser procures from the secretary of state a motor vehicle license, as is required by the provisions of this chapter, within five days after such purchase.

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(8) No motor vehicle shall be used or operated upon the public highways after this chapter takes effect, which shall display thereon a registration seal or number belonging to any other vehicle or a fictitious registration seal or number.

(9) No motor vehicle shall be used or operated on the public highways after this chapter takes effect, unless the owner shall have complied in all respects with this chapter, except that any person purchasing a motor vehicle from the manufacturer, dealer, or other person, after this chapter goes into effect, shall be allowed to operate such motor vehicle upon the public highways for a period of five days after the purchase and delivery thereof; provided, that, during such period, such motor vehicle shall bear the registration number and seal of the previous owner under which it was operated or might have been operated by him.

(10) The provisions of this section shall not apply to motor vehicles owned by non-residents of this state and only temporarily within this state, provided that the owners thereof have complied with the law requiring the registration of owners of motor vehicles in force in the state, territory, federal district or foreign country, of their residence, and the registration number, showing the initial of such state, territory, federal district or foreign country shall be displayed on such vehicle substantially as in this section provided. Such non-residents shall immediately notify the sheriff of the county or counties in which they operate, showing that they have complied with the laws of the state, territory, federal district, or foreign country, whose license they display. All non-residents shall be required to pay the tax similar to that paid by the resident owners of motor vehicles after six months' residence in the state.

(11) It shall be the duty of the sheriff of every county in this state to keep a record of all motor vehicles registered in his county; to see that all owners of motor vehicles comply with the provisions of this chapter in all respects; and to rigidly enforce all its provisions. Any sheriff who neglects to comply with the provisions of this chapter shall be guilty of a misdemeanor.

5134 (1) No person shall operate a motor vehicle on a public highway at a rate of speed greater than is reasonable and proper, having regard to the traffic and use of the highway, or so as to endanger life or limb of any person, or the safety of any property, or in any event on any public highway where the territory contiguous thereto is closely built up, at a greater rate than one mile in six minutes, or elsewhere in any incorporated city or town, at a greater rate than one mile in four minutes, or elsewhere outside of any incorporated city or town, at a greater rate than one mile in two minutes; subject, however, to the other provisions in this chapter.

(2) Upon approaching a bridge, dam, sharp curve, or steep descent, and also in traversing such bridge, dam, curve, or descent a person operating a motor vehicle shall have it under control and operate it at a rate of

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speed not exceeding one mile in fifteen minutes, and upon approaching a crossing of intersecting highways, at a speed not greater than is reasonable and proper, having regard to the traffic then on such highway and the safety of the public.

(3) Upon approaching a person walking in the public highway or a horse or horses, or other live stock, being ridden, led or driven thereon, a person operating a motor vehicle shall give reasonable warning of its approach, and use every reasonable precaution to insure the safety of such person or animal, and, in the case of horses or other live stock, to prevent frightening the same.

(4) A person operating a motor vehicle shall, at the request or on signal by putting up the hand from a person riding, leading, or driving a restive horse or horses, or other live stock, bring such motor vehicle immediately to a stop; and if traveling in the opposite direction, remain stationary as long as may be reasonable to allow such horse or animal to pass, and, if traveling in the same direction, use reasonable precaution in thereafter passing such horse or animal. In case such horse or animal appear badly frightened, or the person operating such motor vehicle is requested to do so, such person shall cause the motor of such vehicle to cease running so long as shall be reasonably necessary to prevent accident and insure safety to others.

(5) Any one operating a motor vehicle, while in an intoxicated condition, shall be guilty of a misdemeanor. Any person operating a motor vehicle who, knowing that injury has been caused to person or property, due to the carelessness or culpability of the operator, or to accident, leaves the place of said injury or accident without stopping and giving his name, residence, including the street and number, and operator's license number to the injured party, or to a police officer, or in case no police officer is in the vicinity then reporting the same to the nearest police station or peace officer, shall be guilty of a felony, punishable by a fine of not more than five hundred dollars, or by imprisonment for not more than two years, or by both such fine and imprisonment, and if any person be convicted a second time of either of the foregoing offenses he shall be guilty of a felony punishable by imprisonment for not more than five years.

(6) Local authorities may, notwithstanding the other provisions of this chapter, set aside, for a given time, a specified public highway for speed tests or races, to be conducted under proper restrictions for the safety of the public.

5135. (1) Whenever a person operating a motor vehicle shall meet on a public highway any other person riding or driving a horse or horses or other live stock, or any other vehicles, the person so operating such motor vehicle shall reasonably turn the same to the right of the center of such highway so as to pass without interference. Any such person so operating a motor vehicle shall, on overtaking any such horse, live stock, or other

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vehicle shall, as soon as practicable, turn to the right so as to allow free passage on the left. Any such person so operating a motor vehicle shall at the intersection of public highways, keep to the right of the intersection of the centers of such highways, when turning to the right, and pass to the right of such intersection when turning to the left. Nothing in this sub-division shall, however, be construed as limiting the meaning or effect of the provisions of the preceding section of this chapter.

(2) Every motor vehicle while in use on a public highway shall be provided with good and efficient brakes, and also with suitable bell, horn, or other signal, and be so constructed as to exhibit, during the period from one hour after sunset to one hour before sunrise, two lamps showing white lights visible within a reasonable distance in the direction towards which such vehicle is proceeding, and also a red light visible in the reverse direction; provided, that motorcycles shall be required to exhibit but one white light during the period herein specified.

(3) Subject to the provisions of this chapter, local authorities shall have no power to pass, enforce, or maintain, any ordinance, rule or regulation requiring of any owner or operator of a motor vehicle, any license or permit to use the public highways, or excluding or prohibiting any motor vehicle whose owner has complied with the provisions of this chapter from the free use of such highways except such driveway, speedway, or road, as has been or may be expressly set apart by law for the exclusive use of horses and light carriages, or except as herein provided, in any way affecting the registration or numbering of motor vehicles, or prescribing a slower rate of speed, than is herein specified, at which such vehicles may be operated, or the use of the public highways, contrary or inconsistent with the provisions of this chapter, and all such ordinances, rules, or regulations, now in force, are hereby declared to be of no validity or effect; provided, however, that the local authorities of incorporated cities and towns may limit, by ordinance, rule, or regulation, hereafter adopted, the speed of motor vehicles on the public highways on condition that such ordinance, rule or regulation shall also fix the same speed limitation for all other vehicles, such speed limitation not to be in any case less than one mile in six minutes, and on further condition that such incorporated city or town shall also have placed conspicuously on the side of each main public highway where the boundary of such municipality crosses the same, and on every main highway where the rate of speed changes, signs of sufficient size to be easily readable by persons using the highway, bearing the words, "Slow down to miles" (the rate being inserted), and, also, an arrow pointing in the direction where the speed is to be reduced or changed; and, also, on further condition that such ordinance, rule, or regulation, shall fix the penalties for violation thereof, similar to and no greater than those fixed by such local authorities for violation of speed limitations by any other vehicles than motor vehicles, which penalties shall, during the existence of the ordinance, rule, or regulation, supersede those specified

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in the sixth section of this chapter; and provided further, that nothing in this chapter contained shall be construed as limiting the power of local authorities to make, enforce and maintain further ordinances, rules or regulations affecting motor vehicles which are offered to the public for hire.

(4) Local authorities may, notwithstanding the provisions of this chapter, make, enforce and maintain such reasonable ordinances, rules or regulations concerning the speed at which motor vehicles may be operated in any public park or parkways, but in that event signs must be placed at each entrance of such park and along such parkway, conspicuously indicating the rate of speed permitted or required; and may exclude motor vehicles from any cemetery or grounds used for the burial of the dead.

(5) Nothing in this chapter shall be construed to curtail or abridge the right of any person to prosecute a civil suit for damages by reason of injuries to person or property resulting from the negligent use of the highways by a motor vehicle, or its owner, or his employee, or agent.

5136 (1) Every person hereafter desiring to operate a motor vehicle as a chauffeur shall file in the office of the secretary of state, on a blank to be supplied by such secretary, a statement which shall include his name and address and the trade name and motive power of the motor vehicle or vehicles he is able to operate; and shall pay a registration fee of five dollars.

Sub-division (2) The secretary of state shall thereupon file such statement in his office, register such chauffeur in a book or index to be kept for that purpose, and assign him a number.

Sub-division (3) The secretary of state shall forthwith, upon such registration and without other fee, issue and deliver to such chauffeur a badge of aluminum, or other suitable metal, which shall be oval in form, and the greater diameter of which shall not be more than two inches; and such badge shall have stamped thereon the words, "Registered Chauffeur, No., State of Arizona," with the registration number inserted therein; which badge shall thereafter be worn by such chauffeur pinned upon his clothing in a conspicuous place, at all times while he is operating a motor vehicle upon the public highways.

Sub-division (4) No chauffeur, having registered as herein provided, shall voluntarily permit any other person to wear his badge nor shall any person, while operating a motor vehicle, wear any badge belonging to another person, or a fictitious badge.

Sub-division (5) No person shall operate a motor vehicle as a chauffeur upon the public highways after thirty days after this title takes effect, unless such person shall have complied in all respects with the requirements of this section.

5137. Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be

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punishable by a fine not exceeding one hundred dollars or by imprisonment not exceeding thirty days; or by both such fine and imprisonment for the first offense; and punishable by a fine of not less than fifty dollars nor more than one hundred dollars or imprisonment not exceeding thirty days, or by both such fine and imprisonment for a second offense; and punishable by a fine of not less than one hundred dollars nor more than two hundred and fifty dollars or imprisonment not exceeding thirty days, or by both such fine and imprisonment for a third or subsequent offense.

5138. The amount of the fees secured by the secretary of state, as in this chapter provided, shall be paid into the state treasury, to the credit of the state road tax fund.

5139. There is hereby appropriated out of any money in the state road tax fund, the sum of twenty-five hundred dollars annually for the purpose of carrying out the object of this chapter, to be used by the secretary of state in the purchase of the necessary stationery; books and postage; for the necessary incidental expenses; for the purchase of the necessary seals, number plates and badges. The state auditor is hereby directed to draw his warrant for any legal claim against said sum, and the state treasurer is hereby directed to pay the same.

5140. All licenses granted for motor vehicles from and after September 20, 1912, shall hold and not have to be renewed until January 1, 1914; and thereafter the annual period, specified in this chapter, shall be from January 1 to December 31 of each and every year. The amendments provided for in this chapter, pertaining to the license tax on motor vehicles, shall not take effect until the beginning of the next fiscal year, January 1, 1914.

A N A C T

AUTHORIZING THE EMPLOYMENT OF PERSONS CONVICTED OF CRIME AND SENTENCED TO IMPRISONMENT IN THE STATE PRISON, UPON THE PUBLIC ROADS, HIGHWAYS, AND BRIDGES OF THIS STATE, AND AUTHORIZING THE BOARD OF CONTROL TO REGULATE SUCH EMPLOYMENT AND TO PROVIDE THE NECESSARY IMPLEMENTS, TOOLS, MACHINERY AND SUPPLIES NECESSARY THEREFOR. Be It Enacted by the Legislature of the State of Arizona:

Sec. 1. It shall be lawful for the Board of Control of the State of Arizona to cause persons convicted of crime and sentenced to imprisonment in the State Prison to labor and be employed upon the construction, repair, or maintenance of State roads, highways, and bridges within this State; Provided, that such work done under the provisions of this Act shall conform to the directions and specifications of the State Engineer; and Provided further, that all the work done or performed on the State Highway in the several counties of this State, by the prisoners, shall only be done on the request of the Supervisors of the said counties.

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Sec. 2. Whenever the Board of Control shall deem it expedient that any such persons shall labor or be employed upon the public roads, highways, or bridges, the Secretary of said Board shall notify the Superintendent of the State Prison, and it shall thereupon be the duty of said Superintendent to furnish such number of men as the Board of Control may direct and to cause them to be removed to the place or places where such work is to be done.

Sec. 3. The Board of Control shall purchase, in the manner provided by law, and deliver from time to time at the place or places where work is to be done, all implements, tools, machinery and supplies of every kind, necessary for use in and about such work, and for providing suitable shelter and subsistence for the men so employed, and all animals necessary for the prosecution of such work and necessary shelter and subsistence for such animals.

Sec. 4. The State Engineer may from time to time establish and maintain camps or enclosures for the men so employed, and maintain the same for such time as may be required in doing such work, and may, with the approval of the Board of Control, make and establish rules and regulations governing the conduct and deportment of the men so employed while in such camps or enclosures and engaged in such work, and to provide suitable means and methods for the enforcement of such rules and regulations.

Sec. 5. Whenever any work upon or about which such men are employed is completed, or for any reason, the Board of Control shall deem it expedient that such men be no longer employed thereon, the said State Engineer shall cause such men to be returned to the State Prison or removed to such other place of employment as said Board may direct, and to cause all machinery, tools, implements, supplies, equipment, and other property to be removed to the State Prison or other suitable place, and properly stored and preserved, or removed to some other place or places where like work is to be done, for use in and about such work.

Sec. 6. The said State Engineer may from time to time return any men so employed to the State Prison or apply for others to be so employed, and may, from time to time, transfer any person so employed from one place to another where any such work is being done.

Sec. 7. The cost of removing and transporting the persons so employed and any necessary guards, to and from the State Prison, and from one place to another, and of establishing and maintaining any such camps or enclosures, and the shelter, maintenance, and subsistence for the persons so employed, and necessary guards, and the purchase, repair and maintenance of tools, equipment and machinery and the purchase and storage of supplies, and the purchase, shelter and subsistence for animals and the transportation of equipment, animals, or supplies, and all other necessary expenses incurred in or about the employment of such persons and the carry-

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ing on of any such work shall be payable as follows: That proportion equalling the maintenance cost at the Prison for the number of prisoners employed shall be paid from the Prison maintenance fund, and the remainder from the State Road Tax Fund of the particular county in which the prisoners work as provided in this Act, except the purchase of tools, equipment, machinery, and animals, which shall be paid for out of the General Fund of the State. All claims therefor shall be in writing, and in such form as may be prescribed by the Board of Control, and shall be approved in writing by the State Engineer, and shall be audited by the State Auditor and if correct, ordered paid as herein provided. All payments shall be made by warrants drawn on the State Treasurer, or the County Treasurer of the respective counties, as the case may be, by the State Auditor, countersigned by the Governor, and payable as herein provided, and the State Treasurer and the County Treasurer of the respective counties are hereby authorized and directed to pay the same.

Sec. 8. A sufficient sum is hereby appropriated out of the General Fund of this State, and out of the Prison maintenance fund, and the State Road Tax Fund, for the fiscal years ending June 30th, 1914, and June 30th, 1915, to carry out the provisions of this Act.

Sec. 9. All Acts and parts of Acts in conflict with the provisions of this Act are hereby repealed.

Approved May 15, 1913.

March 8, 1913.

Hon. George W. P. Hunt,
Capitol Building,
Phoenix, Arizona.

Sir:

Pursuant to your instructions a full and complete report of the operations and expenditures of this department for the present fiscal year has been in course of preparation. Itemized statement of disbursements has not been completed, and as I will be out of Phoenix for the next ten days or two weeks conferring with the Boards of Supervisors in Santa Cruz and Mohave Counties, I beg to submit the accompanying report covering the operations of this department, which will also explain the delay in preparing statement of expenditures to be submitted later. It has been impossible with our clerical force to keep the work up to date.

Very respectfully,

LAMAR COBB,

State Engineer.

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Governor George W. P. Hunt,

Capitol Building,

Phoenix, Arizona.

Sir:

I have the honor to submit the following report covering the operations of the Engineer Department for the past eight months of the current fiscal year. The present State Road Law, re-creating the office of State Engineer and making appropriation for the construction of state highways, was approved June 20, 1912, ten days before the beginning of the current fiscal year. It provided a salary of \$3,000 for the State Engineer and \$2,500 for the necessary expense "required to perform the duties of his office" (paid out of the General Fund) and an appropriation of \$250,000, 25% of which to be expended under the direction of the State Board of Control and the State Engineer and 75% under the direction of the County Boards of Supervisors in the counties where raised and the State Engineer, for the construction, etc., of roads and bridges.

The expenditure of this appropriation was subject to the following proviso: "Provided, that no obligation shall be assumed or expense incurred under the provisions of this Act, within any fiscal year, in the amount of any sum in excess of the levy herein provided for any the money actually collected under said levy."

In construing this provision the Supreme Court said, In the matter of the application of the Valley Bank of Phoenix for a writ of mandamus against David F. Johnson, State Treasurer of the State of Arizona, "We hold, therefore, that all warrants against the General Fund, if there is no money with which to pay them but an appropriation therefor, when presented, to the extent of such appropriation only, should be registered and endorsed as provided by law. That all Road Fund Warrants drawn for obligations existing against the State prior to June 30, 1913, should likewise be registered and endorsed as provided by law. That Road Fund Warrants for obligations contracted during the current fiscal year should not be registered and endorsed as it cannot be known what money will be "actually collected" and, therefore, the appropriation is not for any definite or fixed sum.

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This decision meant that warrants could be issued to pay off the deficit existing on July 1, 1912 (\$50,612.30), including an amount sufficient to cover the \$4,000 guaranteed by the Territory to complete the Black River bridge, in Gila County, but that no warrants could be issued for any work contracted for after the first day of July, 1912, until after the money was actually collected and in the hands of the State Treasurer, which could not be earlier than January 1, 1913. This, however, did not affect the Chevelon Creek bridge, although the cost of its construction was to be taken from the 25% portion of the State Road Fund, as the law providing for this project made it mandatory upon the Board of Control to construct it forthwith.

The situation, therefore, that confronted us on July 1st was as follows: The State Road Fund of \$250,000 could not be drawn upon until after January 1, 1913, except for the purpose of paying off the deficit, completing the Black River bridge and constructing the Chevelon Creek bridge. No provision had been made for continuing operations on the Tempe bridge. Closing down of this work, from July to January, in its then uncompleted stage would have been at great loss. Our force would have been completely disorganized, the prisoners sent back to Florence without other employment, watchmen employed to guard equipment and material that would be rapidly deteriorating, and the final completion of the bridge probably delayed for twelve months as the spring floods would have prevented continuous operations had all the main arches not been in place. To avoid this the Board of Supervisors of Maricopa County and the State Engineer arranged to borrow a sufficient sum from the banks of Phoenix and Tempe at 6% interest to meet the payrolls and the merchants from whom subsistence and other supplies were bought agreed to wait for settlement until January 1st. This bridge is now nearing completion.

On July 1st there were employed upon the Tempe bridge about 70 prisoners. In the prison at Florence there were more than 150 additional whose services could be profitably employed upon the state highways and bridges. As there was no money available in the State Road Fund with which to furnish employment for these men their labor was being lost to the state while they were being

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supported in idleness. That their services might be utilized, it was proposed by the Board of Control that the necessary moneys be advanced from the Prison Fund to put them to work on the state highways, the Boards of Supervisors of the counties where they were to be employed and the State Engineer agreeing to re-imburse the Prison Fund out of the county portion of the State Road Fund when it became available. Under this arrangement prisoners were worked upon the roads in the Counties of Pinal, Maricopa and Gila. In addition to the above work performed by prison labor, the Black River bridge in Gila County (began under the last administration) was completed and a contract was awarded for the construction, which is now under way, of the Chevelon Creek bridge in Navajo County.

This covers all the construction work undertaken since the adoption of the present State Road Law and with the exception of a few weeks' work on the Florence-Tucson road, all the construction work done under the supervision of this department since the date of my appointment, March 12, 1912.

In a department of this kind the work necessary to be performed is properly subdivided into administration, engineering, construction and maintenance. Upon the passage of the State Road Law, June 20, 1912, there was available for all of these purposes, the salary of the State Engineer and \$2,500 for the necessary expense "required to perform the duties of his office," excepting authority to construct, with appropriation therefor, the Chevelon Creek bridge in Navajo County and to complete the Black River bridge in Gila County. No additional funds were in sight until January 1, 1913, save those to be raised by the automobile tax law, which would go into effect September 20th unless held up by a referendum petition advocated by some up until that date. We had \$2,500 to cover the cost of all office and engineering expense until receipts from the automobile tax were available. This being a new law, the receipts were very slow in coming in. October 1st, \$3,241.30 had been paid in, November 1st, \$7,194.30, December 1st, \$9,449.80, January 1st, \$10,457.80, February 1st, \$11,474.80, March 1st, \$12,322.80. This law will probably net about \$13,000, allowing \$1,000 for cost of collection, for the fiscal year ending June 30, 1913.

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The Attorney General ruled that the engineering expense not covered by the above must come out of the 25% portion of the State Road Tax Fund, which, under the general provisions of that law, was to be expended under the direction of the Board of Control and the State Engineer. However, in so far as this 25% fund was concerned for the present fiscal year, or to be more exact, until January 1, 1914, the legislature had directed that it should be used to pay off a deficit of \$40,503.00, construct the Chevelon Creek bridge, \$5,500, and that the portion contributed by Maricopa County, \$12,250, be expended on the Tempe bridge. A total of \$58,253 chargeable against the 25% portion, \$62,500, provided there are no delinquent taxes, which leaves of that fund for the present fiscal year \$4,247.

STATE ROAD FUNDS, Fiscal Year 1912-13.

State Road Tax Law, \$250,000	
Less deficit July 1, 1912, \$40,503.....	\$209,497.00
Automobile tax law	13,000.00
State Engineer's salary	3,000.00
State Engineer's expense fund	2,500.00
	<hr/>
	\$227,997.00

For administration and engineering charges we have

State Engineer's salary	\$ 3,000.00
State Engineer's expense fund	2,500.00
Automobile tax fund	13,000.00
Approximate balance 25% fund	4,247.00
	<hr/>
	\$ 22,747.00

To meet all expense of administration and engineering we have a fund of about 8% of the total amount to be expended, whereas not less than 15% is necessary for the proper performance of the work. And a larger amount the first year was necessary for the economical prosecution of this work under the present law, for with the county funds running from \$42,898 in Cochise down to \$3,287 in Apache, with an average of about \$13,000, it would be in the interest of economy to do the location work necessary for the expenditure of the appropriation for two years while the field party was on the ground. And this is also true of the plans and estimates which could be prepared to cover two years appropriation at one

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time more cheaply than if done on two separate occasions. It would not be advisable to do more than two years' preparatory work in advance as a change of administration might cause a change in routes and therefore a loss of the work done. In addition to being placed at a disadvantage by an insufficient appropriation it has been worse than appears from the above statement. The larger portion of the engineering work and expense must necessarily precede the construction. In point of time we had from July 1st to January 1st to prepare for construction, but we started with a fund of only \$2,500, the additions to which we could not estimate with any accuracy or certainty. The apparent deficit on July 1st was \$50,612, which was reduced by the returns from delinquent taxes to the State Treasurer in October and January by \$11,928.20. As stated before, the automobile tax law was threatened with a referendum up until September 20th and after that date the receipts were so slow in coming in that we could not plan for their use until they were actually collected, neither could we anticipate the collection of delinquent taxes. As stated, only \$4,247 was left of the 25% portion of the State Road Fund, which was placed to the credit of the Engineering Department. This left the Board of Control and the State Engineer with no money for construction or for the purchase of equipment. Each county, if the work is done other than by contract, has to purchase from its limited appropriation equipment for doing the work which will remain idle for most of the year.

Under the old law the State Engineer was an employee of the Board of Control and his duties were confined almost solely to the engineering work. His accounts and records, under the law, were kept by the Board of Control and the Auditor. The present law, which directs that the appropriation shall be expended under the joint direction of the State Engineer and the Board of Control, or the Boards of Supervisors, has increased many fold the administrative duties of this officer. He has to direct and administer the expenditure of at least sixteen different funds in fourteen different counties, acting jointly with fifteen different boards consisting of 45 different individuals. Notwithstanding this has been a pleasant duty, it has and will take much of his time, leaving little to devote to engineering problems.

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All of the accounts incident to the expenditure of these various funds must be kept in this department, and the chief clerk has to do business with and instruct the fourteen different clerks of as many boards of supervisors as to the proper method of handling the accounts. If the construction work is done under contract, the keeping of accounts will be comparatively simple as few payments will have to be made; if by day labor with semi-monthly rolls, purchasing of all material, renting or purchasing equipment it will require considerable more office assistance, and if, as we have had in the past few months, three separate forces of prisoners working in three different counties at the same time our present permanent clerical force of one clerk and one stenographer is entirely inadequate to handle the accounts and correspondence. In addition to the work ordinarily borne by an engineering department, working and camp equipment had to be purchased, subsistence from month to month had to be purchased and clothing ordered from the prison or purchased in open market. In making purchases, competitive bids were solicited, whenever possible, from the various merchants and the contract awarded to the lowest. All bills for these purchases had to be checked and claims, in triplicate, drawn to cover; one for the Board of Supervisors, one for the Auditor, and one for this office. As the prison was advancing the money to carry on the work in Gila and Pinal Counties, all of these accounts had to go through that office, which greatly increased the work in this department.

Between July 1, 1912, and March 1, 1913, accounts were opened with the 14 different counties, 596 claims, aggregating \$103,760.74 segregated into 24 different accounts, and approximately 4,700 letters written. We have adopted the requisition system for the purchasing of all supplies and material.

In the above I have endeavored, as briefly as possible, to inform you of the difficulties that have confronted us in operating this department handicapped by insufficient funds, under a new law, so different in many respects from the previous one that it necessitated a complete change in the organization, methods of conducting both preliminary and construction work, and of handling and keeping accounts, that under the conditions, as set forth, it was

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not possible to conduct the construction work undertaken and prepare for further construction to begin promptly upon the date funds became available, January 1, 1913. The State Road Fund law, in its general provisions which gives home rule to the counties in the selection of the county units of the proposed state highways and supervision over the expenditure of funds for their construction, is good, but when it went further and took practically all of the 25% portion from which was to be paid the expenses of this office, and directed that it be expended for other purposes, it increased the cost of the work and will delay state road construction many months.

Before taking up what has been accomplished by this department in the past eight months of the present fiscal year, July 1, 1912, to March 1, 1913, I beg to state my understanding of the purpose of the State Road law and interpretation of its provisions that has guided me in assisting in its administration. As I understand the purpose of the law is to connect the various counties of the state by means of main highways along the most direct and beneficial routes. The county units to be so selected as to accommodate the greatest number of people and coordinate into a state highway system. That the roads be located along the routes selected, so as to afford the most economical construction consistent with durability and cost of maintenance. That the appropriation was for permanent construction work and not for repairing old roads. That no road or part of a road should be designated as a state highway except so much thereof as can be properly constructed with the funds in hand. Should a north and south highway and two east to west highways be designated, comprising 1600 miles, the appropriation of \$250,000 annually would not be sufficient to maintain them, as it would only be \$156 per mile. After they are once properly constructed and drained they can be kept in almost perfect condition throughout the entire year at a cost of from \$50 to \$100 per mile. I have endeavored, and with considerable success, to impress this fact upon the members of the various boards of supervisors, but in the small counties where the State Road Fund is small, and especially where the levy for county roads is far below the maximum of 25 cents on the \$100 they are very insistent upon spreading out their limited

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fund over many miles of old, improperly located roads. If this is permitted it means the postponement of properly constructed state roads for an indefinite period. I give below tables showing the amount of each county's portion of the State Road Fund, the levy made for county purposes and the amount it will raise.

	State Road Fund	County Levy on County Roads	County Road Fund Raised by Levy
Cochise	\$42,898.84	15 cts.	\$48,908.42
Maricopa	36,749.91	25 "	69,830.17
(Expended on Tempe bridge.)			
Yavapai	21,198.05	20 "	32,223.85
Greenlee	16,172.45	8 "	9,833.60
Gila	13,689.88	25 "	26,012.75
Pima	11,813.27	25 "	22,389.90
Coconino	9,080.96	25 "	17,255.14
Mohave	6,848.19	25 "	13,013.11
Pinal	6,779.85	25 "	12,882.70
Yuma	5,917.20	10 "	4,497.40
Graham	5,329.46	5 "	2,025.37
Navajo	4,343.95	25 "	8,254.69
Santa Cruz	3,420.75	12 "	3,119.96
Apache	3,287.49	25 "	6,246.72

Taking the counties in the order as above given I beg to report as follows regarding the work done and that proposed to be done during the present fiscal year.

Cochise County.

County portion State Road Fund.....\$42,898.84

After a conference with the Board of Supervisors and an inspection of the road from Douglas via Bisbee, Tombstone and Fairbanks to Huachuca Siding, it was decided to adopt this route for the State Highway and for this year's work to construct a bridge across the San Pedro River at Fairbanks and to build the road from Bisbee west as far as the funds would permit.

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A survey of the Fairbanks bridge site with soundings for foundations was made.

The highway was located 9 miles out of Bisbee.

Plans and estimates for this work are now in course of preparation in this office.

A caretaker with team was employed to keep the Douglas-Bisbee highway in repair.

Maricopa County.

County portion State Road Fund.....	\$36,749.91
State portion State Road Fund.....	12,249.97
	<hr/>
	\$48,999.88

The law provided that Maricopa County should have all of the State Road Fund contributed by said county for the purpose of completing the Tempe bridge. As this fund was not available until after January 1, 1913, arrangements were made to borrow sufficient to meet the payrolls for labor on the bridge and the merchants and others agreed to wait for settlement until the above date.

To continue the employment of prisoners on this work, arrangement was made by the Board of Supervisors and the State Engineer with the Board of Control whereby the prison would pay into the Road Fund for each prisoner so employed the net per capita cost of maintenance of prisoners at the prison. Similar arrangement was made for the employment of prisoners in other counties.

When the grading outfit of prison labor engaged on the Florence-Mesa highway reached the Maricopa line it was decided to have them grade from that point to Higley, a distance of seven miles, which was done.

Minor repairs and some dragging was done on the Glendale road.

The County Road Superintendent was appointed as superintendent of state highways

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Yavapai County.

County portion State Road Fund.....\$21,198.05

Several conferences with the Board of Supervisors have been held and the state highway from Prescott to Senator Mountain inspected, also the road from Prescott via Camp Verde to the Cocoino County line, but the location of the work for this year has not been definitely decided upon.

The employment of a caretaker and team on the Senator Mountain division has been continued.

The County Road Superintendent has been appointed Superintendent of State Highways.

Greenlee County.

County portion State Road Fund.....\$16,172.45

Have had conference with Board of Supervisors but nothing definite decided upon.

Any location of a state highway south out of Clifton, the county seat, would, for several miles, lie within the corporate limits of the town. There is some doubt as to the legality of expending state road funds within the corporate limits of a town or city. A case is now before the Supreme Court, the decision in which may settle this question.

Gila County.

County portion State Road Fund.....\$13,689.88

After a conference with the Board of Supervisors it was decided to expend this year's appropriation on the Globe-Ray highway. An arrangement was entered into between the State Board

STATE HIGHWAY DEPARTMENT.

of Control, the Board of Supervisors and the State Engineer, whereby the state prisoners were employed on this road. The Board of Control agreeing to pay into the Gila County State Road Fund for each prisoner so employed the net per capita cost of maintaining a prisoner at the state prison. As no funds were available until after January 1, 1913, the Board of Control agreed to advance the amount necessary from the Prison Fund, which was to be reimbursed from Gila County's portion of the State Road Fund.

Both camp and working equipment had to be purchased for this force.

This work was commenced in July, 1912, and closed down on account of the cold weather, January, 1913.

8 miles of location survey were made of this highway in Gila County.

1½ miles of road were graded and 1 mile of old road repaired. Black River bridge was completed.

The two road caretakers with two teams were retained on the Globe-Roosevelt road.

Pima County.

County portion State Road Fund.....\$11,913.27

After inspection of the road from the Florence division, through Tucson to the Davidson Canon division of the North and South highway, it was decided to expend this year's appropriation on the road between Tucson and Davidson Canon via Vail station on the Southern Pacific.

10 miles of road has been located from Tucson with survey still in progress.

Coconino County.

County portion State Road Fund.....\$ 9,080.96

After a conference with the Board of Supervisors it was de-

STATE HIGHWAY DEPARTMENT.

cided to expend this year's appropriation on the North and South highway between Flagstaff and the Yavapai County line.

Mohave County.

County portion State Road Fund.....\$ 6,848.19

A conference has been held with the Board of Supervisors and inspection made of the road from Kingman to Oatman, but no decision has been arrived at relative to this year's work or the designation of a state highway.

Pinal County.

County portion State Road Fund.....\$ 6,779.85

After a conference with the Board of Supervisors it was decided to expend this year's appropriation on the Florence-Mesa highway and should there be any balance after this road was graded it should be expended in maintaining the Florence-Tucson highway.

As no funds were available until after January, 1913, an arrangement was entered into with the Board of Control whereby the state prisoners were employed in grading this road from the Florence bridge to Maricopa County line, 7 miles south of Higley, a distance of 25 miles. The prisoners were employed on the same terms as in Maricopa and Gila Counties, the prison advancing the necessary funds to prosecute the work, to be later reimbursed from the State Road Fund of Pinal County. As in Gila County, camp and working equipment had to be first purchased from their limited road fund. Two graders were borrowed, one from Maricopa and one from Pinal County. 25 miles of road were graded and partially protected by side ditches. No culverts were used as the

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fund was too limited. The gulches and washes were crossed by grading the road into them to a 10 to 15% grade. A large portion of this road is over a decomposed granite country and I anticipate that it will pack very satisfactorily. The cost of maintaining this road in its present fair condition by an occasional dragging would not be large, but we have no funds with which to do so.

Some repairs were made on the Florence-Tucson highway. This road from Florence to the Pima County line, 38.4 miles, was graded by the Territorial Engineer, but owing to a lack of funds, no culverts were put in. There are over 200 washes and gulches crossing this road. There is only a small amount left in the Road Fund with which to keep this road in repair during this year.

Yuma County.

County portion State Road Fund.....\$ 5,917.20

After a conference with the Board of Supervisors and inspection of the road from Yuma to Wellton on the East and West highway and of the two bridge sites at Dome and Antelope Hill, it was decided to expend this year's appropriation as far as it would go on a bridge across the Gila River at either Dome or Antelope Hill. A survey is being made of the latter site and borings made to determine its feasibility. A survey will also be made at Dome.

Graham County.

County portion State Road Fund.....\$ 5,329.46

After a conference with the Board of Supervisors and inspection of the road from near Geronimo to east of Solomonville, it was decided to expend this year's appropriation on the East and West

STATE HIGHWAY DEPARTMENT.

highway between San Carlos and Mathews. Before meeting with the Board they had entered into an agreement with the Indian Agent at San Carlos whereby they were to advance him \$2,000 out of the county road fund and he was to furnish all labor and material to bridge all the openings on the old road bed of the Gila Valley, Globe & Northern R. R. and put it in good condition for a wagon road from San Carlos to Geronimo, a distance of 30 miles. It was agreed that the said \$2,000 should be taken from the State Road Fund. It was further agreed to expend the balance of this year's appropriation between Mathews and Ft. Thomas. 16 miles of location survey has been made of this road. Plans and estimates are in course of preparation in this office.

The County Superintendent of Roads has been appointed Superintendent of State Highways.

Under the supervision of the road superintendent some repair work has been done on this road.

Navajo County.

County portion State Road Fund.....\$ 4,343.95

Appropriation for Chevelon Creek bridge \$ 5,500.00

Contract was let for the construction of the Chevelon Creek bridge October 1, 1912, to the Missouri Valley Bridge and Iron Company. This work is nearing completion.

On September 6, 1912, two designs for a bridge to be constructed over the Little Colorado River east of Holbrook was submitted to this office by the Board of Supervisors for our opinion of their relative merit. There was nothing contained in their letter to indicate that we were to pass upon plans for a state highway bridge and we assumed it was to be a county bridge. However, in replying, after passing upon the merits of the two plans submitted, we stated, "We cannot, however, approve any plan that does not contemplate

STATE HIGHWAY DEPARTMENT.

solid rock foundations for all piers and abutments at this location." After the completion of this work it was proposed by the Board of Supervisors to pay for it out of the State Road Fund. They stated that the clerk of the Board had been instructed to advise this office in September that it was to be a state bridge and they had understood its construction would meet with our approval. It was finally agreed that the original cost as contracted for would be taken from the State Road Fund and that the county pay for the approaches and reinforcement of the foundations which they had found to be necessary.

This office did not approve of the location, plan or foundations of this bridge, but as it was in place and on what will be a state highway, and further that Navajo County would have to pay for its construction no matter what fund it was taken from, agreement was reached as stated above, with the further understanding that in the future this office was to pass upon all plans for highway work.

Santa Cruz County.

County portion State Road Fund.....\$ 3,420.75

Disposition of this fund for this year will be taken up with the Board of Supervisors within a few days.

Apache County.

County portion State Road Fund.....\$ 3,287.49

Disposition of this fund will be taken up with the Board of Supervisors when construction work is in progress in Coconino County.

STATE HIGHWAY DEPARTMENT.

During the past eight months I have inspected all the highways constructed by the last administration under the provision of the old State Road law. The best constructed of these roads is the Mogollon Hill division of the Prescott-Flagstaff highway, which was surfaced from a natural quarry of broken stone and, with the exception of some sloughing off from the side hill cuts and ruts in the surfacing which can be repaired for a small amount, it is in as good condition as when completed, December, 1911. There has been no maintenance work done on this road. Next to this the Davidson Canon division of the Tucson-Bisbee highway exhibits the best type of mountain road location and construction. No maintenance work has been done on this road since its completion, December, 1911, yet it is in almost perfect condition. And third in point of proper construction comes the Prescott-Phoenix highway between Prescott and Senator Mountain. One man and team has been kept on this road for maintenance. It is not as well drained as the other two mentioned. These three roads are a credit to the engineering skill of those in charge of their construction. The one feature that deserves particular attention is the drainage. And this is the most important part in the construction of any kind of road and the one usually neglected. As one engineer of prominence puts it "proper road construction is based on three principles, 1st drainage, 2nd drainage, 3rd drainage." And drainage does not mean bridging streams and putting culverts in the gulches alone, for this is only a part of the drainage problem. Every foot of a mountain road should have a hillside ditch with culverts across the roadway at frequent intervals, their distance apart depending upon the watershed to be drained, to prevent any water from the adjoining hills ever reaching the road bed and washing off the surfacing material. The function of the gutter along the side of the road is not to take care of the run-off from the hillsides but only to take care of that which falls on the road itself and between it and the hillside ditch. The popular belief is that the government road from Phoenix to the Roosevelt Dam is a perfect type of mountain road. Almost every day you see in the papers where some one speaks of it as on wonderful piece of road construction and the next day—a rain intervening—where some man wore out a set of tires making the trip

STATE HIGHWAY DEPARTMENT.

to the dam. Insufficient drainage results in the loss of the road surfacing whenever it rains. This road was built for the sole purpose of getting supplies to the dam during its construction, and to answer that purpose alone it was cheaper to maintain it for that period as built than to properly drain it.

The Globe-Roosevelt road was not properly drained, nor was the Douglas-Bisbee, and it will take a considerable amount to put them in proper condition. Oiling the latter road was a mistake, though at the time it was considered good practice to oil earth or gravel roads throughout the whole county. Practice in road construction is changing more rapidly than any other branch of engineering work. The old type of macadam roads will in a short time become as obsolete as the use of oil on earth roads. Taken as a whole the work done by the previous administration on the five roads mentioned was very well executed. They are all too narrow, as everyone will and does tell you, but they rarely stop to consider that every additional foot in width means a greater cost per mile and therefore fewer miles of road. Also that 4 feet added to a 12 ft. road on hillside work, as most of our roads are, means doubling the cost of excavation. Notwithstanding the additional cost, we have decided on a minimum width of 16 feet for all roads to be constructed in the future. I have been over a great many roads in every county in the state except two, and I have not found a foot of properly graded and protected mountain road or road in a rolling country that was not constructed under the direction of the engineer department. There are a few miles of graveled road in Graham, about $\frac{1}{2}$ mile in Yuma and several miles of caliche road in Maricopa. I know of no other improved roads in the state, outside of cities, towns or special road districts, though I may have missed a half mile or so elsewhere. Every two years the personnel of the various boards of supervisors is almost completely changed. They go in imbued with the idea that their predecessors squandered the county road funds and go out with the public equally confident that they have. With both more or less correct in their opinions, but it has not been the fault of the supervisors. With county road funds of limited proportions to repair hundreds of miles of road, and with every man in the county clamoring for work in his locality,

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it has been next to impossible for them to set aside a sum, in any amount, for permanent work. Even a large amount of money equally distributed over a large mileage of roads, many of which are natural water courses, and if not natural are soon artificial conduits made so by lack of drainage, must result in bad roads at all seasons of the year except just following the annual repairing period. The supervisors themselves recognize the futility of the present practice and the necessity for a change in administrative methods that will tend towards its correction. Eight out of the fourteen counties of the state levied for county road work the maximum allowed by law of 25 cents on the \$100 assessed valuation, and I am informed the other six will do so in the future. With the funds this levy will raise it will be possible to set aside a portion for the purpose of properly grading, draining and improving a few miles of road each year. It was to accomplish this that they unanimously recommended the law be so changed as to permit the employment of a county engineer, one who could devote his entire time and attention to the problems of road and bridge construction and maintenance for the purpose of advising them as to what should be done and supervising the work itself. This is no reflection upon the intelligence or the ability of the present road superintendents, for there are some very competent men who hold these positions today. They are well qualified to conduct certain parts of road work, about which they can inform any engineer in Arizona, but there are also problems that they themselves recognize can only be solved by an engineer; such, for instance, as bridge design and construction, determination of the proper size for drainage openings either for bridges or culverts, etc. Should the Harrison bill become a law the County Engineer will not take the place of the road superintendent in fact, even though he does by law. And if the County Engineers are sensible men they will in most cases continue many of them in their present employment and seek their advice regarding questions about which they have superior information gained from experience.

I mention the county road problem for the reason that it has a direct bearing upon the administration of the State Road Law. As stated before, in those counties where the state road fund is small and the county levy below the maximum of 25 cents, it has

STATE HIGHWAY DEPARTMENT.

been difficult to impress upon the Supervisors that the state fund is only for the purpose of permanent construction and not temporary work. In some instances this may be permitted this year to a limited extent as some claim that when making the county levy they were under the impression that the state fund would be at their disposal to expend anywhere they saw fit and for any character of work. Next year it will be the policy of this office to permit no portion of this fund to be expended except for the purpose, as I understand it was intended, of permanent road construction and maintenance thereof.

On August 29, 1912, I addressed the following letter to the various boards of supervisors:

"Gentlemen:

In discharging the duties of this office under the provisions of the Roberts State Road Law which provides that seventy-five per cent of the total appropriation be spent under the joint direction of the State Engineer and the Boards of Supervisors of the fourteen different counties, I find that we are badly handicapped in not having more rapid means of transportation always available for the State Engineer and the Supervisors. This is especially true at this time when the selection of routes for State Highways in the fourteen different counties is under consideration and the inconvenience will continue during the period of construction.

It would take me fourteen months to meet with the different Boards of Supervisors were I to await their regular monthly meeting, and it has been found in the counties where these conferences have been held that the Supervisors are not sufficiently informed as to the relative merits of the routes suggested to arrive at a decision without going over the ground. The Board is usually too busy with other matters at their regular meetings to spare the time necessary to do this work as thoroughly as it should be done, and in addition the hire of automobiles is a very considerable expense and quite often it is impossible to secure them at the time when needed.

If this department was supplied with an automobile it would enable me to take the Supervisors together, or singly, when otherwise inconvenient, over the routes under consideration at their convenience. It is necessary for the successful administration of the road law that the Supervisors should have intimate knowledge of the road conditions in their own counties and in adjoining counties when connected by a State Highway.

STATE HIGHWAY DEPARTMENT.

It has been suggested by the Board of Supervisors of Pinal County by the passage of a resolution that the various counties purchase an automobile for the State Engineer Department out of their 75% portion of the State Road Tax contributing in proportion to their assessed valuation.

The State's 25% portion of the Road Tax Fund, as will be seen by my letter of July 27th, is not available for this purpose, and the amount available for engineering expense for this year is limited to the Automobile Tax Fund, which is very uncertain.

Furthermore the selection of routes and supervision of construction by the Supervisors is not an engineering charge nor a State charge and should be borne by the county portions of this fund.

The State should and will pay all charges for the up-keep of the machine, if purchased. Such a machine should cost in the neighborhood of \$2,000.00.

I respectfully submit this proposition for your consideration and would request that you notify me at your earliest convenience of your approval or disapproval of such a purchase.

Yours very truly."

A favorable reply having been received from all of them this purchase was made. It has already enabled me to inspect the roads in company with the Boards of Supervisors in Graham, Cochise, Pima and Maricopa Counties, and before the year is over, the supervisors in every county in the state will be thoroughly conversant, through its use, with the condition of the state roads within their counties and adjoining ones, as well as many of the county roads. It will, as it has already, permit us to keep in closer touch with the work in progress, and also more frequent inspection of the condition of the roads already built. The upkeep of this machine and cost of operation is a charge against the State Engineer's expense fund; however, there is no charge for storage in Phoenix, as I furnish the garage in lieu of any cost for its private use, which it is almost impossible, as a rule, to separate from its public use. The services of a chauffeur were dispensed with after my first trip.

Accompanying statement of the receipts and expenditures of this office will be submitted in a few days. I will make such recommendations regarding amendments to the State Road Law as are in my opinion necessary.

STATE HIGHWAY DEPARTMENT.

Upon the passage of the State Road Law I wrote the various Boards of Supervisors explaining its provisions and my interpretation thereof, concluding as follows:

"In the natural order of things every public official is subjected to criticism and the present State Engineer does not anticipate being made an exception, but in the administration of the law he is consoled by the fact that you gentlemen will have the pleasure of sharing this with him. He will accord you the fullest share of honor that may accrue from a successful administration, as also, at least an equal portion of all adverse criticism. No matter of what character or how severe adverse criticism of the acts of a public official may be he would profit thereby if communicated direct to him and not, as is so often thoughtlessly done, to others with small chance of its ever reaching his ears. To aid me in discharging the duties of this office to the satisfaction of the public I invite criticism of my work, as I do not know it all and would like to profit by the opinions of others. As long as I hold this office it will be my earnest endeavor to see every dollar of the public money intrusted to my care is expended to secure the greatest possible returns of that it was designed to accomplish. Should any one think such is not being done they will perform a public duty by making it known to me that I may correct an evil or satisfy them of their error.

Public office is a public trust and a public official serves himself best when he serves the public best."

LAMAR COBB,
State Engineer.

**SUMMARY EXPENDITURES BY COUNTIES
STATE ROAD FUNDS**

July 1, 1912, to June 30, 1913.

COUNTY:	WORK:	25% Fund	75% Fund	Total
APACHE:		\$	\$	\$
	Equipment, Prop'n Auto for State Engineer.....		44.00	44.00
COCHISE:		2,342.12		
	Bisbee-Tombstone Highway Sec. 1.....		1,031.75	
	Bisbee-Douglas Highway (Maintenance).....		1,474.90	
	Fairbank Bridge.....		1,395.47	6,244.24
	Equipment.....			
COCONINO:		97.30		
	Canon Padre Bridge.....		121.25	218.55
	Equipment.....			
GILA:		2,845.69	9,106.87	
	Globe-Ray Highway, Sec. 2.....	4.84		
	Globe-Roosevelt Highway.....	1,879.80		
	Black River Bridge.....		2,400.00	
	Maintenance.....		184.00	16,421.20
	Equipment.....			
GRAHAM:		1,014.70	2,201.92	
	Solomonville-San Carlos Highway, Sec. 2.....		3.00	
	Maintenance.....		71.50	3,291.12
	Equipment.....			

COUNTY:	WORK:	25% Fund	75% Fund	Total
GREENLEE:		619.27		
	Clifton-Solomonville Highway, Sec. 1		217.25	836.52
	Equipment			
*MARICOPA:		131.81	791.86	
	Florence-Mesa Highway, Soc. 1	117.39		
	Phoenix-Prescott Highway, Grand Ave.	896.20	26.02	
	Phoenix-Tempe Highway	37,645.01	31,363.51	
	Tempe Bridge		46.10	
	General Expense		228.50	
	Maintenance		494.00	71,740.40
	Equipment			
MOHAVE:		1,246.56		
	Kingman-Needles Highway		92.00	1,338.56
	Equipment			
NAVAJO:		4,985.17		
	Chevelon Creek Bridge		3,265.00	
	Little Colorado Bridge		58.25	8,308.42
	Equipment			
PIMA:		1,295.65		
	Tucson-Bisbee Highway, Sec. 1	880.50		
	Tucson-Bisbee Highway, Sec. 2	1,020.14		
	Tucson-Bisbee Highway, Davidson Canon		143.50	3,339.79
	Equipment			

COUNTY:	WORK:	25% Fund	75% Fund	Total
PINAL:		461.93	3,468.52	
	Florence-Mesa Highway, Sec. 1	1,044.40		
	Globe-Ray Highway, Sec. 1	236.64		
	Tucson-Florence Highway		313.59	
	Maintenance		191.75	6,716.83
	Equipment			
SANTA CRUZ:		73.60		
	Nogales-Tucson Highway, Sec. 1		42.75	116.35
	Equipment			
YAVAPAI:		242.95		
	Verde Bridge	297.33		
	Phoenix-Prescott Highway, Prescott Division	6,494.46		
	Phoenix-Prescott Highway, Silver Mountain Division	91.67		
	Prescott-Flagstaff Highway, Sec. 2	64.10		
	Prescott-Flagstaff Highway, Sec. 3		62.00	
	General Expense		1,058.27	
	Maintenance		284.75	8,595.53
	Equipment			
YUMA:			1,493.90	
	Antelope Hill Bridge		435.24	
	Dome Bridge Site		40.00	
	General Expense		957.36	2,926.50
	Equipment			

COUNTY:	WORK:	25% Fund	75% Fund	Total
EQUIPMENT:	606.82		
TOTAL:	\$ 66,636.05	\$ 63,108.78	\$ 129,744.83
GENERAL:			
State Engineer's Office Expense	8,023.79		8,023.79
GRAND TOTAL, 1912-1913	\$ 74,659.84	\$ 63,108.78	\$ 137,768.62
DEFICIT, 6-30-'12	13,467.79		13,467.79
		\$ 88,127.63	\$ 63,108.78	\$ 151,236.41

*In addition to expenditures shown, following made from \$30,000 loan account:

Tempe Bridge	\$21,714.85
Florence-Mesa, Sec. 2	344.24
Prescott-Phoenix, Grand Ave.	1,473.15
Phoenix-Tempe Highway	627.64
General Expense	14.90
Equipment	53.00
Maintenance	212.27

\$24,440.05

STATE HIGHWAY DEPARTMENT.

APACHE COUNTY

It was agreed with the Board of Supervisors that the State Road Funds of this county should be expended in conjunction with the \$30,000 county bond issue under the direction of U. S. Senior Highway Engineer W. A. Crossland.

Other expenditure made was for proportion of purchase price of State Engineer's automobile.....\$ 44.00

COCHISE COUNTY

Bisbee-Tombstone Highway, Section 1:

Survey extending from the city limits of the City of Bisbee through Tombstone Canyon toward Tombstone, a distance of 10.1 miles, made and plans and specifications, together with estimate, prepared for construction of 3.9 miles.

Engineering:

Salaries	\$ 1,369.64
Commissary Supplies	367.55
Traveling Expense	161.25
Engineering Supplies	14.65
Team Hire	365.50
Salaries Office Draftsmen	38.71
Miscellaneous Expense	24.82
	<hr/>
	\$ 2,342.12

Fairbank Bridge:

Survey and soundings made for construction of bridge over the San Pedro River near Fairbank and plans and specifications prepared and work started in May with prison labor.

Expenditures to June 30, 1913.....\$ 1,474.90
(For detail, see Prison Labor section of this report.)

Maintenance:

J. F. Walker employed as caretaker on the Bisbee-Douglas

RECEIPTS AND EXPENDITURES—STATE ROAD TAX FUND

July 1, 1912 to June 30, 1913

COUNTY:	Appor- tionment	Paid in			Del. 1912	Paid in Prior to 1912 25%	Refunds		Total 75%	Total 25%	Expe nditures		Balance 75%
		75%	25%	Total			75%	25%			75%	25%	
Apache	\$ 4,383.32	\$ 3,404.65	\$ 1,134.88	\$ 4,539.53		\$ 39.72			\$ 3,404.65		\$ 44.00		\$ 3,360.65
Cochise	57,198.45	43,710.91	14,570.30	58,281.21		1,932.90	688.75		44,399.66		3,902.12	2,342.12	40,497.54
Coconino	12,107.95	9,379.35	3,126.45	12,505.80		772.33			9,379.35		121.25	97.30	9,258.10
Gila	18,253.17	13,744.52	4,581.51	18,326.03		1,240.17	10.00		13,754.52		11,690.87	4,730.33	2,063.65
Graham	7,105.94	5,138.07	1,712.68	6,850.75	255.19	173.60		9.69	5,138.07		2,276.42	1,014.70	2,861.65
Greenlee	21,563.27	17,388.97	5,796.31	23,185.28		217.18			17,388.97		217.25	619.27	17,171.72
Maricopa	48,999.18	34,767.66	11,589.22	46,356.88	2,643.00	3,414.92	6,750.66	3,834.29	41,518.32		32,949.99	38,790.41	8,568.33
Mohave	9,130.92	7,430.51	2,476.83	9,907.34		113.44			7,430.51		92.00	1,246.56	7,338.51
Navajo	5,791.93	4,372.35	1,457.45	5,829.80		444.01			4,372.35		3,323.25	4,985.17	1,049.10
Pima	15,711.02	11,605.89	3,868.63	15,474.52	236.50	1,354.59			11,605.89		143.50	3,196.29	11,462.39
Pinal	9,039.80	6,743.96	2,247.99	8,991.95	47.85	1,391.88			6,743.96		3,973.86	1,742.97	2,770.10
Santa Cruz	4,561.00	3,045.54	1,015.17	4,060.71	500.29	179.70			3,045.54		42.75	73.60	3,002.79
Yavapai	28,264.06	20,564.96	6,854.99	27,419.95	844.11	1,658.33			20,564.96		1,405.02	7,190.51	19,159.94
Yuma	7,889.60	5,438.61	1,812.87	7,251.48	638.12	1,021.25	15.60		5,454.21		2,926.50		2,527.71
Motor Tax	\$250,000.31	\$186,735.95	\$ 62,245.28	\$248,981.23		\$ 13,954.02	*\$ 7,465.01	*\$ 3,850.43	\$194,200.96	\$ 80,049.73	\$ 63,108.78	\$ 66,636.05	\$131,092.18
Expense State										\$ 16,003.50			
Engineer Office												8,023.79	
Deficit 1911-'12												13,467.79	7,925.60
Totals	\$250,000.31	\$186,735.95	\$ 62,245.28	\$248,981.23		\$ 13,954.02	*\$ 7,465.01	*\$ 3,850.43	\$194,200.96	\$ 96,053.23	\$ 63,108.78	\$ 88,127.63	\$139,017.78

*Receipts shown in these columns all represent refunds and to obtain net expenditure should be deducted from Expenditure Column.

75% Fund:

Cochise County	Treasurer's Receipt No. 428	\$ 688.75
Gila "	" No. 308	10.00
Maricopa "	" No. 360, 377, 425, 430, 431, 453, 462, 504, 507, 508,	6,750.66
Yuma "		15.60
		\$ 7,465.01

25% Fund:

Treasurer's Receipt Nos. 477, 505, 509	\$ 3,850.43
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STATE HIGHWAY DEPARTMENT.

Highway beginning November 17, 1912, at \$140.00 per month, he furnishing team and subsistence for same.

Salary	\$ 864.17
Material	167.58
	<hr/> \$ 1,031.75

Equipment:

Proportion of cost State Engineer's Automobile.....	\$ 576.25
Well drilling outfit	781.07
Ditch cleaner	15.00
Pipe cutter and stock and dies	23.15

	<hr/> \$ 1,395.47
Well drilling outfit sold to Yuma Co.	\$ 1,688.75

Net expenditure to June 30, 1913.....\$ 706.72

COCONINO COUNTY

Canon Padre Bridge:

Division Engineer J. S. Barlow together with County Engineer E. Ray Lamport, selected site and made profile for bridge one hundred and thirty-six feet in length over the Canon Padre on the Flagstaff-Winslow Highway, twenty-two miles from Flagstaff. Bids will be requested for construction of a reinforced concrete structure in July, 1913.

Salaries	\$ 40.00
Team hire	8.00
Travel and subsistence	49.30
	<hr/> \$ 97.30

Equipment:

Proportion of cost of State Engineer's automobile.....	\$ 121.25
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GILA COUNTY

Globe-Ray Highway, Section 2:

Survey made from the City of Globe toward Ray to the Pinal

STATE HIGHWAY DEPARTMENT

County line, a distance of 21 miles and final location made of 8.8 miles and construction commenced in July, 1912, with prison labor.

Engineering	\$ 2,845.69	
Construction	8,106.87	
		\$11,952.56
Refund	10.00	
		\$ 11,942.56

(For detail see Prison Labor Section of this report.)

Black River Bridge:

Work of construction of bridge over the Black River completed and balance due from State Road Fund expended, \$1,879.80.

Globe-Roosevelt Highway:

Inspection made of this highway by Division Engineer J. S. Barlow in conjunction with other work.

Proportion of expenses.....	\$ 4.84
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Maintenance:

Two caretakers were employed on maintenance of Globe-Roosevelt Highway at \$100.00 per month, each furnishing team, one working from Roosevelt end and the other from Globe.

Salaries	\$ 2,400.00
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Equipment:

Proportion cost of State Engineer's automobile.....	\$ 184.00
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GRAHAM COUNTY

Solomonville-San Carlos Highway, Section 2:

Survey of sixteen miles northwest from Matthews toward San Carlos to eastern boundary of San Carlos Indian Reservation.

Salaries	\$ 682.60
Commissary Supplies	126.29
Traveling Expense	\$6.85

STATE HIGHWAY DEPARTMENT.

Engineering Supplies 42.65
Team Hire and Miscellaneous 126.31

\$ 1,014.70

Refund acct. supplies sold Maricopa County.... 9.69

Net Cost Survey \$ 1,005.01

Upon recommendation of the Board of Supervisors, the Superintendent of the San Carlos Indian Reservation was authorized to expend \$2,000.00 in construction of highway across the Reservation, such sum to be paid from State Road Fund—Graham County.

Construction of some small wooden culverts on this highway done under direction of County Road Superintendent:

San Carlos Indian Reservation..... \$ 2,000.00

Culverts:

Material \$124.42

Labor 77.50

201.92

\$ 2,201.92

Maintenance:

Report forms for County Road Supt. Maintenance State
Highways \$ 3.00

Equipment:

Proportion cost of State Engineer's automobile..... \$ 71.50

GREENLEE COUNTY

Clifton-Solomonville Highway, Section 1:

Survey of three miles from Clifton toward Solomonville and connection of 2.2 miles with Clifton-Duncan road

Salaries—Engineering Corps \$ 339.19

Salaries—Office 65.00

Commissary supplies 59.90

Traveling expense 151.10

STATE HIGHWAY DEPARTMENT.

Engineering supplies	3.98	
Miscellaneous expense	10.10	
		\$ 619.27

Equipment:

Proportion of cost State Engineer's automobile.....	\$ 217.25
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MARICOPA COUNTY

Summary of Expenditures by Funds.

25% Fund:

Florence-Mesa Highway, Section 2.....	\$ 131.81
Phoenix-Prescott Highway, Grand Ave....	117.39
Phoenix-Tempe Highway	896.20
Tempe Bridge	37,645.01

\$ 38,790.41

Refund—Tempe Bridge	3,834.29
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\$ 34,956.12

75% Fund:

Florence-Mesa Highway, Section 2.....	\$ 791.86
Phoenix-Tempe Highway	26.02
Tempe Bridge	31,363.51
General Expense	46.10
Equipment	494.00
Maintenance	228.50

\$ 32,949.99

Refunds—Tempe Bridge	6,750.66	\$ 26,199.33
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Net expenditures from State Road Fund.....	\$ 61,155.45
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\$30,000 Fund:

Tempe Bridge	\$ 21,714.85
Florence-Mesa Highway, Section 2.....	344.24
Prescott-Phoenix Highway, Grand Ave....	1,473.15
Phoenix-Tempe Highway	627.64
General Expense	14.90
Equipment	53.00
Maintenance	212.27

\$ 24,440.05

STATE HIGHWAY DEPARTMENT.

Under Act of Legislature approved April 3, 1913, there was authorized a loan of \$30,000.00 from the General Fund of the State to Maricopa County for completion of Tempe bridge, etc., such loan to be repaid from 1913 taxes and expenditures from this fund not shown in expenditures against State Road Fund for fiscal year 1912-1913, but carried as separate account.

Florence-Mesa Highway, Section 2:

Expenditures from State Road Fund 1912-1913....\$	923.67
Expenditures from Loan Fund 1912-1913.....	344.24
	\$ 1,267.91

(For detail see Prison Labor Section of this report.)

Tempe Bridge:

Expenditures from State Road Fund 1912-1913....\$	69,008.52
Expenditures from Loan Fund 1912-1913.....	21,714.85
	\$90,723.37
*Refunds.....	10,584.95
	\$ 80,138.42

Phoenix-Tempe Highway:

Expenditures from State Road Fund 1912-1913....\$	912.32
Expenditures from Loan Fund 1912-1913.....	627.64
	\$ 1,539.96

Phoenix-Prescott Highway, Grand Ave. Division:

Construction of three concrete culverts begun in April, 1913, under direction of Division Engineer F. G. Twitchell:

Expenditures from State Road Fund 1912-1913....\$	117.39
Expenditures from Loan Fund 1912-1913.....	1,473.15
	\$ 1,590.54

The County Road Superintendent placed two small wooden culverts on this division, cost of which was included in State Road Fund expenditures:

Material	\$ 37.90
Teams	28.04
Labor	18.60
	\$ 84.54

Engineering on concrete culverts:

STATE HIGHWAY DEPARTMENT.

Salaries	\$ 27.50
Miscellaneous	5.35
	<u>\$ 32.85</u>
Construction concrete culverts to 6-30-13:	
Temporary road	\$245.56
Teams	51.25
Foundation, Labor	283.14
Forms, Labor	396.50
Forms, Material	4.00
Concrete, Labor	376.22
Concrete, Material	87.35
Embankment	20.33
Miscellaneous	8.80
	<u>\$ 1,473.15</u>

General Expense:

Expense of Board of Supervisors on inspection:

State Road Funds	\$ 46.10
Loan Fund	14.90
	<u>\$ 61.00</u>

Equipment:

State Road Funds	\$494.00
Loan Fund	53.00
	<u>\$547.00</u>

*Refunds shown as receipts and credits not considered by Auditor and for uniformity gross expenditures are shown herein.

Maintenance:

County Road Superintendent allowed \$15.00 per month for supervising maintenance work on State Highways in this county. Salary for April, May and June not paid previous to July 1, 1913.

Expended from State Road Funds	\$228.50
Expended from Loan Fund	212.27
	<u>\$ 440.77</u>
Salary Road Supt.	\$90.00
Labor and Teams	273.00
Lumber	76.15
Miscellaneous	1.62
	<u>\$440.77</u>

STATE HIGHWAY DEPARTMENT

MOHAVE COUNTY

Kingman-Needles Highway:

Survey from Yucca to Topock, a distance of 31.7 miles, made and construction by force account started in June, 1913, but no expenditure made account such construction this fiscal year.

Engineering:

Salaries, Engineering Corps	\$776.66
Salaries, Office	42.28
Commissary supplies	84.52
Engineer's traveling expense	196.47
Engineering supplies	2.00
Stock rental	42.00
Miscellaneous	102.63
	\$ 1,246.56

Equipment:

Proportion cost of State Engineer's automobile..... \$ 92.00

NAVAJO COUNTY

Chevelon Creek Bridge:

Under Chapter 68, Special Session, Laws of 1912, \$5,500.00 was appropriated from the 25% portion of the State Road Fund for the construction of a bridge over Chevelon Creek, about twelve miles east of Winslow. After due advertised call for bids, contract was awarded the Missouri Valley Bridge & Iron Company October 1, 1912, for construction of a one hundred and two foot span Warren type truss steel bridge with curved upper chord and concrete floor for the sum of \$4,800.00, this including seven cubic yards of concrete in abutments. Construction eighty per cent complete June 30, 1913.

Engineering: Location and Soundings—

Salaries	\$ 37.70
Expenses	6.55
	\$ 44.25

STATE HIGHWAY DEPARTMENT.

Inspection of Construction: DO EVANOM

Salaries	\$ 599.54	
Travel and expenses	96.55	
Commissary supplies	103.30	
Miscellaneous	28.47	
		\$ 827.86

Construction:

Contract	\$3,072.00	
Extra Concrete	295.68	
Grading approaches	745.38	\$ 4,113.06
		\$ 4,985.17

Little Colorado Bridge:

One hundred and twenty-eight foot steel bridge over the Little Colorado River, near Holbrook, built by El Paso Bridge and Iron Company on authority of the Board of Supervisors of this county, without the location or the plans receiving approval of the State Engineer. Contract cost\$3,265.00

Equipment:

Proportion of cost of State Engineer's automobile.....\$ 58.25

PIMA COUNTY

Tucson-Bisbee Highway, Section 1:

Survey made for Section One of the highway extending from City of Tucson to City of Bisbee, this section running from Tucson to Vail, a distance of 21.048 miles. Plans are prepared and bids will be requested early in July, 1913.

Engineering:

Salaries of Engineering Corps	\$748.20	
Commissary	310.30	
Travel and expense	48.85	
Transit rental	30.00	
Transportation of party (teams and auto).....	109.00	
Engineering supplies	25.40	
Miscellaneous	14.90	\$ 1,295.65

STATE HIGHWAY DEPARTMENT.

Tucson-Bisbee Highway, Section 2:

Survey extending from Vail 10.078 miles to connection with Davidson Canyon of constructed highway made and bids will be requested upon completion of Section 1.

Engineering:

Salaries	\$202.40
Commissary supplies	221.30
Traveling expense	36.95
Transit rental	20.00
Transportation of party	393.00
Miscellaneous	6.85
	<hr/>
	\$ 880.50

Tucson-Bisbee Highway, Davidson Canyon Division:

(Deficit incurred under old Road Law.)

Corrugated iron culverts purchased in January, 1912, for construction, but invoice not paid until January, 1913.....\$1,020.14

Equipment:

Proportion of cost of State Engineer's automobile.....\$ 143.50

PINAL COUNTY

Florence-Mesa Highway, Section 1:

Survey from Arizona Eastern depot at Florence station to the Maricopa County line, 23.6 miles, and grading work done by prison labor:

Engineering	\$ 461.93
Construction	3,468.52
	<hr/>
	\$3,930.45

(For detail see Prison Labor section of this report.)

Globe-Ray Highway, Section 1:

Survey from Ray to the Gila County line, a distance of 9.2 miles, made 1911-1912, but these expenses not paid until after January 1913.

STATE HIGHWAY DEPARTMENT.

(Deficit incurred under Old Law.)

Salaries, Engineering Corps	\$408.51
Commissary supplies	521.50
Traveling expense	27.95
Transit rental	10.00
Stakes	30.44
Miscellaneous	46.00
	\$ 1,044.40

Prisoners were used on this party for axemen and chainmen.

Tucson-Florence Highway:

Construction work on this highway completed prior to June 30, 1912, but final estimate was not paid until after July 1, 1912:

(Deficit incurred under old Road Law.)

Labor and Teams.....\$ 236.64

Equipment:

Propor. of cost of State Engineer's automobile	\$ 91.00
Road levelers and cooking range.....	100.75
	\$191.75

Maintenance:

Maintenance work on Tucson-Florence Highway under supervision of County Board of Supervisors:

Teams and labor	\$248.39
Other labor	12.00
Miscellaneous	7.10
Inspection	46.10
	\$ 313.59

SANTA CRUZ COUNTY

Nogales-Tucson Highway, Section 1:

Reconnaissance from Nogales toward Tucson made by Division Engineer J. S. Barlow:

Salaries and expense.....\$ 73.60

Equipment:

Proportion of cost of State Engineer's automobile.....\$ 42.75

STATE HIGHWAY DEPARTMENT.

YAVAPAI COUNTY

Prescott-Phoenix Highway, Silver Mountain Division:

(Deficit incurred under Old Road Law.)

Final estimate	\$3,634.75
Culverts	2,688.90
Other labor	170.81

\$ 6,494.46

Prescott-Phoenix Highway, Prescott Division:

(Deficit incurred under Old Road Law.)

Right of way	\$100.00
Supplies	197.33

\$ 297.33

Prescott-Flagstaff, Section 2:

Survey started in June, 1913, from a point 0.9 miles north of the Verde River bridge to connect with the Mogollon Hill division of Section One of this highway, constructed in 1911.

Salaries	\$ 91.67
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Prescott-Flagstaff Highway, Section 3:

Survey extending from Cherry P. O. toward Camp Verde started in June, 1913:

Expenditures to June 30, 1913:

Salaries	\$ 15.00
Traveling expense	49.10

\$ 64.10

Verde Bridge:

(Deficit incurred under Old Road Law.)

Right of Way	\$ 242.95
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General Expense:

Inspection of State Highways by Board of Supervisors:

Expenses	\$ 62.00
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Equipment:

Proportion of cost of State Engineer's automobile	\$ 284.75
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Maintenance:

STATE HIGHWAY DEPARTMENT.

Caretaker employed on Phoenix-Prescott Highway at three dollars per day, the 75% Fund furnishing team, tools, etc.

Salaries	\$ 843.50
Material	23.40
Expense	191.37
	<hr/>
	\$, 1,058.27

YUMA COUNTY

Antelope Hill Bridge:

Survey and soundings completed for bridge over the Gila River at Antelope Hill, about seven miles from Wellton.

Salaries	\$ 782.99
Commissary supplies	229.43
Traveling expense	83.30
Teams	50.00
Lumber	25.42
Repairs to well rig	75.46
Miscellaneous expense	247.30
	<hr/>
	\$ 1,493.90

Dome Bridge Site:

Survey and soundings also made for bridge over the Gila River at Dome.

Dome Bridge Site:

Salaries	\$ 263.39
Commissary supplies	48.80
Traveling expense	6.45
Teams	62.25
Miscellaneous	54.35
	<hr/>
	\$ 435.24

General Expense:

Inspection of State Highway route and bridge sites by Board of Supervisors and the State Engineer.....\$ 40.00

Equipment:

Prop'n of cost State Engineer's automobile	\$ 79.50
Well rig and freight	773.43
Tents and frames	76.75
Small tools	27.68
	<hr/>
	\$ 957.36

STATE HIGHWAY DEPARTMENT.

GENERAL EXPENSE

Equipment:

Distributing plant for bridge construction.....	\$541.82	
Storage of culverts at Prescott	65.00	
		\$ 606.82

ADMINISTRATIVE EXPENSE

General Fund:

Salary State Engineer	\$3,000.00	
Travel expense, State Engineer	786.84	
Auto expense, State Engineer	515.08	
		\$ 4,301.92
Postage	\$ 140.00	
Telegraph and telephone	131.90	
Drafting supplies	127.11	
Stationery	743.94	
Blue printing	97.33	
Books and periodicals	50.25	
Engineering instruments	120.09	
Salaries, Miscellaneous	48.40	
Miscellaneous	88.89	
		\$ 1,547.10

25% Fund:

Salaries paid for previous year	\$ 404.98	
Salaries drafting and engineering off. force	2,901.12	
Salaries clerical force	2,848.17	
		\$ 6,154.27

Traveling Expenses:

T. F. Nichols, office engineer.....	\$ 23.91	
K. K. Koontz, division engineer	131.20	
J. C. Ryan, division engineer	90.00	
J. S. Barlow, division engineer	90.00	
Miscellaneous	127.00	
		\$ 462.11

STATE HIGHWAY DEPARTMENT.

Engineering instruments	\$ 165.16
Drafting supplies	207.25
Stationery	10.00
General expense	25.00
Secretary of State for Administration Ex	
pense Motor Vehicle Tax Law.....	1,000.00

Total Office Expense	\$ 8,023.79
Refund	6.45

\$ 8,017.34

1913-1914

It has been the policy of this office, approved by the Board of Control and the Boards of Supervisors to utilize the State Road Fund solely for construction purposes of as permanent a nature as possible upon properly located roads, and the maintenance thereof. The minimum width of roadway, including gutters, was increased from 12 ft. as formerly to 16 ft. and the maximum to 26 ft. The width of road as constructed in different sections has been governed by proximity to centers of population—the amount of traffic it would have to carry—but in no case less than 16 ft. A maximum grade of 6% was adopted and has been adhered to except in extreme cases where it was thought the expense would not be justified. For bridges, live loads of a 15-ton roller for steel and 20-ton roller, 150 lbs. per sq. ft., for reinforced concrete were adopted. Wherever practicable, foundations have been carried to solid rock and in all cases to firm footing below the stream bed to a depth of not less than 10 ft. for large nor less than 4 ft. for small bridges. Minimum size of culverts was increased from 6 inches to 18 inches and both corrugated iron and concrete pipe used with headwalls on one or both ends. Size of openings were determined, if possible, by high water marks or the E. P. & S. W. drainage formulae. After preparation of plans and quantity sheet all contracts have been let on a lump sum basis.

The character of road construction made under the operation of the State Road Law can be divided into two general classes: Heavy construction, in mountainous or rolling country, which consisted of grading a roadway from 16 to 24 feet in width, excavating adequate sidehill ditches, installation of all necessary drainage structures, and surfacing with the most suitable material found near or adjacent to the road. And light construction, over mesa or desert country, which consisted of crowning a roadway 20 to 26 feet wide, the excavation of side ditches to concentrate storm water, grading back from cross washes to about 10% grade, with only sufficient fills to install culverts as limited funds would permit and surfacing where absolutely necessary with gravel.

STATE HIGHWAY DEPARTMENT.

The construction of bridges and approaches over large streams and arroyas were found to be the most necessary improvements in several counties and the major portion of their funds during this year were expended for this purpose. Reinforced concrete has been given preference in all bridge work and only in extreme cases of limited funds have wooden structures been erected.

The scheme for administering the State Road Fund, as provided in the law of June 20, 1912, whereby the Boards of Supervisors and the State Engineer act jointly in the expenditure of county portions has worked very successfully. They have worked in almost perfect harmony without the slightest manifestation of personal ill feeling, notwithstanding the many trying differences of opinion. They have been of great assistance to one another in settling the many problems that have arisen in connection with the State road work and a very beneficial rivalry has been engendered between the State and county officials and employees in the construction of roads.

SUMMARY EXPENDITURES BY COUNTIES

STATE ROAD FUNDS

July 1, 1913, to June 30, 1914

COUNTY:	WORK:	25%	75%	Total
APACHE:	Beaver Dam and Milky Wash Bridges	\$ 29.17	\$	\$
	Big Hollow Bridge		3,823.35	
	Equipment		18.95	3,871.47
COCHISE:	Fairbank Bridge	12.11	25,758.95	
	Bisbee-Douglas Highway	169.39	17,420.68	
	Tucson-Bisbee-Fairbank Bridge Sec.		4,514.53	
	Bisbee-Tombstone Highway, Sec. 1.	1,359.42	41,382.28	
	Equipment		2,386.42	
	Maintenance		2,075.29	95,079.07
COCONINO:	Canon Padre Bridge	98.04	8,903.83	
	Flagstaff-Winslow Highway	84.13	6,140.68	
	Equipment		69.20	15,295.88

COUNTY:	WORK:	25%	75%	Total
GILA:				
	Globe-Ray Highway, Sec. 2 .....	.60	255.65	
	Globe-Roosevelt Highway	1,088.88	13,694.99	
	Globe-San Carlos Highway	927.55		
	Equipment		215.05	
	Maintenance		2,694.07	18,876.79
GRAHAM:				
	Solomonville-San Carlos Highway, Sec. 2		2,000.00	
	Solomonville-San Carlos Highway, Sec. 2-A	269.05	3,144.22	
	Solomonville-San Carlos Highway, Sec. 2-B	1.96	49.09	
	Equipment		18.95	
	Maintenance		595.89	6,079.16
GREENLEE:				
	Clifton-Duncan Highway	850.84		
	Clifton-Solomonville Highway, Sec. 1	1,733.02		
	Equipment		18.95	2,602.81
MARICOPA:				
	Prescott-Phoenix, Grand Ave. Division		1,407.40	
	Florence-Mesa Highway, Sec. 2		1,428.48	
	Phoenix-Tempe Highway	19,121.75	24,421.43	
	Tempe Bridge	4,428.34	3,146.48	
	Wichenburg Bridge	31.58		
	Prop'n \$30,000 loan expended previous year		24,440.05	
	Equipment	571.51	3,370.60	
	Maintenance		1,977.60	84,345.22

COUNTY:	WORK:	25%	75%	Total
MOHAVE:				
	Kingman-Needles Highway	176.67	14,298.06	14,474.73
	Equipment		37.90	37.90
				14,512.63
NAVAJO:				
	Chevelon Creek Bridge	1,386.94	1,070.88	2,457.82
	Winslow-Holbrook Highway		1,322.99	1,322.99
	Jacks Canon Bridge .....	.75	2,154.60	2,155.35
	Equipment		88.21	88.21
				6,024.37
PIMA:				
	Tucson-Bisbee Highway Sec. 1	660.01	5,998.92	6,658.93
	Tucson-Bisbee Highway, Sec. 2-A)	796.69	14,300.36	15,097.05
	Tucson-Bisbee Highway, Sec. 2-A)	119.57	1,511.02	1,630.59
	Equipment		18.00	18.00
	Tucson-Bisbee, Davidson Canon Division	670.20		670.20
				22,563.75
PINAL:				
	Florence-Mesa, Section 1	76.26	4,213.47	4,289.73
	Tucson-Florence Highway	698.31	2,300.23	2,998.54
	General Expense		25.00	25.00
	Equipment		425.79	425.79
	Maintenance		1,885.50	1,885.50
				9,624.56
SANTA CRUZ:				
	Nogales-Tucson Highway, Section 1	1,160.32	3,652.80	4,813.12
	Equipment		18.95	18.95
	Maintenance		350.75	350.75
				5,182.82

COUNTY:	WORK:	25%	75%	Total
YAVAPAI:				
	Prescott-Flagstaff, Section 1	12.09	2,537.83	
	" " " 2	927.26		
	" " " 3	1,952.22		
	" " " 3-A	5,108.34	30,230.32	
	" " " 3-B	8.05		
	Prescott-Dewey Highway	661.14		
	General Expense		70.05	
	Equipment		777.85	
	Maintenance	149.19	4,271.03	46,705.37
YUMA:				
	Antelope Hill Bridge	324.32	5,450.68	
	Phoenix-Yuma Highway	1,063.49	154.25	
	Dome Bridge Site		271.79	
	Equipment		428.95	7,693.48
GENERAL:				
	Salaries and Expense	13,661.52		13,661.52
	Equipment	3,777.29		3,777.29
		\$ 64,167.97	\$291,728.22	\$ 355,896.19

RECEIPTS AND EXPENDITURES—STATE ROAD FUND
July 1, 1913, to June 30, 1914.

COUNTY:	Appor- tionment	Paid in		Total	Del. 1913	Received Delinquent 1912		Total	Rec'd Prior 1912 25%	Refunds		Balance July 1, 1913	Total 75%	Total 25%	Expenditures		Balance 6-30-14
		75%	25%			75%	25%			75%	25%				75%	25%	
Apache	\$ 3,997.50	\$ 2,980.15	\$ 993.38	\$ 3,973.53	\$ 23.97				\$ 5.92			\$ 3,360.65	\$ 6,340.80		\$ 3,842.30	\$ 29.17	\$ 2,498.50
Cochise	58,500.75	43,955.03	14,651.68	58,606.71		242.45	80.82	323.27	157.90	8,978.72		40,497.54	93,673.74		93,538.15	1,540.92	135.59
Coconino	10,697.25	7,571.53	2,523.82	10,095.35	601.90	99.31	33.10	132.41	105.31			9,258.10	16,928.94		15,113.71	182.17	1,815.23
Gila	21,593.75	16,118.54	5,372.86	21,491.40	102.35	276.27	92.09	368.36	338.72	4,967.72	20.00	2,063.65	23,426.18		16,859.76	2,017.03	6,566.42
Graham	6,100.25	4,651.60	1,550.53	6,202.13		196.21	65.40	261.61	35.88			2,861.65	7,709.46		5,808.15	271.01	1,901.31
Greenlee	22,722.00	16,810.28	5,603.43	22,413.71	308.29	30.52	10.18	40.70	5.16			17,171.72	34,012.52		18.95	2,583.86	33,993.57
Maricopa	44,539.75	31,968.66	10,656.22	42,624.88	1,914.87	805.40	268.46	1,073.86	347.11	19,774.19	1,937.77	8,568.33	61,116.58		60,192.04	23,581.67	924.54
Mohave	9,363.00	6,868.59	2,289.50	9,158.09	204.91	271.33	90.45	361.78	50.28			7,338.51	14,478.43		14,335.96	176.67	142.47
Navajo	4,699.75	3,543.64	1,181.20	4,724.84		8.07	2.69	10.76		63.21		1,049.10	4,664.02		4,636.68	1,387.69	27.34
Pima	15,875.75	11,756.61	3,918.87	15,675.48	200.27	136.00	45.33	181.33	271.84			11,462.39	23,355.00		20,317.28	2,246.47	3,037.72
Pinal	12,841.75	9,622.50	3,207.51	12,830.01	11.74	352.49	117.50	469.99	320.86	1,150.29		2,770.10	13,895.38		8,849.99	774.57	5,045.39
Santa Cruz	3,886.50	2,657.60	885.87	3,543.47	343.03				103.86	175.66		3,002.79	5,836.05		4,022.50	1,160.32	1,813.55
Yavapai	26,382.25	19,749.44	6,583.13	26,332.57	49.68	281.23	93.74	374.97	422.82	85.22	19.49	19,159.94	39,275.83		37,887.08	8,818.29	1,388.75
Yuma	8,799.75	6,452.25	2,150.75	8,603.00	196.75	89.89	29.96	119.85	133.48	92.05		2,527.71	9,161.90		6,305.67	1,387.81	2,856.23
TOTAL	\$250,000.00	\$184,706.42	\$ 61,568.75	\$246,275.17		\$ 2,789.17	\$ 929.72	\$ 3,718.89	\$ 2,299.14	*\$35,287.06	*\$ 1,977.26	\$131,092.18	\$353,874.83	\$ 66,932.70	\$291,728.22	\$ 46,157.65	\$ 62,146.61
Balance 7-1-'13														7,925.60			
Auto Tax														34,046.25			
Expense State Eng'rs Office											157.83					13,661.52	
Equipment																4,348.80	44,736.58
	\$250,000.00	\$184,706.42	\$ 61,568.75	\$246,275.17		\$ 2,789.17	\$ 929.72	\$ 3,718.89	\$ 2,299.14	*\$35,287.06	*\$ 2,135.09	\$131,092.18	\$353,874.83	\$ 108,904.55	\$291,728.22	\$ 64,167.97	\$106,883.19

*Receipts shown in these columns all represent refunds and to obtain net expenditure should be deducted from Expenditure Column.

25% Fund:

Treasurer's receipts, Nos. 97, 132, 143, 344, 374, 382, 439, 497, 530, 564, 573, 601.....\$ 2,135.09

75% Fund:

Cochise County — Treasurer's Receipt	Nos. 179, 210, 291, 319, 329, 340, 347, 400, 406, 417, 418, 419, 447, 449, 493, 506, 508, 563, 574	\$ 8,978.72
Gila	Nos. 42, 332, 345, 346, 408, 416, 434, 483, 507, 534, 603, 616	4,967.72
Maricopa	Nos. 41, 54, 73, 74, 112, 134, 178, 203, 205, 223, 226, 238, 239, 249, 262, 280, 288, 294, 304, 316, 371, 373, 375, 415, 420, 448, 451, 485	\$ 19,774.19
Navajo	Nos. 585, 602	63.21
Pinal	Nos. 164, 320, 395	1,150.29
Santa Cruz	No. 162	175.66
Yavapai	No. 482	85.22
Yuma	Nos. 68, 133	92.05

STATE HIGHWAY DEPARTMENT.

APACHE COUNTY

Board of Supervisors:

J. R. Armijo, Chairman,

Hyrum J. Knight, Member,

Pedro Candelaria, Member,

Theo. Lopez, Clerk.

F. R. Goodman, Division Engineer.

Beaver Dam and Milky Wash Bridges:

Selection of sites for bridges over Beaver Dam and Milky Wash between Holbrook and St. Johns made in June, 1914.

Engineering—Salaries\$ 29.17 \$ 29.17

Big Hollow Wash Culvert:

Plans furnished by Mr. W. A. Crossland, Senior Highway Engineer, Office of Public Roads, for a three arch concrete culvert over Big Hollow Wash on State Highway between Holbrook and St. Johns. Contract awarded Faustino Franco for construction of this culvert for \$2,614.75 for 106.5 cubic yards with allowance of \$12.60 per cubic yard for additional concrete yardage. Construction completed and bridge accepted February, 1914:

Original Contract, 106.5 cu. yds.\$2,614.75

Additional yardage, 88.58 1,116.10

Extra work 92.50

\$ 3,823.35

Equipment:

Road drag\$ 18.95

COCHISE COUNTY

Board of Supervisors:

August Hickey, Chairman,

John Rock, Member,

Wm. Riggs, Member,

A. C. Karger, Clerk.

J. C. Ryan, Division Engineer.

STATE HIGHWAY DEPARTMENT.

Fairbank Bridge:

Construction of bridge at this point begun in May, 1913, completed in November, 1913:

Expenditures 1913-1914.....	\$25,771.06
*Refunds.....	\$3,789.04
	<hr/> \$21,982.02

(For detail see Prison Labor section of this report.)

Tucson-Bisbee Highway, Fairbank Bridge Section:

This section built in connection with construction of Fairbank bridge and completed in December, 1913.

Expenditure 1913-1914	\$4,514.53
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(For detail see Prison Labor section of this report.)

Bisbee-Douglas Highway:

Reconstruction and surfacing work on portion of this highway commenced January 1, 1914, and carried on to May 1, 1914, at which time work was discontinued until such time as additional funds were available.

Expenditure 1913-1914	\$17,590.07
Refunds	528.40
	<hr/> \$17,061.67

(For detail see Prison Labor section of this report.)

Bisbee-Tombstone Highway, Section 1:

Construction work on this section started October, 1913, with prison labor and work is being continued at this time.

Expenditures 1913-1914	\$42,741.70
Refunds	2,534.14
	<hr/> \$40,207.56

Equipment:

County equipment purchased 1913-1914.....	\$ 2,386.42
Taken into State equipment.....	2,127.14
	<hr/> \$ 259.28

*Refunds shown as receipts and credits not considered by Auditor, and for uniformity gross expenditures are shown herein.

STATE HIGHWAY DEPARTMENT.

Maintenance:

Caretaker employed on the Bisbee-Douglas Highway to December 1, 1913, at \$140.00 per month including team; maintenance taken over entirely under direction of Division Engineer J. C. Ryan as of that date and teams and day labor used to put road in as good condition as possible until reconstruction work commenced in January, 1914.

Maintenance by caretaker:

Salaries	\$ 921.43	
Miscellaneous expense	47.15	
		\$ 968.58

In addition to the work done under direction of Division Engineer, December 1, 1913, to January 1, 1914, during August, 1913, Assistant Engineer B. M. Atwood was delegated to superintend temporary repair work on portions of this road consisting of cleaning out ditches and scarifying old oil surface. Day labor was used on this work at \$3.00 per day and teams at \$3.00 per day.

Maintenance under direction of Engineers:

Salaries and wages	\$ 478.81	
Engineer's travel and expenses	154.15	
Team hire	286.50	
Drags constructed	50.00	
Tools and steel for scarifying	126.70	
Miscellaneous	10.55	
		\$ 1,106.71
		\$ 2,075.29

COCONINO COUNTY

Board of Supervisors:

H. J. Gray, Chairman,

R. F. Bongberg, Member,

P. M. Shafer, Member,

C. H. Brownell, Clerk.

F. R. Goodman, Division Engineer.

STATE HIGHWAY DEPARTMENT.

Canon Padre Bridge:

Contract awarded Topeka Bridge & Iron Company for construction of a one hundred and forty foot Luten type arch for \$7,900.00 and construction commenced by that company in September, 1913, Assistant Engineer W. H. Caruthers acting as inspector. Supplementary agreement made with the contractor for building approaches on basis of wages paid plus 10%. Construction of bridge proper completed in April, 1914, and approach work taken over by Assistant Engineer Caruthers and finished with day labor. Final estimate on contract for bridge will be paid in July, 1914.

Paid on contract	\$6,896.70
Salary of Inspector	572.02
Travel and subsistence	188.10
Miscellaneous expense	36.80
Approaches	1,072.45
2 24 in. Corr. Iron Culverts in approaches.....	137.76
	<hr/>
	\$ 8,903.83

Engineering:

Salaries	\$ 10.00
Travel	2.55
Advertising, etc.	44.14
Expenses, Office Engineer	34.05
Expenses, Office	7.30
	<hr/>
	\$ 98.04
	<hr/>
	\$ 9,001.87

Flagstaff-Winslow Highway:

Highway between the Canon Padre bridge and Canon Diablo bridge site graded by day labor, approximately 13 miles:

Engineering:

Salaries	\$ 82.18
Expense	1.95
	<hr/>
	\$ 84.13

Construction:

Clearing and Grubbing—

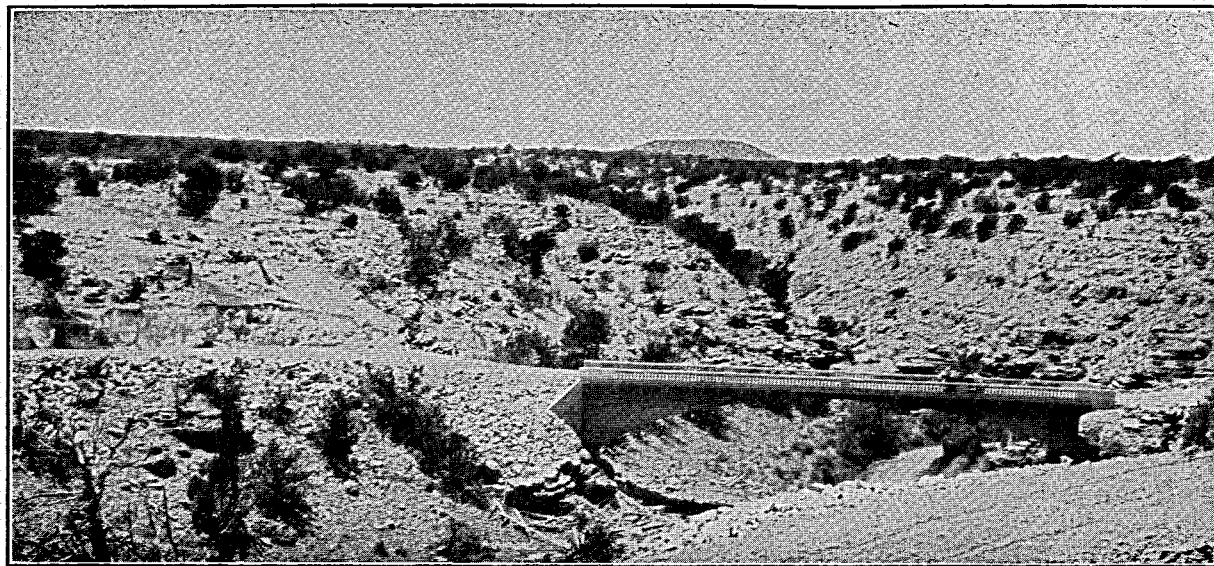
Labor	\$ 875.46
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Grading:

Labor	\$3,229.99
Teams	792.09
	<hr/>
	\$4,022.08



COCONINO COUNTY
Santa Fe Highway
Upper Picture—Meteor Mountain



COCONINO COUNTY
Canon Padre Bridge
Santa Fe Highway

STATE HIGHWAY DEPARTMENT.

Culverts and Drains:

Teams 36.83

Ditching:

Teams 24.05

Surfacing:

Labor \$ 349.00

Teams 102.20

\$ 451.20

Superintendence:

Salaries \$ 477.81

Expenses 198.13

\$ 675.94

Miscellaneous expense

\$ 55.12

\$ 6,140.68

\$ 6,224.81

Equipment:

Drags and small tools..... \$ 69.20

GILA COUNTY

Board of Supervisors:

David DeVore, Chairman,

Mart McDonald, Member,

Patrick Rose, Member,

Frank L. Gates, Clerk.

F. G. Twitchell, Division Engineer.

Globe-Ray Highway, Section 2:

While construction work on this section was closed in January, 1913, it was necessary to leave two prisoners to guard the material and equipment at that camp, the cost of their subsistence being charged to the work. This arrangement was continued to September 17, 1913, when camp was dismantled and equipment and material transferred to the Bisbee-Tombstone Highway camp, the equipment being taken over to state road equipment and the material by Cochise County 75% portion of State Road Fund and credit allowed the Globe-Ray Highway construction therefor.

STATE HIGHWAY DEPARTMENT.

Expenditures 1913-1914	\$ 256.25
*Refunds	3,384.61
Net Credit	\$3,128.36
(For detail see Prison Labor Section of this report.)	

Globe-Roosevelt Highway:

Work of putting in additional drainage and repairing this section of highway undertaken December 15, 1913, with an honor force of prisoners selected from Phoenix-Tempe highway force and this work is being continued at this date.

Expenditures 1913-1914:	
Engineering	\$ 1,088.88
Construction	13,694.99
	<hr/>
	\$14,783.87
*Refunds	1,536.91
	<hr/>
	\$13,246.96

Equipment:

Expenditures 1913-1914	\$ 215.05
*Refunds	66.20
	<hr/>
	\$ 148.85

Globe-San Carlos Highway:

Survey from the city limits of Globe four and one-half miles south to the boundary of the San Carlos Indian Reservation made and plans and specifications being prepared for advertising for bids in July, 1914.

Engineering:	
Salaries	\$ 687.75
Subsistence and travel	187.10
Auto expense: Engineer	30.00
Blue prints	22.70
	<hr/>
	\$ 927.55
*Refunds shown as receipts and credits not considered by Auditor and for uniformity gross expenditures are shown herein.	

STATE HIGHWAY DEPARTMENT.

Maintenance:

Caretaker on the Roosevelt end of the Globe-Roosevelt highway, at \$100.00 per month retained to January 1, 1914, and caretaker on the Globe end of same highway retained to January 31, 1914, after which dates maintenance work taken in hand by prison forces engaged on this highway.

Caretakers:

Salaries	\$1,300.00
Miscellaneous	5.00
	<u>\$1,305.00</u>

Maintenance work done on Globe-Roosevelt highway under direction of Board of Supervisors.....\$1,319.02

Black River bridge was repainted in June, 1914. Material bills only paid to June 30, 1914.....\$ 170.05

GRAHAM COUNTY

Board of Supervisors:

Phil C. Merrill, Chairman,

A. C. Peterson, Member,

W. L. Nelson, Member,

Benjamin Blake, Clerk.

F. G. Twitchell, Division Engineer.

Solomonville-San Carlos Highway, Section 2:

\$2,000.00 was appropriated, upon recommendation of Board of Supervisors, from this county's proportion of State Road Funds for expenditure under the direction of the superintendent of the San Carlos Indian Reservation on that portion of the State Highway through the Reservation between Geronimo and the boundary of Gila and Graham Counties.....\$2,000.00

With appropriation of \$2,000.00 1912-1913, and \$2,000.00 1913-1914, the Superintendent of San Carlos Indian Reservation accomplished the following:

STATE HIGHWAY DEPARTMENT.

26 miles of road improved, utilizing as far as possible the abandoned railroad grade.

Construction following bridges and culverts:

- 6 10-ft. wooden bridges;
- 1 20-ft. wooden bridge;
- 1 80-ft. wooden bridge;
- 1 98-ft. wooden bridge;
- 15 wooden culverts;
- 25 corrugated iron culverts.

Solomonville-San Carlos Highway, Section 2-A:

Under supervision of Division Engineer F. G. Twitchell, the County Road Superintendent W. R. Foote constructed 1.89 miles from Matthews toward San Carlos on this section of the State Highway, this construction consisting of grading and surfacing and putting in wooden culverts and bridges:

Engineering:

Right of way plats\$ 22.70

Inspection:

Salaries 77.42

Expense 168.93

\$ 269.05

Construction:

Grading:

Labor\$ 107.50

Teams 459.25

\$ 566.75

Culverts:

Labor\$ 1,029.00

Materials 506.33

\$1,535.33

Miscellaneous

92.64

*Surfacing

949.50

\$ 3,144.22

\$ 3,413.27

*Surfaced with 8 in. of gravel to width of 16 feet.

STATE HIGHWAY DEPARTMENT.

Solomonville-San Carlos, Section 2-B:

Division Engineer F. G. Twitchell instructed to secure necessary right of way for extension of construction from Section 2-A.

Salary and expenses..... \$ 51.05

Equipment:

Road drag \$ 18.95

Maintenance:

Maintenance of State Highways in this county under direction of County Road Superintendent who is allowed \$15.00 per month for supervision:

Labor\$ 331.51

Teams 159.91

Material 104.47

\$ 595.89

GREENLEE COUNTY

Board of Supervisors:

Wade Hampton, Chairman.

R. A. Campbell, Member;

C. P. Dunn, Member.

A. L. Terry, Clerk.

J. S. Barlow, Division Engineer.

Clifton-Solomonville Highway, Section 1:

Final location made and plans and specifications prepared for advertising for bids for construction of 3 miles of highway from Clifton toward Solomonville.

Engineering:

Engineering Corps salaries\$ 803.55

Travel and subsistence 628.79

Team hire 92.00

Transit rental 30.00

Blue printing, specifications, etc. 101.10

Miscellaneous 77.58

\$ 1,733.02

STATE HIGHWAY DEPARTMENT.

Clifton-Duncan Highway:

Survey made of seven miles of highway from the end of Clifton-Solomonville Highway, Sec. 1, toward Duncan.

Engineering:

Salaries	\$ 440.92
Travel and subsistence	343.92
Team hire	66.00
	<hr/> \$ 850.84

MARICOPA COUNTY

Board of Supervisors:

W. A. Moeur, Chairman,
Frank Luke, Member,
Lin B. Orme, Member,
Jas. Miller, Jr., Clerk.

Tempe Bridge:

Finishing and paving work completed in September, 1913, and bridge opened for traffic September 20, 1913.

Expenditures 1913-1914	\$ 7,574.82
*Refunds	7,542.74
	<hr/> \$ 32.08

(For detail see Prison Labor Section of this report.)

Phoenix-Tempe Highway:

Construction work on this highway with prison labor continued to completion, December, 1913. (For detail see Prison Labor section of this report.)

Expenditures 1913-1914	\$43,543.18
*Refunds	9,781.48
	<hr/> \$33,761.70

Reimbursement made to General Fund for loan of \$30,000.00 in fiscal year 1912-1913. Expenditures during that year \$24,440.05. Amount expended current year from this fund, \$5,559.26, shown as regular expenditures against proper projects.

STATE HIGHWAY DEPARTMENT.

Florence-Mesa Highway, Section 2:

Construction (grading only) on this project finished in February, 1913, but final adjustment of expenditures between Maricopa and Pinal Counties not made until current year.

Expenditures 1913-1914	\$ 1,428.48
*Refunds	465.43
	<hr/> \$ 963.05

Prescott-Phoenix Highway, Grand Ave. Division:

Work of construction of concrete culverts started latter part of previous fiscal year completed.

Expenditures 1913-1914—

Superintendence	\$ 48.28
Temporary road	267.00
Teams	27.09
Forms, labor	11.25
Forms, material	133.30
Concrete, labor, teams	123.08
Concrete, labor	180.43
Cement	346.48
Gravel	168.60
Lumber	32.15
Steel	9.00
Miscellaneous	2.54
Embankment	58.20
	<hr/> \$1,407.40
*Refunds	24.50
	<hr/> \$ 1,382.90

Maintenance:

County Road Superintendent allowed \$15.00 per month for supervision of maintenance on State Highway in this county up to December, 1913, at which time a caretaker was placed in charge of Phoenix-Tempe Highway at \$70.00 per month, the County Road Superintendent, however, looking after the other sections.

Salary County Road Supt.	\$ 180.00
Grand Ave. Division:	

Teams	\$ 540.75
Labor	565.00
Material and supplies	169.38
	<hr/> \$ 1,275.13

*Refunds shown as receipts and credits not considered by Auditor, and for uniformity gross expenditures are shown herein.

STATE HIGHWAY DEPARTMENT.

Phoenix-Tempe Highway:

Salary caretaker	\$ 397.33
*Hay and Grain	87.66
Miscellaneous	9.35

Tempe Bridge:

Light Globes to replace those broken	\$ 28.08
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*Team and wagon furnished by 75% Fund.

Equipment:

Expenditures 1913-1914:

75% Fund	\$ 3,370.60
25% Fund	571.51

*Refunds	3,897.81
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\$ 44.30

Wickenburg Bridge:

Survey and soundings made at Wickenburg for bridge over the Hassayampa River for Maricopa County:

Salaries	\$ 19.80
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Expense	11.78
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\$ 31.58

State Road Fund will be reimbursed by Maricopa County for this charge, together with pay roll charges under office.

MOHAVE COUNTY

Board of Supervisors:

John C. Potts, Chairman,

N. K. Ridenour, Member,

J. Sam Withers, Member,

Isaac Bartholomew, Clerk,

E. R. Goodman, Division Engineer.

*Refunds shown as receipts and credits not considered by Auditor, and for uniformity gross expenditures are shown herein.

STATE HIGHWAY DEPARTMENT.

Kingman-Needles Highway:

Work of grading highway from Kingman to Topock started in June, 1913, under force account agreement with Aubrey Investment Company completed in December, 1913. Division Engineer James A. Parker was in charge of supervision of this work and prices allowed were as follows, plus 10%:

Foreman, per day	\$ 4.00	Blacksmith, per day	\$ 4.00
Laborers, per day	2.25	2 H. team and driver per day..	5.00
4 H. team and driver.....	8.00	6 H. team and driver per day..	11.00
8 H. team and driver.....	13.50	Wagons per day .....	.15
Water wagons, per day.....	.25	Fresnos per day .....	.10
Plows, per day .....	.10	Scrapers per day .....	.10

Engineering:

Unpaid bills from previous year:

Salaries	\$ 1163.255
Subsistence	132.61
Travel	10.00
Miscellaneous	31.51
	<hr/>
	\$ 176.67

Superintendence:

Salary	525.00
Expenses	153.05
Saddle horse and feed	165.25
	<hr/>
	\$ 843.30

Construction:

Clearing and Grubbing	\$ 1,022.58
Grading:	
Labor	12,349.59
Material	82.59
	<hr/>
	\$ 12,432.18
	<hr/>
	\$ 14,474.73

Equipment:

Drags	\$ 37.90
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STATE HIGHWAY DEPARTMENT.

NAVAJO COUNTY

Board of Supervisors:

J. E. Richards, Chairman,

E. T. Hatch, Member,

Barnett Stiles, Member,

C. M. C. Houck, Clerk,

F. R. Goodman, Division Engineer.

Chevelon Creek Bridge:

Construction of bridge under contract with Missouri Valley Bridge & Iron Company completed, together with original approaches, bridge being accepted July, 1913. In May, 1914, additional work done on approaches by day labor under direction Assistant Engineer B. M. Atwood.

Expenditures 1913-1914:

Balance due on contract\$1,432.32

Extra concrete in abutments 662.48

Force account on approaches 136.01

\$ 2,230.81

Forces under B. M. Atwood on approaches:

Labor\$ 60.56

Material 157.95

Teams 8.50

\$ 227.01

\$ 2,457.82

Winslow-Holbrook Highway:

Under supervision of Assistant Engineer B. M. Atwood, 3, 735 feet of road graded and five small culverts constructed from approach of Chevelon Creek bridge toward Winslow by use of day labor:

Superintendence:

Salary\$ 76.08

Expenses 32.22

\$ 108.30

Camp Costs:

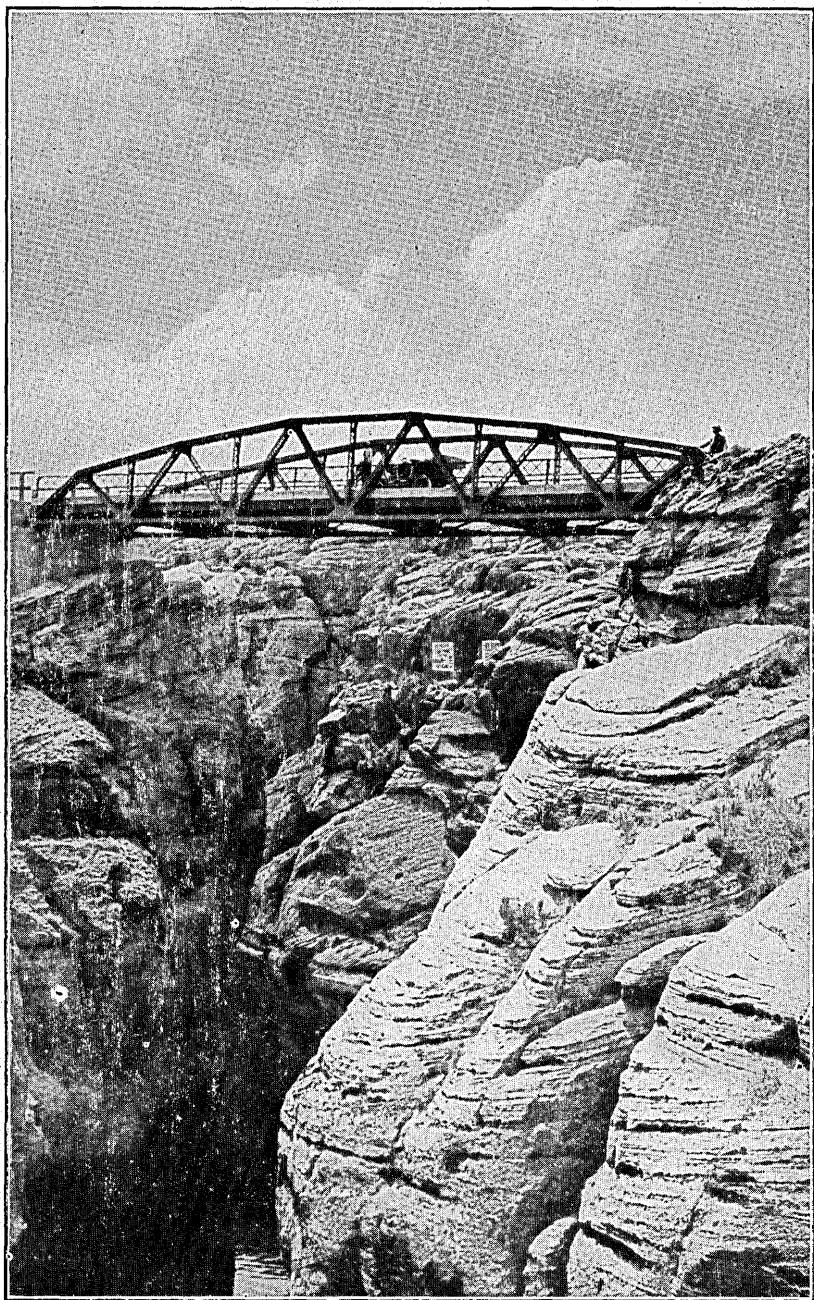
Cook 38.71

Labor 20.26

Teams 25.00

*Supplies 131.37

\$ 215.34



NAVAJO COUNTY
Cheallon Creek Bridge
Santa Fe Highway

STATE HIGHWAY DEPARTMENT.

Clearing and Grubbing:

Labor	6.25	
		\$ 5.25

Grading:

Solid Rock:

Labor	\$17.90	
Material	10.50	
		\$ 28.40

Loose Rock:

Labor	\$19.00	
Teams	15.00	
		\$ 34.00

Earth Excav.:

Labor	\$10.75	
Teams	25.25	
		\$ 36.00

Borrow, earth:

Labor	\$38.96	
Teams	110.00	
		\$148.96

Borrow, L. R.:

Labor	\$17.30	
Teams	31.00	
		\$ 48.30

S. R. Excav.:

Labor	\$16.50	
Material	6.50	
		\$ 23.00
		\$ 318.16

Culverts:

No. 1—1.5'x1.2'x18' Stone box—6 C. Y.

Labor	\$ 7.00	
Teams	1.00	
Material	2.83	
		\$ 10.83

No. 2—1.5'x1.2'x18' Stone Box—6 C. Y.

Labor	\$ 7.00	
Teams	1.00	
Material	2.83	
		\$ 10.83

No. 3—1.5'x1.2'x19' Stone Box—7 C. Y.

Labor	\$ 7.50	
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STATE HIGHWAY DEPARTMENT.

Teams	2.00	
Material	2.84	
		\$ 12.34
2 36 in.x22' Corr. Iron Culverts		
Pipe	\$308.26	
Labor	8.00	
		\$ 316.26
38.5 C. Y. Masonry Headwalls		
Labor	\$ 30.97	
Teams	6.00	
		\$ 36.97
Ditching:		
Solid Rock—Labor	\$ 5.00	
Loose Rock—Labor	11.74	
		\$ 16.74
Miscellaneous		\$ 4.50
Material not used, but to be placed later (culverts)		\$ 226.08
		\$1,322.99
*Refund		\$ 63.21
		\$ 1,259.78

Jack's Canon Bridge:

Thirty foot rail top concrete bridge over Jack's Canon four and one-half miles southeast of Winslow and thirteen hundred and fifty feet of road constructed and one 18 inch corrugated iron culvert placed by day labor under direction of Assistant Engineer B. M. Atwood.

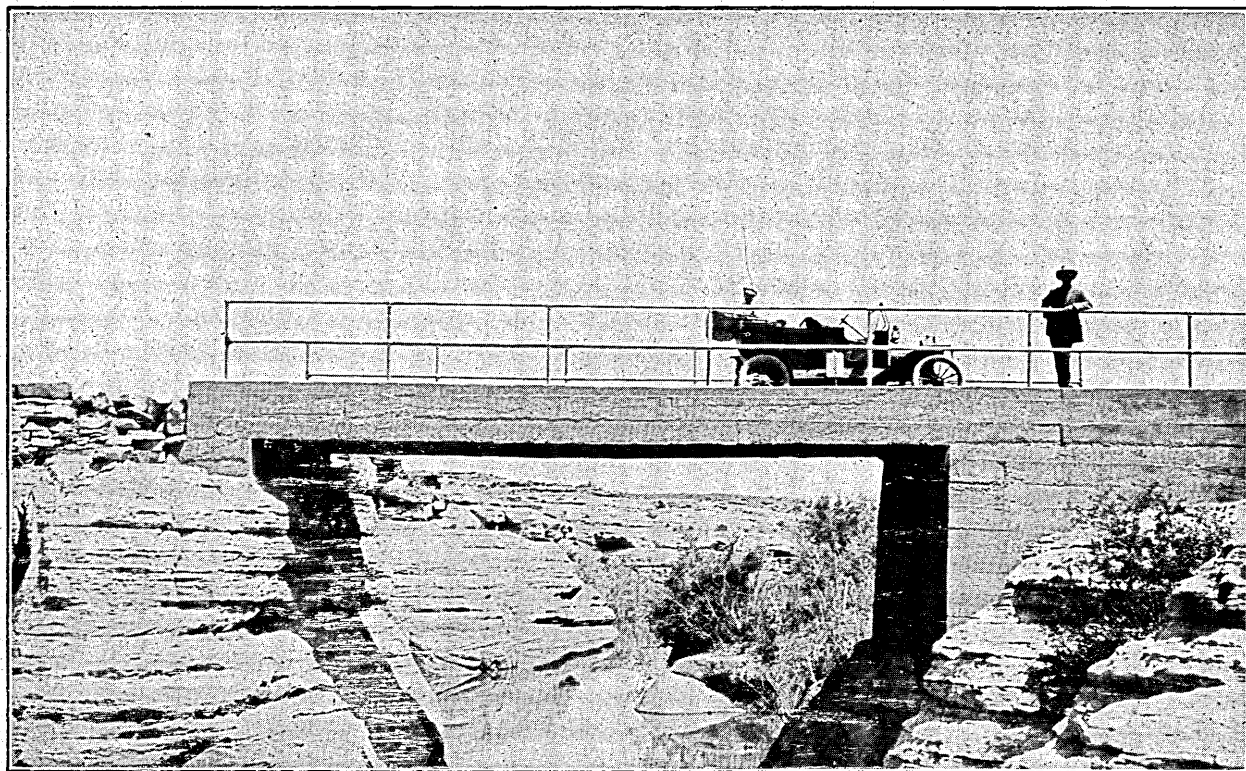
Superintendence:

Salary	\$ 149.77	
Expenses	113.55	
		\$ 263.32
Camp Costs:		
Cook	\$ 67.61	
Labor	35.83	
Teams	28.00	
Supplies	213.72	
		\$ 335.16

Grading—500 cu. yds. .

Solid Rock—Labor\$52.25

*Refunds shown as receipts and credits not considered by Auditor, and for uniformity gross expenditures are shown herein.



NAVAJO COUNTY
Jacks Canon Bridge
Santa Fe Highway

STATE HIGHWAY DEPARTMENT.

Loose Rock—Labor	3.50	
Earth:		
Labor	\$ 5.25	
Teams	13.00	
		\$ 18.25

Borrow—Solid Rock:		
Labor	\$23.42	
Material	15.00	
		\$ 38.42

Borrow—Loose Rock:		
Labor	\$92.90	
Teams	64.75	
		\$157.65
		\$ 280.07

Bridge:

Excavation:

Labor	\$18.07	
Material	6.25	
		\$ 24.32

Forms and Falsework:

Labor	\$94.25	
Nails	3.60	
Wire	1.20	
Lumber transportation	17.00	
		\$200.85

Concrete:

Cement	\$252.45	
Cement transportation	20.00	
Labor	79.35	
Gravel	72.00	
		\$423.80

Reinforcing:

Material	\$369.95	
Material transportation	35.00	
		\$404.95

Masonry:

Labor	\$ 2.48	
Material	1.70	
		\$ 4.18

Railing:	\$104.80	
		\$1,163.20

STATE HIGHWAY DEPARTMENT.

Ditching:			
Solid Rock:			
Labor	\$ 12.00		
Material	13.75		
		\$ 15.75	\$ 15.75
Surfacing:			
Labor	\$ 29.75		
Teams	27.75		
		\$ 57.50	\$ 57.50
Miscellaneous Labor		\$ 40.35	\$ 40.35
			\$ 2,155.35

Equipment:

Drags and small tools.....	\$ 88.21
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PIMA COUNTY

Board of Supervisors:

W. B. Coberly, Chairman,

J. W. Estill, Member,

C. F. Ainsworth, Member,

Bertram L. Hitch, Clerk.

J. S. Barlow, Division Engineer.

Tucson-Bisbee Highway, Section 1:

Bids for grading 21.048 miles between city limits of Tucson and Vail opened August 4, 1913, and contracted awarded D. O. & L. L. Johnson, lowest bidders, for \$5,416.50. Following culvert work included in original estimate stricken out by Board of Supervisors prior to asking for bids: Two 13 ft. rail floor culverts, two 20 ft. rail floor culverts and one 40 ft. rail floor culvert. Work under this contract completed and accepted June, 1914.

Engineering:

Expense incurred 1912-1913 and paid 1913-1914:

Salaries\$ 25.00

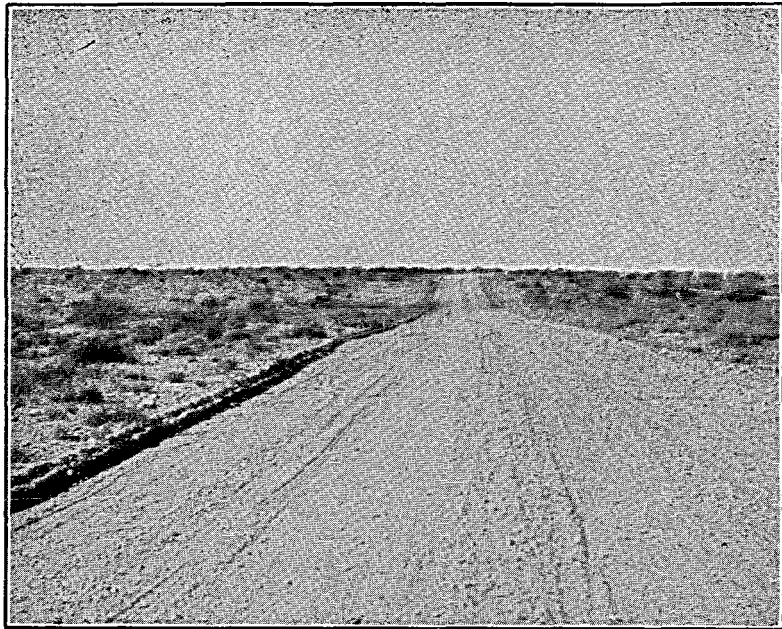
Subsistence 63.25

Miscellaneous 28.85

\$ 91.70

Expense during construction:

Salaries\$ 241.48



PIMA COUNTY
Tucson-Bisbee, Section 1
Tucson to Vail
Borderland Highway

STATE HIGHWAY DEPARTMENT.

Subsistence	
and Miscellaneous	229.33
Team rental	97.00
	\$ 568.31
	\$ 660.01

Contract:

Clearing and grubbing 48.5 Acres @ \$5.00	242.50
Earth excavation 18761 cu.yds. @ .16½	3,095.56
Embankment 8958 cu.yds. @ .18	1,612.44
Ditching 8720 Lin. ft. @ .05	436.00
Placing 24-in. culverts 60 Lin. ft. @ .50	30.00
	\$5,416.50

Inspector:

Salary	\$ 421.37	
Expenses	161.05	
	\$ 582.42	\$ 582.42
		\$ 6,658.93

Tucson-Bisbee Highway, Section 2-A:

Final survey, plans and specifications made for 10.078 miles extending from Vail to beginning of Davidson Canyon division, constructed under Territorial administration. Account lack of funds bids were asked by Board of Supervisors for the last 4.8 miles of this section and contract awarded Roberts & Johnson November 10, 1913, for \$14,577.89.

Engineering: Survey—

Salaries	\$ 32.85
Travel and subsistence	147.60
Miscellaneous	20.35
	\$ 250.80

Engineering: During construction—

Salaries	\$ 231.41
Travel and subsistence	227.13
Inspection expense	155.00
Office, blue prints, etc.	51.92
	\$ 665.46
	\$ 916.26

Contract:

Clearing and grubbing	14.7 A.	@ \$ 5.00	\$ 73.50
Earth excavation	4846.8 CY	@ .25	1,211.70
Rock excavation	6522.4 CY	@ .75	4,891.80
Embankment	144220.5 CY	@ .20	2,884.10

STATE HIGHWAY DEPARTMENT.

Ditching	18700.0 Lft @ .05	935.00
Concrete, Second Class	22,63.2 CY @ 10.00	632.00
Concrete, Third Class	6300.0 CY @ 10.00	3,000.00
2 in. Galvanized Pipe Rail	140.0 Lft @ .25	35.00
Placing 24 in. Corr. Iron Culverts	369.0 Lft @ .50	184.50
Placing 12x18 in. " " "	211.0 Lft @ .50	105.50
Placing 30x36 in. " " "	74.0 Lft @ .50	37.00
Placing 48 in. " " "	79.0 Lft @ .50	39.50
Second hand rail	25200.0 Lbs @ .02 1/4	567.00
Reinforcing steel	531.0 Lbs @ .04	21.24
		\$14,577.89
Paid to June 30, 1914		12,454.11
Culverts		1,048.50
Cement tests		7.50

Inspector:		
Salaries		\$ 510.95
Travel and subsistence		279.30
		\$ 790.25
		\$15,216.62

Tucson-Bisbee Highway, Davidson Canyon Division:

\$1,000.00 has been appropriated by the Board of Control from the 25% Fund for repair work on this section and under force account agreement with J. H. Fritz, there was expended to June 30, 1914, \$670.20. Prices allowed under this agreement: Foreman \$4.00, teamsters \$2.00, laborers \$2.00, 2 h. team and scraper \$3.50, and 4 h. team and wagon \$6.50 per day plus ten per cent.

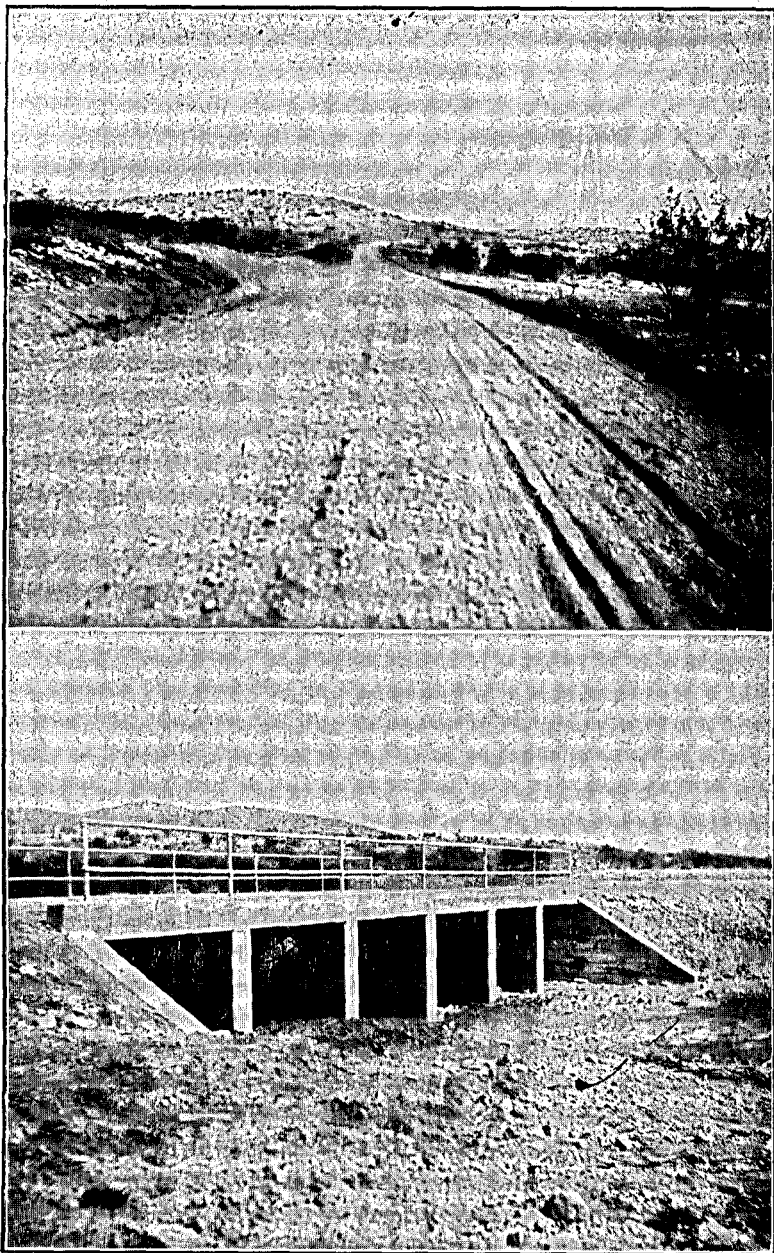
Equipment:		\$ 18.00
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PINAL COUNTY

Board of Supervisors:

Thos. N. Wills, Chairman,
J. G. Keating, Member,
H. B. Wiggins, Member,
C. H. Neimeyer, Clerk.

(F. G. Twitchell, Division Engineer.



PIMA COUNTY
Tucson-Bisbee, Section 2, Vall East
Borderland Highway

STATE HIGHWAY DEPARTMENT.

Florence-Mesa Highway, Section 1:

Expenditure 1913-1914 (Cons.).....	\$ 4,213.47
Expenditure 1913-1914 (Engr.).....	76.26
	<hr/>
	\$ 4,289.73
*Refund	1,028.99
	<hr/>
	\$ 3,260.74

(For detail see Prison Labor Section of this report.)

Tucson-Florence Highway:

Expenditures 1913-1914 (Constr.).....	\$ 2,300.23
Expenditures 1913-1914 (Engr.).....	698.31
	<hr/>
	\$ 2,998.54

(For detail see Prison Labor Section of this report.)

Maintenance:

Expenditures 1913-1914	\$ 1,885.50
*Refund	20.55
	<hr/>
	\$ 1,864.95

(For detail see Prison Labor Section of this report.)

Equipment:

Expenditures 1913-1914	\$ 425.79
*Refunds	100.75
	<hr/>
	\$ 325.04

General Expense:

Right of way (Florence-Mesa highway)	\$ 25.00
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SANTA CRUZ COUNTY

Board of Supervisors:

A. S. Henderson, Chairman,

W. C. Fortune, Member,

A. L. Peck, Member,

Lula Reddock Wood, Clerk.

J. S. Barlow, Division Engineer

*Refunds shown as receipts and credits not considered by Auditor, and for uniformity gross expenditures are shown herein.

STATE HIGHWAY DEPARTMENT.

Nogales-Tucson Highway:

Final location made and partial construction by day labor commenced under supervision of Division Engineer J. S. Barlow in August, 1913, and continued to September, 1913, when funds were exhausted. With money available, 4.6 miles graded and two rail top culverts constructed.

Engineering: During Construction:

Salaries	\$ 126.81	
Travel, commissary supplies	222.46	
		\$ 349.27

Construction:

Grading:

Labor	\$ 655.38	
Teams	2,030.25	
Material	153.31	
		\$ 2,838.94

Ditching:

Labor	\$ 101.25	
Teams	65.00	
		\$ 166.25

Culverts:

Labor	\$ 33.00	
Rail	68.15	
Cement	80.83	
Lumber	5.04	
Nails	2.34	
		\$ 189.36

Superintendence:

Salaries	\$ 228.75	
Expenses	229.50	
		\$ 458.25

*Refund

\$ 3,826.41

NOTE: Engineering expenses \$175.66 primarily charged to 75% Fund; transferred to 25% Fund and credit allowed 75% Fund.

*Refunds shown as receipts and credits not considered by Auditor, and for uniformity gross expenditures are shown herein.

STATE HIGHWAY DEPARTMENT.

Nogales-Tucson Highway, Section 1:

Work resumed on this highway April, 1914, and plans and specifications prepared for advertising for bids in July, 1914:

Engineering:

Salaries	\$ 482.85
Subsistence and travel	324.00
Miscellaneous	4.20
	<hr/>
	\$ 811.05

Maintenance:

Maintenance work under direction of Board of Supervisors:

Teams and drivers	\$ 293.00
Labor	57.00
Miscellaneous .....	.75
	<hr/>
	\$ 350.75

YAVAPAI COUNTY

Board of Supervisors:

Wm. Stephens, Chairman,

Alonzo Mason, Member,

Harry Heap, Member,

R. T. Belcher, Clerk.

F. R. Goodman, Division Engineer.

Prescott-Flagstaff, Section 1 (Mogollon Hill Division):

Day labor force under direction of Assistant Engineer J. E. Linney completed approximately one mile of road that had been left in an unfinished condition when work closed down in 1911, also replacing several wooden culverts with corrugated iron pipe and cleaning out ditches for entire length of this division:

Engineering:

Salaries	\$ 12.09
----------------	----------

New Construction:

Grading:

Labor and teams	\$436.33
Powder	365.87

STATE HIGHWAY DEPARTMENT.

Hay and grain 46.86

\$849.06

Culverts:

Labor \$ 313.93

Material 187.55

\$501.48

Miscellaneous, supplies for camp, etc. \$166.94

Superintendence:

Salaries \$ 130.11

Expenses 53.70

\$233.81

\$ 1,751.29

Repair and Maintenance:

Teams \$ 93.50

Hay and Grain 46.12

Powder 12.95

Supplies 168.89

Payrolls 436.58

Miscellaneous 38.50

\$786.54

\$ 786.54

\$ 2,549.92

Prescott-Flagstaff Highway, Section 2:

Survey of this section under way as of June 30, 1913, completed, a distance of 6.2 miles from a point approximately .9 miles north of Verde River bridge to beginning of Mogollon Hill division:

Engineering:

Salaries \$ 523.99

Subsistence 101.43

Travel 105.95

Team hire and miscellaneous 174.39

Office expense 21.50

\$927.26

*Refund 19.49

\$ 907.77

Prescott-Flagstaff Highway, Section 3:

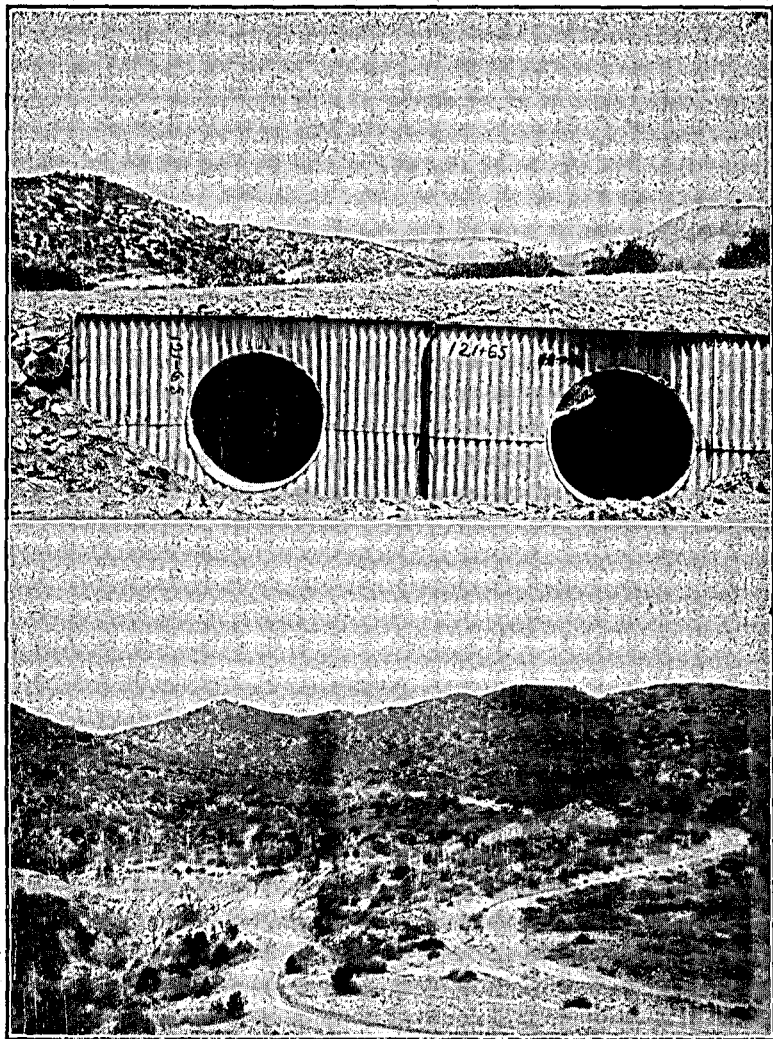
Survey commenced in previous fiscal year from Cherry P. O. to Verde River, a distance of sixteen miles, completed.

Engineering:

Salaries \$ 1,387.97

Subsistence 376.75

Traveling expense 8.65



YAVAPAI COUNTY
Prescott-Flagstaff, Sec. 3-A
Cherry Creek Hill
Grand Canon-Nogales Highway
Left, new road 6% grade
Right, old road 20% grade

STATE HIGHWAY DEPARTMENT

Team Rental 277.02

Office expense 72.10
Transit rental 15.00
Engineering supplies 13.53
Miscellaneous 78.22

\$ 1,952.22

Prescott-Flagstaff Highway, Section 3-A:

Plans and specifications prepared for 4.375 miles from Cherry toward Camp Verde and contract awarded T. C. Snider December 15, 1913, for \$24,988.39, which work was completed in April, 1914.

Engineering: During Construction:

Salaries \$ 809.54
Subsistence 330.04
Blue prints, etc. 54.12

\$ 1,193.70

Contract:

Clearing and grubbing	16 A.	@ \$40.	\$ 640.00
Earth excavation	7118.2 CY	@ .18	1,281.27
Loose rock excavation	9875.6 CY	@ .40	3,950.24
Solid rock excavation	7534.4 CY	@ .85	6,304.24
Earth embankment furnished	2861.0 CY	@ .18	514.98
Rock embankment furnished	6272.7 CY	@ .80	5,018.16
Ditching	23100.0 LFt	@ .07	1,617.00
Second Class concrete	47.8 CY	@ 15.00	717.00
Third Class concrete	209.6 CY	@ 12.50	2,620.00
2 in. Galv'd Iron pipe rail	198.0 LFt	@ .15	29.70
Placing 18 in. Corr. Iron Culverts	576.0 LFt	@ .70	403.20
Placing 24 in. " " "	1225.0 LFt	@ .70	875.50
Placing 30 in. " " "	120.0 LFt	@ .70	84.00
Placing 36 in. " " "	302.0 LFt	@ .70	211.40
Placing 42 in. " " "	25.0 LFt	@ .70	17.50
Placing 48 in. " " "	22.0 LFt	@ .70	15.40
Second hand rail in place	33075.0 Lbs	@ .02	661.50
Placing 72 in. Corr. Iron Culverts	39.0 LFt	@ .70	27.30

\$ 24,988.39

Extra Work Under Contract:

Grading—Labor \$ 1,013.91
Culverts—Labor 929.91
Ditching—Labor 15.57

\$ 1,959.39

Material 217.37
Culverts—Material 5,721.26

STATE HIGHWAY DEPARTMENT.

Inspection:

Salary	\$ 881.75
Expenses	376.80
	<hr/>
	\$ 1,258.55
	<hr/>
Refund on culverts	\$ 35,338.66
	<hr/>
	85.22
	<hr/>
	\$ 35,253.44

Prescott-Flagstaff Highway, Section 3-B:

Plans and specifications are in course of preparation for construction of additional 3.97 miles from end of completed Section 3-A.

Engineering: Salaries \$ 8.05

Prescott-Dewey Highway:

Survey of proposed highway from Prescott to Dewey, a distance of 17 miles, made.

Engineering:

Salaries	\$ 351.11
Subsistence	100.56
Travel	31.60
Office Salaries	81.41
Miscellaneous	42.57
	<hr/>
	\$ 661.14

General:

Expense of Supervisors inspecting..... \$ 70.05

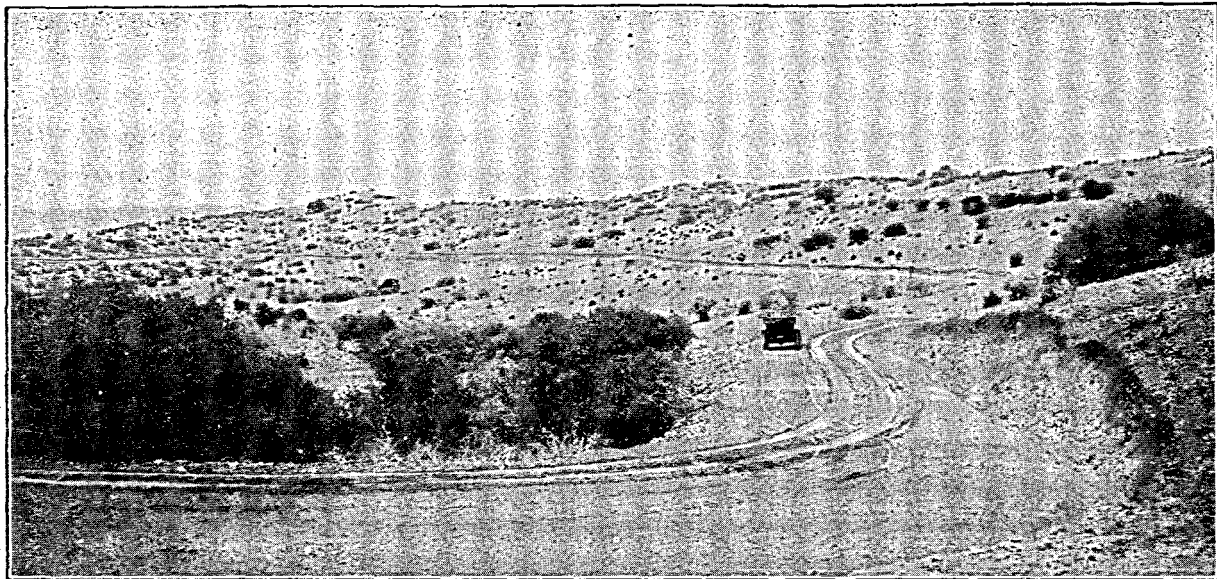
Maintenance:

Under direction of County Road Superintendent about 0.5 miles of road graded connecting Senator Mountain division of Prescott-Phoenix Highway with old county road:

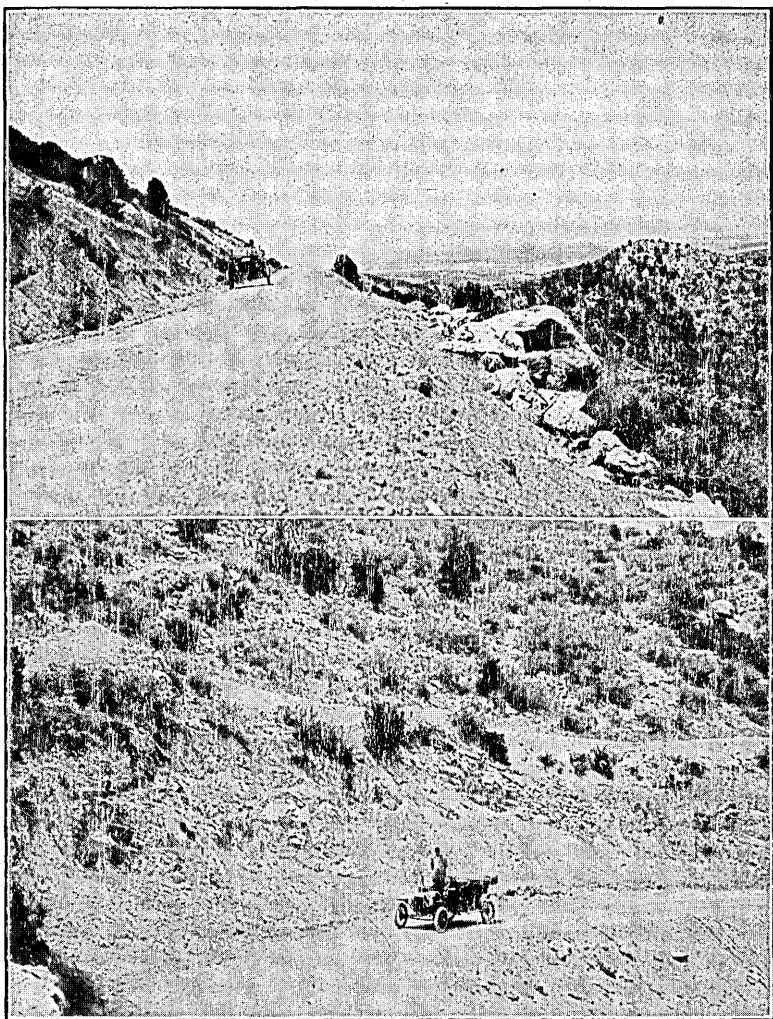
Labor	\$1,234.50
Team rental	20.00
Hay and Grain	98.30
Powder and Fuse	220.77
Miscellaneous	41.57
	<hr/>
	\$ 1,616.14

Two caretakers employed on Prescott-Phoenix Highway at \$3.00 per day, State furnishing team and wagon and necessary tools.

Salaries	\$1,995.65
Material	134.56



YAVAPAI COUNTY
Prescott-Dewey
Grand Canon-Nogales Highway
State Location—County Construction



YAVAPAI COUNTY
Prescott-Flagstaff, Section 3-A
Cherry Creek Hill
Grand Canon-Nogales Highway

STATE HIGHWAY DEPARTMENT

Hay and Grain, etc.....	524.78	
Salary and expense, Div. Engr.....		\$ 2,654.89
		<hr/>
		\$4,420.22
Equipment:		
Team of mules and wagon and small tools.....		\$ 777.85

YUMA COUNTY

Board of Supervisors:

F. E. Elliott, Chairman,

B. F. Hopkins, Member,

Ike Proebstel, Member,

Roy Hansberger, Clerk.

J. C. Ryan, Division Engineer.

Antelope Hill Bridge:

Bids requested for plans and construction of bridge over the Gila River at Antelope Hill, opened December 15, 1913, and after checking over, it was decided to postpone this construction until May, 1914, and build by use of prison labor. However, it was found necessary number of prisoners were not available at time construction was to be commenced and it was determined to readvertise for bids covering the furnishing of necessary labor and materials, with exception of cement and reinforcing steel furnished by State f. o. b. Tacna, to construct a reinforced concrete deck girder bridge consisting of ten spans of sixty-five feet each; width of roadway sixteen feet. Plans and specifications prepared therefor and bids were received May 12, 1914, and contract awarded lowest bidder, Perry E. Borchers, for \$19,865.00.

Expenditures 1913-1914:

Soundings, etc., and Inspector.....	\$ 324.32	
Construction	5,460.68	
	<hr/>	\$ 5,775.00

STATE HIGHWAY DEPARTMENT.

Dome Bridge Site:

Expense incurred 1912-1913 not paid prior to July, 1913.

Supplies	\$ 214.04
Transit rental	3.91
Traveling expense	24.40
Team rental	23.39
Miscellaneous	6.05
	<hr/>
	\$ 271.79
Refund	92.05
	<hr/>
	\$ 179.74

Phoenix-Yuma Highway:

Survey of Phoenix-Yuma Highway between Dome and Mohawk commenced April, 1914, and construction by day labor under supervision of Assistant Engineer W. H. Caruthers in progress at this date.

Engineering:

Salaries	\$ 579.40
Commissary supplies	392.97
Traveling expense	54.52
Team hire	36.60
	<hr/>
	\$1,063.49

Construction:

Labor	154.25
	<hr/>
	\$ 1,217.74

Equipment:

\$ 428.95

ADMINISTRATIVE EXPENSE

General Fund.

Salary and expenses of State Engineer paid from General Fund of State:

Salary	\$3,000.00
Traveling expense	501.75
Auto expense	1,998.04
	<hr/>
	\$ 5,499.79

25% Fund.

Salaries and expense of State Engineer's office paid from 25% State Road Funds.

STATE HIGHWAY DEPARTMENT.

Salaries:

Drafting & Engineering.....	\$6,787.72
Clerical	3,808.95
	<u>\$10,596.67</u>

Travelling Expense:

Office Engineer	89.90
Chief Clerk	94.40
Division Engineers	987.82
	<u>1,172.12</u>

Stationery and Supplies:

Drafting	333.19
Office and general.....	622.82
Stamps	200.00
	<u>1,156.01</u>

Engineering Instruments:

	<u>222.79</u>
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Miscellaneous Expense:

Telephone and telegraph.....	142.10
Express	32.91
Blue Printing	225.29
Auto number plates	9.00
Auto insurance	54.60
	<u>463.90</u>
	<u>\$ 13,661.52</u>

Refunds:

Scrip	106.41
Engineering for other Depts.....	51.42
	<u>157.83</u>
	<u>\$ 13,503.69</u>

Engineering Equipment.

1 1914 Velie Roadster	\$ 1,330.00
1 Team of mules	450.00
1 Set of harness	40.00
2 Mountain wagons	281.50
1 Twin Motorcycle, Indian	361.50
2 No. 10 Remington typewriters.....	143.90
1 Bick No. 6 typewriter with case.....	40.00
3 Transits and tripods	689.20
5 Level rods	57.50
1 Pocket Transit	18.00
1 4-A Eastment Kodak with case.....	79.65
2 Hand levels	21.15

STATE HIGHWAY DEPARTMENT.

Miscellaneous equipment	104.49	
	<u>\$ 3,616.89</u>	
Storage on equipment	116.00	
Repairs to transit	44.40	
	<u>\$ 3,777.29</u>	
Expenditures 1913-1914		\$ 3,777.29

STATE ROAD EQUIPMENT

Prior to August 17, 1913, date of Prison Labor law becoming effective, it was necessary to purchase all equipment required in connection with prison labor work from the 75% Fund of the county in which it was desired to work and upon completion of such work sell the equipment to the County 75% Fund in which work was then undertaken. Owing to the outlay necessary for equipment, the funds available for construction work were very materially reduced and in Maricopa and Cochise Counties on this date equipment approximating \$11,000.00 had been purchased from the 75% Fund of these counties. Refund was made these counties at depreciated value of this equipment from the General Fund as provided by the Prison Labor law, and this equipment taken over by State Road Equipment Fund. It had also been necessary to rent teams for furtherance of construction work, the average rental of which was \$25.00 per month per team, which it can be readily seen was a very uneconomical proposition as in eighteen to twenty months the rentals paid would equal purchase price of teams. We have purchased under this law seventeen teams of mules, five in use at Bisbee-Tombstone camp and twelve at the Globe-Roosevelt camp. Equipment for three prison labor construction camps were in use to May 1, 1914, two in Cochise County and one to December 15, 1913, in Maricopa County and since that date in Gila County, this equipment consisting of freight wagons, tank wagons, dump wagons, graders, wheelers, fresnos, concrete mixers, tents, full kitchen and dining equipment, and necessary hand tools. Two auto trucks have

STATE HIGHWAY DEPARTMENT.

also been put in use in connection with this work, one in use in Pinal County used on maintenance work in that county to April 1st and since that date in freighting on construction work now under way in that county, and the other in use at the Bisbee-Tombstone and Bisbee-Douglas camps for hauling supplies and transferring men between these two camps during construction on Bisbee-Douglas highway. These trucks are also used for transporting prisoners to and from the camps from the State Prison, which has proven very economical.

Account the large quantity of solid rock necessary to move on the Bisbee-Tombstone construction, it was thought advisable to purchase an air compressor and in October, 1913, a 15 H.P. Sullivan portable compressor was placed on this work and the results obtained show the saving effected by its use over that of hand drill work to have more than paid for the entire outfit.

Detail of Prison Labor Equipment purchased under this Fund as follows:

Class 1—Animals:

17 Spans Mules	\$8,177.90	
1 Saddle Horse	65.00	
2 Bloodhounds	50.00	
		\$ 8,292.90

Class 2—Wagons, trucks, scrapers, graders, plows, saddles, harness, etc.

1 5-Ton Sauer Truck	\$5,250.00	
1 2½-3-Ton Mack Truck	3,000.00	
6 Wheelers	835.93	
8 Freight wagons	1,238.00	
2 Tank wagons	340.00	
12 Dump wagons	2,360.57	
1 Extra wagon bed	42.80	
1 Austin Giant Road Grader	415.00	
1 Russell Special Road Grader and Scarifier Attachment	565.00	
Miscellaneous, fresnos, scrapers, harness, plows, etc.	2,719.97	
		\$16,767.27

Class 3—Machinery: :

2 Ransome Concrete Mixers, No. 60	\$2,220.92
77 Concrete pipe moulds	826.87

STATE HIGHWAY DEPARTMENT.

1 1-H. P. Gasoline engine	58.32
1 15-H. P. Air compressor and drills.....	2,084.72
1 4-H. P. Gasoline engine and pump	302.75
1 Crescent band saw	88.18
Miscellaneous	1,878.56
	<u>\$ 6,460.32</u>
Class 4—Wheelbarrows, shovels, picks, mattocks, hammers, hatchets, crow bars, forges, etc...	\$ 1,989.80
Class 5—Small tools not classified	\$ 68.40
Class 6—Camp Equipment:	
48 Tents and flies	\$1,886.53
Mattresses, blankets, kitchen equip't etc.....	6,575.86
	<u>\$ 8,462.39</u>
Class 8—Firearms, etc.	\$ 645.55
Class 9—Equipment not classified	\$ 1,258.90
Class 10—Engineering equipment for use on Prison Labor Construction:	
2 Leitz Transits	\$ 484.20
2 Dummy Levels	201.78
Miscellaneous	96.68
	<u>\$ 782.66</u>
TOTAL.....	\$ 44,728.19

STATE HIGHWAY DEPARTMENT.

SUMMARY SHOWING NET COST OF STATE ROAD AND BRIDGE CONSTRUCTION 1912-1914

State Road Fund, expenditures.....		\$ 507,132.60
General Fund, Equipment expenditures.....		44,728.19
General Fund, State Engineer's Salary and Expense.....		11,348.81
<hr/>		
Total Book Expenditures.....		\$ 563,209.60
Deficit July 1, 1912.....	\$ 52,157.30	
Refunds	44,903.30	
Equipment, Construction	44,728.19	
Equipment, Engineering	3,842.29	
<hr/>		145,631.17
<hr/>		
Cost of operations		\$ 417,578.43
Construction	\$359,735.55	86.2%
Administrative and Engineering.....	39,446.33	9.4%
Maintenance	18,396.55	4.4%
<hr/>		
	\$417,578.43	100.0%
Interest and depreciation of equipment (estimated).....		10,000.00
<hr/>		
Net cost highway construction, 1912-1913 and 1913-1914.....		\$ 427,578.43

CONSTRUCTION:

2064 Lin. Ft. Bridges (over 10 feet).....	\$ 120,026.76
143.2 Miles of Road.....	239,708.79
<hr/>	

SUMMARY OF RECEIPTS AND EXPENDITURES—25% FUND
JULY 1, 1912, TO JUNE 30, 1914

County	RECEIPTS			EXPENDITURE			Balance
	25%	Refunds	Total 25%	Exp. Prior June 20, 1912	Exp'nse Sub. June 20, 1912	Total	
Apache	\$ 2,178.90	\$	\$ 2,178.90		29.17	29.17	
Cochise	31,393.60		31,393.60		3,883.04	3,883.04	
Coconino	6,561.01		6,561.01		279.47	279.47	
Gila	11,625.35	20.00	11,645.35	2,094.75	4,652.61	6,747.36	
Graham	3,538.09	9.96	3,547.88		1,285.71	1,285.71	
Greenlee	11,632.26		11,632.26		3,203.12	3,203.12	
Maricopa	26,275.93	5,772.06	32,052.99	26,717.77	36,226.48	62,943.59	
Mohave	5,020.50		5,020.50		1,423.23	1,423.23	
Navajo	3,085.35		3,085.35		6,372.86	6,372.86	
Pima	9,459.26		9,459.26	1,020.14	4,422.62	5,442.76	
Pinal	7,285.74		7,285.74	1,281.04	1,236.50	2,517.54	
Santa Cruz	2,184.60		2,184.60		1,233.92	1,233.92	
Yavapai	15,613.01	19.49	15,632.50	7,034.74	8,974.06	16,008.80	
Yuma	5,148.31		5,148.31		1,387.81	1,387.81	
Motor Tax			50,049.75				
General Expense		164.28	164.28		21,685.31	21,685.31	
Equipment				541.82	3,842.29	4,384.11	
Deficit 6-30-12						13,467.79	
	\$140,996.91	\$ 5,985.52	\$191,176.12	\$ 38,689.60	\$113,606.00	\$152,295.60	\$ 44,736.58

NOTE:—The State Road Law of June 20, 1912, provided that all unpaid expense incurred prior to that date should be paid from the 25% Fund; also that the entire 25% Fund collected from Maricopa County for the year 1913, should be expended in that county.

STATE HIGHWAY DEPARTMENT.

SUMMARY OF RECEIPTS AND EXPENDITURES—75% FUND

July 1, 1912 to June 30, 1914.

COUNTY:	Taxes	Refunds	Total	Exp'tures	Balance
Apache	\$ 6,384.80	\$	\$ 6,384.80	\$ 3,886.30	\$ 2,498.50
Cochise	87,908.39	9,667.47	97,575.86	97,440.27	135.59
Coconino	17,050.19		17,050.19	15,234.96	1,815.23
Gila	30,139.33	4,977.72	35,117.05	28,550.63	6,566.42
Graham	9,985.88		9,985.88	8,084.57	1,901.31
Greenlee	34,229.77		34,229.77	236.20	33,993.57
Maricopa	67,541.72	26,524.85	94,066.57	93,142.03	924.54
Mohave	14,570.43		14,570.43	14,427.96	142.47
Navajo	7,924.06	63.21	7,987.27	7,959.93	27.34
Pima	23,498.50		23,498.50	20,460.78	3,037.72
Pinal	16,718.95	1,150.29	17,869.24	12,823.85	5,045.39
Santa Cruz	5,703.14	175.66	5,878.80	4,065.25	1,813.55
Yavapai	40,595.63	85.22	40,680.85	39,292.10	1,388.75
Yuma	11,980.75	107.65	12,088.40	9,232.17	2,856.23
	\$374,231.54	\$ 42,752.07	\$416,983.61	\$354,837.00	\$ 62,146.61

STATE HIGHWAY DEPARTMENT.

EXPENDITURES BY COUNTIES

STATE ROAD FUNDS

July 1, 1912—June 30, 1914.

COUNTY:	WORK:	Exp'tures	Refund	Net Cost
APACHE:				
	Beaver Dam and Milky Bridges.....	\$ 29.17	\$	\$
	Big Hollow Wash Culvert	3,823.35		3,823.35
	Prop'n State Engineer's Auto	44.00		44.00
	Equipment	18.95		18.95
		\$ 3,888.47	\$	\$ 3,888.47
COCHISE:				
	Bisbee-Tombstone Hy.	\$ 45,083.82	\$ 2,534.14	\$ 42,549.68
	Bisbee-Douglas Hy.	17,590.07	528.40	17,061.67
	Fairbank Bridge	27,245.96	3,789.04	23,456.92
	Tucson-Bisbee Hy. Fairbank Br. Sec.	4,514.53		4,514.53
	Equip'mt (Includes prop'n auto \$576.25)	3,781.89	2,815.89	966.00
	Maintenance	3,107.04		3,107.04
		\$101,323.31	9,667.47	\$ 91,655.84
COCONINO:				
	Canon Padre Bridge and Approaches....	\$ 9,099.17		\$ 9,099.17
	Flagstaff-Winslow Hy.	6,224.81		6,224.81
	Equipment	69.20		69.20
	Prop'n State Engineer's Auto	121.25		121.25
		\$ 15,514.43		\$ 15,514.43
GILA:				
	Globe-Ray Hy., Sec. 2.....	\$ 12,208.81	\$ 3,394.61	\$ 8,814.20
	Black River Bridge	1,879.80		1,879.80
	Globe-Roosevelt Hy.	14,788.71	1,536.91	13,251.80
	Globe-San Carlos Hy.	927.55		927.55
	Prop'n State Engineer's Auto.....	184.00		184.00
	Equipment	215.05	66.20	148.85
	Maintenance	5,094.07		5,094.07
		\$ 35,297.99	\$ 4,997.72	\$ 30,300.27
GRAHAM:				
	Solomonville-San Carlos Hy. Sec. 2.....	\$ 5,216.62	\$ 9.69	\$ 5,206.93
	" " " " 2-A....	3,413.27		3,413.27
	" " " " 2-B....	51.05		51.05

STATE HIGHWAY DEPARTMENT.

COUNTY:	WORK:	Exp'tures	Refund	Net Cost
	Prop'n State Engineer's Auto.....	71.50		71.50
	Equipment	18.95		18.95
	Maintenance	598.89		598.89
		<u>\$ 9,370.28</u>	<u>\$ 9.69</u>	<u>\$ 9,360.59</u>
GREENLEE:				
	Clifton-Duncan Hy.	\$ 850.84		\$ 850.84
	Clifton-Solomonville, Sec. 1	2,352.29		2,352.29
	Prop'n State Engineer's Auto	217.25		217.25
	Equipment	18.95		18.95
		<u>\$ 3,439.33</u>		<u>\$ 3,439.33</u>
MARICOPA:				
	Tempe Bridge	\$ 98,298.19	\$18,127.69	\$ 80,170.50
	Phoenix-Tempe Hy.	45,093.04	9,781.48	35,311.56
	Florence-Mesa, Sec. 2	2,696.39	465.43	2,230.96
	Prescott-Phoenix, Grand Ave. Div.	2,997.94	24.50	2,973.44
	Maintenance	2,418.37		2,418.37
	General Expense	61.00		61.00
	Wickenburg Bridge	31.58		31.58
	Prop'n State Engineer's Auto	494.00		494.00
	Equipment	3,995.11	3,897.81	97.30
		<u>\$156,085.62</u>	<u>\$32,296.91</u>	<u>\$123,788.71</u>
MOHAVE:				
	Kingman-Needles	\$ 15,721.29		\$ 15,721.29
	Prop'n State Engineer's Auto	92.00		92.00
	Equipment	37.90		37.90
		<u>\$ 15,851.19</u>		<u>\$ 15,851.19</u>
NAVAJO:				
	Little Colorado River Bridge.....	\$ 3,265.00		\$ 3,265.00
	Chevelon Creek Bridge	7,442.99		7,442.99
	Winslow-Holbrook Hy.	1,322.99	63.21	1,259.78
	Jacks Canon Bridge	2,155.35		2,155.35
	Prop'n State Engineer's Auto.....	58.25		58.25
	Equipment	88.21		88.21
		<u>\$ 14,332.79</u>	<u>\$ 63.21</u>	<u>\$ 14,269.58</u>
PIMA:				
	Tucson-Bisbee Hy. Sec. 1.....	\$ 7,954.58		\$ 7,954.58
	" " " " " " 2 and 2-A.....	16,097.12		16,097.12

STATE HIGHWAY DEPARTMENT.

COUNTY:	WORK:	Exp'tures	Refund	Net Cost
" " "	Davidson Canon.....	1,020.14		1,020.14
" " "	(deficit)			
Tucson-Bisbee Hy.	Davidson Canon.....	670.20		670.20
Equipment	.....	18.00		18.00
Prop'n State Engineer's Auto	.....	143.50		143.50
		\$ 25,903.54		\$ 25,903.54
PINAL:				
Florence-Mesa, Sec. 1	.....	\$ 8,220.18	\$ 1,028.99	\$ 7,191.19
Tucson-Florence Hy.	.....	3,235.18		3,235.18
Globe-Ray Hy. Sec. 1	.....	1,044.40		1,044.40
Prop'n State Engineer's Auto	.....	91.00		91.00
Equipment	.....	526.54	100.75	425.79
General Expense	.....	25.00		25.00
Maintenance	.....	2,199.09	20.55	2,178.54
		\$ 15,341.39	\$ 1,150.29	\$ 14,191.10
SANTA CRUZ:				
Nogales-Tucson Hy.	.....	\$ 4,886.72	\$ 175.66	\$ 4,711.06
Prop'n State Engineer's Auto	.....	42.75		42.75
Equipment	.....	18.95		18.95
Maintenance	.....	350.75		350.75
		\$ 5,299.17	\$ 175.66	\$ 5,123.51
YAVAPAI:				
Prescott-Phoenix, Silver Mt. Division....		\$ 6,494.46	\$	\$ 6,494.46
Prescott-Phoenix, Prescott Division	.....	297.33		297.33
Prescott-Dewey Hy.	.....	661.14		661.14
Prescott-Flagstaff, Sec. 1 Mogollon Hill	.....	1,763.38		2,549.92
" " " 1 Mogollon Hill	.....	786.54		
(Maintenance)				
Prescott-Flagstaff, Sec. 2	.....	1,018.93	19.49	999.44
" " " 3	.....	2,016.32		2,016.32
" " " 3-A	.....	35,338.66	85.22	35,253.44
" " " 3-B	.....	8.05		8.05
General Expense	.....	132.05		132.05
Verde Bridge	.....	242.95		242.95
Prop'n State Engineer's Auto	.....	284.75		284.75
Maintenance	5,329.30		5,329.30
Maintenance	149.19		149.19
Equipment	777.85		777.85
		\$ 55,300.90	\$ 104.71	\$ 55,196.19

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COUNTY:	WORK:	Exp'tures	Refund	Net Cost
YUMA:				
	Antelope Hill Bridge	\$ 7,268.90		\$ 7,268.90
	Dome Bridge Site	707.03	92.05	614.98
	Phoenix-Yuma Hy.	1,217.74		1,217.74
	General Expense	40.00		40.00
	Prop'n State Engineer's Auto	79.50		79.50
	Equipment	1,306.81		1,306.81
		<u>\$ 10,619.98</u>	<u>\$ 92.05</u>	<u>\$ 10,527.93</u>

PRISON-LABOR

The "Good Roads" movement and Prison Labor for the past decade have been becoming more and more closely allied until at this time they are considered by all "Good Roads" enthusiasts throughout the nation as interdependent. As an example, quoted herein is an article by Charles Henry Davis, C. E., President of National Highways Association, which is deemed worthy of the earnest consideration of every citizen of Arizona:

"Society has, for centuries, manufactured more criminals than human nature of its own accord produces. The more fortunate, but not necessarily less criminal, have, almost universally, cruelly punished those less fortunate brothers caught in their so-called crimes. Correction, instruction, forgiveness, kindness, have played but a small part in dealing with the "criminal" or "convict." Would that we might call him by a kindlier name! For many of us now think and talk of him as of a different breed, forgetting that he is, after all, a man. We cry against slavery, yet legalize it for tens of thousands. We scorn revenge, yet mete out vengeance in the name of the law. We remove from society offenders against society and forcibly detain them for years in surroundings as much unlike real society as is possible. We then once more thrust them upon society untaught, revengeful, weak, broken in mind and body, and wonder why they fall again! Why should they not? Has not society done its utmost to prevent their rise? Most of them are mentally deficient and should have our care and help—not our contempt. Many of them have been sorely tempted without ability to run from temptation. And all of us must run! Some have led honorable and useful lives and would continue to do so did society have the forbearance and forgiveness of the parent towards the child. And society should have such forgiveness and thus restore men to society and not brand them as criminals. Our modern

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prisons are barbaric. They typify the medieval prisons, so loathsome to our imagination, and yet we call them modern. They are not. They still hold men in abject slavery, in idleness worse than death. Without sun. Sometimes without light. With foul air and fouler companions. Does this treatment, even of the convict, produce repentance? No, a thousand times no! Revenge, insanity, more crime are the inevitable results.

As in many other activities, our laws and their administration are fifty years behind the times. Once there, how many of us could resist the debauching influences? How many of us could resist the degrading example of those associates more steeped in crime and hardened by their previous contact with still earlier criminals? How many of us could return to the life outside without a feeling of bitterness, or resentment, against our whole social structure? We have abolished negro slavery, a paradise to that of criminal slavery. We maintain institutions little better than the torture chambers of ancient times. They are not designed for reform, tuition, enlightenment. They offer little incentive to right living, high ideals. They are not places where erring humanity may be schooled and trained to become good citizens. They are more fit to drag and trample down into the mire the poor unfortunates sent there for their "first offense." There, even plant life does not exist. The grass, the plants, the flowers, the trees do not grow within their yards. How much less does man! Could there be greater shame to our nation than thus to cling to the ancient custom of depriving men of their freedom, shutting them up within four walls, leaving them to their fate? "Men are but children of a larger growth." But do we treat our children in this wise? Do we not believe in pointing out to them and making attractive and possible the road to virtue? Do we rather enslave and chastise them unmercifully for having failed to find it out themselves? We used to when parents held the lives of their children in their hands! The state now so holds the

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lives of its citizens. When shall we take such power away? In our criminal procedure we now have the spirit of punishment, cruelty, unkindness, physical force, slavery, confinement, isolation, darkness, silence and all the resultant evils thereof, resistance, revenge, sullenness, depravity, hopelessness, insanity.

We should turn on the light; we should give men the sunshine, the free air and fields of the country. We should have, and thus give, hope, faith, help. We should correct, not punish. We should be kind and square, and our "pals" will respond most wonderfully. Children are not controlled by physical force. Deliberate, low-voiced, firm kindness and square doing gain their obedience. So it is with their larger brothers. What results to be attained by such a change—change in our moral acknowledgment of the wrongs we have done to the convict! We have been too long blind to this wrong thinking and doing. We have had too much pride, too little charity. We have admired too long the public prosecutor. We have delayed too long the coming of the public defender.

How can we do all this? We must do something with those who violate the rules. Yes? But that something should be to help them not to break the rules again. Temporary exile, into a temporary society as nearly as possible like the one they left, would seem the best solution. They would thus be learning the game according to the rules. Responsibility, during their temporary exile, would increase the desire to play so well, so fairly, that they could go back from whence they came. To do this we must get them "Back to the land." But how? One way is via good roads, although some prefer railroading!

To have Good Roads everywhere throughout these United States will mean more to this nation than any other development since our Declaration of Independence. During all ages it has been of primary importance to provide a people with means of intercommunication. People, like water, must move or stagnate. They must run and play

STATE HIGHWAY DEPARTMENT.

like the brook itself or become sluggish and dull—to themselves as well as to others. Of the seven modes of intercommunication—water, roads, post, railroad, telegraph, telephone, and wireless—only one, roads, is free to all the people of the earth. Roads are the most universally used and are therefore the most beneficial to the greatest number of people. The importance of Good Roads everywhere is paramount—their benefits are all-embracing.

There are 18,000,000 children who endeavor to attend school. There are over 30,000,000 who should attend school. Why don't they? Largely because during much of the school term a considerable part of the 2,000,000 miles of our roads are impassable. This is shown by the fact that only nine-tenths of one per cent (0.9%) of the urban white population of the United States of native parentage is illiterate, while rural illiteracy is six hundred per cent greater in the same class of inhabitants. How can we have or get good schools in the rural districts if we have not the good roads to reach them at all times and in all seasons? If we do not have good schools, the illiteracy results, then we help—in the best possible way—the growth of the criminal classes.

The relation of good and bad roads to illiteracy, and thus to crime, is indicated by the accompanying table.

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	Na. Wht. of Na. Ptg.	Pr. Ct. Imp'd Roads	Per cent of Illiterate Native Whites of Native Parentage. (1910)		
			Total	Urban	Rural
New England:	Tot. Pop. (1910) 2,135,801	(1909) 22.2	0.7	0.5	1.2
Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut	6,552,681				
South Atlantic:	5,397,864	6.7	8.0	2.2	9.8
Delaware, Maryland, Va., W. Va., N. Car., S. Car., Geo., Florida	12,194,895				
Pacific:	1,684,658	14.2	0.4	0.3	0.6
Wash., Oregon California	4,192,304				
West, South Central:	4,101,510	2.6	5.6	1.4	6.8
Ark., Louisiana, Okla., Texas.	8,784,534				

This table does not, of course, include foreign-born, native born of foreign parentage, or negroes, all of whom are excluded for obvious reasons. Illiteracy is eleven times greater in the South Atlantic States than in New England, while the percentage of improved roads (such as they are) is less than one-third. Similar figures for the Pacific and West Southcentral are fourteen times greater illiteracy, while the percentage of improved roads is less than one-fifth as much. The excess of illiteracy in rural over urban New England is only one hundred and forty per cent, while in the South Atlantic States this excess is nearly four hundred per cent, due to the lower percentage of improved roads. This difference is slightly greater in comparing the other two groups in the table.

The children of today are the electors, the representatives, the senators, the judges, one of them the President, of tomorrow. The population is increasing by leaps and

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bounds. If education means liberty, and if poor roads mean illiteracy or worse, have we a right not to build good roads, even if they would not pay for themselves well within the generation which builds them?

Today we have preventive medicine. Instead of waiting to cure people of disease we are bending every effort to prevent disease. Why not profit thereby? Crime is a kind of disease. Why not do those things which will prevent crime? Idleness more than any other one thing produces moral deterioration and crime. The building of "Good Roads Everywhere" by the nation, the state, the county and the town will give constant employment to the army of unemployed. This will tend to prevent crime if we apply it rightly.

What better thing than to employ those temporarily withdrawn from our society, in the building of "Good Roads Everywhere?" Such a policy will be of vast economic advantage to the nation. It will give brawn, brain and heart to those most needing it. It will give them freedom of mind and body. It will give them inspiration, hope. Tear down our prison walls, and rear no more, for they are festering-places for our bellow beings. Let us no longer go back on those of our own mold! Let us rather, from now on, give our "pals" a "square deal!" We can be sure they will answer in kind."

In the preparation of this report, it has been the endeavor to give a full and complete accounting of the public funds expended in the furtherance of good roads, which is unquestionably one of the most important public improvements undertaken and one that enters into the daily life of every man, woman and child in the Nation, and as a large proportion of the funds so expended has been for construction by prison labor, it is due the citizens of this commonwealth that every feature entering into this character of work be laid before them.

Although in the year 1901 prison labor under guard was in use on public highway construction in Alabama, Arkansas, Florida,

STATE HIGHWAY DEPARTMENT.

Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia, and had been for some years in some of these states, the first attempt to use this class of labor in Arizona was not made until 1910. At that time, upon recommendation of Territorial Engineer J. B. Girand, prisoners were employed in construction of a bridge over the Gila River at Florence and later, in 1911, on a bridge over the Salt River at Tempe, detail of such construction being covered by this report.

At the time of admission of Arizona to the Union, February 14, 1912, construction work on the Tempe bridge was in progress and funds for other highway and bridge improvements would not be available before December of that year. Governor Geo. W. P. Hunt, after due consideration, determined to place additional prisoners on highway construction work and carry such expenditures as necessary therefor from the Prison Fund until such time as State Road Funds were available for repayment to Prison Fund of amounts advanced and for carrying on further construction. In the furtherance of ideas on prison management and in view of the excellent results obtained since 1903 and 1909 in our sister states, New Mexico and Colorado, respectively, under the "Honor System," it was his desire to carry out these proposed improvements with Honor men. The proposed system, however, did not meet with the approval of some of the people not familiar with the results sought to be obtained. However, to this date, there has been an average of one hundred and sixty men of an average prison roll of four hundred and sixty engaged on highway and bridge improvement work under this department, part under guard system and part under honor system and at this time have adopted a system by which the two are working very successfully. This system is as follows:

All men assigned to highway and bridge work are taken to the guard camps and after working there six months or more and have shown themselves to be efficient and desirous of taking advantage of the opportunity to rehabilitate themselves, are eligible for transfer to the honor camps. "Let the convict build the roads and the roads will rebuild the convict" has been the basis of this system. Firstly, the assignment to the guard camp gives opportunity for upbuilding the physical man and the recovery of his equilibrium lost

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under confinement. Secondly, upon obtaining the first result desired, through the honor system, the trust and confidence placed tends to bring to the fore every good quality and the feeling that brotherhood among men still exists. With this feeling awakened comes the reformation of the prisoner and efficiency not to be obtained from the best of paid labor—the two desired results.

In this progressive age, there is little room for the relic of the dark ages crying for punishment in its worst form for infractors of the law and arguing that a prisoner is never reformed and society is only safe after his complete isolation or death. Those who have given the subject the time and study it deserves, well and truly contend: That the infractor of the law has incurred a debt to society and should be made to repay such indebtedness; that during the serving of his sentence in liquidation of such indebtedness, it is the duty of the State and society to use every possible means to bring about reformation in the life of the prisoner so that when his sentence expires he will be ready to resume his place among his fellow citizens a better man than before.

The success or failure of this system rests entirely, practically, upon the men in charge of the camps and in daily contact with the men and it has been the endeavor to obtain men of such character as to put their hearts into the work for carrying on to successful culmination both from the economic and moral standpoint.

One of the most serious problems facing the people of Arizona in the furtherance of the moral results obtained under this system is the protection of these men upon release at expiration of sentence. Under the present law, a man is furnished five dollars, a suit of clothes and transportation to any point in the State within a radius of three hundred miles of the prison. Those familiar with economic conditions can readily appreciate the handicap under which this man starts life anew. Employment is none too plentiful and should he be fortunate enough to secure such, in many cases as soon as it is discovered that he is an "exconvict" he is discharged. Within our own observation this has happened more than once and in one instance the man was employed as a day laborer. What logical reason could be offered for such action? The most logical solution

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we have been able to arrive at is the payment of a wage for each day employed on highway and bridge work, based on the efficiency of the men, such wages to be credited to the prisoner and turned over to him upon release, except in cases of those with families dependent upon them, in which case turned over to the families as required by them. By payment of such a wage based upon the amount of work performed by the prisoner, even greater efficiency than now obtains would result.

ECONOMIC VALUE—PRISON LABOR

So many factors enter into the economic value of prison labor on highway construction in Arizona that it varies between wide limits.

UNDER GUARD

Under average conditions at present the cost of road construction with prison labor under guard approximates its cost by contract. Better construction is always secured by prison labor than by contract and this is of great or small value dependent upon the character of the work. The value of prison labor is increasing with experience gained by its use. The cost per working man per day has decreased on the Bisbee-Tombstone Highway from \$1.98 in January to \$1.315 in June, with an average for 9 months of \$1.619. This does not include the cost of stockade, camp and camp equipment, which cannot be segregated until completion of the job. On bridge work done in the past I am inclined to believe that its value has not been as great as on road work, or will ever be, unless road construction is carried on in connection therewith to utilize surplus labor (in camp, which at times is not needed on the bridge construction). The economic minimum as to the number of prisoners for a road or bridge construction camp is not less than from 70 to

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100. As compared to work done by day labor or force account, prison labor under guard is more economical. Their efficiency has been estimated by those in immediate charge of the work from 66 2-3 to over 100 per cent as compared to free labor of the same character.

WITHOUT GUARD

Both road and bridge work can be done far more economical by the use of prisoners under the honor system than it can be done by contract, force account or day labor. As with prison labor under guard, its value is increasing with experience gained by its use. On the Globe-Roosevelt Highway the cost per working man has averaged for 6 months \$1.05 per day (exclusive of transportation) with a minimum of 68c in June. This does not include the cost of camp and camp equipment, which cannot be segregated until completion of the job. The economic minimum as to number of prisoners for a honor force is 40 to 50.

Since the first of this year the Boards of Supervisors in the counties where prison labor has been employed (except Pinal, where only a small force was engaged) have been furnished monthly statement showing total expenditures and segregated costs, including that of prisoners per working man day. These statements have also been furnished the newspapers in the vicinity of the work.

The system of keeping and reporting monthly unit cost data for prison labor construction forces was worked out by Chief Clerk E. P. Adams and Division Engineers J. C. Ryan and F. G. Twitchell, assisted by Office Engineer T. F. Nichols, and the reduction in operating expense is largely attributable to this system.

There is no State highway department or penitentiary in the Union under whose direction prison labor is employed that furnishes such complete cost data as does this department and at the time when it is of the greatest value—during construction. In fact, notwithstanding the large number of states that employ prison labor,

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on highway construction, there has been so very little cost data kept that it has been impossible to estimate its economic value therefrom and the people generally have labored under an erroneous impression of its economic value, also as to its aggregate value in Arizona.

The number of honor men available does not at the present time exceed 50 and the total number of able bodied men in the State prison that can be furnished for road does not exceed 190.

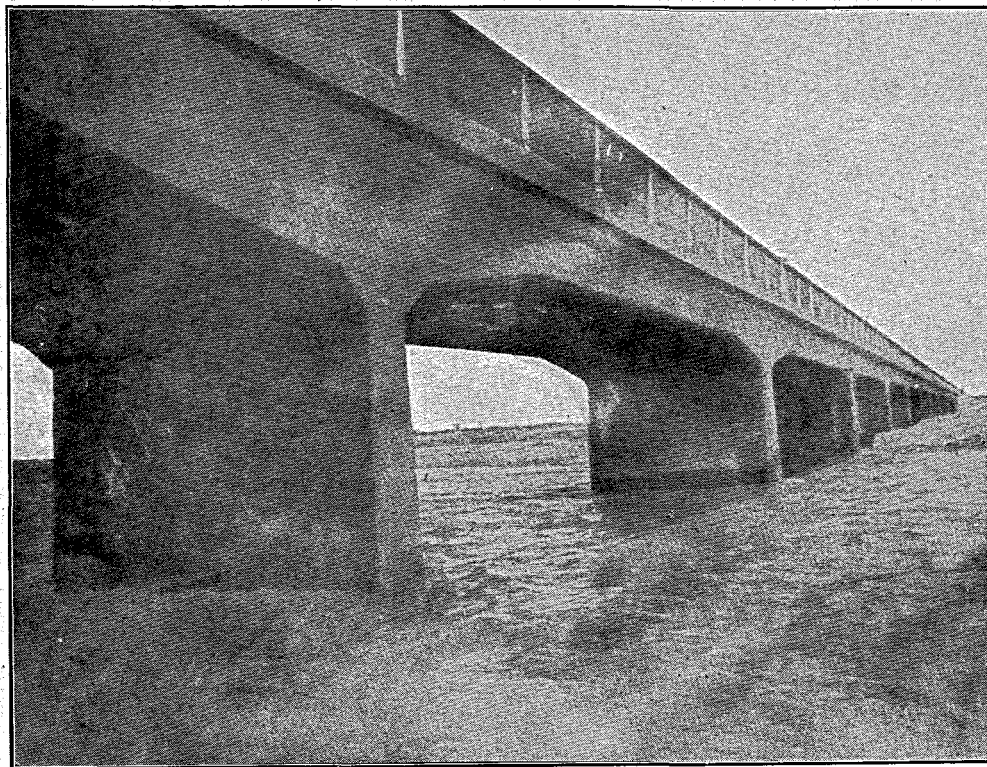
CHANDLER TUNNEL

FLORENCE BRIDGE

J. C. Ryan, Bridge Engineer.

Under date of September 10, 1909, the Territorial Engineer was instructed by the Board of Control to make survey and soundings for construction of a bridge over the Gila River near the City of Florence. Plans and specifications for a seven hundred foot reinforced concrete bridge were submitted and adopted November 5, 1909, and bids advertised for. Five bids were submitted, running from \$62,300 for the highest to \$47,963 for the lowest. After carefully considering the bids, the Territorial Engineer recommended to the Board of Control that all bids be rejected and the work be done with prison labor, which recommendation was accepted and instructions given to proceed with construction.

In March, 1910, preliminary excavation work was started with a prison force of 14 men, which was increased in April to 36 when actual construction was begun. This force was increased to an average of 55 men until completion of the work in December, 1910. Data as to number of men on camp work or other outside work cannot be located, and it is therefore impossible to give any unit costs on labor. Given below, however, is statement of segregated physical costs:



PINAL COUNTY
Prison Labor
Florence Bridge
Borderland and Grand Canon-Nogales Highways

STATE HIGHWAY DEPARTMENT

Engineering:

Salaries—

Engineers	\$ 877.86
Draftsmen	240.00
Other	428.15

\$ 1,546.01

Camp—

Supplies	356.05
Equipment	492.80

848.85

Miscellaneous—

Surveys	39.60
Specifications	52.00
Advertising	38.40
Consulting Engineer	294.05
Travel, Engineers	143.05
Board and Room	200.50
Right of Way	15.15

782.75

\$ 3,177.61

Construction:

Salaries—

Superintendence	1,733.95
Draftsmen	64.20
Rodman, chainmen, etc.	766.80

2,564.95

Foremen	1,618.95
Carpenters	4,823.00
Cooks	702.85
Teamsters, guards, etc.	2,922.65

10,167.25

Teams—

Rental	1,803.66
Feed	1,349.78
Stable expense	71.88

3,225.32

Prisoners—

Camp Supplies	2,078.76
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18,036.28

Material—

Cement	\$5,251.55
Sack Cr.	796.60
Other	4,454.95

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Lumber	5,506.98	
Reinforcing steel	7,940.87	
Hardware and miscellaneous.....	2,049.49	
		19,952.29
Fuel and Oil		524.62
Tools and Equipment—		
Charged to job.....	6,496.18	
Less recovered (est.).....	4,210.34	
		3,286.84
Miscellaneous Expense—		
Camp supplies—Eng'r mess.....	1,012.87	
Camp equipment, etc.....	48.66	
Office expense.....	69.62	
Miscellaneous.....	309.57	
		1,440.72
Total Cost.....		\$ 45,417.36

TEMPE BRIDGE

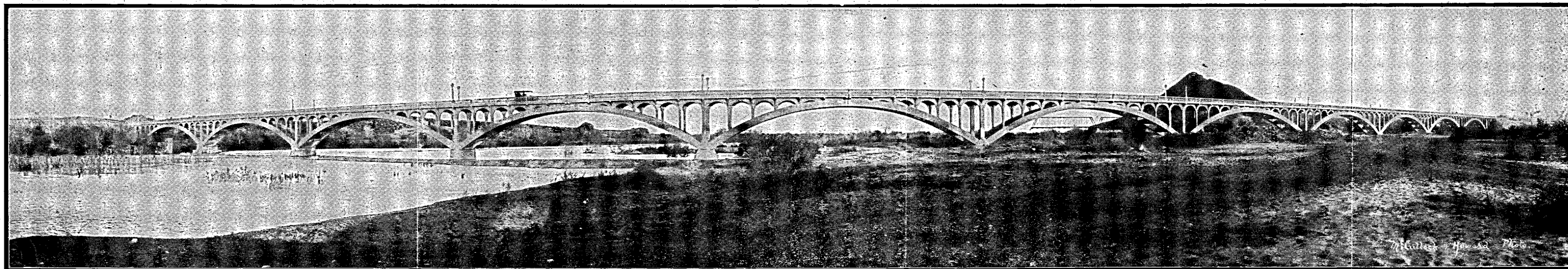
Including South Approach with San Francisco Canal Culvert.

J. C. Ryan, Division Engineer.

Under instructions from Board of Control, the Territorial Engineer submitted plans for construction of bridge over Salt River at Tempe, February 24, 1911, and under date of May 31, 1911, the Superintendent of the Prison was instructed to send twenty-five prisoners and six guards to the camp established at the bridge site. The following resolution was adopted on this date by the Board of Control relative to use of prison labor on this work:

“Whereas, certain prisoners now confined in the Territorial Prison at Florence can be advantageously employed by the Territory in the construction of the Territorial bridge across the Salt River near Tempe; and

Whereas, it is deemed advisable for the Board of Control that men so employed be rewarded for faithful and efficient service on the construction of said bridge, and it is



Built June, 1911—October, 1913

TEMPE BRIDGE
Prison Labor

Length 1507 ft. 9 in., 18 ft. roadway

STATE HIGHWAY DEPARTMENT

the belief of the members of the Board of Control that by so rewarding prisoners so employed a greater standard of efficiency may be maintained and better results can be achieved on the work by giving the prisoners an incentive for good behavior;

Whereas, be it resolved that for every day of faithful and conscientious labor performed by a territorial prisoner in the construction of the said bridge, a credit of two days shall be allowed to the said prisoner to be deducted from his sentence in addition to the regular good time allowance."

On July 13, 1911, the Superintendent of the Prison was instructed to send twenty-five additional men to Tempe for employment on this work, bringing the prison force up to fifty men and shortly thereafter increased to bring average up to fifty-seven men for the period of twenty-seven months for completion of the bridge. Of the average of fifty-seven prisoners at the Tempe bridge site, forty-eight were employed on the bridge proper and nine on camp work (one cook and waiter for engineer's and foremen's mess, one cook and waiter for prison mess, one barber, one laundryman and one corralman). The paid force consisted of one engineer, one assistant engineer, five foremen, two carpenters, seven guards and one bookkeeper.

The original plans and specifications called for a nine span solid arch ring bridge 1225 feet in length for 16-foot roadway and estimate on this basis was made of \$78,397.92. Later, these plans and specifications were revised to call for an eleven span arch rib type bridge for 18-foot roadway with open spandrel walls and various other changes were made, necessitating additional paid skilled labor in the way of carpenters, etc., together with increase in reinforcing materials. Detail of construction costs for project, which includes south approach with San Francisco Canal Culvert; (North approach included in Phoenix-Tempe Highway.)

Material:	
Cement	\$ 8,343.74
Steel	17,496.76

STATE HIGHWAY DEPARTMENT.

Lumber	7,493.27	
Hardware, etc.	6,593.62	
		\$ 39,927.39
Freight on Materials:		
Cement	\$ 4,792.00	
Steel	813.91	
Lumber	623.63	
Hardware, etc.	876.79	
		\$ 7,106.33
Miscellaneous Supplies:		
Oil and Coal	\$ 3,821.43	
Freight	905.67	
		\$ 4,727.10
Tools and Equipment:		
Construction	\$ 6,875.51	
Engineering	619.77	
Freight	937.51	
		\$ 8,432.79
Equipment credits	286.30	
		\$ 8,146.49
Teams:		
Rentals	\$ 5,785.22	
Feed	4,024.18	
		\$ 9,809.40
Labor:		
Engineer and Assistants	\$ 8,702.81	
Foremen	8,591.42	
Carpenters	10,726.88	
Office Draftsman	1,483.36	
Time and Bookkeeper	1,024.14	
Office Engineer and Force	1,222.71	
Other paid labor	703.37	
		\$ 32,454.69
Supplies, Engineer's Mess:		\$ 6,473.72
Miscellaneous Expense:		
Miscellaneous expense of Engineers and Engineering Parties, including railroad fare, rent of quarters, telephone and telegraph charges, office supplies, etc.....		\$ 2,510.03
Oiling approach to bridge		130.00
Rent of land for storage of material.....		256.50

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Right of Way:	624.70
Paving:	2,866.53
Bridge Plate:	126.53

Prisoners:

Camp Supplies, food, clothing, etc.....	\$ 16,913.63
Salary of Guards	17,722.89
Transportation	718.45
Medical attention	365.75
Escapes	342.65
Expense of Guards	84.44
Stockade expense, building, wiring, tele- phone, lights, etc.	1,382.91

\$ 37,530.72

Maintenance refunds from Prison..... 25,770.74

\$ 11,760.01

\$126,919.44

Credit due account equipment recovered as State Equipment 1,439.47

\$125,479.97

Included in cost of bridge are the following:

South approach	\$2,600.86
San Francisco Canal Culvert.....	3,960.00

\$ 6,560.86

Net Cost Tempe Bridge \$118,919.11

Credit has not been allowed this construction for the stockade and buildings now standing, also lumber left over, probable value, \$1,000.00.

UNIT COSTS OF LABOR

Total men days.....	46,859
Total working men days.....	33,726

Average number of men on job.....	57
Average number of men on bridge work.....	48
Average number of men on camp work.....	9
Average cost per man per day, exclusive of maintenance refund .....	.80
Average cost per man per day, less refund.....	.25
Average cost per working man per working day, exclusive of refund	1.11

STATE HIGHWAY DEPARTMENT.

Av. cost per working man per working day, less refund.....	.348
Average cost per man per day for guards.....	.378*
Average cost per working man per working day for guards.....	.53**

*Included in Item 4.

**Included in Item 6.

Escapes	11
Recaptured	2
Engineers and Assistants per working day.....	\$16.22
Foremen per working day	19.28
Carpenters per working day	16.43
Office per working day	3.51
Other per working day	2.95

Efficiency report of Division Engineer in charge of this construction shows the following:

"Paid labor force necessary to do the same amount of work per day as 48 prisoners:

1 Blacksmith	\$ 4.00
3 Derrick Engineers @ \$3.50	10.50
14 White laborers on foundation work, etc. @ \$2.50.....	35.00
8 Laborers on concrete work @ \$2.00.....	16.00
4 White teamsters @ \$2.50	10.00
6 Laborers on rock crusher @ \$2.00.....	12.00
1 Cook for Engineer's Mess	2.50
	<hr/> \$ 90.00
48 Prisoners @ \$1.11.....	53.28

Difference in favor of Prison Labor per day..... \$ 36.72"

Cooks and waiters for general mess not included under paid labor as boarding house should be self-sustaining.

GLOBE-RAY HIGHWAY

Section Two.

In July, 1912, it was decided to start work on what is designated Globe-Ray Highway, Section Two, extending from the City of Globe toward Ray to the Gila County boundary, a distance of 21.0 miles. After investigation of honor system as then being used in Colorado and other states, it was deemed expedient to adopt that

STATE HIGHWAY DEPARTMENT.

method on this work. Accordingly, late in that month twenty men were selected from the inmates of the State Prison at Florence and sent overland from Florence, via Ray, to location selected for camp in the Pinal Mountains, about nine miles from the City of Globe. Insomuch as the heaviest construction on this section was through the Pinal Mountains, it was decided work should be done here first. In order to economically freight materials and supplies from Globe to the camp, it was found necessary to grade two miles of new road and make considerable repairs to two miles of old road between these points. Camp had been established early in August and additional men were sent from the prison, bringing the force up to thirty men. Only one paid man, the superintendent of construction, was employed. On October 10, 1912, the paid force was increased by the employment of a foreman who was afterwards relieved and a bookkeeper employed, the superintendent looking after all outside work. Work was continued to January 17, 1913, at which time, owing to extreme weather conditions, it was deemed advisable to close down the camp. Tabulated statement of costs as follows:

Engineering: (Prior to Construction)

Salaries	\$1,629.62
Commissary supplies	591.46
Engineer's Travel Exp.	55.50
Transit rental	20.00
Engineering supplies	24.88
Miscellaneous expense	88.38
Office salaries	47.19
	<hr/>
	\$2,457.03

(During Construction)

Salaries	\$ 266.29
Commissary and expense	122.97
	<hr/>
	\$ 389.26

\$2,846.29

*Refund..... 20.00

\$ 2,826.29

Construction:

Material:

Lumber	\$ 482.41
Powder, fuse, etc	529.80

STATE HIGHWAY DEPARTMENT.

Drill steel	138.35
Miscellaneous	95.26
	<u>\$1,245.82</u>
Team feed and stable expense	\$52.08
Equipment:	
Purchased for work	\$2,830.88
Recovered	2,338.23
	<u>\$492.65</u>
Labor (Paid):	
Salaries	\$1,245.80
Expenses	481.37
	<u>\$1,727.17</u>
Labor (Prison):	
Food	\$3,465.20
Clothing	966.41
Transportation	245.40
Medical attention	15.00
Team and horse hire, Transporta-	
tion, 1-17 '13 to Prison	239.00
Escape expense	140.20
	<u>\$5,071.21</u>
Maintenance refund	3,445.82
	<u>\$1,625.39</u>
Office expense	44.80
	<u>\$ 5,987.91</u>
Total Engineering and Construction	\$ 8,814.20
Escapes	3
Recaptured	1
Killed in recapture	1
Not apprehended	1

*Burros used on survey sold.

STATE HIGHWAY DEPARTMENT.

Statement of quantities as of December 1, 1912:

All road not less than 14 feet.

Eng'r's Station	Excav. Cu Yd	Embank. Cu Yd	Classification		
			Earth Cu Yd	L. Rock Cu Yd	S. Rock Cu Yd
0 to 3	441.2	178.7	264.7	110.3	66.2
3 4	75.6	82.5	75.6		
4 5	122.4	105.0	73.4	49.0	
5 6	111.8	56.0	95.0	16.8	
6 9	787.8	353.5	472.7	196.9	118.2
9 14 85	1640.2	1698.1	738.1	492.1	410.0
14 85 19 00	974.5	533.7	438.5	292.3	243.7
19 00 23 00	349.8	143.1	349.8		
23 00 23 80	149.9	43.2		149.9	
23 80 28 00	375.9	513.2	357.1		18.8
	5029.1	3707.0	2864.9	1307.3	856.9

Road between Globe and Camp:

314 Lin. Ft. retaining wall, 152.4 cu. yds.

350 Lin. Ft. surface ditch.

5300 Lin. Ft. new road constructed.

Two miles old road repaired.

As estimate was not prepared at time of closing down of camp, actual additional quantities moved from December 1st to January 17th are not available. However, using this estimate as a basis together with men days for this period as compared with period July to December 1st, i.e., July to December 1st, 4243, December 1st to January 17th, 877, a minimum of 25% increase over December 1st estimate is believed proper.

As compared with other construction, it must be admitted the results obtained in this camp could be bettered at this time by reason of thorough organization and efficiency methods developed since this work was done. There was, however, one matter entering into the work to such a marked degree as to command the serious attention of the citizens of the State—the introduction of liquor into construction camps where prisoners are employed. We quote from report of Superintendent of the Prison in this connection:

STATE HIGHWAY DEPARTMENT.

"One of the greatest difficulties which we have encountered in working prisoners on public works without guards has been the smuggling into the various camps of intoxicating liquor. Without exception, to every body of men we have had at work outside the prison, whiskey has been furnished from one source or another. The first case we endeavored to prosecute and were able to obtain a conviction, but the man was fined only twenty dollars and released. I think that a law should be passed which would make the furnishing of intoxicants to state prisoners a felony."

FLORENCE-MESA HIGHWAY

Survey of this section of State Highway system completed in September, 1912, 32.1 miles, to Higley. Section One of this highway extends from City of Florence to the Maricopa County line, a distance of 25 miles. Section Two extends from the Maricopa County line toward Mesa to Higley, a distance of 7.1 miles.

In October, 1912, it was determined to start construction on this road with honor prisoners, selected by the Superintendent of the Prison, beginning at Florence and working toward Higley. A force of thirty men was selected and commenced on this work October 20, 1912, at the Arizona Eastern Depot, Florence, and by the latter part of February, 1913, had completed the grading to Higley, 30.7 miles. Costs have been segregated as between Pinal and Maricopa Counties and tabulated statements covering follow:

Pinal County 23.6 Miles.

Engineering: (Prior to Construction)

Salaries	\$ 334.50
Commissary supplies	91.70
Expenses	34.36
Travel	1.37
	\$ 461.93

STATE HIGHWAY DEPARTMENT.

Construction:

Material:

Lumber	\$ 71.97	
Miscellaneous	111.12	
		\$ 183.09

Teams:

Rentals	\$1,962.83	
Feed and stable	1,761.81	
		\$3,724.64

Equipment:

Purchased	\$1,176.45	
Recovered	905.93	
		\$ 270.52

Labor, Paid:

Salaries and expenses Supt.	\$ 770.94	
		\$ 770.94

Miscellaneous:

Office	\$ 2.60	
Water	60.05	
		\$ 62.65

Labor, Prison:

Food, clothing, etc.	\$1,876.91	
Guards	304.69	
Escapes	1,013.55	

\$3,195.15

Maintenance refunds	\$1,765.54	
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\$1,429.61

\$ 6,441.45

TOTAL CONSTRUCTION AND ENGINEERING \$ 6,903.38

Maricopa County. 7.1 Miles.

Engineering: (Prior to Construction)

Salaries	\$ 90.92	
Commissary supplies	30.30	
Expense	10.59	
		\$ 131.81

Construction:

Material:

Miscellaneous	\$ 39.28	\$ 39.28
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Equipment:	3.95	3.95
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STATE HIGHWAY DEPARTMENT.

Teams:

Stolen	\$460.00	
Rentals	576.27	
Feed	382.61	
		\$1,418.88

Labor: Paid:

Salary, Supt.	\$171.76	
Expense, Supt.	14.30	
		\$ 186.06

Miscellaneous:

Office expense	\$ 1.75	
Water	7.61	
		\$ 9.36

Labor: Prison

Food, Clothing, etc.	\$ 724.35	
Escapes	182.70	
		\$ 907.05
Maintenance refund	465.43	
		\$ 441.62

\$ 2,099.15

TOTAL ENGINEERING AND CONSTRUCTION

\$ 2,230.96

During the period of October, 1912, to February, 1913, over which this work extended there were nine escapes, three of which were recaptured. Six of these escapes can be directly laid to the fact of liquor being smuggled into camp to the prisoners and when this was discovered it was deemed advisable to employ a guard to try and eliminate this feature.

The entire road was graded to a width of twenty feet and partially ditched; owing to lack of funds the culvert work was postponed. This part of the work is now under way and is covered in separate item.

In analyzing the costs shown for this work, we find a gross cost of \$336.00 per mile (gross cost—exclusive of refund from prison for maintenance) and a net cost of \$270.00 per mile. These figures do not represent true construction costs of labor, teams and material

STATE HIGHWAY DEPARTMENT.

which, for a comparison with other labor, are essential. The following items, for this purpose, should be deducted from costs shown:

Amount paid for team stolen.....	\$ 460.00
Amount paid for horse killed.....	150.00
Expense after escapes.....	1196.25
	<hr/>
	\$1,806.25 or \$56.00 per mile

In May, 1914, Assistant Engineer Ed Ten Eyck was assigned to Pinal County to direct the culvert work on the Florence-Mesa Highway and Tucson-Florence Highway. The concrete pipe moulds used for the work on Phoenix-Tempe Highway were shipped to Florence and prisoners were furnished by the prison for the manufacture of the necessary pipe. On account of small fund available in Pinal County for this work, \$2,000.00 was appropriated from the 25% Fund for expenditure on the Florence-Mesa Highway in conjunction with the Pinal County 75% Funds. Owing to the innumerable drainage openings, it has been found expedient, until such times as sufficient funds are available for culverts, to hire teams and grade down as many of the smaller washes as possible and only put culverts in the larger. This work is under way at this date and should be completed by August 1st. Expenditures to June 30, 1914, as follows:

Engineering:

Salaries	\$ 38.67	
Travel	6.79	
Supplies, etc.	30.80	
	<hr/>	\$ 76.26

Construction:

Salary, Asst. Engr.	\$ 101.29	
Foremen	51.76	
Subsistence	27.50	
Freight on forms	31.00	
	<hr/>	\$ 211.55

\$ 287.81

TUCSON-FLORENCE HIGHWAY

Cement pipe is also being made by prison labor at Florence for placing on the section of the State Highway extending from Flor-

STATE HIGHWAY DEPARTMENT.

ence to the Pima County boundary, a distance of 38.4 miles. This road was graded under the Territorial administration, but due to insufficient funds, culvert work was postponed. There are more than two hundred drainage openings on this section of road and as funds are limited it will be necessary to follow the same methods used on the Florence-Mesa Highway and only put in culverts in the larger openings, grading down the smaller until such time as funds are available. Prison labor under the honor system will be used in placing these culverts.

Culverts:

Expenditures to June 30, 1914—

Camp	\$ 11.85	
Clearing and grubbing	49.25	
Culverts	1,330.01	
Ditching	45.12	
		\$ 2,300.13

*Detail of cost of concrete pipe culverts:

36 in.—2 foot section:

1½ sacks cement	\$.95
Reinforcing, 11 ft. ....	.82
Superintendence, etc. ....	.35

\$2.12, per lin. ft. \$ 1.06

30 in.—2 foot section:

1 1-3 sacks cement	\$.85
Reinforcing, 10.5 ft. ....	.80
Superintendence, etc. ....	.30

\$1.95, per lin. ft. \$.975

24 in.—2 foot section:

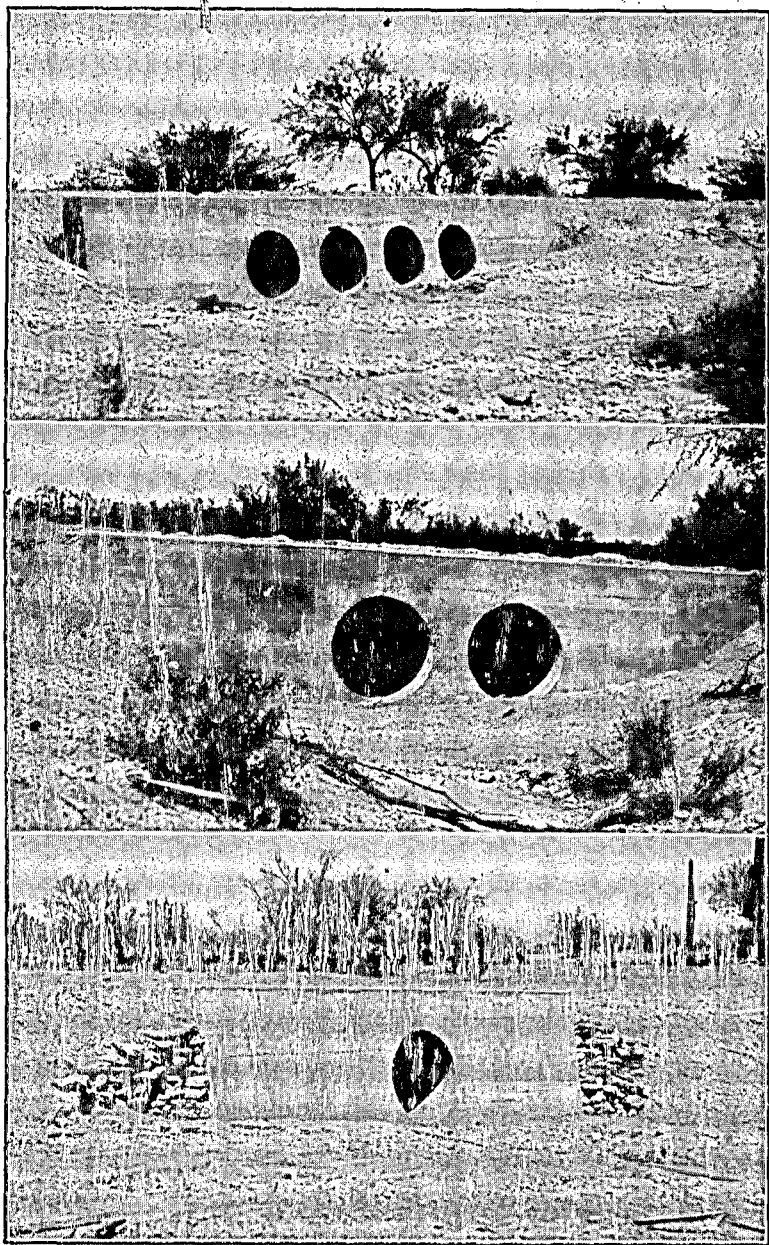
¾ sack cement	\$.47
Superintendence, etc. ....	.30

\$.67, per lin. ft. \$.335

*No charge for labor account prisoners used at Prison.

Cost of corrugated iron culverts in event work done by contract:

36 in per ft.	\$2.95
30 in. " "	2.46
24 in. " "	1.98



PINAL COUNTY
 Prison Labor
 Florence-Mesa, Section 1
 Borderland and Grand Canon-Nogales Highways

STATE HIGHWAY DEPARTMENT.

PINAL COUNTY MAINTENANCE

In September, 1913, a five ton Sauer truck was purchased for use in maintenance work. This truck was placed at Florence and an average gang of seven prisoners with paid driver and foreman were engaged during the winter of 1913 and up to May, 1914, on maintenance work in Pinal County. The road between Florence and Higley was dragged after rains, ruts filled in and ditches cleaned, also gravel placed on some of the worst sandy stretches. Since May the truck has been used in hauling cement pipe from the prison out to locations of openings on Florence-Mesa and Tucson-Florence Highways, also transporting prisoners to and from the work thereon.

Table of costs of maintenance below:

Salary of driver and foreman	\$ 792.12
Gasoline and oil	422.90
Miscellaneous auto expense	36.72
Miscellaneous expense, frt., etc.....	46.53
Steel	8.90
Powder	10.25
	<hr/>
	\$1,317.42
Refund of salaries	20.55
	<hr/>
	\$ 1,296.87
Maintenance work under direction of Board of Supervisors	
with day labor and teams in June and August, 1913:	
Labor and teams	\$ 454.30
Material	113.78
	<hr/>
	\$ 568.08

PHOENIX-TEMPE HIGHWAY.

F. G. Twitchell, Division Engineer.

Survey of highway extending from north end of Tempe bridge toward Phoenix to the Grand Canal, a distance of 3.64 miles, completed in April, 1913, and construction work commenced latter part

STATE HIGHWAY DEPARTMENT.

of May. This road was completed December 1st. Average force employed on this road consisted of 60 prisoners on road work, 13 on camp work and a paid force of one engineer and instrumentman, one bookkeeper, four foremen and two carpenters, also twenty rented teams. Detailed statement of costs follow:

Material:

Cement	\$2,046.23*
Steel	210.62
Lumber	634.45
Powder, caps and fuse	3,016.99
Hardware	424.98
Culverts, Corr. Iron	54.72
Miscellaneous	136.01
	<hr/>
	\$ 6,524.00

Teams:

Stock killed on work	\$ 575.00
Rentals	3,431.88
Feed	3,577.94
	<hr/>
	\$ 7,584.82

Equipment:

Tools, etc., worn out on job	559.79
------------------------------------	--------

Fuel:

155.64

Labor: Paid:

Engineer and Ass't.	\$1,552.55
Carpenters	2,084.47
Foremen	2,674.21
Office	492.50
Miscellaneous	1,701.26
	<hr/>
	\$ 8,504.99

Miscellaneous Expense:

Office and Engineer's miscellaneous	\$ 396.56
Rent of building	150.00
Rent of land	38.00
	<hr/>
	\$ 584.56

Engineer's Mess:

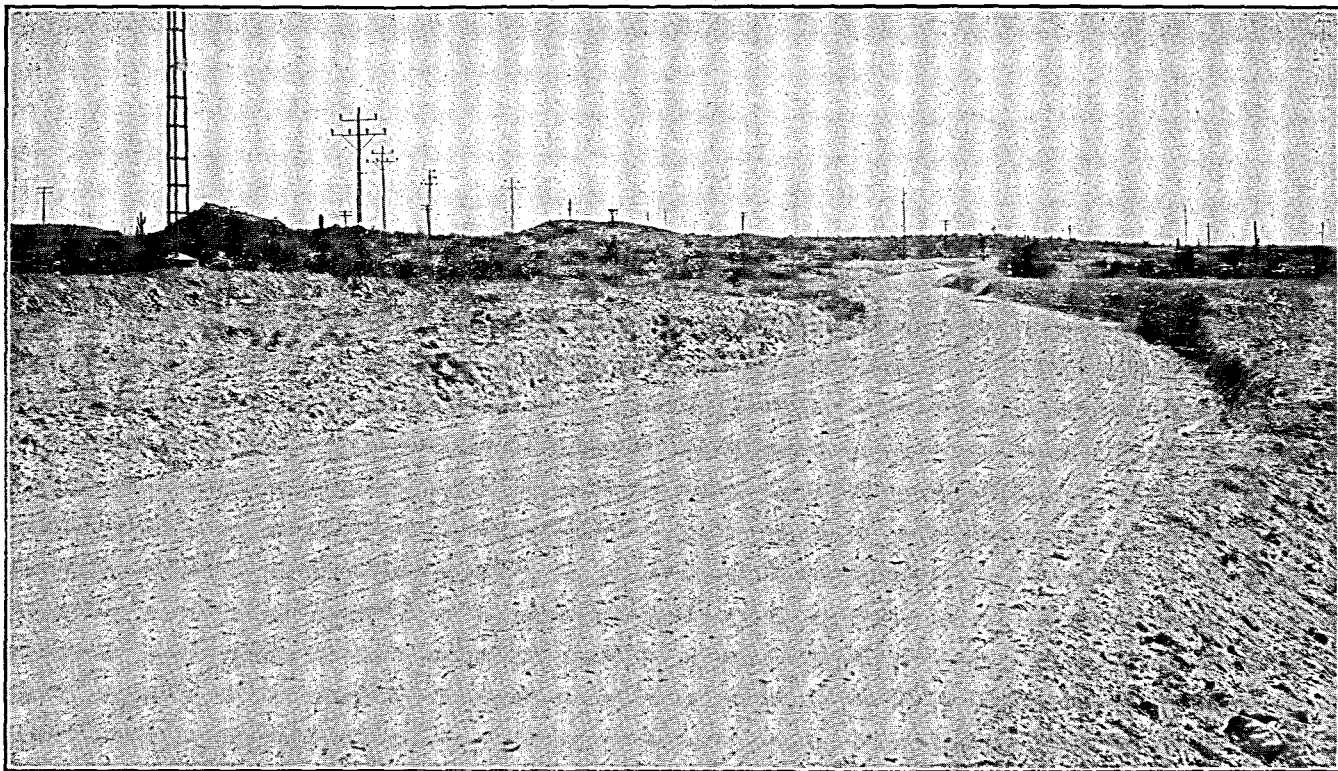
Supplies	\$ 1,178.35
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Right of Way:

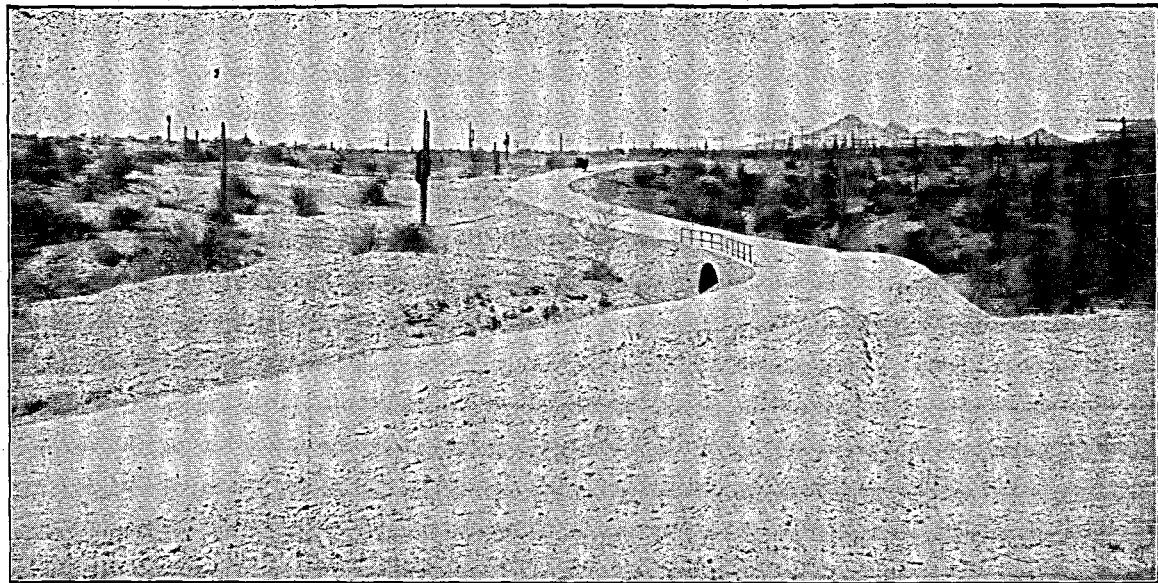
150.00

Prisoners:

Provisions, clothing, etc.	\$7,991.00
Guards	4,937.40
Transportation	480.95



MARICOPA COUNTY
Prison Labor
Phoenix-Tempe
Roosevelt Dam, Borderland and Grand Canon-Nogales Highways



MARICOPA COUNTY
Prison Labor
Phoenix-Tempe
Roosevelt Dam, Borderland and Grand Canon-Nogales Highways

STATE HIGHWAY DEPARTMENT.

Medical	346.50
Escapes	154.86
Rewards	200.00
Miscellaneous expense, stockade	191.23
	<u>\$14,276.92</u>
Maintenance refunds from Prison	5,532.91
	<u>\$ 8,744.01</u>
	\$ 33,986.16

Engineering-Surveys:

Salaries field force	\$ 336.27
Salaries office force	252.77
Commissary supplies	174.00
Travel expense	52.45
Miscellaneous	56.62
Office expense	22.19
	<u>\$ 897.30</u>
	\$34,883.46

*\$428.10 credit allowed account sacks returned,
but not credited on books as yet.

UNIT COSTS.

Total men days	15637
Total working men days	10161
Average number of men on job	77
Average number of men on road work	60
Average number of men on camp work	13
Average number of men not working	4
Cost per man per day, exclusive of refund .....	.913
Cost per man per day, less refund .....	.559
Cost per working man per working day, exclusive of refund	1.405
Cost per working man per working day, less refund .....	.86
Cost per man per day for guards .....	.32*
Cost per working man per working day for guards .....	.49**
*Included in Item 5.	
**Included in Item 7.	
Paid Labor:	
Engineer and instrumentman per working day	\$11.18
Office	4.00
Foremen	19.75
Carpenters	12.33
Miscellaneous	10.06*

*Includes men from bridge charged to highway at \$1.00 per day.

STATE HIGHWAY DEPARTMENT.

QUANTITIES.

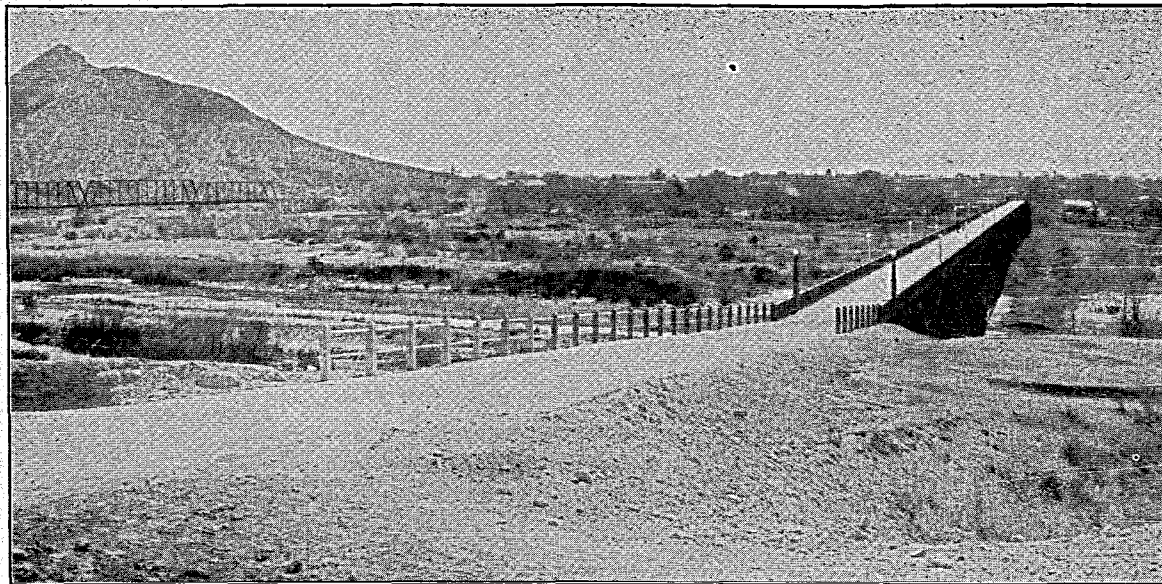
Clearing and grubbing, 10 acres.....	@ \$19.76	\$ 197.60
Earth excavation, 19,731 cu. yds.....	.34	6,708.54
Rock excavation, 11,321 cu. yds.....	1.40	15,849.40
Surfacing—Sta. 136-192—1658 cu. yds.....	1.00+	1,662.35
Concrete culverts, 838 cu. yds.	9.36	7,843.01
104 lineal feet corrugated culverts in place.....	1.83	190.32
754 lineal feet concrete pipe in place .....	.60½	456.09
Concrete headwalls, 149 cu. yds.	7.23+	1,078.75

\$33,986.16

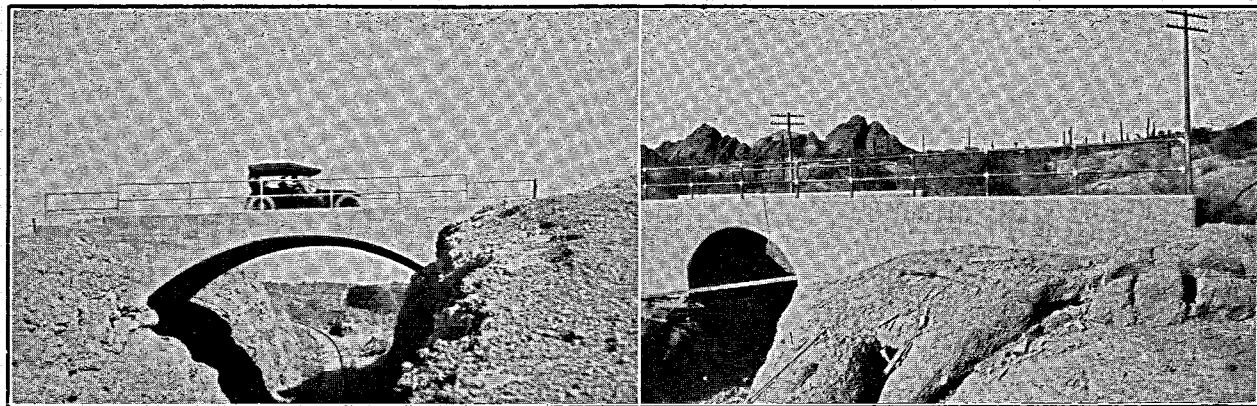
This work consisted of the grading of 3.64 miles of roadway 24 feet wide, surfacing with caliche, decomposed granite and gravel to a depth of 6 inches (loose), the construction of the following concrete bridges and culverts:

- One arch having a clear span of thirty-six feet;
- One double arch, each section having a twelve foot clear span;
- One arch having a twenty-one foot clear span;
- Two arches of twelve foot clear span each;
- One rail top bridge consisting of two eight foot spans;
- Eight concrete culverts from 24 to 40 feet in length;
- Twenty-two pipe culverts with concrete headwalls, comprising:
 - 326 linear feet of 24 inch cement pipe;
 - 428 linear feet of 18 inch cement pipe;
 - One 24 inch corrugated iron culvert pipe 41 feet long;
 - One 24 inch corrugated iron siphon, 32 feet long.

As will be seen from the table of quantities, 11,321 cubic yards of rock were moved at an expenditure for powder, fuse and caps of \$3,016.99, with a total cost per yard of \$1.40, which is probably higher than it could have been done by contract. 19,731 cubic yards of earth were moved at a cost of \$0.34 per cubic yard, which is high for average earth excavation. However, there was a long haul and a large percentage of this material was a layer of ten to twelve inches over bed rock. This also includes the cost of finishing on 2.58 miles. 1.06 miles over a silt subgrade was surfaced with 6 inches (loose) of caliche. The concrete cost of \$9.36 per cubic yard as against an average contract price of \$12.00 offsets cost of excava-



TEMPE BRIDGE AND NORTH APPROACH
Prison Labor



MARICOPA COUNTY
Prison Labor
Phoenix-Tempe
Roosevelt Dam, Borderland and Grand Canon-Nogales Highways

STATE HIGHWAY DEPARTMENT.

tion. Attention is called to the manufacture and laying of 754 lineal feet of concrete pipe (18 inch and 24 inch) at a cost of \$0.605 per lineal foot (pipe 0.295, laying 0.310) as against average contract prices using corrugated iron \$2.07 (corrugated iron pipe \$1.47, laying \$0.60). This concrete pipe was made on the work by prisoners using moulds bought for that purpose and shows a saving of \$1.465 per lineal foot. The road was thoroughly dragged after the rains and the surfacing bound well. It is holding up satisfactorily notwithstanding the heavy traffic and extremely dry season, except in the cuts which were broken to 12 inches in depth but not excavated and backfilled. A caretaker was placed in charge of the road from Phoenix to Tempe, 6.64 miles. Immediately upon opening of this piece of new road and the Tempe bridge the traffic increased on the route over 500 per cent.

COCHISE COUNTY

J. C. Ryan, Division Engineer.

Prisoners under guard have been employed on State Highway and bridge work in this county continuously from May, 1913. The first work undertaken was the construction of a reinforced concrete bridge over the San Pedro River near Fairbank, which was carried to completion in December, 1913. In October of this year an additional force of forty men began work on the highway between Bisbee and Tombstone and upon completion of the bridge near Fairbank a portion of that force was transferred to the Bisbee-Tombstone camp.

The number of escapes from the work in this county has been larger than anticipated due to the fact of work being in such proximity to the Mexican boundary, twenty-seven miles from Fairbank, nine miles from Bisbee and on the Bisbee-Douglas work for a portion of the time one mile. Under ordinary conditions, this would have very little effect on our working conditions, but with Mexican internal affairs as they have been the past year, the men of the na-

STATE HIGHWAY DEPARTMENT.

ture not caring for work have felt they would be safe from extradition once across the border, and especially so if enlisted in the ranks of either army. With this idea and watching for an opportunity to carry out such plans, it has been impossible to guard them closely enough to prevent escapes. Also, on account of the character of the immediate surrounding country at the Bisbee camp, mountainous and covered with underbrush, it is known to be very difficult to capture a runaway before reaching the border. Another feature entering into this has been the fact with two camps going on, in order to secure the greatest efficiency and economy, requiring at least seventy men in each camp, it has been necessary to take every available man from the prison regardless of his trustworthiness or aptitude to manual labor; and, upon completion of the Bisbee-Douglas work, it was decided to only maintain one camp under guard and one on honor.

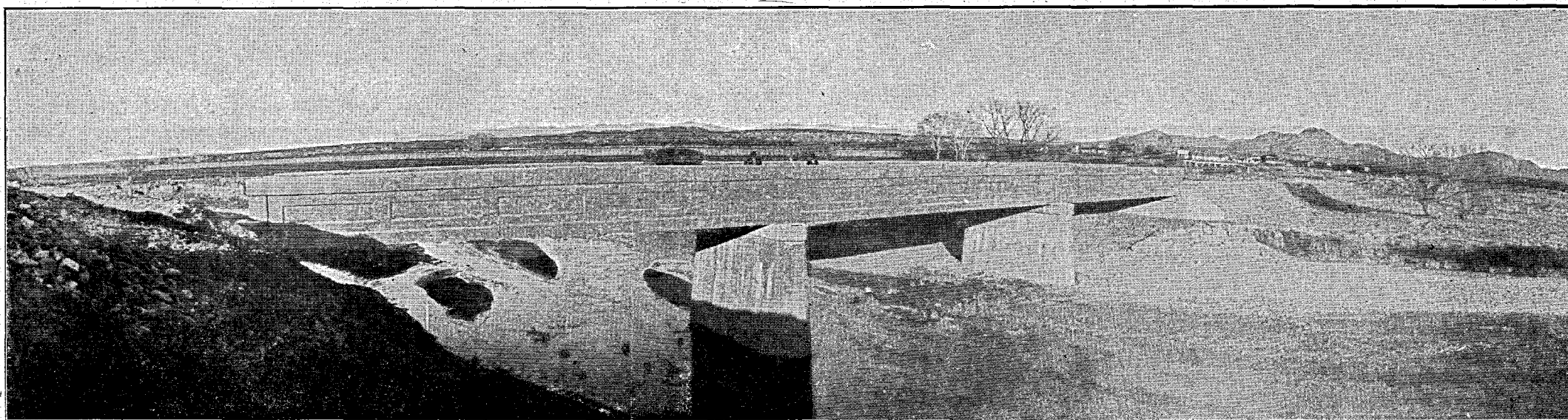
FAIRBANK BRIDGE AND HIGHWAY

In April, 1913, survey and soundings for bridge over the San Pedro River at Fairbank were completed. Plans were prepared for a 192-foot through girder reinforced concrete bridge with 16-foot roadway.

As the work on the Tempe bridge had reached the stage where practically all the force then engaged on that work could be available, it was decided to construct the Fairbank bridge with prison labor. Accordingly, on May 24, 1913, with the exception of ten prisoners and the Assistant Engineer, the Tempe bridge force was transferred to the Fairbank bridge site and construction work gotten under way. This work was carried to completion in November, 1913.

In addition to the bridge at this location; 0.396 miles of road, 16 feet wide, was graded and surfaced with six inches of caliche and the following bridges and culverts constructed:

- 1 30-foot rail top bridge;
- 2 3x4-foot concrete box culverts with headwalls;
- 1 24-inch corrugated iron culvert with headwalls;



COCHISE COUNTY
Prison Labor
Fairbank Bridge
Borderland Highway

STATE HIGHWAY DEPARTMENT.

approximately 15 miles of old road repaired east and west of Fairbank. Tabulated statement of costs as follows:

Engineering: (Prior to Construction)

Salaries	\$ 473.47
Commissary supplies	173.33
Travel expense	69.65
Transit rental	15.60
Miscellaneous	14.20

\$ 746.25

Construction:

Material:

Cement	3,468.47
Steel	2,325.85
Lumber	2,408.30
Powder and fuse	115.28
Wire	128.95
Handrail pipe	31.50
Hardware, etc.	314.91

\$8,793.26

Labor—Paid:

Engineers	\$ 856.94
Foremen	1,717.06
Carpenters	1,128.00
Office	536.86
Other	274.50

\$4,512.86

Engineer's and Foremen's Mess \$1,093.76

Transportation for employes..... 305.65

Office and miscellaneous expense..... 398.16

Medical attention for R. E. Kirkland.... 449.15

Teams:

Rentals	\$ 1,147.35
Feed	1,134.28

\$2,281.63

Fuel: 563.49

Equipment:

Purchased and repairs	\$2,276.56
Recovered	1,059.09

\$1,217.47

Transp. from Tempe \$ 674.68

\$1,892.15

\$20,290.11 \$ 746.25

STATE HIGHWAY DEPARTMENT.

Cost of Labor (prison):

Groceries, meat and clothing.....	\$4,558.76
Medical attention	85.00
Transportation	620.00
Guards	4,346.19
Escapes	59.03
	<u>\$9,668.98</u>
Maintenance refunds	\$2,869.75

	<u>\$6,799.23</u>	
Office—Travel expense	\$ 12.11	
Bridge plate	123.75	\$ 27,225.20
		<u>\$ 27,971.45</u>
Approaches and road		4,514.53
		<u>\$ 23,456.92</u>
Cost of Bridge.....		

Average number of men on job	38
Average number of men on bridge	29
Average number of men on camp work.....	9
Average cost per man per day, gross.....	1.28
Average cost per man per day, net.....	.90
Average cost per working man on bridge, gross.....	2.01
Average cost per working man on bridge, net.....	1.41
Average cost per working man on bridge for guards.....	.91*

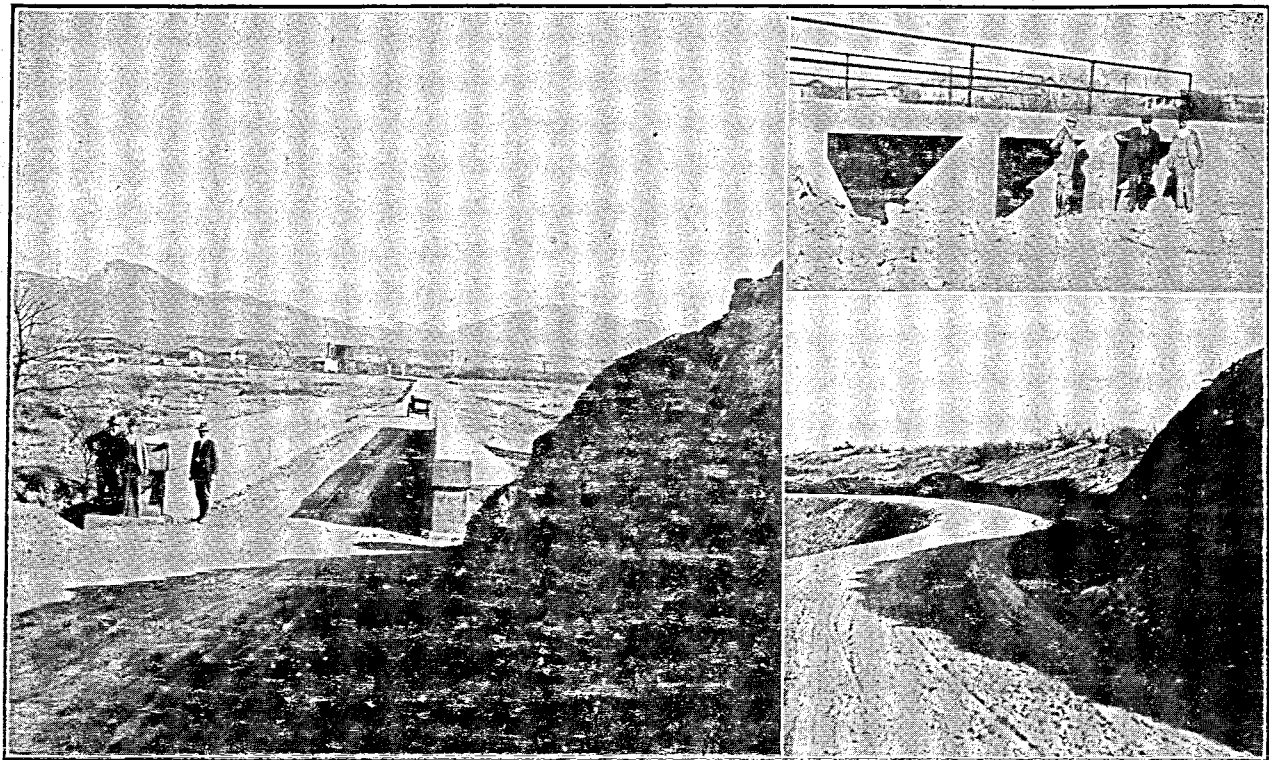
*Included in Item 6; (\$2.01).

Engineers, per working day.....	6.56
Foremen " " "	12.17
Carpenters " " "	6.06
Office " " " (Bookkeeper)	3.86
Other paid labor per working day	1.47

Total men days	7560
Total working men days.....	4807
Total men days, camp	1659
Total men days, Sundays and sick.....	1094
Total prisoners working during period May to December.....	85
" " escaping " " "	8
" " recaptured " " "	2
" " not captured " " "	6

Sand and gravel for concrete work were not available at the bridge site. Cost of hauling in as below:

Foremen	\$ 392.26
Teams	525.58
Prisoners	1,426.92
	<u>\$ 2,344.76</u>



COCHISE COUNTY
Prison Labor
Fairbank Bridge and Approaches
Borderland Highway

STATE HIGHWAY DEPARTMENT.

Two thousand nine hundred and eight feet of road approach,
one 30 foot rail top culvert and two 3x4 foot concrete boxes—designated Tucson-Bisbee Highway, Fairbank bridge section. Costs as follows:

Paid Labor:

Engineer	\$ 32.71	
Instrumentman	168.00	
Bookkeeper	171.50	
Foreman	353.66	
Carpenter	20.00	
		\$ 745.87
Teams		\$ 850.20
Prison Labor		2,134.62
Material		186.29
		<u>\$ 3,916.98</u>

30 ft. Rail Top Culvert.

70.9 cu. yds. concrete.

56.5 cu. yds. earth excavation.

Paid Labor:

Foreman	\$ 69.90	
Instrumentman	24.00	
Bookkeeper	7.00	
Carpenter	36.00	
		\$ 136.90

Teams:

Excavation	\$ 42.00	
Concrete	23.64	
		\$ 65.64

Prison Labor:

Excavation	\$ 71.00	
Concrete	158.14	
		\$ 229.14

Total labor..... \$ 431.68

Labor Pr cu yd. concrete..... 4.49

Labor Pr cu. yd. excavation..... .20

Material:

Rail	\$ 131.09
Piperail	30.60
Cement	257.95

STATE HIGHWAY DEPARTMENT.

Lumber	54.58	
Miscellaneous	29.23	
	<u>503.45</u>	\$ 935.13

Material—Per cu. yd. concrete7.10

Two 3x4 Concrete Culverts

35.6 cu. yds. concrete.

28.4 cu. yds. earth excavation.

Labor:

Foreman	37.28	
Instrumentman	12.00	
Bookkeeper	3.50	
Carpenter	20.00	
	<u>72.78</u>	\$ 72.78

Teams:

Excavation	\$ 14.00	
Concrete	16.74	
	<u>112.56</u>	\$ 216.08

Labor per cu yd.4.47

Excavation20

Material:

Lumber	\$ 43.65	
Moulding	2.00	
Cement	160.80	
Miscellaneous	15.09	
	<u>221.54</u>	\$ 437.62

Material per cu. yd. concrete..... 6.22

Maintenance refund.....

775.20

\$ 4514.53

The cost per man per working day shown for this project illustrates the handicap of working a small force under guard. Twenty additional men could have been used on this work without increasing the paid superintendence and guard expense and on the other hand resulted in a reduction thereof by reason of shortening time required for completion of work.

STATE HIGHWAY DEPARTMENT.

A sudden rise in the San Pedro River carried away the forms and falsework for one of the piers, also some equipment and it is impossible to estimate the material and labor loss resulting therefrom.

Another feature entering into this work was an epidemic of smallpox among the men during August, 1913, resulting in natural loss of efficiency.

BISBEE-TOMBSTONE HIGHWAY

Section One.

Bisbee West 3 Miles.

Division Engineer J. C. Ryan.

Plans and specifications for construction of 3.9 miles of the highway extending from the city limits of Bisbee through Tombstone Canon were prepared and construction of stockade and quarters for prison force started late in September, 1913. It was planned to commence this work with a force of at least seventy men, but owing to work on a concrete building within the prison then under way, only forty men could be secured. These men were transferred to Bisbee October 7, 1913, and this force immediately began work, continuing until December, when increased by men from the Phoenix-Tempe Highway work. It has been found that 70 men is the economic minimum for prison labor construction camps under guard; the costs, therefore, shown for the first four months of this work run higher than the subsequent months.

This work consisted of the regrading of about two miles of old road, correcting the alignment, widening the road to a width of 17 to 24 feet and reducing the maximum grade from about 14% to 10%, and the construction of 1 mile of new road. The entire three miles was surfaced with local material—decomposed granite and gravel with loam binder—to a depth of 12 inches, adequate drainage structures and storm ditches were installed. This was very heavy and expensive work. Note itemized statement of quantities and drainage structures.

STATE HIGHWAY DEPARTMENT.

QUANTITIES.

M I L E 1.

Width varies from 20 to 24 feet, exclusive of surface ditches.

Clearing and Grubbing, None.

Grading:

SOLID ROCK	4922.0	Cu. Yds.
Loose rock and boulders	24.0	" "
Earth excavation and bor.....	425.9	" "
Gravel borrow, "Fresno".....	1725.0	" "

Culvert Excavation:

SOLID ROCK	66.5	" "
Loose rock and boulders.....	283.1	" "
Earth excavation	222.7	" "

Culverts and Retaining Wall: Cu Yds. Masonry Cu. Yds. Concrete

1-4x6 reinforced concrete box.....		33.42
1-3-10 ft. span rall top culvert.....		134.30
1-3x5, reinforced concrete box.....		29.80
Retaining wall	79.50	
1-12 in. Corr. iron pipe, 20 ft. long.....	7.00	
4-Doub. 12 in. Corr. iron pipe, 20 ft. long	34.10	
2-18 in. Corr. iron pile, 22 ft. long.....	18.90	
3-24 in. Corr. iron pipe, 22 ft. long.....	42.70	
1-30 in. Corr. iron pipe, 22 ft. long.....	10.40	
1-30 in. doub. Corr. iron pipe, 22 ft. long	45.60	
1-36 in. doub. Corr. iron pipe, 24 ft. long	19.20	
	257.4	197.52

Storm Ditches:

SOLID ROCK.....	72.7
Loose rock and boulders	208.6
Earth excavation	367.0
Gravel (Fresno)	597.0

Finishing:

Earth and crushed rock surface, 1 ft. deep.

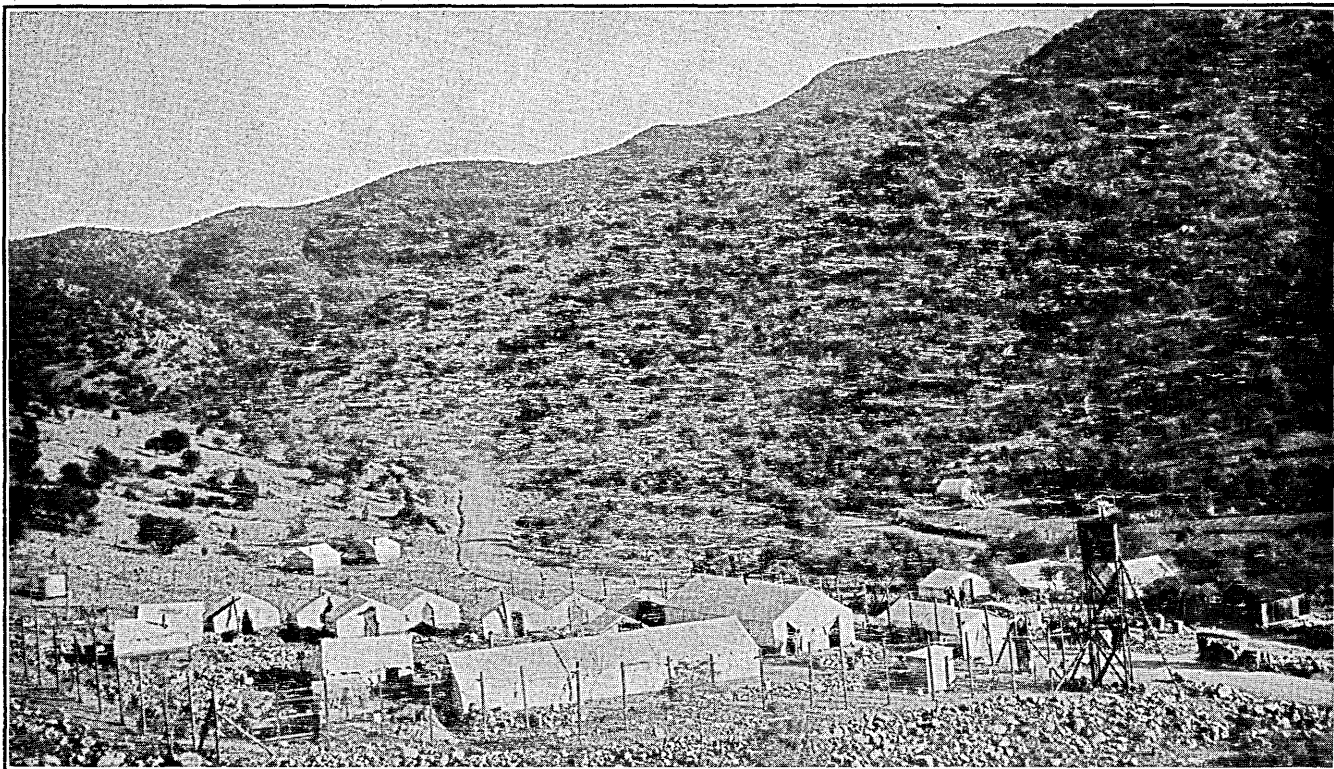
M I L E 2.

Width varies from 16 to 24 feet, exclusive of surface ditches.

Clearing and Grubbing: 0.3 miles 1.82 acres

Grading:

SOLID ROCK	5978.7	cu. yds.
Loose rock and boulders	583.0	" "
Earth excavation and borrow.....	1832.2	" "



COCHISE COUNTY
Prison Labor Camp
Bisbee-Tombstone, Sec. 1
Borderland Highway

STATE HIGHWAY DEPARTMENT.

Culvert Excavation:

SOLID ROCK

None.

Loose rock and boulders 71.0

Earth excavation 215.0

Culverts:

Cu. Yds. Masonry. Cu. Yds. Concrete.

1—4x6 reinforced concrete box..... 33.32

1—8 ft. rail top culvert 102.33

1—18 in. Corr. iron pipe, 22 ft..... 20.6

6—24 in. Corr. iron pipe, 22 ft..... 86.6

1—24 in. Corr. iron pipe, 24 ft..... 13.0

1—30 in. Corr. iron pipe, 20 ft..... 18.4

138.6 135.65

Dry Wall:

Dry masonry 27.0

Storm Ditches:

SOLID ROCK 29.0

Earth Excavation 504.8

Finishing:

Earth and Decomposed Granite, 1 ft. deep.

M I L E 3.

Of this 0.9 is 16 ft. in width and 0.1 varies in width from 20 to 24 ft. (exclusive of surface ditches).

Clearing and Grubbing:

8.18 acres

Grading:

SOLID ROCK 2146.1 Cu. Yds.

Loose rock and boulders 2894.7 " "

Earth excavation and borrow 1220.1 " "

Culvert Excavation:

SOLID ROCK 96.0 " "

Loose rock and boulders 108.0 " "

Earth excavation 96.0 " "

Culverts:

Cu. Yds. Masonry. Cu. Yds. Concrete

1—2x4 reinforced box 11.70

1—2x3 reinforced box 8.84

1—9 ft. reinforced box 128.29

1—4x6 Rail top culvert 37.55

1—24 in. Corr. iron pipe, 24 ft..... 6.9

1—24 in. Corr. iron pipe, 22 ft..... 6.7

1—30 in. Corr. iron pipe, 20 ft..... 6.6

1—30 in. Corr. iron pipe, 22 ft..... 6.4

1—30 in. Corr. iron pipe, 24 ft..... 7.2

STATE HIGHWAY DEPARTMENT.

1—36 in. Corr. iron pipe, 20 ft.....	5.9
3—36 in. Corr. iron pipe, 22 ft.....	18.4
3—36 in. Corr. iron pipe, 24 ft.....	18.2
1—36 in. Corr. iron pipe, 20 ft. Double....	8.6
1—36 in. Corr. iron pipe, 22 ft. Double....	7.7

..... 92.6 186.38

Storm Ditches:

SOLID ROCK	213.8 Cu. Yds.
Loose rock and boulders	253.2 "
Earth Excavation	208.0 "

Finishing:

Earth and decomposed granite, 1 ft. deep.

Reports in detail to June 30, 1914, are as follows:

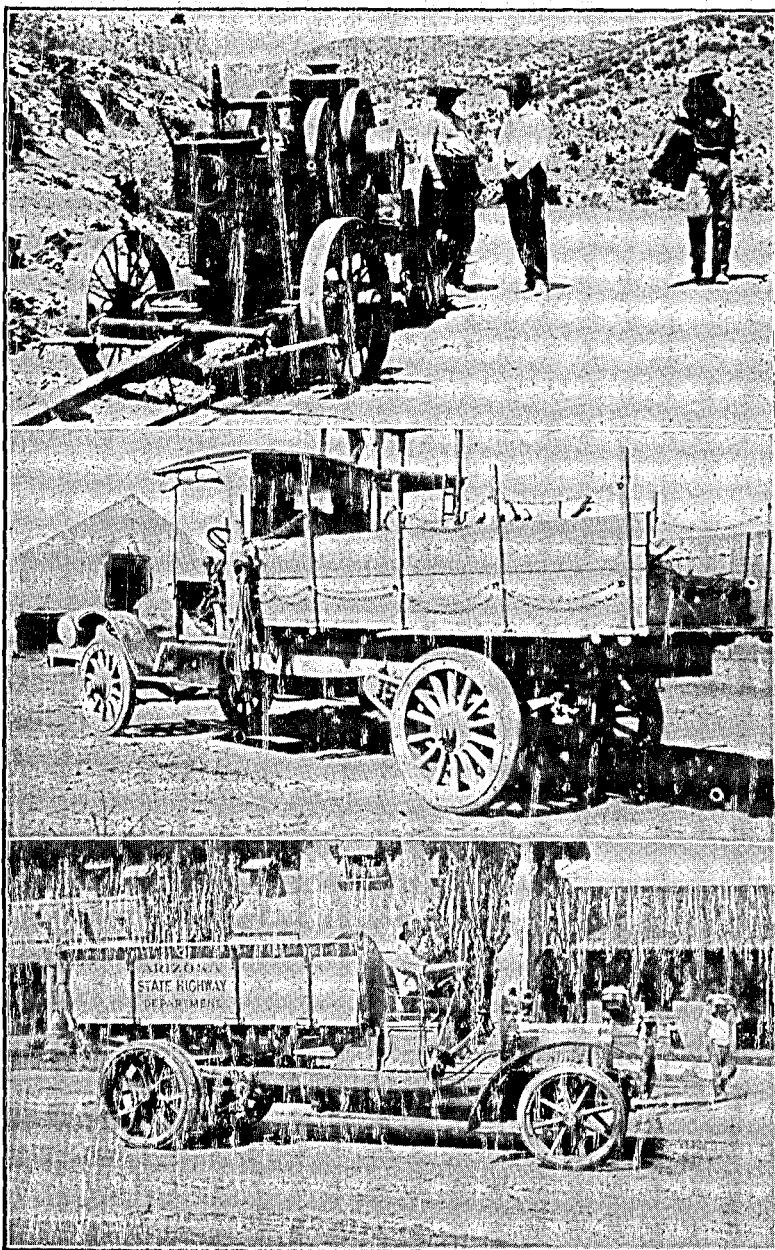
BISBEE-TOMBSTONE HIGHWAY, SEC. 1

COST OF MAINTAINING PRISONERS

October, November, December, 1913 and January, 1914.

7413 Prisoner Days.

Groceries	\$ 1,797.61	242
Meat	1,273.80	172
Fuel	193.26	.026
Doctor's Fees and Medicine.....	107.70	.014
Clothing	1,368.16	.185
Transportation Prisoners	1,421.99	.191
Escapes (includes rewards).....	117.69	.010
Captain of the Guard Board.....	71.40	.010
Bookkeeper's Board	271.40	.010
Guard's Payroll	2,483.09	.335
Truck, Hauling Supplies.....	57.23	.008
	\$ 8,923.33	1.203
Average number of men.....	60	
Total number of Prisoner days.....	7413	
Less Prisoners in camp.....	2908	
Number Prisoners outside work.....	4505	
Cost per Prisoner day, outside work.....		\$ 1.98



PRISON LABOR
State Equipment

STATE HIGHWAY DEPARTMENT.

Escapes—16.

Recaptured—7.

NOTE: The cost shown is high by reason of small number of men to December 8th (forty men) and includes initial transportation expense, also clothing, etc.

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

COST OF TEAMS

October, November, December, 1913, and January, 1914.

Number of Team Days 747.

Hay purchased during perlor.....	\$ 375.66		
Less on hand 1-31.....	\$15.57		
Less sold to guards.....	15.94		
		31.51	
Hay used		\$ 344.15	\$.460
Barley purchased	92.32		
Less on hand 1-31.....	\$ 1.52		
Less sold to guards.....	7.88		
		9.40	
Barley used		82.92	.111
Transportation of stable supplies:			
Supplies for motor truck.....	19.85		
Salary of chauffeur	27.20		
		47.05	.063
Help, 30 prisoner days @ \$1.98.....		59.40	.080
Feed at Tempe when teams were purchased.....		67.24	.090
* Supplies and water (See note).....		61.26	.082
		\$ 662.02	\$.886
Salary sub-foreman		12.09	.016
		\$ 674.11	\$.902
Total team days	747		
Less teams in camp account Sundays, idle, etc.....	327		
Total work days	420		
Rate per team per work day.....			\$ 1.603

* This item includes shoes, etc., for the stock, axle grease, repairs, etc., for wagons, water charged to corral amounting to \$10.00.

STATE HIGHWAY DEPARTMENT.

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

COST OF ENGINEER'S MESS

October, November, December, 1913, and January, 1914.

Groceries bought	\$ 904.71	
Groceries from prison mess	200.00	
Less store accounts	\$ 245.78	
Less captain's board	70.20	
On hand 1-31	81.00	
	<u>396.98</u>	
Total used	707.73	
Total meals		\$.135
5231		
Meat used	286.22	
Rate per meal .....		.055
Fuel	\$90.00	
Less on hand 1-31	30.00	
	<u>60.00</u>	
Rate per meal .....		.011
Cooks and waiters	\$274.28	
Less prison mess	100.32	
	<u>173.96</u>	
Rate per meal .....		.033
	<u>\$1,237.91</u>	\$.234
Rate per man per day .....		.702
Recapitulation for Employees Boarded:		
Groceries	\$1,104.74	
Less Credits	\$663.39	
Less on hand	81.00	
	<u>744.39</u>	
	\$ 360.35	
Meat	286.22	
Fuel	60.00	
Cooks and waiters	173.96	
	<u>\$ 880.53</u>	
Less captain's board	70.20	
	<u>\$ 810.32</u>	

STATE HIGHWAY DEPARTMENT.

Rate per day for 807 men days.....	\$ 1.004
Less Sundays, etc. 122	
<u>685</u>	
Rate per day per working day.....	1.180

SUMMARY OF COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

September, October, November, December, 1913, and January, 1914.

02-2-1 Camp Construction	\$ 1,633.52
02-2-2 Clearing and Grubbing	366.98
02-2-3 Grading	8,558.91
02-2-4 Bridges and Culverts	4,282.70
02-2-5 Ditching	621.52
02-2-6 Finishing	404.50
02-2-7 Dragging	9.96
02-2-8 Miscellaneous Surveying	1,343.13
02-2-8 Shoo-Fly	120.09
02-2-8 Transportation Camp Equipment.....	553.63
02-2-8 Transportation Road Equipment.....	537.77
	\$18,432.71

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

September, October, November, December, 1913, and January, 1914.

02-2-1 Camp Construction.

318 prisoners @ \$1.98.....	\$ 629.64
6 teams @ 1.603.....	9.62
Lumber, etc	21.49
Engineer's expense	130.63
Paid labor including board.....	842.14
	\$1,003.88
	\$1,633.52

STATE HIGHWAY DEPARTMENT.

02-2-2 Clearing and Grubbing.

134½ prisoners @ \$1.98.....	266.31
Engineer's expense	54.74
Paid labor including board.....	45.93
	<u>100.67</u>
10 acres	366.98
Rate per acre	\$ 36.70

02-2-3 Solid Rock Grading.

987½ prisoners @ \$1.98.....	1,955.25
8 teams @ 1.603.....	12.82

Material:

Gas Eng. Oil	\$ 17.69
Distillate	68.63
Gasoline	21.25
Dry cells	10.00
B. S. Coal	4.10
Pick steel	2.10
Judson powder	28.50
Fuse	25.55
Dynamite 40%	27.25
Dynamite 30%	229.00
Caps	5.70
Waste	4.38
	<u>444.15</u>
Engineer's expense	401.91
Paid labor including board.....	295.76
	<u>1,154.64</u>

2470 cu. yds.

Rate per cu. yd.....	1.26
----------------------	------

02-2-3 Loose Rock and Boulders, Grading.

1238½ prisoners @ \$1.98.....	2,452.23
28½ teams @ \$1.603.....	45.69
Repairs to tools.....	1.72
Engineer's expense	504.07
Paid labor including board.....	322.76
	<u>874.24</u>
	<u>3,326.47</u>

2259 cu. yds.

Rate per cu. yd.....	1.47
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02-2-3 Earth Excavation and Borrow, Grading.

630 prisoners @ \$1.98.....	1,247.40
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STATE HIGHWAY DEPARTMENT.

197 teams @ \$1.603.....	315.79	
Engineer's expense	256.41	
Paid labor including board.....	302.95	
	<u>875.15</u>	
		\$2,122.55
2645 cu. yds.		
Rate per cu. yd.....		.80

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

COSTS

September, October, November, December, 1913, and January, 1914.

Bridges and Culverts.

02-2-4 Solid Rock Excavation.

56 prisoners @ \$1.98.....		110.88
Dynamite 40%	7.40	
Caps .....	.30	
Fuse .....	.30	
	<u>8.00</u>	
Engineer's expense	22.79	
Paid labor including board.....	24.00	
	<u>54.79</u>	
		165.67
71 cu. yds.		
Rate per cu. yd.....		2.33

Bridges and Culverts.

02-2-4 Loose Rock Excavation.

62½ prisoners @ \$1.98.....		131.67
1 team @ \$1.603.....	1.60	
Engineer's expense	27.07	
Paid labor including board.....	39.02	
	<u>67.69</u>	
		199.36
102½ cu. yds.		
Rate per cu. yd.....		1.94

STATE HIGHWAY DEPARTMENT.

Bridges and Culverts.

02-2-4 Earth Excavation.

58 prisoners @ \$1.98.....		114.84
Engineer's expense	23.61	
Paid labor including board.....	38.65	
	<hr/>	62.26
		<hr/>
		177.10

98½ cu. yds.

Rate per cu. yd..... 1.80

Bridges and Culverts.

02-2-4 Masonry.

114½ prisoners @ \$1.98.....		226.71
3 teams @ \$1.603.....	4.81	
160 sacks cement.....	136.00	
Engineer's expense	46.60	
Paid labor including board.....	102.69	
	<hr/>	290.10
		<hr/>
		516.81

92.2 cu. yds.

Rate per cu. yd..... 5.60

Bridges and Culverts.

02-2-4 Corrugated Iron Pipe.

13½ prisoners @ \$1.98.....		26.73
9½ teams @ \$1.603.....	15.23	
Iron pipe culverts	925.76	
Engineer's expense	5.49	
Paid labor including board.....	8.69	
	<hr/>	955.17
		<hr/>
		981.90

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

September, October, November, December, 1913, and January, 1914.

Bridges and Culverts.

02-2-4 Forms.

75½ prisoners @ \$1.98.....		149.49
16½ teams @ \$1.603.....	16.83	

STATE HIGHWAY DEPARTMENT.

Wire, nails, etc., and lumber.....	214.63	
Engineer's expense	30.73	
Paid labor including board.....	150.72	
	<u>412.91</u>	

562.40

Bridges and Culverts.

02-2-4 Concrete.

282½ prisoners @ \$1.98.....		559.35
886 teams @ \$1.603.....	141.87	
Gas eng. oil.....	\$ 8.69	
Distillate	9.50	
Water	10.00	
Railing	44.76	
640 sax cement.....	537.00	
	<u>609.95</u>	

Engineer's expense	114.98	
Paid labor including board.....	115.70	
	<u>982.50</u>	

1,541.85

Bridges and Culverts.

02-2-4 Reinforcement.

1 prisoner @ \$1.98.....		1.98
Forty pound steel rails.....	56.25	
½ in. and ¾ in. rods.....	70.91	
Engineer's expense .....	.41	
Paid labor including board.....	8.06	
	<u>135.63</u>	

137.61

284.36 cu. yds.		
Rate per cu. yd. (inc Forms, Concrete, Reinf.).....		7.88

02-2-5 Ditching, Solid Rock.

62½ prisoners @ \$1.98.....		123.75
7 teams @ \$1.603.....	11.22	
Dynamite	\$ 25.35	
Caps	1.00	
Fuse	1.65	
	<u>28.00</u>	
Engineer's expense	25.44	

STATE HIGHWAY DEPARTMENT.

Paid labor including board.....	16.80	
		81.46
		205.21
176.8 cu. yds.		
Rate per cu. yd.....		1.16

02-2-5 Ditching, Loose Rock and Boulders.

72 prisoners @ \$1.98.....		142.56
1 team @ \$1.603.....	1.60	
Engineer's expense.....	29.30	
Paid labor including board.....	35.91	
		66.81
		209.37
174.2 cu. yds.		
Rate per cu. yd.....		1.20

02-2-5 Earth, Ditching.

74½ prisoners @ \$1.98.....		147.51
Engineer's expense.....	30.32	
Paid labor including board.....	29.11	
		59.43
		206.94
270 cu. yds.		
Rate per cu. yd.....		.77

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

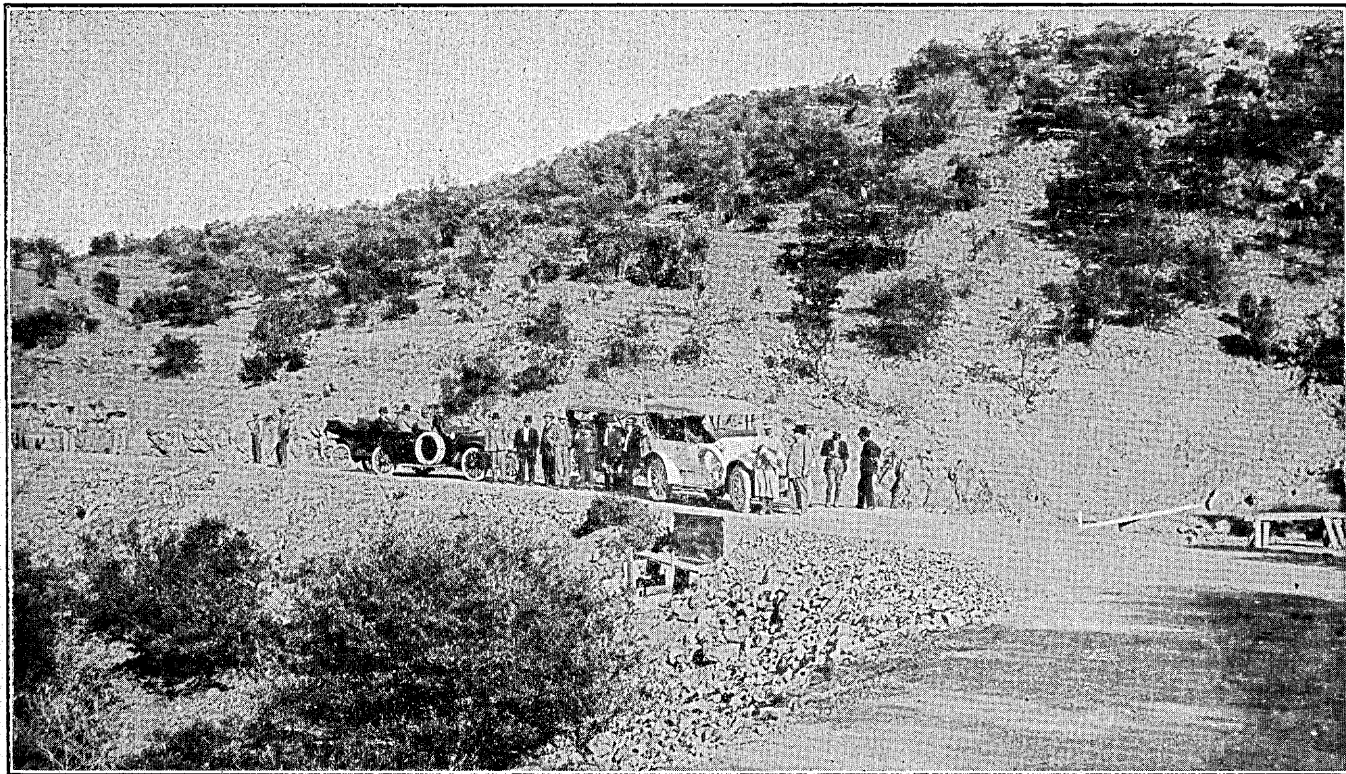
September, October, November, December, 1913, and January, 1914.

02-2-6 Finishing.

169½ prisoners @ \$1.98.....		335.61
Engineer's expense.....		68.99
		404.50
5200 feet.		

02-2-7 Dragging.

2 prisoners @ \$1.98.....		3.96
2 teams @ \$1.603.....	3.21	
Engineer's expense.....	.81	



COCHISE COUNTY
Prison Labor
Bisbee-Tombstone, Sec. 1
Borderland Highway

STATE HIGHWAY DEPARTMENT.

Paid labor including board.....	1.98	
		6.00

9.96

02-2-8 Miscellaneous Surveying.

72 prisoners @ \$1.98.....		142.56
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4 teams @ \$1.603.....	6.41	
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Stakes, etc.	48.95	
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Engineer's expense	30.50	
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Paid labor including board.....	1,114.71	
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1,200.57

1,343.13

02-2-8 Shoo-Fly.

42½ prisoners @ \$1.98.....		84.15
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5 teams @ \$1.603.....	8.01	
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Engineer's expense	18.50	
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Paid labor including board.....	9.43	
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35.94

120.09

02-2-8 Transportation of Camp Equipment.

22 teams @ \$1.603.....		35.27
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Freight and expenses.....		353.09
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Paid labor including board.....		165.27
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553.63

02-2-8 Transportation Road Equipment.

4 prisoners @ \$1.98.....		7.92
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27 teams @ \$1.603.....	43.28	
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Freight and expenses.....	348.16	
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Paid labor including board	138.41	
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529.85

537.77

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

COSTS

MAINTENANCE OF PRISONERS

February, 1914.

Total Prisoner Days 2568 1-3.

Groceries on hand Feb. 1.....	\$ 375.23
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STATE HIGHWAY DEPARTMENT.

Groceries bought in February.....	780.42	
Vegetables bought in February.....	27.15	
	<u>1,182.80</u>	
Less to Eng. mess.....	\$130.00	
Less on hand 2-28.....	325.78	
	<u>455.78</u>	
	727.02	727.02
Rate per day per man.....		280
Meat on hand Feb. 1.....	61.29	
Meat bought in February.....	409.04	
	<u>470.33</u>	
Less on hand Feb. 28.....	77.38	
	<u>392.95</u>	392.95
Rate per day per man.....		150
Fuel.....	48.32	48.32
Rate per day per man.....		018
Clothing on hand Feb. 1.....	425.26	
Bought on February.....	110.96	
	<u>536.22</u>	
Less on hand Feb. 28.....	395.88	
	<u>140.34</u>	
Rate per day per man.....		055
Transportation of prisoners.....		195.40
Rate per day per man.....		076
Escapes.....		184.83
Rate per day per man.....		072
Guarding.....		1,010.67
Rate per day per man.....		390
Truck, Transporting Supplies:		
Gasoline, etc.....	10.90	
Half wages.....	18.75	
	<u>29.65</u>	
Rate per day per man.....		011
Medicine.....	10.55	
Doctor.....	25.00	
	<u>35.55</u>	
Rate per day per man.....		013
	<u>\$2,764.73</u>	<u>\$ 1,064</u>

STATE HIGHWAY DEPARTMENT.

Average number of men.....	90
Total men days.....	2568 1-3
Less Sundays, camp help, sick and idle.....	1012 5-6
Total labor days.....	1555 1-2
Rate per man per labor day.....	1.777
Escapes—3	
Recaptured—2.	

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

COSTS

CORRAL

February, 1914.

Hay on hand February 1.....	24 bales		
Hay bought in February.....	190 bales		
	—		
	214 bales		
Hay sold in February.....	8		
Hay on hand Feb. 28.....	98		
	—		
	106 bales		
Hay used in February.....	108 bales	7236 lbs. @ \$18.25	\$ 66.04
Barley on hand Feb. 1.....	1 sack		
Barley bought in February.....	176 sacks		
	—		
	177 sacks		
On hand 2-28.....	117		
Sold in February.....	4		
	—		
	121 sacks		
Used in February.....	56 sacks	3920 lbs. @ \$ 2.20	86.24
Transportation Stable supplies:			
Chauffeur's wages, 1 day.....		\$ 3.13	
Oil and Gasoline for truck and pump.....		5.97	
			9.10
Corral help, 22 prisoner days @ \$1.77.....			39.09
Supplies: Shoes, lumber for wagons, etc.....			17.64

\$218.11

STATE HIGHWAY DEPARTMENT.

Total team days.....	168	
Teams in camp Sundays, saddle horses, etc.....	58½	
Total team work days.....	109½	
Rate per team day.....		\$ 1.30
Rate per work day per team.....		1.99

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

COSTS

ENGINEER'S MESS

February, 1914.

Groceries on hand February 1.....	\$ 81.00	
Groceries bought in February.....	153.05	
Groceries received from Prison mess.....	130.00	
	\$ 364.05	
Less Groceries on hand Feb. 28, 1914.....	95.33	
	\$ 268.72	
Less store accounts	114.21	
	\$ 154.51	
Rate per meal.....		\$.128
Meat used in February.....	56.35	
Rate .....		.046
Fuel	15.00	
Rate .....		.012
Cooks and waiters.....	32.72	.028
	\$ 258.58	.214
Rate per day per man.....		.624
Total meals	1503	1503
Less bookkeeper, truckman and cooks.....	294	
	1209	

STATE HIGHWAY DEPARTMENT

RECAPITULATION

Groceries	\$268.72	
Less credits	232.96	
	\$ 35.76	
Meat	56.35	
Fuel	15.00	
Cooks and waiters.....	34.72	
	\$ 141.83	
Less captain's board.....	16.80	
	\$ 125.03	
Total men days.....	226	
Less truckman and bookkeeper.....	42	
	184	
Rate per day.....		.68
Total	184	
Less Sundays	24	
	160 labor days	
Rate per labor day.....		.78

COSTS

SUMMARY

February, 1914.

02-2-1 Camp Construction	\$ 3.25
02-2-3 Grading	2,727.12
02-2-4 Bridges and Culverts.....	1,295.33
02-2-5 Ditching	494.75
02-2-6 Finishing	492.60
02-2-8 Miscellaneous Surveying	176.11
	\$5,189.16

STATE HIGHWAY DEPARTMENT.

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

February, 1914.

02-2-1 Camp Construction.

Lumber	\$ 1.25
Paid labor and board.....	2.00
	<u>\$ 3.25</u>

02-2-3 Grading, Solid Rock.

764 prisoners @ \$1.77.....	1,357.63
19½ teams @ \$1.99.....	38.80

Material:

Spring Steel	\$.72
Copper wire	15.00
Distillate	31.04
Dry cells	1.33
Gas. Eng. oil.....	14.70
B. S. coal.....	9.50
Fuse 900 ft.....	4.77
150 Exploders 8 ft.....	7.50
200 Exploders 12 ft.....	12.00
14 boxes 30%	98.00
4 boxes 30%	30.00
6 boxes Judson	34.20
80 kegs black	213.64
3 boxes caps	3.00
Auto supplies	6.00
Express on drills	6.22
Lumber	4.00
Engineer's expense	181.36
Paid labor and board.....	166.82
Electric tape50
	<u>840.30</u>
	<u>879.10</u>
	<u>2,236.73</u>

1245.5 cu. yds.

Rate per cu. yd.....	1.79
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02-2-3 Grading, Loose Rock.

8 prisoners \$ 1.77.....	14.22
Engineer's expense	2.09

STATE HIGHWAY DEPARTMENT.

Paid labor and board.....	6.10	
		8.19

22.41

23.8 cu. yds.

Rate per cu. yd.....		.792
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02-2-3 Grading, Gravel Borrow.

64 prisoners @ \$1.777.....		113.73
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51½ teams @ \$1.99.....	102.49	
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Lumber60	
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Fresno repairs35	
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Engineer's expense	16.70	
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Paid labor and board.....	26.14	
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146.28

260.01

1346 cu. yds.

Rate per cu. yd.....		.19
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02-2-3 Grading, Earth Excavation and Borrow.

62½ prisoners @ \$1.777.....		111.07
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16 teams @ \$1.99.....	31.84	
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Engineer's expense	33.94	
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Paid labor and board.....	31.12	
---------------------------	-------	--

96.90

207.97

449.3 cu. yds.

Rate per cu. yd.....		.46
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COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

February, 1914.

02-2-4 Bridges and Culverts, Solid Rock Excavation.

None.

02-2-4 Bridges and Culverts, Loose Rock Excavation.

24 prisoners @ \$1.777.....		42.65
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Engineer's expense	6.26	
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STATE HIGHWAY DEPARTMENT.

Paid labor and board.....	14.32	
		20.58
		<u>63.23</u>

50 cu. yds.

Rate per cu. yd.....		1.26
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02-2-4 Bridges and Culverts, Earth Excavation.

36 prisoners @ \$1.777.....		63.97
Engineer's expense	9.40	
Paid labor and board.....	18.52	
		<u>27.92</u>
		91.89

76 cu. yds.

Rate per cu. yd.....		1.20
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02-2-4 Bridges and Culverts, Masonry.

3 prisoners @ \$1.777.....		5.33
6 sacks cement	5.03	
Engineer's expense78	
Paid labor and board.....	4.00	
		<u>9.81</u>
		15.14

4 cu. yds.

Rate per cu. yd.....		3.78
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02-2-4 Bridges and Culverts, Forms.

42½ prisoners @ \$1.777.....		75.52
3½ teams @ \$1.99.....	6.96	
Lumber, rails, etc.....	124.67	
Engineer's expense	11.09	
Paid labor and board.....	87.21	
		<u>229.93</u>
		305.45

02-2-4 Bridges and Culverts, Concrete.

92 prisoners @ \$1.777.....		163.48
12 teams @ \$1.99.....	23.88	
Distillate	26.16	
Hand rails	34.70	
370 sacks cement.....	309.88	

STATE HIGHWAY DEPARTMENT.

Engineer's expense	24.01	
Paid labor	26.36	
		<u>444.99</u>
		608.47

02-2-4 Bridges and Culverts, Re-enforcement.

5½ prisoners @ \$1.777.....		9.77
4 teams @ \$1.99.....	7.96	
½ in. & ¾ in. rods.....	19.23	
40 lb. rails	168.75	
Engineer's expense	1.44	
Paid labor and board.....	4.00	
		<u>201.38</u>
		211.15

162.6 cu. yds.

Rate per cu. yd. (Including Forms, Concrete, Re-inf.) 6.92

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

February, 1914.

02-2-5 Ditching, Solid Rock.

30½ prisoners @ \$1.777.....		54.20
10 ft. fuse .....	.53	
½ box caps .....	.50	
2-3 box 40% dynamite.....	5.00	
Engineer's expense	7.96	
Paid labor and board.....	18.57	
		<u>92.76</u>
		86.76

52 cu. yds.

Rate per cu. yd..... 1.67

02-2-5 Ditching, Loose Rock.

72 prisoners @ \$1.777.....	127.94
Engineer's expense	18.79

STATE HIGHWAY DEPARTMENT.

Paid labor and board.....	35.80	
		54.59
		<u>182.53</u>

219 cu. yds.

Rate per cu. yd.....		.83
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02-2-5 Ditching, Earth.

89½ prisoners @ \$1.77.....		159.04
Engineer's expense	23.36	
Paid labor	43.06	
		<u>66.42</u>
		225.46

381 cu. yds.

Rate per cu. yd.....		.59
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02-2-6 Finishing.

214½ prisoners @ \$1.77.....		381.17
3 teams @ \$1.99.....	5.97	
Engineer's expense	55.98	
Paid labor and board.....	49.48	
		<u>111.43</u>
		492.60

02-2-8 Miscellaneous Surveying.

25½ prisoners @ \$1.77.....		45.31
Tracing cloth	6.90	
Stakes	8.20	
Engineer's expense	6.66	
Paid labor and board.....	109.04	
		<u>130.80</u>
		176.11

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

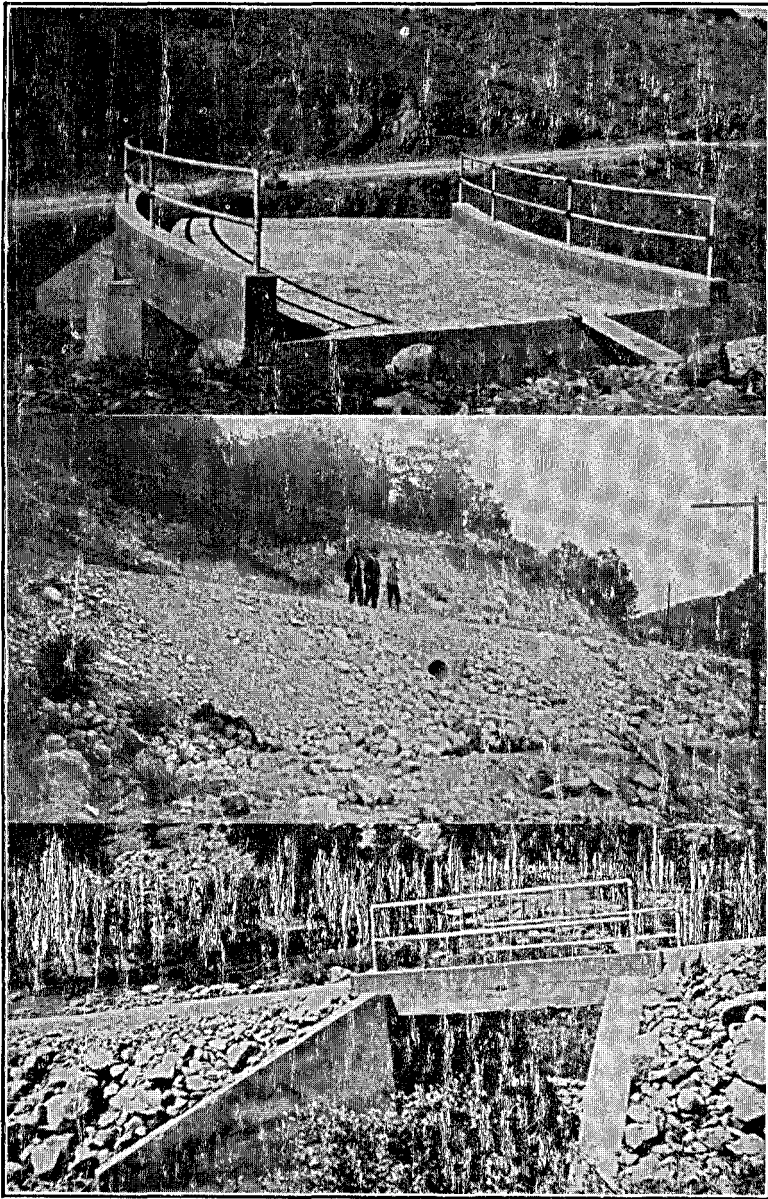
MAINTENANCE OF PRISONERS

March, 1914.

Total Prisoner Days 2565½.

02-2-1 Stockade.

Groceries on hand March 1.....	\$ 325.78
Groceries bought in March.....	655.97



COCHISE COUNTY
Prison Labor
Bisbee-Tombstone, Section 1
Borderland Highway

STATE HIGHWAY DEPARTMENT.

Vegetables bought in March.....	22.09	
	<u>1,003.84</u>	
Less to Engineer's mess.....	\$125.00	
Less on hand 3-31.....	290.54	
	<u>415.54</u>	
	588.30	588.30
Rate per day per man.....		.23
Meat on hand 3-1.....	77.38	
Meat bought in March.....	452.94	
Meat bought in March.....	13.58	
	<u>543.90</u>	
Less on hand 3-31.....	85.69	
	<u>458.21</u>	458.21
Rate per day per man.....		.177
Clothing on hand 3-1.....	395.88	
Bought in March.....	16.90	
	<u>412.78</u>	
Less on hand 3-31.....	275.58	
	<u>137.20</u>	
Rate per day per man.....		.053
Transportation of prisoners.....	109.10	
Rate per day per man.....		.042
Medicine.....	22.80	
Doctor's services.....	20.00	
	<u>42.80</u>	
Rate per day per man.....		.017
Guarding, Payroll.....	928.20	
Captain's board.....	20.15	
Horses, feed.....	31.00	
Dogs, feed.....	5.00	
	<u>984.35</u>	
Rate per day per man.....		.383
Transportation of Supplies:		
Gasoline.....	17.82	
Supplies.....	.30	
Oil.....	5.50	
Repairs.....	2.43	
Wages of truckman.....	19.35	
	<u>45.40</u>	
Rate per day per man.....		.018

STATE HIGHWAY DEPARTMENT.

Escapes	29.50	
Rate per day per man.....		.011
	<u>\$2,391.86</u>	<u>\$.931</u>
Total number of men.....	82	
Total men days	2565.5	
Less camp work, sick, Sundays, etc.....	879.0	
	<u>1686.5</u>	
Total labor days.....	1686.5	
Rate per labor day per man.....		1.418
Escapes—4.		
Recaptured—3.		

SUMMARY OF COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

March, 1914.

Brought forward September to January, inclusive.....	\$18,432.71
Brought forward February	5,189.16

March:

02-2-1 Camp Construction	\$ 10.53
02-2-3 Grading	2,883.97
02-2-4 Bridges and Culverts	1,099.05
02-2-5 Ditching	131.30
02-2-6 Surfacing	445.92
02-2-8 Surveying and Shoo-Fly.....	134.45
	<u>4,705.22</u>
	<u>\$28,327.09</u>

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

ENGINEER'S MESS

March, 1914.

Groceries on hand 3-1.....	\$ 95.33
Groceries bought in March.....	158.38

STATE HIGHWAY DEPARTMENT.

Groceries from Prison mess.....	125.00		
Vegetables	2.60		
	<u>381.31</u>		
Less on hand 3-31.....	87.25		
	<u>294.06</u>		
Less store accounts.....	136.98		
	<u>157.08</u>	\$ 157.08	
Rate per meal .....			.135
Meat	87.07		
Less used by dogs.....	5.00		
	<u>82.07</u>		
Rate per meal .....			.07
Cook and waiter, 31 days.....		30.00	
Rate per meal .....			.025
		<u>\$ 270.15</u>	<u>\$.23</u>
Rate per day .....			.69
Total meals	1479		
Less bookkeeper, truckman and cooks.....	318		
	<u>1161</u>		

RECAPITULATION

Groceries	\$ 294.06	
Less credits	239.96	
	<u>54.10</u>	
Meat	82.07	
Cook and waiter	30.00	
	<u>166.17</u>	
Less captain's board.....	20.15	
	<u>146.02</u>	
Total men days	247	
Less bookkeeper and truckman.....	37	
	<u>210</u>	
Rate per day per man.....		.695
Total days	210	

STATE HIGHWAY DEPARTMENT

Less Sundays	32	
	<u>178</u>	
Rate per labor day.....		.82

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

STABLE

Hay on hand 3-1.....	98 bales		
Hay bought in March.....	156 bales		
	<u>254 bales</u>		
Less hay on hand 3-31.....	101 bales		
	<u>153 bales</u>	\$ 97.92	
Less hay sold		<u>14.12</u>	
			83.80
Barley on hand 3-1.....	117 sacks		
Delivered March	65 sacks		
	<u>182 sacks</u>		
Less on hand 3-31.....	110 sacks		
	<u>72 sacks used</u>	110.88	
Less barley sold		<u>17.00</u>	93.88
Transportation stable supplies:			
Chauffeur's wages		3.63	
Gasoline		10.00	
		<u>13.63</u>	
Medicine		3.80	
Shoes, nails, etc.....		4.30	
		<u>8.10</u>	
Corral man (prisoner).....		<u>14.79</u>	
			214.20
Total team days.....		173	
Rate per team day.....			1.238

STATE HIGHWAY DEPARTMENT.

Total cost	214.20
Less charge to guarding.....	31.00
	<hr/>
	183.20
Total teams	173
Less to guards	31
	<hr/>
	142
Less Sundays, sick and idle.....	50
	<hr/>
Total labor days.....	92
Rate per labor day per team.....	1.99

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

March, 1914.

02-2-1 Camp Construction.

5 prisoners @ \$1.418.....		\$ 7.09
Supplies	\$ 2.35	
Engineer's expense	1.09	
	<hr/>	3.44
		<hr/>
		10.53

02-2-3 Grading, Solid Rock.

1044.5 prisoners @ \$1.418.....		1,481.52
41.25 teams @ \$1.99.....	82.19	
Supplies	36.74	
2 boxes caps	2.50	
200 ft. fuse	1.10	
100 12 ft. exploders.....	8.00	
50 8 ft. exploders.....	3.50	
10 boxes, 500 lbs, 30% dynamite.....	70.00	
4 boxes, 200 lbs, 40% dynamite.....	30.00	
134 kegs black powder.....	339.02	
Paid labor and board.....	320.55	
Engineer's expense	228.11	
	<hr/>	1,121.71
		<hr/>
		2,603.23

STATE HIGHWAY DEPARTMENT.

2121.1 cu. yds.

Rate per cu. yd..... \$ 1.23

02-2-3 Grading, Loose Rock.

113.5 prisoners @ \$1.418.....	160.94
5.25 teams @ \$1.99.....	10.45
Paid labor and board.....	25.58
Engineer's expense	24.74
	<hr/> 60.77
	<hr/> 221.71

420.2 cu. yds.

Rate per cu. yd..... .53

02-2-3 Grading, Earth Excavation and Borrow.

28 prisoners @ \$1.418.....	39.70
1 team & \$1.99.....	1.99
Paid labor and board.....	11.24
Engineer's expense	6.10
	<hr/> 19.33
	<hr/> 59.03

165.7 cu. yds.

Rate per cu. yd..... .36

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

March, 1914.

02-2-4 Bridges and Culverts, Loose Rock Excavation.

33½ prisoners @ \$1.418.....	54.59
Paid labor and board.....	31.49
Engineer's expense	8.39
	<hr/> 39.88
	<hr/> 94.47

146 cu. yds.

Rate per cu. yd..... .65

STATE HIGHWAY DEPARTMENT.

02-2-4 Bridges and Culverts, Earth Excavation.

10 prisoners @ \$1.418.....	14.18
Engineer's expense	2.18
	<u>16.36</u>

40 cu. yds.

Rate per cu. yd..... .42

02-2-4 Bridges and Culverts, Masonry.

88½ prisoners @ \$1.418.....	125.49
16½ teams @ \$1.99.....	32.84
Paid labor and board.....	52.73
Engineer's expense	20.88
	<u>201.48</u>
Cement	87.03
Water	8.00
	<u>326.97</u>

139.5 cu. yds.

Rate per cu. yd..... 2.35

02-2-4 Bridges and Culverts, Pipe and Pipe Transportation.

4½ prisoners @ \$1.418.....	6.38
2 teams @ \$1.99.....	3.98
222 ft. 24 in. pipe.....	361.86
Paid labor and board.....	1.20
Engineer's expense .....	.98
	<u>368.02</u>
	<u>374.40</u>

02-2-4 Bridges and Culverts, Forms.

13½ prisoners @ \$1.418.....	19.14
2 teams @ \$1.99.....	3.98
Paid labor and board.....	26.00
Engineer's expense	2.94
	<u>32.92</u>
	<u>52.06</u>

02-2-4 Bridges and Culverts, Concrete.

45 prisoners @ \$1.418.....	63.81
5½ teams @ \$1.99.....	10.95
Railing	6.84
Paid labor and board.....	28.57
Engineer's expense	9.81

STATE HIGHWAY DEPARTMENT.

Express .....	.89	
Cement	84.81	
		<u>141.87</u>
		205.68
02-2-4 Bridges and Culverts, Reinforcement.		
Steel		16.07
Add concrete		205.68
Add Forms		<u>52.06</u>
Total Reinforcement, Forms, Concrete.....		273.81
33 cu. yds.		
Rate per cu. yd.....		8.30

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

March, 1914.

02-2-4 Bridges and Culverts, Dry Wall.

4 prisoners @ \$1.418.....		5.67
1 team @ \$1.99.....	1.99	
Paid labor and board.....	4.51	
Engineer's expense .....	.87	
		<u>7.37</u>
		13.04
15 cu. yds.		
Rate per cu. yd.....		.87

02-2-5 Ditching, Solid Rock.

7½ prisoners @ \$1.418.....		10.64
Paid labor and board.....	5.05	
Engineer's expense	1.64	
		<u>6.69</u>
		17.33
20 cu. yds.		
Rate per cu. yd.....		.87



COCHISE COUNTY
Prison Labor
Bisbee-Tombstone, Sec. 1
Borderland Highway

STATE HIGHWAY DEPARTMENT.

02-2-5 Ditching, Loose Rock.

51½ prisoners @ \$1.418.....	73.03
Paid labor and board.....	29.71
Engineer's expense	11.23
	<u>40.94</u>

113.97

154.8 cu. yds.

Rate per cu. yd..... 73

02-2-6 Surfacing.

218.5 prisoners @ \$1.418.....	309.83
17.5 teams @ \$1.99.....	34.83
Paid labor and board.....	50.63
Engineer's expense	47.63
Water	3.00

136.09

445.92

1550 feet.

02-2-8 Miscellaneous Surveying.

5 prisoners @ \$1.418.....	7.09
Paid labor and board.....	111.55
Engineer's expense	1.09

112.64

119.73

02-2-8 Shoo-Fly.

9 prisoners @ \$1.418.....	12.76
Engineer's expense	1.96

14.72

15 cu. yds.

Rate per cu. yd..... 98

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

MAINTENANCE OF PRISONERS

April, 1914.

02-2-1 Stockade.

Groceries on hand April 1.....	\$ 290.54
Groceries bought in April.....	587.89

STATE HIGHWAY DEPARTMENT.

Vegetables		14.15
		<u>892.58</u>
Less to Engineer's mess.....	\$ 100.85	
Less on hand 4-30.....	205.25	
		<u>306.10</u>
		586.48
Rate per day per man.....		249
Meat on hand 4-1.....	85.69	
Meat bought in April.....	370.00	
	<u>455.69</u>	
Less on hand 3-30.....	35.09	
		<u>420.60</u>
Rate per day per man.....		.17
Clothing on hand 4-1.....	275.58	
Clothing bought in April.....	173.59	
	<u>449.17</u>	
Less on hand 4-30.....	274.17	
		<u>175.00</u>
Rate per day per man.....		.075
Medicine	7.50	
Doctor's services	10.00	
		<u>17.50</u>
Rate per day per man.....		.007
Transportation of Prisoners.....	57.71	
Rate per day per man.....		.024
Escapes	29.00	
Rate per day per man.....		.011
Guarding:		
Payroll	999.31	
Captain's board	21.00	
Feed two horses.....	28.50	
Supplies and feed for dogs.....	29.55	
	<u>1,078.36</u>	
Rate per day per man.....		.46
Transportation of Supplies:		
Gasoline	10.90	
Supplies.....	5.32	
Repairs for truck.....	53.27	

STATE HIGHWAY DEPARTMENT.

Truckman's wages	8.18	
19½ teams @ \$1:787.....	34.85	
		112.52
Rate per day per man.....		.047
Water and fuel.....		15.00
Rate per day per man.....		.006
		<u>\$2,492.17</u> \$1.049
Average number of men.....	78	
Total men days	2348.5	
Less Sundays, sick, camp.....	862.5	
		<u>1486</u>
Total work days	1486	
Rate per work day.....		1.677
Escapes—2.		

Increase over previous month by reason of distance working from camp making it necessary to carry lunches and increase in guards due to work extending over a mile section.

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

ENGINEER'S MESS

April, 1914.

Groceries on hand 4-1.....		87.25
Groceries bought in April.....	97.26	
Groceries from prison mess.....	100.85	
Vegetables	10.30	
		<u>208.41</u>
		295.66
Less on hand 4-30.....	50.25	
Less store accounts	116.12	
		<u>166.37</u>
		129.29
Coal		5.00
		<u>134.29</u>

STATE HIGHWAY DEPARTMENT.

Rate per meal.....		115
Meat	113.95	
Less to dags	6.00	
	<u>107.95</u>	
Rate per meal .....		.094
Cook and waiter.....	36.60	
Rate per meal.....		.031
	<u>\$ 278.84</u>	<u>\$.24</u>
Rate per day .....		.72
Total meals	1449	
Less bookkeeper, truckman and cooks.....	284	
	<u>1165</u>	

RECAPITULATION

Groceries	\$ 245.41
Meat	108.95
Cook and waiter	36.60
	<u>390.96</u>
Less credits	239.63
	<u>151.33</u>
Total men days	226
Less bookkeeper and truckman.....	38
	<u>188</u>
Less Sundays	23
	<u>165</u>
Rate .....	.805
Rate per work day.....	.917

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

STABLE

April, 1914.

Hay on hand 41.....	101 bales
Hay bought in April.....	177 bales
	<u>278 bales</u>

STATE HIGHWAY DEPARTMENT.

Less on hand 4-30.....	64 bales		
	214 bales used	122.34	
Less sold to guards.....	92 bales	48.85	
			73.49
Barley on hand 4-1.....	110 sacks		
Barley bought in April.....	60 sacks		
	170 sacks		
Less on hand 4-30.....	90 sacks		
	80 sacks used	123.20	
Less sold to guards.....		24.60	
			98.60
Transportation of Supplies:			
Gasoline		10.90	
Chauffeur's wages		6.71	
Stable supplies		27.55	
Corral man (prisoner).....		19.50	
			64.66
			236.75
Total teams	181		
Rate per day			1.308
Total cost		236.75	
Less charged to guarding.....		28.50	
			208.25
Total teams	181		
Less to guards	30		
Less Sundays	34½		
		64½	
Total team work days.....		116½	
Rate per team working day.....			1.787

COSTS

SUMMARY

April, 1914.

Brought Forward	\$ 28,327.09
02-2-1 Camp Construction	10.84
02-2-3 Grading	3,131.59

STATE HIGHWAY DEPARTMENT.

02-2-4 Bridges and Culverts.....	531.79
02-2-5 Ditching	77.58
02-2-6 Finishing	491.18
02-2-8 Miscellaneous Surveying	113.83
Total.....	\$ 32,683.90

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

April, 1914.

02-2-1 Camp Construction.

6 prisoners @ \$1.667.....	\$ 10.06	
Engineer's expense .....	.78	
		10.84

02-2-3 Grading, Solid Rock.

1104½ prisoners & \$1.677.....	1,852.32	
65½ teams @ \$1.787.....	117.05	
Paid labor and board.....	456.05	
Engineer's expense	143.83	
2 boxes caps.....	\$ 2.50	
800 ft. fuse	4.40	
Exploders	24.03	
22 boxes 30% dynamite.....	154.00	
2 boxes 40% dynamite.....	15.00	
97 cans black powder.....	245.41	
Miscellaneous supplies	95.16	
		540.50
		3,109.75

1941.9 cu. yds.

Rate per cu. yd..... 1.60

02-2-3 Grading, Earth.

8½ prisoners @ \$1.677.....	14.25	
1½ teams @ \$1.787.....	2.68	
Paid labor and board.....	3.81	
Engineer's expense	1.10	
65.4 cu. yds.		
Rate per cu. yd.....		334

STATE HIGHWAY DEPARTMENT.

02-2-4 Bridges and Culverts, Solid Rock Excavation.

18 prisoners @ \$1.677.....	30.19	
Paid labor including board.....	8.09	
Engineer's expense	2.34	
		40.62

23.5 cu. yds.

Rate per cu. yd.....	1.73
----------------------	------

02-2-4 Bridges and Culverts, Loose Rock Excavation.

31 prisoners @ \$1.677.....	51.99	
Paid labor and board.....	35.04	
Engineer's expense	4.03	
		91.06

206.1 cu. yds.

Rate per cu. yd.....	.44
----------------------	-----

02-2-4 Bridges and Culverts, Earth Excavation.

4 prisoners & \$1.677.....	6.71	
Paid labor and board.....	5.39	
Engineer's expense .....	.52	
		12.62

38.7 cu. yds.

Rate per cu. yd.....	.33
----------------------	-----

02-2-4 Bridges and Culverts, Masonry.

27 prisoners @ \$1.677.....	45.28	
5½ teams @ \$1.787.....	9.83	
Paid labor and board.....	35.04	
Engineer's expense	3.51	
32 sacks cement \$23.60 and water \$3.75.....	27.35	
		121.01

56.5 cu. yds.

Rate per cu. yd.....	2.14
----------------------	------

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

April, 1914.

02-2-4 Bridges and Culverts, Pipe Transportation.

1½ prisoners @ \$1.677.....	2.51	
2 teams @ \$1.787.....	3.57	
Engineer's expense .....	.20	
		6.28

STATE HIGHWAY DEPARTMENT.

Bridges and Culverts, Forms.

10 prisoners @ \$1.677.....	16.77	
2 teams @ \$1.787.....	3.57	
Paid labor and board.....	10.78	
Engineer's expense	1.30	
Lumber, etc.	58.86	
		91.28

02-2-4 Bridges and Culverts, Concrete.

25½ prisoners @ \$1.677.....	42.76	
9 teams @ \$1.787.....	16.08	
Paid labor and board.....	5.39	
Engineer's expense	3.31	
96 sacks cement	70.80	
		138.34

02-2-4 Bridges and Culverts, Reinforcement.

Reinforcement iron.....	26.97	26.97
Recapitulation:		
Forms	91.28	
Concrete	138.34	
Reinforcing	26.97	
		256.59
29.8 cu. yds.		
Rate per cu. yd.....		8.61

02-2-4 Dry Wall, Bridges and Culverts

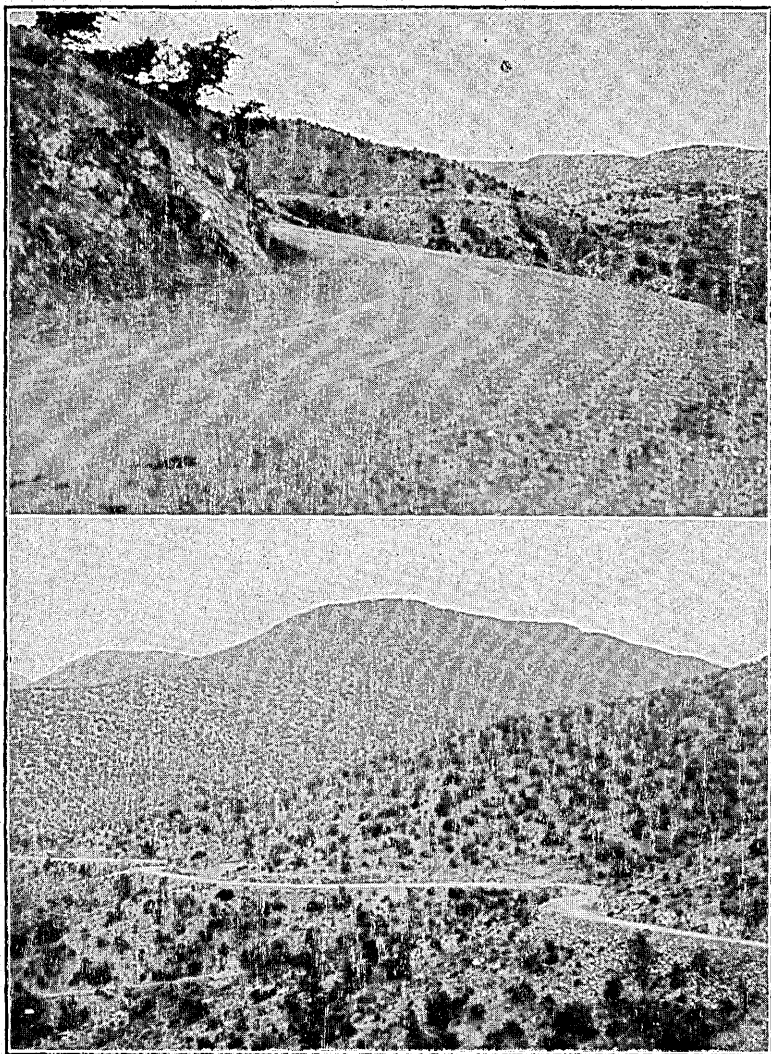
2 prisoners @ \$1.677.....	3.35	
Engineer's expense .....	.26	
		3.61
8 cu. yds.		
Rate per cu. yd.....		.45

02-2-5 Ditching, Solid Rock.

15 prisoners @ \$1.677.....	25.15	
Paid labor and board.....	13.48	
Engineer's expense	1.95	
		40.58
34.7 cu. yds.		
Rate per cu. yd.....		1.17

02-2-5 Ditching, Earth.

16 prisoners @ \$1.677.....	26.83	
Paid labor and board.....	8.09	



COCHISE COUNTY
Prison Labor
Bisbee-Tombstone, Sec. 1
Borderland Highway

STATE HIGHWAY DEPARTMENT

Engineer's expense..... 2.08
 37.00

127.4 cu. yds.

Rate per cu. yd..... 29

02-2-6 Finishing.

216 prisoners @ \$1.677..... 362.23
 11½ teams @ \$1.787..... 20.55
 Paid labor and board..... 77.82
 Engineer's expense 28.08
 Supplies 2.50
 491.18

1820 feet.

02-2-8 Surveying.

1 prisoner, paid labor, etc..... 113.83

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

MAINTENANCE OF PRISONERS

May, 1914.

Stockade.

Groceries on hand May 1..... \$ 205.35
 Groceries bought in May..... 1,120.28
 Vegetables 9.90

1,335.53
 Less on hand May 31..... 365.62
 Less to Engineer's mess..... 104.16
 469.78

865.75

Rate per day per man..... 264
 Meat on hand May 1..... 35.09
 Meat bought in May..... 499.51
 534.60

Rate per day per man..... 163

STATE HIGHWAY DEPARTMENT.

Fuel	20.00	
Water	8.00	
	<hr/>	
	28.00	
Team hauling water.....	21.09	
	<hr/>	49.09
Rate per day per man.....		.015
Clothing on hand May 1.....	274.17	
Clothing bought in May.....	1,013.26	
	<hr/>	
	1,287.43	
Less on hand May 31.....	1,036.93	
	<hr/>	250.50
Rate per man per day.....		.076
Medicine	34.90	
Doctor	30.00	
	<hr/>	64.90
Rate per day per man.....		.02
Escapes	1.15	
Transportation and Supplies:		
Chauffeur's wages	22.31	
Truck repairs and supplies.....	113.59	
5½ teams hauling	7.73	
	<hr/>	143.63
Rate per day per man.....		.044
Guards	1,148.91	
2 horses	37.20	
Supplies and dog feet.....	6.10	
	<hr/>	1,192.01
Rate per day per man.....		.363
	<hr/>	\$3,101.63
		\$.945
Average number of men.....	106	
Total men days	3280½	
Less Sundays, sick, camp.....	1160½	
	<hr/>	
Total work days	2120	
Rate per work day.....		1.466
Escapes—2.		

STATE HIGHWAY DEPARTMENT.

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

ENGINEER'S MESS

May, 1914.

Groceries on hand May 1.....	\$ 50.25
Groceries bought in May.....	166.36
Groceries from Prison mess.....	104.16
Vegetables	11.85

332.62

On hand 5-31\$ 86.25

Store accounts145.03

231.28

Rate per meal	101.34	101.34	.072
Meat		159.79	
Rate per meal .....			.114
Fuel		8.05	
Rate per meal .....			.006
Cook and waiter		33.79	
Rate per meal .....			.024

\$ 302.97 \$216

1407 Meals\$ 302.97 .216

Rate per day648

RECAPITULATION

Groceries	246.37
Meat	159.79
Fuel	8.05
Cook and waiter	33.79

448.00

Less credits278.90

169.10

*Total men days333

Less bookkeeper31

Less chauffeur15½

STATE HIGHWAY DEPARTMENT.

Less Sundays 46
 92½
 240½
 Rate per work day..... .703
 *This item includes men whose board is included in wages.

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

STABLE

May, 1914.

Hay on hand May 1.....	64 bales		
Hay delivered in May.....	263 bales		
	<hr/>		
	327 bales		
On hand May 31.....	74 bales		
	<hr/>		
	253 bales		\$ 141.73
Sold to guards and Forrest.....	58 bales		36.74
	<hr/>		
	195 bales		104.99
Barley on hand May 1.....	90 sacks		
Barley delivered in May.....	90 sacks		
	<hr/>		
	180 sacks		
On hand May 31.....	76 sacks		
	<hr/>		
	104 sacks	\$ 158.60	
Sold to guards.....	14 sacks	23.80	
	<hr/>		
	90 sacks	134.80	134.80
 Supplies and Transportation:			
Gasoline		2.60	
Medicine		1.40	
Rope and snaps.....		2.27	
Shoeing		4.00	

STATE HIGHWAY DEPARTMENT.

Chauffeur's wages	2.93	
Corral man	32.55	
		45.75
		\$ 285.54
Total number of teams.....	238	
Less Sundays	35	
Total team work days.....	203	
Rate per day.....		1.20
Rate per work day.....		1.406

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1.

May, 1914.

02-2-1 Camp Construction.

28½ prisoners @ \$1.466.....	\$ 41.78	
Paid labor and board.....	4.93	
Engineer's expense	6.73	
		53.44

02-2-3 Solid Rock Grading.

1329 prisoners @ \$1.466.....	1,948.43	
67½ teams @ \$1.406.....	94.91	
2 boxes caps.....	\$ 2.20	
200 ft. fuse.....	1.10	
Exploders	9.72	
15 boxes 30% dynamite.....	105.00	
4 boxes 40% dynamite.....	30.00	
105 kegs black powder.....	265.65	
		413.67
Miscellaneous supplies	225.32	
Paid labor and board.....	556.97	
Engineer's expense.....	313.07	
		3,552.37
2480.1 cu. yds.		
Rate per cu. yd.....		1.43

STATE HIGHWAY DEPARTMENT.

02-2-3 Gravel Borrow, Grading.

25½ prisoners @ \$1.466.....	37.38	
7 teams @ \$1.406.....	9.84	
Paid labor and board.....	14.80	
Engineer's expense	6.02	
		68.04
152.2 cu. yds.		
Rate per cu. yd.....		.45

02-2-4 Bridges and Culverts, Solid Rock Excavation.

32 prisoners @ \$1.466.....	46.91	
Paid labor and board.....	16.11	
Engineer's expense	7.55	
		70.57
47 cu. yds.		
Rate per cu. yd.....		1.50

02-2-4 Bridges and Culverts, Loose Rock Excavation.

13 prisoners @ \$1.466.....	19.06	
Paid labor and board.....	4.55	
Engineer's expense	3.07	
		26.68
36 cu. yds.		
Rate per cu. yd.....		.74

02-2-4 Bridges and Culverts, Earth Excavation.

35½ prisoners @ \$1.466.....	52.04	
Paid labor and board.....	31.84	
Engineer's expense	8.38	
		92.26
177 cu. yds.		
Rate per cu. yd.....		.52

02-2-4 Bridges and Culverts, Rubble Masonry.

222 prisoners @ \$1.466.....	325.45	
46 teams @ \$1.406.....	64.68	
263 sacks cement.....	193.96	
Water	3.75	
Miscellaneous supplies	2.20	
Paid labor and board.....	112.88	
Engineer's expense	52.39	
		755.31
199.5 cu. yds.		
Rate per cu. yd.....		3.79

STATE HIGHWAY DEPARTMENT.

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

May, 1914.

02-2-4 Bridges and Culverts, Iron Pipe and Transportation.

Paid labor and board.....	\$ 1.80	
180 ft. 12 in. pipe.....	158.40	
44 ft. 18 in. pipe.....	55.88	
44 ft. 24 in. pipe.....	73.04	
70 ft. 30 in. pipe.....	170.10	
48 ft. 36 in. pipe.....	136.80	
		596.02

02-2-4 Bridges and Culverts, Concrete, Repairing Mixer.

7 prisoners @ \$1.466.....	10.26	
Repairs for Mixer, sprocket wheel, clutch, etc.....	63.36	
Paid labor and board.....	4.93	
		78.55

02-2-5 Ditching, Solid Rock.

5 prisoners @ \$1.466.....	7.33	
Engineer's expense	1.18	
Paid labor and board.....	2.27	
		10.78
8.5 cu. yds.		
Rate per cu. yd.....		1.44

02-2-5 Ditching, Loose Rock.

17 prisoners @ \$1.466.....	24.92	
2 teams @ \$1.406.....	2.91	
Engineer's expense	4.01	
Paid labor and board.....	12.14	
		43.98
44.1 cu. yds.		
Rate per cu. yd.....		1.00

02-2-5 Ditching, Earth.

59 prisoners @ \$1.466.....	86.49	
Engineer's expense	13.92	
Paid labor and board.....	36.39	
		136.80
220.6 cu. yds.		
Rate per cu. yd.....		.62

STATE HIGHWAY DEPARTMENT.

02-2-6 Finishing.

337 prisoners @ \$1.466.....	494.04
23 teams @ \$1.406.....	32.34
Engineer's expense	79.53
Paid labor and board.....	86.18
	<hr/>
1629 ft.	692.09

02-2-8 Surveying.

7½ prisoners @ \$1.466.....	11.00
Engineer's expense	1.77
Paid labor and board.....	68.71
	<hr/>
	81.48

02-2-8 Transportation Camp Equipment.

2 prisoners @ \$1.466.....	2.93
6 teams @ \$1.406.....	8.44
Engineer's expense	28.67
Paid labor and board.....	12.57
	<hr/>
	52.61

SUMMARY OF COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

May, 1914.

02-2-1 Camp Construction	\$ 53.44
02-2-3 Grading	3,620.41
02-2-4 Bridges and Culverts.....	1,619.39
02-2-5 Ditching	191.56
02-2-6 Finishing	692.09
02-2-8 Surveying	81.48
02-2-8 Transportation Camp Equip.....	52.61
	<hr/>
	\$ 6,310.98
Amount brought forward.....	32,683.90
	<hr/>
Total	\$ 38,994.88

STATE HIGHWAY DEPARTMENT.

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

STOCKADE

June, 1914.

Total Men Days 2969

			Rate per day per man.
Groceries on hand 6-1.....	\$ 205.35		
Groceries bought in June.....	841.95		
Vegetables	23.09		
	<u>1,070.39</u>		
To Engineer's mess.....	\$ 85.12		
On hand 6-30.....	345.30		
	<u>430.42</u>		
		639.97	.216
Meat bought in June.....	437.64		
Pork (our own).....	36.75		
	<u>474.39</u>		
Less to dogs.....	6.00		
	<u>468.39</u>	468.39	.156
Fuel	22.20		
Water	10.00		
Water hauling, 48½.....	51.41		
Ice	8.50		
	<u>92.11</u>	92.11	.031
Clothing on hand 6-1.....	1,036.93		
Clothing bought in June.....	7.00		
	<u>1,043.93</u>		
Clothing on hand 6-30.....	833.70		
	<u>210.23</u>	210.23	.07
Medicine	12.85		
Doctor's services	15.00		
	<u>27.85</u>	27.85	.01
Supplies and Transportation:			
Truck, 9½ days @ \$4.34.....	41.23		
Supplies	1.09		
	<u>42.32</u>	42.32	.015

STATE HIGHWAY DEPARTMENT.

Escapes		71.45	.025
Guarding:			
Payroll	1,046.66		
Captain's board	19.50		
Guard horses, 39 days.....	20.67		
Supplies, dog feed.....	7.00		
		1,093.83	.37
		2,646.15	.893
Average number of men.....	97		
Total men days.....	2969		
Less camp work and Sundays.....	955½		
Total work days.....	2013½		
Rate per work day.....			1.315
Escapes—4.			
Recaptured—2.			

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

ENGINEER'S MESS

June, 1914.

Total Meals	1412	
Less	315	
	1097	
		Rate
		per Meal.
Groceries on hand 6-1.....	\$ 86.25	
Bought in June	177.38	
Vegetables	13.27	
From Prison mess.....	85.12	
	362.02	
On hand 6-30.....	\$ 75.00	

STATE HIGHWAY DEPARTMENT.

Sold to guards.....	175.82		
	250.82		
Meat bought in June.....	81.32	111.20	101
Pork (our own).....	2.00		
Fuel and water.....		83.32	.076
Cook and waiter.....		11.00	.01
Total meals.....	1412	30.00	.028
Less bookkeeper.....	90		
Less chauffeur.....	45		
Less cook and waiter.....	180		
		235.52	.215
	315		
Rate per day.....			.645

RECAPITULATION

Groceries.....	287.02	
Meat.....	83.32	
Fuel and water.....	11.00	
Cook and waiter.....	30.00	
	411.34	
Deduct credits, store accounts and board.....	236.24	
	175.10	
Total men days.....	307	
Less bookkeeper.....	30	
Less chauffeur.....	12½	
Less Sundays.....	32½	
	75	
Total work days.....	232	
Rate per work day.....		.75

STATE HIGHWAY DEPARTMENT.

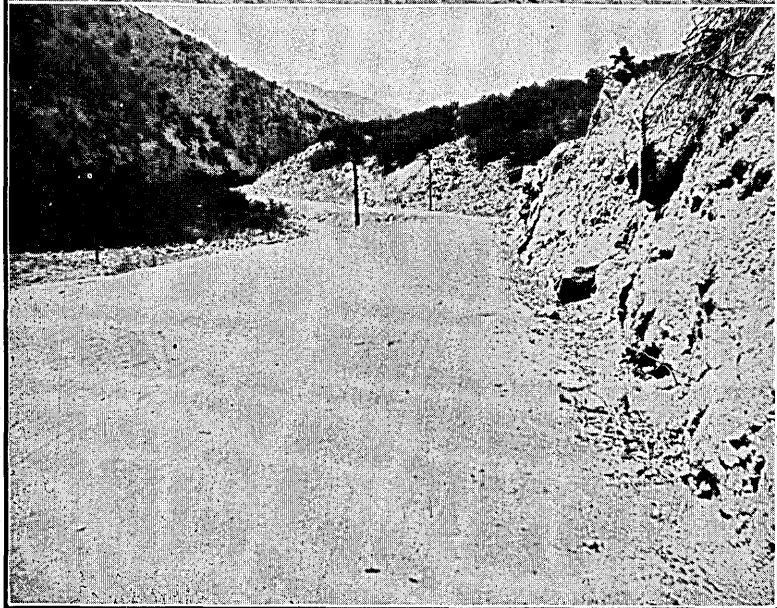
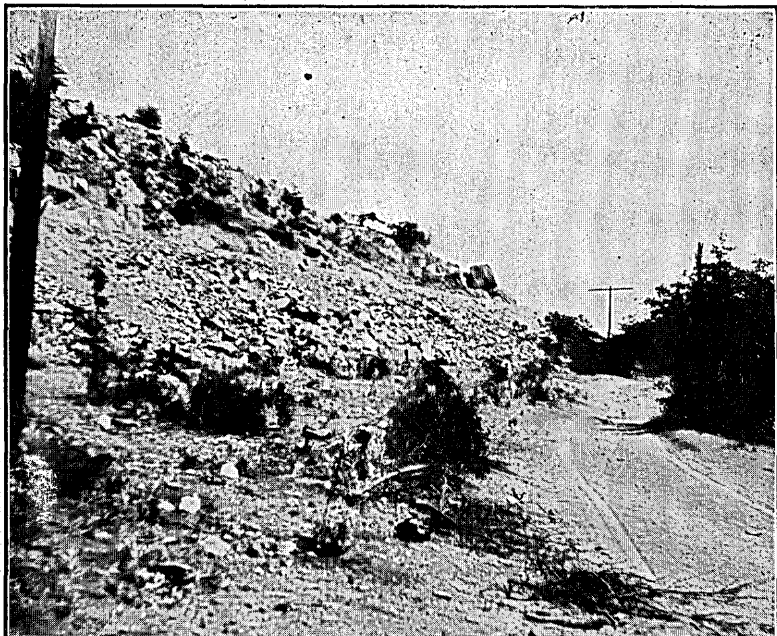
COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

CORRAL

June, 1914.

Total teams	214½		
Less	27		
	<hr/>		
	187½		
Hay on hand 6-1.....	75 bales		
Hay delivered in June.....	113 bales		
	<hr/>		
	187 bales		
Hay on hand 6-30.....	15 bales		
	<hr/>		
	172 bales	\$ 90.34	
Sold to guards.....	35 bales	22.75	
	<hr/>		
	137 bales	67.59	67.59
Barley on hand 6-1.....	76 sacks		
Barley delivered in June.....	90 sacks		
	<hr/>		
	166 sacks		
Barley on hand 6-30.....	64 sacks		
	<hr/>		
	102 sacks	111.18	
Sold to guards and stockade.....	14 sacks	23.19	
	<hr/>		
	88 sacks	87.99	87.99
Supplies and Transportation:			
Supplies	26.96		
Truck 1 day.....	4.34		
	<hr/>		
		31.30	
Corral man, 30 days.....		28.35	
		<hr/>	
		215.23	
Total team days	214½		
Less Sundays	27		
	<hr/>		
	187½		
Rate per day.....			1.00
Rate per work day.....			1.15



COCHISE COUNTY
 Prison Labor
 Bisbee-Tombstone, Sec. 1
 Borderland Highway
 Upper Picture—Left, new road; right, old road
 Lower Picture—New road

STATE HIGHWAY DEPARTMENT.

FINAL ESTIMATE

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

From Station —1 plus 12 at City limits of Bisbee to Station 154 plus 44, a distance of 2.9 miles, of which 1.7 miles is reconstruction of old road, and 1.2 miles is construction of new road. The road bed varies in width from a minimum of 16 feet to a maximum of 24 feet exclusive of surface ditches.

SUMMARY

02-2-1 Camp Construction	\$ 1,725.81
02-2-2 Clearing and Grubbing.....	336.98
02-2-3 Grading	23,341.76
02-2-4 Bridges and Culverts.....	9,238.58
02-2-5 Ditches	1,767.67
02-2-6 Finishing	2,954.26
02-2-7 Dragging	15.42
02-2-8 Surveying	1,847.84
02-2-8 Shoo-Fly	134.81
02-2-8 Transportation Equipment	1,144.01
Total Cost.....	\$ 42,507.14
Deduct Camp Construction.....	\$1,725.81
Deduct Transportation Equipment.....	1,144.01
	<u>2,869.82</u>
	\$ 39,637.32
Cost per mile for 2.9 miles.....	\$ 13,668.05

COSTS

BISBEE-TOMBSTONE HIGHWAY, SEC. 1

FINAL COSTS FOR 2.9 MILES

02-2-1 Camp Construction.	
366.5 prisoners @ \$1.911.....	\$ 700.41
6 teams @ \$1.603.....	9.62
Material	25.09
Paid labor and board.....	849.07
Engineer's expense	141.62
	<u>1,725.81</u>

STATE HIGHWAY DEPARTMENT.

02-2-2 Clearing and Grubbing.

134.5 prisoners @ \$1.98.....	266.31
Paid labor and board.....	45.93
Engineer's expense	54.74
10 acres.....	
Rate per acre.....	36.70
Rate per mile.....	116.20

02-2-3 Grading, Solid Rock.

6305 prisoners @ \$1.588.....	10,009.43
248.75 teams @ \$1.609.....	400.22
Powder and material.....	2,849.97
Paid labor and board.....	2,193.70
Engineer's expense	1,554.36
	<hr/> 17,007.68
12,968.2 cu. yds.....	
Rate per cu. yd.....	1.31

02-2-3 Grading, Loose Rock and Boulders.

1360 prisoners @ \$1.932.....	2,627.39
33.75 teams @ \$1.663.....	56.14
Material	1.72
Paid labor and board.....	354.44
Engineer's expense	530.90
2805 cu. yds.....	
Rate per cu. yd.....	1.27
	<hr/> 3,570.59

02-2-3 Grading, Earth and Earth Borrow.

729 prisoners @ \$1.937.....	1,412.42
215.5 teams @ \$1.635.....	352.30
Paid labor and board.....	349.12
Engineer's expense	297.55
	<hr/> 2,411.39
3478.2 cu. yds.....	
Rate per cu. yd.....	.693

02-2-3 Grading, Gravel Borrow (Fresnos).

89.5 prisoners @ \$1.688.....	151.11
58.5 teams @ \$1.92.....	112.33
Water	25.00
Paid labor and board.....	40.94
Engineer's expense	22.72
	<hr/> 352.10
1725 cu. yds.....	
Rate per cu. yd.....	.204

STATE HIGHWAY DEPARTMENT.

02-2-4 Bridges and Culverts, Earth Excavation.

144.5 prisoners @ \$1.751.....	253.06	
Paid labor and board.....	94.40	
Engineer's expense	44.36	
533.7 cu. yds.		
Rate per cu. yd.....		.784
	<u>391.82</u>	

02-2-4 Bridges and Culverts, Loose Rock Excavation.

177 prisoners @ \$1.70.....	305.22	
1 team @ \$1.60.....	1.60	
Paid labor and board.....	124.42	
Engineer's expense	49.88	
	<u>481.12</u>	
462.1 cu. yds.		
Rate per cu. yd.....		1.041

02-2-4 Bridges and Culverts, Solid Rock Excavation.

110 prisoners @ \$1.709.....	187.98	
Powder and supplies.....	8.00	
Paid labor and board.....	48.20	
Engineer's expense	32.68	
	<u>276.86</u>	
162.5 cu. yds.		
Rate per cu. yd.....		1.70

02-2-4 Bridges and Culverts, Masonry.

499 prisoners @ \$1.575.....	786.12	
79.5 teams @ \$1.534.....	121.94	
Cement and supplies.....	506.83	
Paid labor and board.....	330.34	
Engineer's expense	135.86	
	<u>1,881.09</u>	
488.2 cu. yds.		
Rate per cu. yd.....		3.853

02-2-4 Bridges and Culverts, Dry Wall.

8 prisoners @ \$1.456.....	11.65	
1 team @ \$1.99.....	1.99	
Paid labor and board.....	4.51	
Engineer's expense	1.66	
	<u>19.81</u>	
27 cu. yds.		
Rate per cu. yd.....		.734

STATE HIGHWAY DEPARTMENT

02-2-4 Rip Rap, Bridges and Culverts.

10.5 prisoners @ \$1.315.....	14.18	
2 teams @ \$1.15.....	2.30	
Engineer's expense	2.79	
		<u>19.27</u>

02-2-4 Bridges and Culverts, Pipe Transportation.

19.5 prisoners @ \$1.83.....	35.62	
13.5 teams @ \$1.685.....	22.78	
Iron culverts	1,881.84	
Paid labor and board.....	11.69	
Engineer's expense	6.67	
		<u>1,958.60</u>

02-2-4 Bridges and Culverts, Concrete.

471 prisoners @ \$1.833.....	863.59	
105 teams @ \$1.666.....	195.08	
Cement and supplies.....	1,244.40	
Paid labor and board.....	182.92	
Engineer's expense	159.03	
		<u>2,645.02</u>

02-2-4 Bridges and Culverts, Forms.

141.5 prisoners @ \$1.844.....	260.92	
18 teams @ \$1.741.....	31.34	
Supplies, lumber, nails, etc.....	481.61	
Paid labor and board.....	274.71	
Engineer's expense	46.06	
		<u>1,094.64</u>

02-2-4 Bridges and Culverts, Reinforcing

6.5 prisoners @ \$1.808.....	11.75	
4 teams @ \$1.99.....	7.96	
Reinforcing	358.18	
Paid labor and board.....	12.06	
Engineer's expense	1.85	
		<u>391.80</u>

02-2-4 Bridges and Culverts, Repairing Mixer.

7 prisoners @ \$1.466.....	10.26	
Repairs	63.36	
Paid labor and board.....	4.93	
		<u>78.55</u>

Summary of Concreting.

Concrete	2,645.02	
Forms	1,094.64	

STATE HIGHWAY DEPARTMENT.

Reinforcing	391.80
Repairing Mixer	78.55

4,210.01

515.2 cu. yds.

Rate per cu. yd..... 8.11

02-2-5 Storm Ditches, Solid Rock.

148.5 prisoners @ \$1.74.....	257.90
7 teams @ \$1.601.....	11.22
Supplies	34.03
Paid labor and board.....	64.74
Engineer's expense	45.62
315.5 cu. yds.	
Rate per cu. yd.....	1.31

413.51

02-2-5 Storm Ditches, Loose Rock and Boulders.

230.5 prisoners @ \$1.70.....	392.12
3 teams @ \$1.501.....	4.51
Paid labor and board.....	120.45
Engineer's expense	68.12

585.20

461.8 cu. yds.

Rate per cu. yd..... 1.267

02-2-5 Storm Ditches, Earth.

239 prisoners @ \$1.76.....	419.87
Paid labor and board.....	116.65
Engineer's expense	69.68

606.20

1079.8 cu. yds.

Rate per cu. yd..... .561

02-2-5 Storm Ditches, Cleaning Ditches.

19.5 prisoners @ \$1.315.....	25.64
Truck ½ day.....	2.17
Paid labor and board.....	9.18
Engineer's expense	5.19

42.18

02-2-5 Storm Ditches, Cleaning Channel (Fresnos).

49.5 prisoners @ \$1.315.....	65.09
24 teams @ \$1.15.....	27.60

STATE HIGHWAY DEPARTMENT.

Paid labor and board.....	14.75	
Engineer's expense.....	13.14	
		<u>120.58</u>

579 cu. yds. 10.0133
Rate per cu. yd..... 2.209

02-2-6 Finishing.

1375 prisoners @ \$1.58.....	2,171.53	
82 teams @ \$1.52.....	124.74	
Supplies	7.67	
Paid labor and board.....	311.72	
Engineer's expense.....	338.60	
		<u>2,954.26</u>

2.9 miles.
Rate per mile..... 1,018.71

02-2-7 Dragging.

4 prisoners @ \$1.65.....	6.59	
4 teams @ \$1.38.....	5.51	
Paid labor and board.....	1.98	
Engineer's expense.....	1.34	
		<u>15.42</u>

2.9 miles.
Rate per mile..... 5.32

02-2-8 Surveying.

113 prisoners \$1.86.....	210.27	
4 teams @ \$1.603.....	6.41	
Supplies	64.05	
Paid labor and board.....	1,526.43	
Engineer's expense.....	40.68	
		<u>1,847.84</u>

02-2-8 Shoo-Fly.

515 prisoners @ \$1.882.....	96.91	
5 teams @ \$1.601.....	8.01	
Paid labor and board.....	9.43	
Engineer's expense.....	20.46	
		<u>134.81</u>

02-2-8 Transportation of Road Equipment.

4 prisoners @ \$1.98.....	7.92	
27 teams @ \$1.603.....	43.28	
Freight and expenses.....	348.16	
Paid labor and board.....	138.41	
		<u>537.77</u>

STATE HIGHWAY DEPARTMENT

02-28 Transportation of Camp Equipment.

2 prisoners @ \$1.466.....	2.93
28 teams @ \$1.560.....	43.71
Expenses	381.76
Paid labor and board.....	177.84
	<hr/> 606.24

BISBEE-TOMBSTONE HIGHWAY

PRISON MENU

For Average of 91 Men.

SUNDAY

Breakfast.

Corn meal mush; milk; sugar; fried steak and brown gravy;
German fried potatoes; syrup; coffee; bread.

8½ lbs. corn meal	100 lbs. flour per day
12 cans milk per day	50 lbs. lard every 3 days
40 lbs. sugar per day	2 gals. tomatoes per day
106 lbs. beef per day	22 lbs. pink beans per day
70 lbs. potatoes per day	15 lbs. onions per day
13 lbs. coffee per day	
	5 gals. Karo syrup per week

Dinner.

Tomato soup; pink beans with salt pork (2 lbs. pork); braized beef with tomato sauce; boiled cabbage with corned beef (13 lbs. beef); bread, crackers; cottage pudding, plain sauce; coffee, tea (1½ lbs. tea).

Supper.

Stewed prunes (10 lbs. per meal); pink beans; beef-stew; raw cheese; onions; bread, coffee.

MONDAY

Breakfast.

Oat meal mush (10 lbs. per meal); sugar and milk; breakfast bacon (30 lbs. per meal); chip potatoes; syrup; bread; coffee.

STATE HIGHWAY DEPARTMENT.

Dinner.

Roast beef with brown gravy; mashed potatoes; macaroni and cheese (10 lbs. macaroni, 7 lbs. cheese); bread pudding (includes 1 doz. eggs); coffee; bread.

Supper.

Stewed apples (8½ lbs.); fried hash; pink beans; bread; coffee.

TUESDAY

Breakfast.

Fried ham (28 lbs); fried potatoes; corn meal mush, milk and sugar; syrup; bread; coffee.

Dinner.

Split pea soup (2 lbs), crackers; short ribs beef, brown potatoes; navy beans (12 lbs.); bread; coffee.

Supper.

Stewed raisins (10 lbs.); baked beans; stewed beef; onions; bread; coffee.

WEDNESDAY

Breakfast.

Liver and onions (or stewed beef when no liver); steamed brown potatoes; oat meal mush; sugar and milk; bread; coffee.

Dinner.

Stewed beef; pink beans; Spanish rice (8 lbs.); apple roll; bread; tea, coffee.

Supper.

Stewed prunes; chili con carne (1½ chili powder); pink beans; bread; coffee.

THURSDAY

Breakfast.

Fried steak; cornmeal mush, milk and sugar; syrup; German fried potatoes; bread; coffee.

STATE HIGHWAY DEPARTMENT.

Dinner.

Rice and tomato soup; roast beef with brown gravy; potatoes; turnips; bread; coffee.

Supper.

Stewed apples; pink beans; stewed beef; bread; coffee.

FRIDAY

Breakfast.

Hash; fried potatoes; oat meal mush, milk and sugar; syrup; bread; coffee.

Dinner.

Boiled ribs of beef; pink beans; macaroni; raisin roll; bread; coffee.

Supper.

Stewed prunes; navy beans; hash; bread; coffee.

SATURDAY

Breakfast.

Breakfast bacon; fried potatoes; cornmeal mush, milk and sugar; bread; coffee.

Dinner.

Cream of tomato soup; roast beef; mashed potatoes; pink beans; bread; coffee.

Supper.

Stewed raisins; boiled beef; baked beans; raw cheese; onions.

Note: Ham and bacon used instead of salt pork and is proportioned. That is, the amount used each meal must not amount to more than a meal of salt pork would amount to.

LUNCHES

MONDAYS

3 lbs. cheese; 3 lbs. steak; 9 eggs; apple pie (1 lb. lard and left over articles); 1 lb. coffee; 2 lbs. sugar.

STATE HIGHWAY DEPARTMENT.

TUESDAYS

9 eggs; 2 lbs. onions; $2\frac{1}{2}$ lbs ham; cake (includes 4 eggs); pink beans (left over from meal); coffee; sugar.

WEDNESDAYS

Bacon (2 lbs.); 2 lbs cheese; 2 lbs. roast beef; apple pie; coffee; sugar.

The menu for the other three lunches is a repetition of the above.

BISBEE-DOUGLAS HIGHWAY

Forrest Station—East 2.99 Miles.

J. C. Ryan, Division Engineer.

Fourteen men were sent from the Fairbank bridge December 26, 1913, to Forrest Station to establish camp. This work was completed and 26 additional men sent from Bisbee January 11, 1914, and actual construction begun. Work was continued to May 1, 1914, at which time these forces were sent to Bisbee-Tombstone Camp.

This road was crowned and surfaced with a small amount of gravel and one-half gallon oil to the square yard in 1911. It was parallel with and below the E. P. & S. W. R. R. over a loamy soil with the drainage from a large territory passing diagonally cross.

In order to take care of the drainage it was necessary to raise the grade to a sufficient height, average 2.5, maximum 3.4 feet, to install one 24 inch and twelve 36 inch corrugated iron culverts with headwalls. The area of these openings are somewhat in excess of those of the railroad, but we were informed by reliable authority that the floodwaters sometimes covered the railroad embankment to a depth of 6 inches. Before raising the grade it was necessary to secure additional right of way, which was done without cost. Present right of way 100 feet. This 2.99 miles was graded 24 feet wide

STATE HIGHWAY DEPARTMENT.

and surfaced 16 feet wide, with 4 inches of slag and 2 inches of clay and caliche spread and rolled in as a binder. The sub-grade was rolled with a ten ton roller, the slag then applied and rolled. The dressing of clay and caliche applied and rolled after the first rain.

Calumet—East 0.275 Miles.

As at Forrest this road was crowned and surfaced with thin layer of gravel and one-half gallon oil to square yard in 1911. The subsoil would not hold up the surfacing. This road was graded to a height of about 12 to 18 inches and surfaced with 6 inches of gravel and caliche, then rolled.

The entire length of this road, 22.7 miles, was maintained.

QUANTITIES

Bisbee-Douglas Highway:

Grading:

Earth embankment	29723.4	Cu Yds
------------------------	---------	--------

Ditching:

Earth embankment	109.	"
Earth excavation	1007	"

Culverts:

Earth excavation	74.8	"
Concrete headwalls	30.34	"
24 in. Corrugated iron culvert	24.	Feet
36 in. Corrugated iron culvert	288.	Feet
Clearing and grubbing	19.5	Acres
Surfacing, slag	3456.84	Cu Yds

Calumet—East:

Earth embankment	1122.	"
Gravel ballast	815.	"

Reports in detail to June, 1914, as follows:

Cost of Prison Mess from December 26th, '13, to February 1st, '14.

	Total Cost	Per Capita
Groceries	\$ 219.21	.2105
Meat	167.23	.1606
Fuel	73.74	.0708
Medicine .....	.41	
Clothes	207.86	.1997
Transportation	218.40	.2098

STATE HIGHWAY DEPARTMENT.

Expense after escapes	23.47	
Bookkeeper's board	29.14	
Guards and Captain's board	423.94	4072
Lights	4.00	
Water	1.00	
Cost of truck hauling supplies	22.86	
TOTAL	\$1,391.26	
Average number of men	29	
Total number Prisoner days	1041	
Cost per Prisoner per day	1.3365	
Cost per Man Days (Outside work)	1.8379	
Total number Man Days (Outside work)	757	
Men in camp (cooks, dalters, sick and Sunday's)	284	

Statement of cost of feed for teams month of January, 1914.

Hay purchased	\$166.77	
Hay fed	142.17	
Hay on hand February 1st	24.60	
Barley purchased	295.56	
Barley fed	222.76	
Barley on hand February 1st	72.80	
Hay fed	\$142.17	
Barley fed	222.76	
Water	3.00	
Truck hauling hay and barley	45.73	
Corral help:		
48 Prisoners @ 1.8379	88.22	
Total cost of teams (to feed)	501.88	
Total team days	429-1/2	
Working team days	360-1/2	
Idle teams (disabled and Sundays)	69	
Cost per team day to feed	1.1685	
Cost per working team day to feed	1.3922	
Stock rental per team day	0.8065	
Stock rental per working team day	0.9607	
Total cost per working team day	2.3529	

Distribution of cost of truck and truck driver December 26th, '13,
to February 1st, '14.

Driver's salary

\$ 70.15



COCHISE COUNTY
Prison Labor
Bisbee-Douglas
Surfaced with 4 inches of Slag
Borderland Highway

STATE HIGHWAY DEPARTMENT.

Driver's board	23.20
Gasoline and lubricating oils	72.50
	<hr/>
	\$165.85
Total number of days worked.....	29
Cost per day	5.71
Hauling groceries	7 Days \$ 40.01—02-2-1
Hauling gravel	3. " 17.15—02-2-4
Hauling hay and grain	8 " 45.73—02-2-1
Construction camp	4 " 22.85—02-2-4
Hauling lumber	1 " 5.72—02-2-4
Hauling culverts	2 " 11.43—02-2-4
Transporting prisoners	3 " 17.24—02-2-1
Grading	1 " 5.72—02-2-3
	<hr/>
Total	\$165.85

Cost of Engineer's Mess from December 26th, '13, to February 1st, '14.

Groceries	\$174.95
Meat	58.20
Fuel	9.00
Water	1.00
Truck hauling supplies	17.22
Cost of cook and waiter	77.19
	<hr/>
Total	\$337.56
Total number of days.....	428
Cost per day .....	.7887

BISBEE-DOUGLAS HIGHWAY. FORREST—EAST

ESTIMATE No. 1.

MONTH OF JANUARY, 1914.

STATE OF ARIZONA PRISON FORCES.

JANUARY 31st, 1914.

GRADING.

Sta. to Sta.:

Earth Emb

Cu. Yds.

8+50—160

8000

STATE HIGHWAY DEPARTMENT.

DITCHING.

DITCHING.		Ground cleared
		Earth Exc.
		Cu. Yds.
64.92		20.
64.27		80.
		15.
21 99		20.
26 00		80.
29 34		15.
1 50-17 00		20.
1 50-80 90		31.
1 50-112 73		21.
1 50-131 97		13.
1 50-141 11		
1 50-151 11	Total to date.....	200.
1 50-161 11		
1 50-171 11		
1 50-181 11		
1 50-191 11		
1 50-201 11		
1 50-211 11		
1 50-221 11		
1 50-231 11		
1 50-241 11		
1 50-251 11		
1 50-261 11		
1 50-271 11		
1 50-281 11		
1 50-291 11		
1 50-301 11		
1 50-311 11		
1 50-321 11		
1 50-331 11		
1 50-341 11		
1 50-351 11		
1 50-361 11		
1 50-371 11		
1 50-381 11		
1 50-391 11		
1 50-401 11		
1 50-411 11		
1 50-421 11		
1 50-431 11		
1 50-441 11		
1 50-451 11		
1 50-461 11		
1 50-471 11		
1 50-481 11		
1 50-491 11		
1 50-501 11		
1 50-511 11		
1 50-521 11		
1 50-531 11		
1 50-541 11		
1 50-551 11		
1 50-561 11		
1 50-571 11		
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1 50-681 11		
1 50-691 11		
1 50-701 11		
1 50-711 11		
1 50-721 11		
1 50-731 11		
1 50-741 11		
1 50-751 11		
1 50-761 11		
1 50-771 11		
1 50-781 11		
1 50-791 11		
1 50-801 11		
1 50-811 11		
1 50-821 11		
1 50-831 11		
1 50-841 11		
1 50-851 11		
1 50-861 11		
1 50-871 11		
1 50-881 11		
1 50-891 11		
1 50-901 11		
1 50-911 11		
1 50-921 11		
1 50-931 11		
1 50-941 11		
1 50-951 11		
1 50-961 11		
1 50-971 11		
1 50-981 11		
1 50-991 11		
1 50-1001 11		
1 50-1011 11		
1 50-1021 11		
1 50-1031 11		
1 50-1041 11		
1 50-1051 11		
1 50-1061 11		
1 50-1071 11		
1 50-1081 11		
1 50-1091 11		
1 50-1101 11		
1 50-1111 11		
1 50-1121 11		
1 50-1131 11		
1 50-1141 11		
1 50-1151 11		
1 50-1161 11		
1 50-1171 11		
1 50-1181 11		
1 50-1191 11		
1 50-1201 11		
1 5		

CORRUGATED IRON CULVERTS

	Earth exc. Cu. Yds.	Concrete Cu. Yds.
12 60—24 in. pipe	4.8	
21 99—Double 36 in. pipe	14.8	4.66
29 34— " " "	11.2	4.66
71 77— " " "	11.8	4.71
80 90— " " "	11.6	4.86
Total to date	54.2	18.89

CULVERT MATERIAL

	24 in. Pipe	30 in. Pipe	36 in. Pipe	Cement (Sacks)	Lumber (F.B.M.)	Nails 1 Keg
Purchased to date.....	2	4	12	178	672	1
Used this month.....	0	0	8	106	400	½ "
On hand	2	4	4	72	272	½ "

02-2-4

2202-220000: YAWHOM SA JOUNOZ EDOIS

CONFIDENTIAL

Bisbee-Douglas Highway. Forrest—East

Cost of bridges and culverts.—Month of January, 1914.

State of Arizona Prison Forces.

No. 4—Double 36 in. Corrugated Iron Culverts		Totals	Per Culvert
Days Division Engineer @ 7.49	.....	22.47	
0½ days Foreman	5.09	53.45	
6½ days Ins. man	3.95	25.67	
4 days bookkeeper	2.63	10.52	

STATE HIGHWAY DEPARTMENT.

6	days Truck and driver	5.71	34.26	
	Total paid labor		146.37	36.59
	91 days Prisoner @ 1.8379		167.25	41.81
	10 days 2-horse teams @ 2.35		23.50	5.88
	Total labor cost of culverts		\$337.12	84.28
	Material charge		118.65	
	8--36 in. Corrugated Iron Pipes.			

NOTE:—Price of pipes cannot be given as bills for same have not been received.

02-2-6

Bisbee-Douglas Highway. Forrest—East.

Cost of Surfacing—Month of January, 1914.

State of Arizona Prison Forces:

				Totals
1	Day Division Engineer @	7.49	7.49	
1½	" Foreman	4.36	6.54	
1	" Instrument man	3.95	3.95	
1	" Bookkeeper	2.63	2.63	
	Total paid labor			\$20.61
	17 days prisoner @ 1.8379			31.24
	2 days 2-horse teams @ 2.35			4.70
	Total cost of surfacing			\$56.55

02-2-2

Bisbee-Douglas Highway. Forrest—East

Cost of Clearing and Grubbing. Month of January, 1914.

State of Arizona Prison Forces.

37 Prisoners.

				Totals	Per Acre
	14 Acres				
1	Day Division Engineer @	7.49	7.49		
2	" Foreman	5.09	10.18		
1	" Foreman	4.65	4.65		
6	" Foreman	4.36	26.16		
5	" Ins. Man	3.95	19.75		
1	" Bookkeeper	2.63	2.63		
	Total paid labor		70.86	5.06	
	37 Days Prisoner @ 1.8379		68.00	4.85	
	Total cost of clearing and grubbing		138.86	9.92	

STATE HIGHWAY DEPARTMENT.

02-2-5

Bisbee- Douglas Highway. Forrest—East.

Cost of Ditching. Month of January, 1914.

State of Arizona Prison Forces.

200 Cubic Yards Earth Excavation.

		Totals	Per Cu. Yds.
1	Day Division Engineer @ 7.49	7.49	
2	" Foreman @ 4.36	8.72	
1	" Instrument man @ 3.95	3.95	
2	" Bookkeeper @ 2.63	5.26	
Total paid labor		25.42	0.1271
36½ days prisoner @ 1.8379		67.08	0.3354
3½ days 2-horse teams @ 2.35		8.23	0.0412
Total cost of ditching		\$100.73	0.5037

02-2-3

Bisbee-Douglas Highway. Forrest—East.

Cost of Grading. Month of January, 1914.

State of Arizona Prison Forces 353½ Prisoners

	8000 Cu Yds	Earth Emb Totals	Earth Emb. per Cu Yd.
10 days Division Engineer @ 7.47	74.90		
7 " Foreman 6.15	43.05		
18 " Foreman 4.65	83.70		
12½ " Foreman 4.36	54.50		
1 " Truck driver 5.71	5.71		
15 " Bookkeeper 2.63	39.45		
9½ " Instrument man 3.95	37.52		
Total paid labor		338.83	0.0423
353½ Days Prisoner @ 1.8379		649.70	0.0812
345 Days 2 horse teams @ 2.35		811.79	0.1015
Total labor cost of grading		\$1,800.32	0.2250
Total material charge		44.22	0.0055
Total cost of grading		\$1844.54	0.2306

STATE HIGHWAY DEPARTMENT.

02-2-1

Bisbee-Douglas Highway. Forrest—East.

Cost of moving, establishing and dismantling camp.

December, 1913—January, 1914.

State of Arizona Prison Forces:

Dismantling camp at Fairbank, and loading for Forrest:

Total paid labor	\$203.10
Prison labor	157.50
Tteams	20.00

Total dismantling camp at Fairbank

and loading for Forrest\$380.60

Establishing Camp at Forrest:

7	Days Division Engineer @ 7.49	\$ 52.43
7½	" Foreman 5.09	38.18
22	" Foreman 4.65	102.30
4	" Truck and driver 4.71	18.84
6	" Truck and driver 4.36	26.16
11	" Instrument man 3.95	43.45
11	" Bookkeeper 2.63	28.93

Total paid labor\$ 310.29

132 days prisoner @ 1.8379 242.60

Labor cost establishing camp at Forrest 552.89

Material cost establishing camp at Forrest..... 9.00

Freight charges on 2 cars 86.40

Total cost moving and establishing camp at Forrest..... 648.29

Total cost of moving and establishing and dismantling camp\$1,028.89

This charge will be segregated to the different working charges upon completion of this work.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Summary of Cost.

March 1, 1914.

ACCOUNT	CURRENT	PREVIOUS	TO DATE
02 — 2 — 2	\$ 64.56	\$ 138.86	\$ 203.42
02 — 2 — 3	3,791.09	1,844.54	5,635.63
02 — 2 — 4	1,006.81	455.77	1,462.58
02 — 2 — 5	47.68	100.73	148.41
02 — 2 — 6	121.17	56.55	177.72

STATE HIGHWAY DEPARTMENT.

02 — 2 — 7	26.10	.....	26.10
02 — 2 — 8	56.40	.....	56.40
Establishing camp	.....	1,028.89	1,028.89
Totals	\$5,113.81	\$3,625.34	\$8,739.15

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Statement of Supplies and Costs

Month of February, 1914.

Groceries on hand February 1st	\$ 220.66	
Groceries purchased during month	479.72	
Groceries issued to Prison Mess		\$ 282.25
Groceries issued to Engineer's Mess		186.55
Groceries on hand March 1st	231.58	
Meat on hand February 1st	13.64	
Meat purchased during month	271.12	
Meat issued to Prison Mess		195.97
Meat issued to Engineer's Mess		67.79
Meat on hand March 1st	21.00	
Fuel on hand February 1st	177.91	
Fuel issued to Stockade		75.00
Fuel issued outside of Stockade		17.91
Fuel on hand March 1st	85.00	
Medicine on hand February 1st	.50	
Medicine purchased during month	.50	
Medicine issued		1.00
Doctor's Fees		5.00
Clothing in stock February 1st	354.26	
Clothing purchased during month	131.29	
Clothing issued		186.76
Clothing in stock March 1st	298.79	
Transportation of prisoners (including subsistence enroute)		130.42
Expense after escapes (including transportation of guards and other expenses)		65.92
Guards payroll (not including board)		583.48
Cost of lighting Stockade		10.36
Truck driver's salary		40.18
Gasoline and lubricating oils for truck		53.25
Water		5.00
Expense account of J. C. Ryan		10.70
February payroll (other than guards and truck driver)		597.10

STATE HIGHWAY DEPARTMENT.

February material (working accounts)	929.36
Feed for teams	809.39
Team rental	840.17
Wagon and saddle rental	17.50
Horse medicine	2.75
Total current cost	\$ 5,113.81

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Maintaining Prisoners

Month of February, 1914.

1254 2-3 Prisoners

		Cost Per Capita
Groceries	\$ 282.25	0.2249
Meat	195.97	0.1562
Fuel	75.00	0.0598
Medicine	1.00	0.0008
Doctor's fees	5.00	0.0040
Clothing	186.76	0.1488
Transportation	130.42	0.1039
Expense after escapes	65.92	0.0525
Bookkeeper's board	18.97	0.0151
Captain of Guard's board	22.10	0.0176
Guards' payroll	711.06	0.5666
Lighting Stockade	10.36	0.0083
Water	1.00	0.0008
Truck hauling supplies	12.60	0.0100
Total	\$1,718.41	1.3693

Average number of men	44	
Total number Prisoner days	1254 2-3	
Cost per Prisoner day		1.36925
Prisoners in camp (cooks, waiters, sick and Sundays)	357 2-3	
Total Prisoner days (outside work)	897	
Cost per Prisoner day (outside work)		1.91573

BISBEE-DOUGLAS HIGHWAY. Forrest—East

Cost of Teams

Month of February, 1914

951 2-Horse Teams

Hay on hand, February 1st	\$ 24.60
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STATE HIGHWAY DEPARTMENT.

Hay purchased during month	701.64
By Dept. Invoice against Bisbee-Tombstone Hwy, Feb. 28th	119.35
Hay fed during month	392.67
Hay on hand March 1st	189.62
Barley on hand February 1st	72.80
Barley purchased during month	1,129.04
Barley fed during month	416.72
Barley on hand March 1st	785.12
	Totals
Hay fed	\$ 392.67
Barley fed	416.72
Water	3.00
Truck hauling hay and grain	52.90
Corral help	181.66
Horse medicine	2.75
Total cost of feed	\$1,049.70

BISBEE-DOUGLAS HIGHWAY.

Cost of Teams

Total team days	951
Working team days	808½
Idle teams (disabled and Sundays)	142½
Cost per team day to feed	1.10379
Cost per working team day to feed	1.29883
Team rental per day .....	.88346
Team rental per working day	1.03917
Total cost per team day	1.98725
Total cost per working team day	2.33800
Cost of saddle horse per working day	1.25878

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Engineer's Mess,

Month of February, 1914.

Groceries	\$ 186.55
Meat	67.79
Fuel	12.91
Water	1.00

STATE HIGHWAY DEPARTMENT.

Truck hauling supplies 5.30
 Cost of cook and waiter 58.00

Total cost of mess \$ 331.55
 Total number of days.....372
 Cost per day 0.8913

Distribution of cost of truck and truck driver during the month of
 February, 1914:

Driver's salary\$ 40.18
 Driver's board 12.38
 Gasoline and lubricating oils..... 53.25

Total number of days worked.....14

\$105.81

Cost per day 7.5578
 Transportation of Prisoners..... 2½ Days \$ 18.89—02-2-1
 Hauling Groceries 2½ Days 18.90—02-2-1
 Hauling Forage 7 Days 52.90—02-2-1
 Grading 1½ Days 11.34—02-2-3
 Bridges and Culverts..... ½ Days 3.78—02-2-4

Total \$ 105.81

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

ESTIMATE No. 2

Month of February, 1914.

State of Arizona Prison Force.

February 28, 1914.

GRADING.

Sta to Sta		Earth Emb. Cu. Yds.
6 00 163	To date	27000
	Previously reported	8000
	Current estimate	19000

STATE HIGHWAY DEPARTMENT.

DITCHING.

Sta to Sta	Earth Exc. Cu. Yds.
12 60	3
21 99	33
26 00	111
29 34	15
71 77	25
80 90	31
112 73	30
131 97	22
Total to date	270
Previous estimate	200
Current estimate	70

CLEARING AND GRUBBING.

Sta to Sta	Lt	Rt	Acres
6 80	50	20	11.9
8 86	Nothing		
86 102	50	00	1.8
102 126	Nothing		
126 162	60	10	5.8
Total to date			19.5
Previous estimate			14.0
Current estimate			5.5

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Clearing and Grubbing

Month of February, 1914.

State of Arizona Prison Force.

	5.5 Acres	
1/2 days bookkeeper @ 2.68	1.34	
33 days prisoner @ 1.91573	63.22	
Current cost	\$ 64.56	
Previous cost	138.86	
Total to date	\$ 203.42	

STATE HIGHWAY DEPARTMENT.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Dragging and Rolling.

Month of February, 1914.

State of Arizona Prison Force.

1 day foreman	@ 6.10	6.10
3 days gas engineer	@ 4.00	12.00

Current paid labor 18.10

Current material 8.00

Total cost of dragging and rolling to date.....\$26.10

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Account 02-2-8

Miscellaneous

Month of February, 1914.

State of Arizona Prison Force.

1½ Days foreman	@ 5.05	7.57
7 " Prisoner	@ 1.91537	13.41
8½ " 2-horse team	@ 2.338	19.87
1 " Saddle horse	@ 1.26	1.26

Total labor 42.11

Cost of transient meals in Engineer's mess 14.29

Total.....\$56.40

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

ESTIMATE No. 2

CORRUGATED IRON CULVERTS

Sta to Sta	Structure	Earth Exc. Cu Yds	Concrete Cu Yds
12 60	24 in. Pipe	4.8	2.28
21 99	Double 36 in. Pipe	14.8	4.66
29 34	do	11.2	4.66
71 77	do	11.8	4.85
80 90	do	11.6	4.87

STATE HIGHWAY DEPARTMENT.

112	73	do	10.1	4.21
131	97	do	10.4	4.81

Total to date	74.7	30.34
Previous estimate	54.2	18.89
Current estimate	20.5	11.45

CULVERT MATERIAL

	24 in. Pipe	30 in. Pipe	36 in. Pipe	Cement (Sacks)	Lumber F.B.M.	Nails (kegs)
On hand Feb. 1st	2	4	4	72	272	1½
Used this month	1	0	4	59	272	.....
On hand March 1st	1	4	0	13	00	½

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Bridges and Culverts.

Month of February, 1914.

State of Arizona Prison Force.

(2 Double 36 in. Corrugated Iron Culverts)		
(1 Single 24 in. Corrugated Iron Culverts)		
½ Day Division Engineer	@ 7.40	3.70
3½ " Foreman	@ 6.10	21.35
½ " Bookkeeper	@ 2.68	1.34
2 " Instrument man	@ 4.64	9.28
½ " Truck and driver		3.78
Current paid labor		39.45
45½ Days Prisoner	@ 1.91573	87.17
6 " 2-horse team	@ 2.338	14.03
7 " Wagon	@ .54	3.78
1 " Saddle horse	@ 1.26	1.26
Total current labor		145.69
Current Material		861.12
Total current cost		1,006.81
Total previous cost		455.77
Total cost of culverts to date		\$1,462.58

STATE HIGHWAY DEPARTMENT.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Grading

Month of February, 1914.

State of Arizona Prison Force.

		19000 Cu. Yds.	Totals	Per Cu. Yd.
13	Days Division Eng'r	@ 7.40 96.20		
17	" Foreman	@ 6.10 103.70		
24	" Foreman	@ 5.47 131.28		
15	" Foreman	@ 5.05 75.75		
4½	" Foreman	@ 4.01 18.05		
22	" Instrument man	@ 4.64 102.08		
1½	" Truck and driver	..... 11.34		
21	" Bookkeeper	@ 2.68 56.28		
2	" Gas engineer	@ 4.00 8.00		
	Current paid labor	.....	602.68	
685	" Prisoner	@ 1.91573 1,312.27		
760	" 2-horse team	@ 2.338 1,776.88		
20	" Wagon	@ .54 10.80		
24	" Saddle horse	@ 1.259 30.22		
	Total current labor	.....	\$3,732.85	
	Total current material	.....	58.24	
	Total current cost	.....	\$3,791.09	0.1995
	Total previous cost	.....	1,844.54	
	Total cost of grading to date	.....	\$5,635.63	

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Ditches

Month of February, 1914.

State of Arizona Prison Force.

		70 Cu. Yds.	
1	Day Foreman	@ 6.10 6.10	
½	" Bookkeeper	@ 2.68 1.34	
	Current paid labor	.....	7.44
19½	Days Prisoner	@ 1.91573 37.36	

STATE HIGHWAY DEPARTMENT.

1	"	2-horse team	@ 2.338	2.34
1	"	Wagon	@ .54	.54
Total current labor				47.68
Previous cost				100.73
Total cost of ditching to date				\$ 148.41

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing

Month of February, 1914.

State of Arizona Prison Force.

1/2	Days	Division Engineer	@ 7.40	3.70
1	"	Foreman	@ 6.10	6.10
7 1/2	"	Foreman	@ 5.05	37.87
1/2	"	Bookkeeper	@ 2.68	1.34
Current paid labor				49.01
14	Days	prisoner	@ 1.91573	26.82
18	"	2-horse team	@ 2.338	42.08
1	"	Saddle horse	@ 1.26	1.26
Total current labor				119.17
Current material				2.00
Total current cost				121.17
Total previous cost				56.55
Total cost of surfacing to date				\$ 177.72

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Summary of Cost.

ACCOUNT	CURRENT	PREVIOUS	TO DATE
02-2-1—Office	33.10		33.10
02-2-2—	9.89	203.42	213.31
02-2-3—Forrest	706.56	5635.63	6342.19

STATE HIGHWAY DEPARTMENT.

02-2-3—Calumet	1297.82		1297.82
02-2-4—		1462.58	1452.58
02-2-5—	20.10	1481.41	168.51
02-2-6—	4701.97	177.72	4879.69
02-2-7—	30.42	26.10	56.52
02-2-8—	4.02	56.40	60.42
Establishing camp		1028.89	1028.89
Totals.....	\$6,803.88	\$8,739.15	\$15,543.03

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Statement of Supplies and Costs.

Month of March, 1914.

Groceries on hand March 1st	\$231.58	\$
Groceries purchased during month	428.63	
Groceries issued prison mess		349.63
Groceries issued Engineer's mess		189.27
Store Account:		7.61
Groceries on hand April 1st	113.70	
Meat on hand March 1st	21.00	
Meat purchased during month	329.41	
Meat issued prison mess		269.26
Meat issued Engineer's mess		57.10
Store Account		1.05
Meat on hand April 1st	23.00	
Fuel on hand March 1st	85.00	
Fuel purchased during month (B. S. coal).....	2.50	
Fuel issued Stockade		39.00
Fuel issued outside of Stockade		15.50
Medicine purchased during month	8.05	
Medicine issued		2 6.05
Medicine on hand April 1st	2.00	
Doctors fees		20.00
Clothing in stock March 1st	298.79	
Clothing purchased during month	13.80	
Clothing issued		75.82
Clothing in stock April 1st	236.77	
Transportation of prisoners (including subsistence enroute		180.53
Expense after escapes (including transportation of Guards and their expenses)		80.50

STATE HIGHWAY DEPARTMENT.

Guards payroll (less deductions).....	587.11
Cost of lighting stockade	8.00
Gasoline and lubricating oil for truck.....	34.86
Gasoline and lubricating oil for roller	15.42
Repairs of truck and motorcycle	7.70
Water	5.00
Expense Account of J. C. Ryan	25.80
March payroll, other than guards	1,173.45
March material (working accounts)	262.73
Team feed	822.37
Team rental	669.05
Plow rental	8.75
Wagon rental	29.97
Saddle rental	2.50
Horse medicine	2.75
Telephone bill (January, February and March)	22.05
Typewriter rental	5.00
Office supplies	6.05
2432 Cu. Yds. slag ballast	1,824.00
Total.....	\$ 6,803.88

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Maintaining Prisoners

Month of March, 1914.

1498 1-3

Prisoners
Cost per Capita

Groceries	349.63	0.2334
Meat	269.26	0.1798
Fuel	39.00	0.0260
Medicine	6.05	0.0040
Doctors Fees	20.00	0.0134
Clothing	75.82	0.0506
Transportation	180.53	0.1205
Expense after escapes	80.50	0.0537
Bookkeeper's board	27.90	0.0187
Captain of Guard's board	23.40	0.0156
Guard's payroll	703.71	0.4698
Lighting Stockade	8.00	0.0053
Water	1.00	0.0007

STATE HIGHWAY DEPARTMENT.

Truck hauling supplies	14.50	0.0097
Totals.....	\$1,799.30	1.2011
Less charge for cook in Engineers' mess	31.00	
	<u>\$1,768.30</u>	
Average number of men	48	
Total number prisoner days	1498 1-3	
Cost per prisoner day		1.1571
Prisoners in camp (cooks, waiters, sick and Sundays)	425 1-3	
Total prisoner days (outside work)	1073	
Cost per prisoner day (outside work)		1.6480
72 per cent. of men on outside work.		

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Teams

Month of March, 1914.

885½—2-horse Teams

Hay on hand, March 1st	\$ 189.62
Hay purchased during month	290.34
By Dept. Invoice Bisbee-Tombstone Hwy.....	37.85
Hay fed during month	366.73
Hay on hand April 1st	75.38
Barley on hand March 1st	785.12
Barley fed during month	452.54
Store account	3.10
Store on hand April 1st	329.48
Hey fed	\$366.73
Barley fed	455.64
Water	3.00
Truck hauling hay and grain	27.89
Corral help—1 man	74.88
Horse medicine	3.75
	<u>\$930.89</u>
Less team board	9.45

STATE HIGHWAY DEPARTMENT.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Teams.

Total team days	885½
Working team days	670½
Idle teams (disabled and Sundays)	215
Cost per team day to feed	1.0406
Cost per working team day to feed	1.3743
Team rental per day	0.7556
Team rental per working day	0.9978
Total cost per team day	1.7962
Total cost per working team day	2.3721
Cost of saddle horse per working day	1.2666
NOTE: Rental paid for 826½ team days at \$25.00 per month, 59 teams days on which no rental is paid; teams belonging to State and County.	
Total cost to feed 885½ teams	\$921.44

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Statement showing Prisoners Working at Forrest Camp during
Month of March, 1914.

ACCOUNT:	Number Prisoners:
02-2-1	469½
02-2-2	6
02-2-3	127 1-3
02-2-5	5
02-2-6	853
02-2-7	4½
02-2-8	1
Repairing road at Calumet	32
Total	1498½

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Engineer's Mess.

Month of March, 1914.

Groceries	\$ 189.27
Meat	57.10

STATE HIGHWAY DEPARTMENT.

Fuel	13.00
Water	1.00
Truck hauling supplies	7.19
Cost of cook	31.00

Total cost of mess.....	\$ 298.56
Total number of days	333
Cost per day	\$ 0.897

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Distribution of Cost of Truck and Truck Driver During the

Month of March, 1914.

Driver's salary	\$ 43.56
Driver's board	16.20
Gasoline and lubricating oils.....	34.86
Repairs	4.55

Total.....	\$ 99.16
Number days worked	16
Cost per day	\$6.198
02-2-1—Hauling Groceries	3½ Days \$ 21.69
02-2-1—Transportation of Prisoners	½ " 3.10
02-2-1—Hauling hay and grain	4½ " 27.89
02-2-3—Grading	1 " 6.20
02-2-3—Grading—Calumet job	3½ " 21.69
02-2-6—Surfacing	3 " 18.59

Total..... \$ 99.16

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Estimate No. 3.

Month of March, 1914.

State of Arizona Prison Forces:

GRADING: FORREST:

Sta to Sta	Earth Emb. Cu. Yds.
6 163 To date	29583

STATE HIGHWAY DEPARTMENT.

Previous27000
Current Estimate 2583

DITCHING:

Station:	Earth Exc. Cu. Yds.	Earth Borrow Cu. Yds.
12 60	3	
21 99	33	
26	111	
29 34	15	
71 77	25	
80 90	31	
112 73	30	50
131 97	22	
Total to date	270	50
Previous	270	00
Current Estimate	000	50

Clearing and grubbing no estimate.

Bridges and Culverts no estimate:

SURFACING:

Sta to Sta	Lin. Ft.	Cu. Yds. Slag.	Sq. Yds. Surface.
6 110-50	10450		
150 161	1100		
Total to date	11550	2432	25025

REPAIRING ROAD AT CALUMET:

Sta. to Sta.	Earth Emb. Cu. Yds	Gravel Ballast Cu. Yds.
0 186 13-33	584	506
14-23 23-50	538	309
Totals	1122	815

STATE HIGHWAY DEPARTMENT.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing.

Month of March, 1914.

State of Arizona Prison Forces:

		Recapitulation		
	Total	Per 100' Station	Per Cu. Yd. Slag	Per Sq. Yd. Surface
Surfacing Sub-Grade	727.81	4.665		
Unloading & hauling slag	1861.23		0.765	0.074
Spreading Slag	121.66		0.173	0.017
Gravel	44.99	2.368		
Cost of Slag	1824.00		0.75	0.073
Totals	4879.69		1.688	0.164

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing

Month of March, 1914.

State of Arizona Prison Forces:

Cost of Gravel Top Dressing:

1 Day Foreman	4.746	4.75	
1 Day Bookkeeper	2.42	2.42	
Current paid labor			7.17
16 Days Prisoner	1.648		26.37
4 Days 2-horse team	2.3721		9.49
4 Days Wagon rental .....	.491		1.96
Total cost of gravel to date			44.99
2432 Cu. Yds. Slag Ballast @ \$.075			1,824.00
Total Current Cost of Surfacing			4,701.97
Previous Cost			177.72
Total Cost of Surfacing to date			4,879.69

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing.

Month of March, 1914.

State of Arizona Prison Forces:

Cost of Spreading Slag Ballast:

1 Day Division Engineer	8.265	8.27
7 Day Foreman	5.708	39.96

STATE HIGHWAY DEPARTMENT.

1900 Lin. Ft. Top Dressing.
 2432 Cu. Yds. Slag Ballast Spread.
 11550 Lin. Ft., equivalent to 25025 square yds. covered with slag.

Cost of Surfacing Sub-Grade:

3 days Division Engineer	8.265	24.80
3 1-2 Foreman	5.708	19.98
3 1-2 Days Foreman	5.708	19.98
17 1-2 Days Foreman	4.746	83.06
3 Days Gas Engineer	4.00	12.00
8 Days Instrument Man	4.362	34.90
1 Day Truck and Driver	6.20	6.20
5 Days Bookkeeper	2.42	12.10
		<hr/>
Current paid labor		193.04
185 Days Prisoners	1.648	304.88
4 1-2 Days 2-horse team	2.3721	10.67
5 Days Saddle Horse	1.267	6.33
		<hr/>
Total Current Labor		514.92
Current Material		35.17
Total Current Cost		550.09
Previous Cost		177.72
		<hr/>

Total cost of surfacing Sub-Grade to date 727.81

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Cost of Repairing Road at Calumet

Month of March, 1914.

Citizen Labor: Cost per Cu. Yd. Earth Emb. & Gravel Ballast 0.670.

1122 Cu. Yds. Earth Embankment.

815 Cu. Yds. Gravel Ballast.

2 Days Division Engineer	8.265	16.53
16 1-2 Days Foreman	5.00	82.50
3 1-2 Days Foreman	5.708	19.98
2 1-2 Days Foreman	4.746	11.87
8 Days Instrument Man	4.362	34.90
3 1-2 Days Truck and Driver	6.198	21.69
4 Days Gas Engineer	4.00	16.00
5 Days Bookkeeper	2.42	12.10
18 1-2 days Citizen labor	2.00	37.00
15 2-3 days Citizen labor	1.75	27.42
199 5-6 days Citizen labor	1.50	299.75
		<hr/>

Total Current paid labor 579.74

STATE HIGHWAY DEPARTMENT.

32 Days Prisoner	1.648	52.74
49 Days Wagon rental .....	.491	24.06
254 Days 2-horse team	2.3721	602.51
5 Days saddle horse	1.267	6.33
5 2-3 Days Team and Wagon rental	2.50	14.17

Total current labor		1,279.55
Material		18.27

Total Cost of Repairing Road at Calumet to date1,297.82

Average haul for gravel 1000 ft.

4 days rolling included in above cost.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Account 02-2-8

Miscellaneous

Month of March, 1914.

State of Arizona Prison Forces:

1 day Prisoner	1.648	1.65
1 day 2-horse team	2.37	2.37
Current Cost		4.02
Previous Cost		56.40

Total to date 60.42

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Dragging and Rolling.

Month of March, 1914.

State of Arizona Prison Forces:

4 1-2 days Gas. Engineer	4.00	18.00
4 1-2 day Prisoner	1.648	7.42
Current Labor		25.42
Current Material		5.00
Total Current Cost		30.42
Previous Cost		26.10

Total cost of dragging and rolling to date 56.52

STATE HIGHWAY DEPARTMENT.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Ditching.

Month of March, 1914.

State of Arizona Prison Forces:

50 Cu. Yds. Earth Borrow.

5 Days Prisoners	1.648	8.24
5 Days 2-horse team	2.3721	11.86

Total Current labor	20.10
Previous Cost	148.41
Total cost of ditching to date	168.51

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Cost of Clearing and Grubbing.

Month of March, 1914.

State of Arizona Prison Forces:

6 Days Prisoner @	1.648	\$ 9.89
Previous Cost		203.42

Total to date	213.31
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BISBEE-DOUGLAS HIGHWAY Forrest—East.

Cost of Grading.

Month of March, 1914.

State of Arizona Prison Forces:

—2583 Cu. Yds. Earth Embankment.

	Totals	Per Cu. Yd.
1 Day Division Engineer @	8.265	8.27
3 Days Foremen	5.708	17.12
5 Days Foremen	5.13	25.65
5 Day Foremen	4.746	23.73
1 1-2 Instrument Man	4.362	6.54
3 Day Bookkeeper	2.42	7.26
2 Day Gas. Engineer	4.00	8.00
1 Day Truck and Driver	6.20	6.20
Current paid labor		102.77
127 1-3 Days Prisoner	1.648	209.85
119 Days 2-horse team	2.3721	282.28
5 Days saddle horse	1.267	6.34

STATE HIGHWAY DEPARTMENT.

4 Days wagon rental	491	1.96
Plow rental		8.75
Total Current Labor		611.95
Current Material		94.61
Total current cost		706.56
Previous Cost		5,635.63
Total cost of grading to date		6,342.19
Current cost per cubic yard \$0.2736.		

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Summary of Cost.

Month of April, 1914.

Account.	Current	Previous	To Date.
02-2-1—Office	\$ 18.95	\$ 33.10	\$ 52.05
02-2-3		213.31	213.31
02-2-3—Forrest	50.62	6342.19	6392.81
02-2-3—Calumet	203.67	1297.82	1501.49
Establishing Camp		1028.89	1028.89
02-2-4		1452.58	1452.58
02-2-5	296.70	168.51	465.21
02-2-6	2732.20	4879.69	7611.89
02-2-7	104.70	56.52	161.22
02-2-8	87.53	60.42	147.95
Re-surveying Road.			
Douglas to Lowell	147.95		147.95
Cost of Laying Spur for unloading slag ballast	116.60		116.60
Totals	3758.92	15533.03	19291.95

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Statement of Costs and Supplies.

Month of April, 1914.

Groceries on hand April first	\$ 233.97
Groceries purchased during month	400.09
Groceries issued prison mess	\$ 315.00
Groceries issued engineer's mess	163.64
Store Account	16.81

STATE HIGHWAY DEPARTMENT.

Groceries on hand May 1st	138.61	
Meat on hand April 1st	23.00	
Meat purchased during month	328.88	
Meat issued prison mess		271.78
Meat issued engineer's mess		68.15
Store Account		1.58
Meat on hand May 1st	10.37	
Fuel on hand April 1st	33.00	
Fuel issued stockade		10.00
Fuel issued outside stockade		8.00
Fuel on hand May 1st	15.00	
Medicine on hand April 1st	2.00	
Medicine purchased during month	4.50	
Medicine issued		4.30
Medicine on hand May 1st	2.30	
Clothing on hand May 1st	236.77	
Clothing purchased during month	441.83	
Clothing issued during month		87.37
By Dept. Invoice Bisbee-Tombstone Highway...	591.23	
Total		946.53

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Brought Forward	\$ 946.53
Transferring prisoners	7.05
Guards' Payroll (less deductions)	494.90
Cost of lighting stockade	6.00
Gasoline & Lubricating Oil for truck	36.24
Gasoline & Lubricating Oil for roller	15.80
Repairs of truck	2.73
Water	5.00
Expense account of J. C. Ryan	20.00
April payroll (other than guards)	657.13
Miscellaneous Material (Working accounts)	26.65
Office Supplies	7.15
Team Feed	341.57
Team Rental	277.02
Wagon rental	6.50
Saddle Rental	1.75
Telephone Bill	8.30
Typewriter Rental	3.50
1024.8 Cu. Yds. Slag Ballast	768.60

STATE HIGHWAY DEPARTMENT.

Miscellaneous charges to 25 per cent. portion of State	
Road Tax Fund	9.90
Cost of laying spur for unloading slag. Bill from E. P. & S. W. System	116.60
Total	\$3,758.92

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Cost of Maintaing Prisoners.

Month of April, 1914.

	Totals	1365 Prisoner Days. Cost, Per Capita.
Groceries	\$ 315.00	0.2308
Meat	271.78	0.1991
Fuel	10.00	0.0073
Medicine	2.20	0.0016
Clothing	87.37	0.0640
Bookkeepers' Board	22.92	0.0168
Captain Guard's Board	23.84	0.0175
Transferring Prisoners	7.05	0.0052
Guards' Payroll	615.65	0.4510
Lighting Stockade	6.00	0.0044
Water	1.00	0.0007
Truck Hauling Supplies	8.68	0.0064
Totals	1371.49	1.0048
Less charge for cook in Engineers' Mess	30.00	
	1341.49	

Average No. of men	45
Total Prisoner days	1365
Cost per prisoner day	0.9829
Prisoners in camp (cooks, waiters, sick and Sundays).....	367
Total prisoner days (outside work)	998
Cost per prisoner day (outside work)	1.3441
75 per cent of prisoners on outside work.	

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Cost of Engineer's Mess.

Month of April, 1914.

Groceries	\$163.64
Meat	68.15

STATE HIGHWAY DEPARTMENT.

Fuel	8.00
Water	1.00
Truck hauling supplies	4.34
Cost of cook	30.00
<hr/>	
Total cost of Mess	\$275.13
Total number of days	300
Cost per day	0.917

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Distribution of Cost of Truck and the Driver.

Month of April, 1914.

Driver's Salary	\$ 55.00
Driver's Board	19.80
Gasoline and Lubricating Oil	36.24
Repairs (including 2 prisoners)	6.23
<hr/>	
Totals	\$117.27
Number of days worked	18
Cost per day	\$ 6.515
02-2-1 Hauling Groceries	\$ 13.03
02-2-1 Hauling Hay and Grain	3.26
02-2-3 Repairing road at Calumet	39.09
02-2-6 Surfacing	3.25
02-2-7 Dragging and Rolling	19.55
02-2-8 Miscellaneous	39.09
<hr/>	
Total	\$117.27

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Cost of Teams.

Month of April, 1914.

Hay on hand April 1st	\$ 75.83
Hay purchased during month	55.39
Hay fed during month	89.45
Store Account	1.25
By Dept. Invoice Bisbee-Tombstone	

STATE HIGHWAY DEPARTMENT.

Highway	37.82
Hay on hand May 1st	2.72

Barley on hand April 1st	326.48
Barley fed during month	252.08
Store Account	40.30
Barley on hand May 1st	34.10

Hay fed	89.49
Barley fed	252.08
Water	3.00
Truck hauling hay and grain	3.26
Corral help	34.27

Total	\$382.10
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BISBEE-DOUGLAS HIGHWAY Forrest—East.

Cost of Teams.

Month of April, 1914.

Idle Teams (disabled and Sundays 60½)

Total Team days	377½	
Idle Teams (disabled and Sundays)	60½	
Working Team days	317	
Cost per team day to feed		\$1.0122
Cost per working team day to feed		1.2054
Team rental per day		0.7338
Team rental per working day		0.8739
Total cost per team day		1.7460
Total cost per working team day		2.0793
Cost of saddle horse per working day		1.1229

Note:-Rental paid for 332½ team days at \$25.00 per month.

45 Team days on which no rental is paid:

Teams belonging to state and county.

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Surveying Bisbee-Douglas Highway.

Month of April, 1914.

16 Days Instrument Man @	\$4.45	\$71.20
5 Days Truck and Driver	6.515	32.58

STATE HIGHWAY DEPARTMENT.

Current Paid Labor			\$103.78
33 Days Prisoner	1.3441	44.36	
2 Days Horse and Buggy	2.50	5.00	
			<u>49.36</u>
Total Current Labor			153.14
Current Material			<u>1.87</u>
Total cost to date			\$155.01

BISBEE-DOUGLAS HIGHWAY Forrest—East.

Account 02-2-8—Miscellaneous

Month of April, 1914.

State of Arizona Prison Forces:

Scarifying Old Road etc.

1 Day Foreman @ 5.23	\$ 5.23
1 Day Truck and Driver 6.515	6.52
1½ Day Gas Engineer 4.00	<u>6.00</u>

Current paid labor	\$17.75
27 Days Prisoner @ 1.3441	36.29
15 Days 2 Hs. Teams 2.0795	<u>31.19</u>

Total Current Labor	\$85.23
Current Material	<u>2.30</u>

Total Current Cost	87.53
Previous	<u>60.42</u>

Total to date	\$147.95
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BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Account 02-2-7—Dragging and Rolling.

Month of April, 1914.

State of Arizona Prison Forces:

SPRINKLING.

3 Days Foreman @ 5.805	\$17.41
3 Days Truck Driver 6.515	<u>19.55</u>

Current Paid Labor	<u>\$36.96</u>
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STATE HIGHWAY DEPARTMENT.

15 Days Prisoner @ 1.3441	20.16
1 Days 2 Hs. Team @ 2.0793	2.08
Total cost of Sprinkling	<u>\$59.20</u>
ROLLING.	
8 Days Gas Engineer @ 4.00	32.00
Current Material	13.50
Total current cost of dragging and rolling	<u>104.70</u>
Previous	56.52
Total to date	<u>\$161.22</u>

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Ditching.

Month of April, 1914.

State of Arizona Prison Forces:

1½ Days Div. Engineer @	7.83	\$11.74
3½ Days Gen. Foreman	5.805	20.32
2 Days Inst. Man	4.45	8.90
4 Days Bookkeeper	2.50	10.00
2½ Days Foreman No. 2	5.23	13.08
3 Days Foreman No. 3	4.843	14.53
2½ Days Gas Engineer	4.00	10.00
Current paid labor		<u>\$ 88.57</u>
112 Days Prisoner	1.3441	150.54
5 Days Saddle Horse	1.1229	5.61
25 Days 2 Hs. Teams	2.0793	51.98
Total Current Cost		<u>296.70</u>
Previous Cost		168.51
Total cost of ditching to date		<u>\$465.21</u>

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Grading.

Month of April, 1914.

State of Arizona Prison Forces:

FORREST WORK.

1 Day Gen. Foreman @	5.80	\$ 5.80
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STATE HIGHWAY DEPARTMENT.

13 1-2 Days Gas. Engineer	4.00	54.00
6 1-2 Day Instrument Man	4.362	28.35
5 Days Bookkeeper	2.42	12.10
Current paid labor		142.68
154 Days Prisoner	1.648	253.79
5 1-2 Days 2-horse team	2.3721	13.05
8 Days saddle horse	1.267	10.14
Total Current Labor		419.66
Current Material		2.00
Total cost of Spreading Ballast to date		421.66

BISBEE*DOUGLAS HIGHWAY.

Forrest—East.

Cost of Surfacing.

Month of March, 1914.

State of Arizona Prison Forces:

Cost of Unloading and hauling Slag Ballast:

8 Days Division Engineer	8.265	66.12
21 Days Foreman	5.13	107.73
9 Days Foreman	5.708	51.37
2 Days Instrument Man	4.362	8.72
12 Days Bookkeeper	2.42	29.04
2 Days Truck and Driver	6.20	12.40
Total Current paid labor		275.38
498 Days Prisoner	1.648	820.70
261 Days 2-horse team	2.3721	619.12
4 Days Wagon rental .....	.491	1.96
8 Days Saddle Horse	1.267	10.14
Total current labor		1,727.30

Current material including freight charges..... 133.93

Total cost of unloading and hauling slag ballast to date 1,861.23

BISBEE-DOUGLAS HIGHWAY.

Forrest—East.

Cost of Surfacing.

Month of March, 1914.

State of Arizona Prison Forces:

15600 Lin. ft. Sub-Grade Surfaced.

STATE HIGHWAY DEPARTMENT.

1½ Day Foreman No. 2	5.23	7.85	
Current paid labor			\$13.65
11½ Days Prisoner @	1.3441		15.46
9 Days 2 Hs. Teams	2.0793		18.71
Total Current Labor			\$ 47.82
Current Material			2.80
Total Current Cost			50.62
Previous			6342.19
Total Cost of Grading to Date			\$6392.81

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Grading.

Month of April, 1914.

State of Arizona Prison Forces:

REPAIRING ROAD AT CALUMET.

½ Day Div. Engineer @	7.83	\$ 3.91	
1 Day Gen. Foreman	5.805	5.81	
7 Days Foreman No. 3	4.843	33.90	
1 Day Bookkeeper	2.50	2.50	
6 Days Truck and Driver	6.515	39.09	
2 Days Inst. Man	4.45	8.90	
5 Days Teamster	2.25	11.25	
Current Paid Labor			\$105.36
51 Days Prisoner	1.3441		\$ 68.55
9 Days 2 Hs. Teams	2.0793		18.71
11 Days Wagon	0.50		5.50
Total Current Labor			198.12
Current Material			5.55
Total Current Cost			203.67
Previous			1297.92
Total to date			\$1501.49

STATE HIGHWAY DEPARTMENT.

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing.

Month of April, 1914.

State of Arizona Prison Forces:

900 Cu. Yds. Slag Ballast Spread.
1025 Cu. Yds. Slag Ballast Unloaded and Hauled.
13700 Lin. Ft. equiv. to 29683 Sq. Yds. covered with gravel.
4050 Lin. Ft. equiv. to 8775 Sq. Yds. covered with slag.

Cost of Unloading and Hauling Slag.

2½ Days Div. Engr. @	7.83	\$19.57
5½ Days Gen. Foreman	5.805	29.03
8½ Days Foreman No. 2	5.23	44.46
6 Days Bookkeeper	2.50	15.00
		<hr/>
Current Paid Labor		\$108.06
205½ Days Prisoner	1.3441	276.21
105 Days 2 Hs. Teams	2.0793	218.33
8 Days Saddle Horse	1.1229	8.98
		<hr/>
Total Current Labor Unloading and Hauling		\$ 611.58
Previous Cost		1861.23
		<hr/>
Total to date		\$2472.81

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing.

Month of April, 1914.

State of Arizona Prison Forces:

Cost of Gravel Top Dressing.

5 Days Div. Engr. @	7.83	\$39.15
11 Days Gen. Foreman	5.805	63.86
12½ Days Foreman No. 2	5.23	65.38
12 Days Foreman No. 3	4.843	58.12
12 Days Bookkeeper	2.50	30.00
6 Days Inst Man	4.45	26.70
1½ Day Truck Driver	6.515	9.77
		<hr/>
Current Paid Labor		\$292.98
457½ Days Prisoner @	1.3441	614.93
139½ Days 2 Hs Team	2.0793	290.06

STATE HIGHWAY DEPARTMENT.

8 Days Saddle Horse.....	1.1229	8.98
2 Days Wagon	0.50	1.00
		<hr/>
Total Current Labor—Gravel		1207.95
Current Material		17.22
		<hr/>
Total Current Cost of Gravel		1225.17
Previous		44.99
		<hr/>
Total Cost of Gravel to Date		\$1270.16
1024.8 Cu. Yds. Slag Ballast @ .75		\$ 768.60

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing.

Month of April, 1914.

State of Arizona Prison Forces:

Cost of Spreading Slag.

½ Day	Division Engineer	@ 7.83	....	\$ 3.91
1	" Gen. Foreman	@ 5.805	....	5.80
2	" Bookkeeper	@ 2.50	....	5.00
7	" Gas engineer	@ 4.00	....	28.00
				<hr/>
	Current paid labor	.....		\$ 42.71
58 days	prisoner	@ 1.3441	.....	77.90
3 days	2-horse teams	@ 2.0793	.....	6.24
				<hr/>
	Total current cost spreading slag	....		126.85
	Previous cost	.....		421.66
				<hr/>
	Total to date	.....		\$ 548.51

BISBEE-DOUGLAS HIGHWAY. Forrest—East.

Cost of Surfacing.

Month of April, 1914.

State of Arizona Prison Forces:

Total current cost of surfacing.....	\$2,732.20
Total previous cost	4,879.69
	<hr/>
Total cost of surfacing to date	\$7,611.89

STATE HIGHWAY DEPARTMENT.

Recapitulation Current Month

	Total	Per 100' Station	Per Cu. Yd. Slag	Per. Sq. Yd. Surface.
Unloading and hauling slag	611.58		0.597	0.070
Spreading slag	126.85		0.141	0.014
Gravel top dressing	1225.17	8.943		
Cost of slag	768.60		0.750	0.087
Totals	\$3,732.20		1.488	0.171

NOTE:—125 Cu. Yds. of Slag Ballast hauled for repairs but not spread.
Actual cost of slag per sq. yd. surface for current month is \$0.077.

GLOBE - ROOSEVELT HIGHWAY

F. G. Twitchell, Division Engineer.

This section of highway was graded and surfaced with local material under the Territorial administration but owing to narrow roadway (12 feet) sharp curves and insufficient drainage it was deemed advisable for the safety of the increased traffic and to protect the grade to make such necessary improvement as funds would permit. It was therefore determined, upon completion of the Phoenix-Tempe Highway, to transfer a force of prisoners to this work. Twenty-eight men were selected by Division Engineer F. G. Twitchell to do this work under the Honor System. These men together with the required equipment were transported overland from Tempe to Roosevelt arriving at the latter place December 17, 1913.

Every available honor man has been used to keep this force up to an economic minimum and it has run from 27 to 42 with an average in camp of thirty-six. In addition to the 28 men in the original force 53 have been transferred from the guard camps and 9 from the State Prison making in all a total of 90 individual prisoners who have been engaged on this work up to June 30, 1914. A large majority of these prisoners are short term men upon whose release others are transferred to take their place. Of these 90 prisoners there have been 7 escapes, 3 of whom were recaptured. Work

STATE HIGHWAY DEPARTMENT.

done on Globe-Roosevelt Highway consisted of surface ditching; re-crowning for ten miles; and the construction of three miles of new road, including concrete pavings in Pinto Creek and Campaign Wash. Monthly detail reports covering results accomplished to June 30, 1914, follow:

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 2-1-14.

Statement of force engaged for period from December 15th, 1913, to January 31st, 1914.

Average paid force.....	3
Average number prisoners	32
Average number teams	7
Average number saddle horses	2
Average camp force	5
Average working force	26½
Average number sick	½
Escapes	None
Attempted escapes	None
Cases of insubordination	None

Distribution of Time

Number of days in field	48
Days lost acct. Sundays and holidays	9
Days lost acct. moving camp	10*
Days lost acct. bad weather	1½
Days worked	27½

*Includes five days moving camp from Tempe.

Maintenance Costs.

Stockade

Groceries, per man per day.....	.332
Beef per man per day .....	.226
Tobacco per man per day .....	.015
Lighting per man per day .....	.007
Medicine per man per day .....	.026
Clothing and shoes per man per day.....	.081

.687

STATE HIGHWAY DEPARTMENT.

Stable.

Feeding, per head per day .....	.461
Shoeing, medicine and harness .....	.054
	<hr/>
	515
Average freight haul 30 miles.	7
Average water haul 1½ miles.	1

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 2-1-14.

Statement of expenditure for period from December 15th, 1913. to January 31st, 1914.

Gross Expenditure.

Medicine, beef, groceries, hay and grain, clothing, tools, explosives, etc.	\$ 2,995.21
Wages and travelling expenses	784.83
Transportation	586.95

\$ 4,366.99

Assets

Supplies, as enumerated above	\$ 1,409.85
Due from State Engineer acct. transitman	180.13
Due from State Prison acct. maintenance (estimated)	309.80

\$ 1,899.78

Net Expenditure

\$ 2,467.21

Estimate of Work Done.

Maintenance

Number of miles dragged—total	22
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Reconstruction

Number of miles of road crowned, ruts filled, and rocks taken out.....	10
Ditching—C. Y. earth	421
Ditching—C. Y. loose rock	421
Excavation—C. Y. loose rock	83

New Construction

Clearing—acres	7
Grubbing—acres	7
Excavation—C. Y. earth	41
Excavation—C. Y. loose rock	912
Borrow—C. Y. earth	1001

STATE HIGHWAY DEPARTMENT.

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 2-1-14.

Unit Costs of work done in period from December 15th, 1913,
to January 31st, 1914.

Cost per man per day for time actually worked, including
cost of non-productive force engaged on camp, and in-
cluding cost of maintenance for days when idle..... 873

Cost per team per day for time actually worked, includ-
ing cost of teams engaged hauling water and supplies,
and including cost of maintenance for days when idle..... 1.50

Labor costs means net cost of prisoners and teams.

Overhead expense means engineering, superintendence, repairs,
renewals, depreciation, and all other expenses.

	Lab. cost	O. H. cgs.	Total
Clearing and Grubbing per acre 8.2 man days.....	7.16	5.01	12.17
Ditching—classified as 50% earth, 50% L. R.			a
per C. Y.—.17 man days.....	.150		
.05 team days.....	.075		
	.225	.16	.385
Excavation—Loose Rock—per C. Y.			
.20 man days.....	.175		
.04 team days.....	.060		
	.235	.19	.425
Borrow—Earth—per C. Y.			
.04 man days.....	.035		
.02 team days.....	.030		
	.065	.045	.11
Rebuilding—per mile—			
16.3 man days.....	14.23		
4.7 team days.....	7.05		
	21.28	14.88	36.16
Dragging—per mile			
.45 man days.....	.39		
.23 team days.....	.345		
	.735	1.347	2.082

STATE HIGHWAY DEPARTMENT.

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 2-1-14.

Estimate of probable cost of the work done by P. R. C. No. 1 on the Globe-Roosevelt Highway, if same had been carried on by a contractor on a Force Account basis. The supposition being that a contractor would receive the amount of his pay roll plus ten per cent, and straight rental on livestock, wagons, etc.

Pay Roll

Camp foreman 1½ months at \$125.....	\$ 187.50
Two sub-foremen 1½ months at \$75.....	225.00
Board for above men.....	105.25
Laborers—26½ men for 37½ days at \$2.....	1,988.00
	<hr/>
	\$ 2,505.75
Plus 10%.....	250.57
	<hr/>
	\$ 2,755.32

Rental

7 Teams for 37½ days at \$2.....	\$ 525.00
4 Wagons for 37½ days at 50c.	75.00
1 Plow for 37½ days at 50c.	18.75
4 Scrapers for 37½ days at 10c.	15.00
	<hr/>
	\$ 3,389.07

Engineering

Engineer and two helpers—pay roll.....	\$ 375.00
Board and expenses.....	187.50
Team rent.....	112.50
	<hr/>

Total.....\$ 4,064.07

Actual expenditure.....2,467.21

Balance in favor of prison labor.....\$ 1,596.86

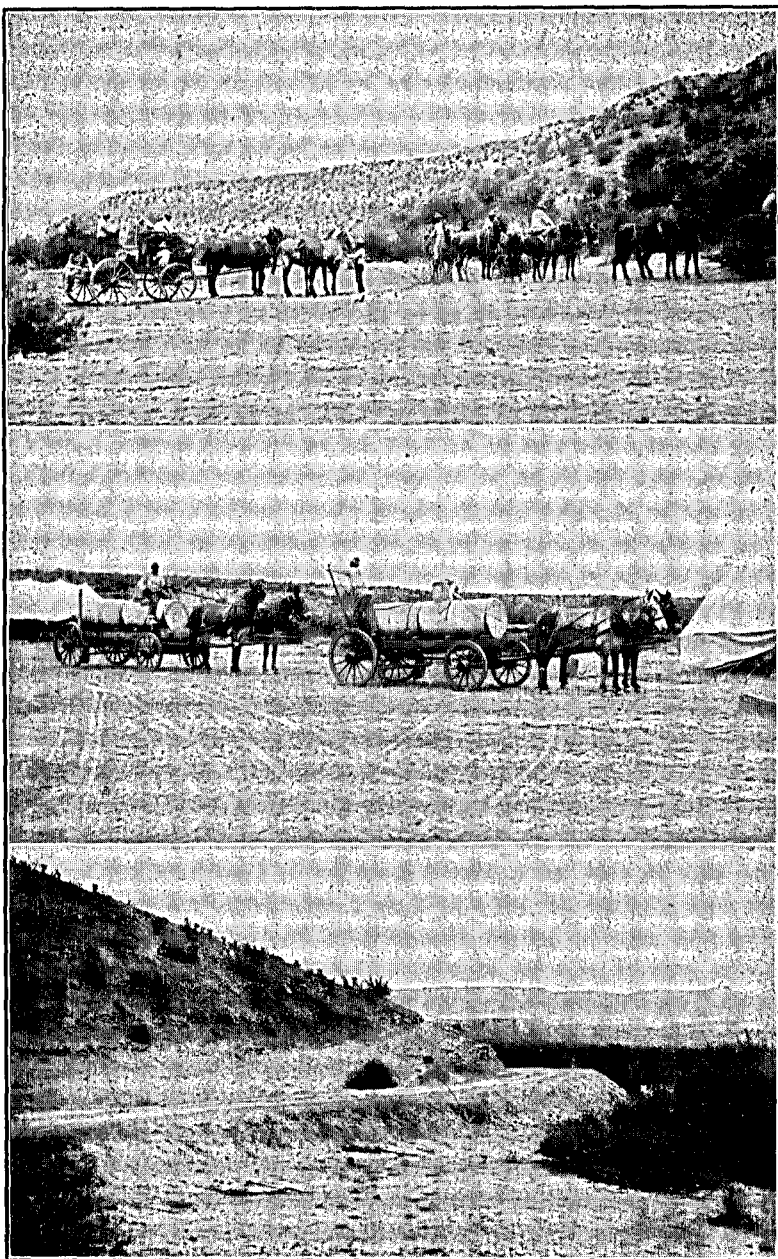
P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 3-2-14.

Statement of force engaged for month of February:

Average paid force.....	3
Average number prisoners.....	36½



GILA COUNTY
Prison Labor
Globe-Roosevelt
Roosevelt Dam Highway
Upper and Center Pictures—State Equipment

STATE HIGHWAY DEPARTMENT.

Average number teams	7
Average number saddle horses	2
Average camp force	6
Average number sick	1½
Average working force	29

Distribution of time:

Days in month	28
Days lost acct. Sundays	4
Days lost acct. bad weather	2
Days worked	22

Maintenance Costs:

Stockade

Groceries, per man per day .....	.346
Beef, per man per day .....	.200
Tobacco, per man per day .....	.013
Lighting, per man per day .....	.006
Clothing and shoes, per man per day .....	.106
Medicine, per man per day .....	.021

.692

Stable

Feeding, per head per day .....	.478
Shoeing, medicine, harness repairs .....	.022

.50

Conduct of Prisoners:

Escapes	None
Attempted escapes	None
Cases of insubordination	None

Average freight haul: 25 miles

Average water haul: 1 mile

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 3-2-14.

Statement of Expenditures for period from December 15th, 1913,

to February 28th, 1914:

Gross Expenditure

Medicine, beef, groceries, hay, grain, clothing, tools, explosives, repairs, renewals, etc.	\$ 3,790.69
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STATE HIGHWAY DEPARTMENT.

Wages and travelling expenses	1,300.71
Transportation	586.95
	<hr/>
	\$ 5,678.35

Assets

Supplies as enumerated above	\$ 1,174.64
Due from Engineering Fund acct. transitman	297.18
Due from State Prison acct. maintenance	509.80
Due from State Prison acct. clothing	31.75

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Net expenditure	\$ 2,013.37
To Jan. 31st	3,664.98
	<hr/>
	2,467.21

For February	\$ 1,197.77
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Estimate of Work Done

Maintenance

Miles dragged and maintained	11
------------------------------------	----

New Construction

Clearing—acres	10
Grubbing—acres	10
Excavation—Loose Rock—C. Y.	1409
Excavation—Solid rock—C. Y.	700
Borrow—earth—C. Y.	591
Ditching—earth—C. Y.	68
Dry wall—C. Y.	43

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 3-2-14.

Unit cost for work done during February, 1914.

Cost per man per day for time actually worked, including cost of non-productive force engaged in camp, and cost of maintenance for days when idle .....	.90
Cost per team per day for time actually worked, including cost of teams hauling water and supplies, and cost of maintenance for days when idle	1.55
Labor cost means net cost of prisoners and teams.	

STATE HIGHWAY DEPARTMENT.

Overhead expense means engineering, superintendence, repairs, renewals, etc.

	Labor	O. H. Cgs.	Total
Clearing and grubbing—per acre.....	3.56	3.63	7.19
Excavation—Loose rock—per C. Y. ....	.231	.174	.406
Solid rock—per C. Y. ....	.285	.239	.524
Borrow—earth—per C. Y. ....	.115	.061	.176
Ditching—earth—per C. Y. ....	.089	.090	.179
Dry wall—per C. Y. ....	.335	.342	.677
Maintenance—dragging— per mile	1.135	.368	1.503

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, Arizona, 3-31-14.

Report for March, 1914.

Per Diem Costs.

Feeding prisoners .....	.621
Clothing prisoners .....	.111
	<hr/>
	.732

Details of Cost of Feeding:

Groceries .....	.357
Beef .....	.240
Tobacco .....	.019
Lighting .....	.005

	.621
Medicine .....	.048
Meals at Engineer's mess .....	.963

Stable

Feeding .....	.440
Shoeing, etc. ....	.061

	.501
Watchman .....	.192

	.693
Engineer's expenses	4.64

STATE HIGHWAY DEPARTMENT.

Personnel:

Average paid force	3
Average number prisoners	32½
Average camp force	6
Average number sick	1
Escapes	Three
Attempted escapes	One
Prisoners released	Seven
Prisoners returned.....	One

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, Arizona, 3-31-14.

Statement of expenditure for period from December 15th, 1913,
to March 31st, 1914.

Gross Expenditure

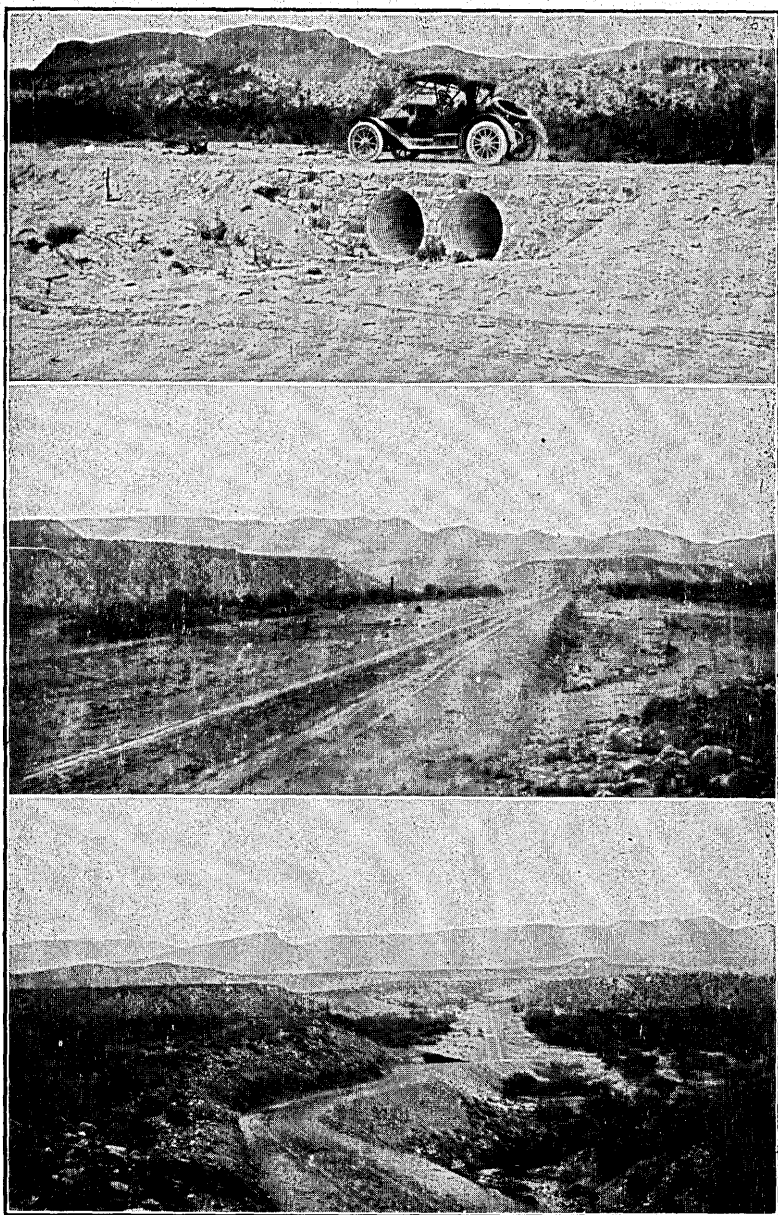
Medicine, beef, groceries, hay, grain, clothing, tools, explosives, repairs, renewals, etc.	\$ 4,960.64
Wages and travelling expenses	1,723.74
Transportation	673.04
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	\$ 7,357.42

Assets.

Supplies as enumerated above	\$ 1,071.82
Due from Engineering Fund acct. transitman	417.03
Due from State Prison acct. maintenance	711.00
Due from State Prison acct. clothing	43.15
	<hr/>
	\$ 2,243.00
Net expenditure	\$ 5,114.42
To Feb. 28th	3,664.98
	<hr/>
For March	\$ 1,449.44

Estimate of Work Done

Miles dragged	3
Clearing—acres	6
Grubbing—acres	6
Excavation—L. R.—C. Y.	925
Excavation—S. R.—C. Y.	310
Borrow—earth—C. Y.	1006
Dry wall—C. Y.	33



GILA COUNTY
Prison Labor
Globe-Roosevelt
Roosevelt Dam Highway

STATE HIGHWAY DEPARTMENT.

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, Arizona, 3-31-14.

Unit costs for work done during March, 1914.

Cost per man per day for time actually worked, including cost of non-productive force engaged in camp, and cost of maintenance for days when idle	1.19
Cost per team per day for time actually worked, including cost of teams hauling water and supplies, and cost of maintenance for days when idle	1.55
Labor cost means net cost of prisoners and teams.	
Overhead expense means engineering, superintendence, repairs, renewals, etc.	

	Labor	O. H.	Cgs.	Total
Clearing and grubbing, per acre	5.16	2.85		8.01
Excavation—Loose rock—per C. Y. ....	.463	.255		.718
Excavation—Solid rock—per C. Y. ....	.641	.321		.962
Borrow—earth—per C. Y. ....	.250	.137		.387
Dry wall—per C. Y. ....	.446	.234		.680
Dragging—per mile	3.61	2.02		5.63

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 5-1-14.

Statement of force engaged for month of April, 1914.

Average paid force	4
Average number prisoners	38
Average number teams	11
Average number saddle horses	1
Average camp force	7
Average number sick	2
Average working force	29

Distribution of time.

Days in month	30
Days lost acct. Sundays	4
Days worked	26

Maintenance Costs.

Stockade

Groceries, per man per day .....	.477
Beef, per man per day .....	.230
Tobacco, per man per day .....	.019

STATE HIGHWAY DEPARTMENT.

Lighting, per man per day .....	.004
Clothing and shoes, per man per day .....	.106
Medicine, per man per day .....	.018

.854

Stable

Feeding, per head per day .....	.450
Shoeing, medicine, repairs .....	.058

.508

Conduct of Prisoners

Escapes	None
Attempted escapes	None
Ret'd acct. incompetence	Three

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 5-1-14.

Statement of expenditure for period from December 15th, 1913,
to April 30th, 1914.

Gross Expenditure

Medicine, beef, groceries, hay, grain, clothing, tools, explosives, cement, repairs, renewals, etc.	\$ 6,644.04
Wages and travelling expenses	2,174.11
Transportation	783.69
A. I. I. Culverts	991.50
	\$ 10,593.34

Assets

Supplies as enumerated above	\$ 1,094.76
Due from Engineering Fund acct. transitman	556.43
Due from State Prison acct. maintenance	938.00
Due from State Prison acct. clothing	43.15

\$ 2,632.34

Net expenditure	\$ 7,961.00
To March 31st	5,114.42
For April	\$ 2,846.58

STATE HIGHWAY DEPARTMENT.

Estimate of Work Done

Clearing—acres	8
Grubbing—acres	8
Excavation—loose rock—C. Y.	2122
Excavation—solid rock—C. Y.	318
Borrow—earth—C. Y.	4836
Foundation Excavation—C. Y.	40
Rubble masonry—C. Y.	25
Dry wall—C. Y.	5
Culverts placed—lineal feet .....	.280

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Globe, 5-1-14.

Unit costs for work done during April, 1914.

Cost per man per day for time actually worked, including cost of non-productive force engaged in camp, and cost of maintenance for days when idle	1.16
Cost per team per day for time actually worked, including cost of teams hauling water and supplies, and cost of maintenance for days when idle	1.35

Prison labor cost means net cost of prisoners and teams.

Paid labor cost means cost of foremen.

Overhead expense means engineering, superintendence, repairs, renewals, etc.

	Prison Labor	Paid Labor	Cement	Explos.	Ovrh'd Expense	Total
Clearing and Grubbing						
per acre	7.61	.81			3.27	11.69
Excavation:						
Loose rock, per C. Y. ....	.139	.021			.063	.223
Solid rock, per C. Y. ....	.486	.063		.254	.214	1.017
Borrow:						
Earth, per C. Y. ....	.096	.015			.043	.154
Foundation:						
Excavation, per C. Y. ....	.464	.221			.264	.949
Rubble Masonry:						
per C. Y.	1.808	.882	2.014		1.045	5.749
Dry wall—per C. Y. ....	.464				.156	.620
Setting up and laying						
culverts, per lin. ft. ....	.129	.060			.088	.277

STATE HIGHWAY DEPARTMENT.

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Statement of force engaged for month of May, 1914.

Average paid force	4
Average number prisoners	37
Average number teams	12
Average camp force	7
Average number sick	1
Average working force	29

Distribution of time

Days in month	31
Days lost acct. Sundays	5
Days worked	26

Stockade

Maintenance Costs.

Groceries, per man per day .....	.352
Beef, per man per day .....	.246
Tobacco, per man per day .....	.015
Lighting, per man per day .....	.002
Clothing and shoes, per man per day .....	.090
Medicine, per man per day .....	.002
	<hr/>
	.707

Stable

Feeding, per head per day .....	.507
Shoeing, medicine, repairs .....	.054
	<hr/>
	.561

Conduct of Prisoners

Escapes	1
Escapes attempted	0
Returned acct. sickness	1
Returned acct. incompetence	0

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Statement of expenditure for period from December 15th, 1913, to May 31st, 1914.

Gross Expenditure

Medicine, beef, groceries, hay, grain, clothing, tools, explosives, cement, repairs, renewals, etc.	\$ 8,221.72
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STATE HIGHWAY DEPARTMENT.

Wages and travelling expenses	2,612.49
Transportation	1,158.69
A. I. I. Culverts	1,500.26

\$ 13,493.16

Assets

A. I. I. Culverts and cement on hand	\$ 425.78
Supplies as enumerated above	1,120.94
Due from Engineering Fund acct. transitman	674.42
Due from State Prison acct. maintenance	1,169.20
Due from State Prison acct. clothing	52.40

\$ 3,442.74

Net expenditure \$ 10,050.42

To April 30th 7,961.00

For May \$ 2,089.42

Estimate of work done.

Clearing—acres	5.4
Grubbing—acres	1.8
Excavation—loose rock—C. Y.	310.0
Excavation—solid rock—C. Y.	29.0
Borrow—earth—C. Y.	1992.0
Foundation Excavation—C. Y.	127.5
Rubble Masonry—C. Y.	196.0
Dry Wall—C. Y.	35.0
Culverts Placed—lineal feet	122.0
Dragging and Crowning—miles	2.7
Re-dragging—maintenance—miles	4
Ditching—C. Y.	746.0

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Unit costs for work done in May, 1914.

Cost per man per day, for time actually worked, including cost of non-productive force engaged in camp, and cost of maintenance for days when idle	1.13
Cost per team per day for time actually worked, including cost of teams hauling water and supplies, and cost of maintenance for days when idle	1.77

Prison labor cost means net cost of prisoners and teams.

Paid labor cost means cost of foreman.

STATE HIGHWAY DEPARTMENT.

Overhead expense means engineering, superintendence, repairs, renewals, etc.

	Prison Labor	Paid Labor	Overhead Expense	Material	Total
Grubbing and clearing, per acre....	4.94	0.00	0.82	0.00	5.76
Excavation:					
Loose rock, per C. Y.....	0.386	0.058	0.062	0.029	0.535
Solid rock, per C. Y.....	0.684	0.103	0.110	0.640	1.537
Borrow—Earth, per C. Y.....	0.181	0.029	0.030	0.015	0.255
Foundation excavation, per C. Y..	0.394	0.102	0.063	0.000	0.559
Rubble Masonry, per C. Y.	1.663	0.408	0.266	1.585	3.922
Dry wall, per C. Y.	0.832	0.200	0.133	0.000	1.165
Setting up and laying culverts					
per lineal ft.....	0.055	0.000	0.009	3.510	3.565
Dragging and Crowning per mlie..	3.222	0.645	0.515	0.000	4.382
Re-dragging:					
Maintenance, per mile	3.840	0.000	0.605	0.000	4.445
Ditching per C. Y.....	0.259	0.039	0.041	0.018	0.357

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Statement of force engaged for month of June, 1914.

Average paid force	4
Average number prisoners	41
Average number teams	13
Average camp force	7
Average number sick	2
Average working force	31

Distribution of time.

Days in month	30
Days lost acct. Sundays	4
Days lost acct. rain	0½
Days worked	25½

Stockade maintenance costs:

Groceries, per man per day .....	.382
Beef, per man per day .....	.194
Tobacco, per man per day .....	.026
Lighting, per man per day .....	.004
Clothing and shoes, per man per day.....	.042
Medicine, per man per day .....	.000

648.

STATE HIGHWAY DEPARTMENT.

Stable.

Feeding, per head per day 399
Shoeing, medicine, repairs 087

486

Conduct of prisoners.

Escapes 1
Escapes attempted 2
Returned acct. sickness 0
Returned acct. insubordination 2

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek.

Statement of expenditure for period from Dec. 15th, 1913,
to June 30th, 1914.

Gross Expenditure

Medicine, beef, groceries, hay, grain, clothing, tools, explosives,
cement, repairs, renewals, etc. \$ 10,131.67
Wages and travelling expenses 3,265.02
Transportation 1,208.14
A. I. I. Culverts 1,500.26
\$ 16,105.09

Assets

A. I. I. Culverts and cement on hand \$ 462.51
Supplies as enumerated above 1,139.91
Due from Engineering Fund acct. transitman 792.17
Due from State Prison acct. maintenance 1,412.60
Due from State Prison acct. clothing 95.10
\$ 3,902.29

Net expenditure \$ 12,202.80
To May 31st 9,761.19

For June \$ 2,441.61

Estimate of Work Done

Clearing—acres 5.5
Grubbing—acres 1.0

STATE HIGHWAY DEPARTMENT.

Excavation—loose rock—C. Y.	960.0
Excavation—solid rock—C. Y.	931.0
Borrow—earth—C. Y.	1677.7
Foundation Excavation—C. Y.	100.0
Rubble Masonry—C. Y.	41.0
Paving and walls—C. Y.	167.0
Dry wall—C. Y.	10.0
Culverts placed—lineal feet 36 in.	76.0
Dragging and crowning—miles	1.18
Re-dragging—maintenance—miles	6.18
Ditching—C. Y.	635.0
Raking—miles	1.63
Repairing washes—maintenance—number (about 100 C. Y.)....	4

P. R. C. No. 1—GLOBE-ROOSEVELT HIGHWAY

Camp at Pinto Creek

Unit costs for work done in June

Cost per man per day, for time actually worked, including cost of non-productive force engaged in camp, and cost of maintenance for days when idle..... .6815

Cost per team per day for time actually worked, including cost of teams hauling water and supplies, and cost of maintenance for days when idle 1.374

Prison labor cost means net cost of prisoners and teams.

Paid labor cost means cost of foreman.

Overhead expense means engineering, superintendence, repairs, renewals, etc.

	Prison Labor	Paid Labor	Overhead Expense	Material	Total
Grubbing, per acre	5.111	2.000	2.5000		9.611
Clearing, per acre	2.480	1.100	1.318		4.898
Excavation:					----
Loose rock, per C. Y.....	0.162	0.029	0.079	0.021	0.291
Solid rock, per C. Y.	0.319	0.038	0.182	0.144	0.683
Borrow—Earth, per C. Y.	0.089	0.024	0.045	0.007	0.165
Foundation Exc., per C. Y.....	0.198	0.100	0.110		0.408
Rubble Masonry, per C. Y.	1.774	0.610	1.433	1.552	5.369
Paving, per C. Y.	0.653	0.203	0.852	1.497	3.205
Dry wall, per C. Y.....	0.136	0.100	0.080		0.316
Setting up and laying culverts					
per lineal foot	0.045	0.026	0.025		0.096

STATE HIGHWAY DEPARTMENT.

\$135.89 A. I. I. culverts used in June

Raking, per mile	12.130	7.362	7.976	2.761	30.229
Dragging and Crowning, per mile..	4.355		1.610		5.965
Re-dragging:					
Maintenance, per mile	3.326		1.213		4.539
Repairing washes, per C. Y.					
Maintenance (100 C. Y.)	0.127		0.045		0.172
Ditching, per C. Y.	0.063	0.025	0.022		0.110

Menu of Prisoners' Mess.

Breakfast: Oatmeal, bacon, fried potatoes, hot cakes with syrup, coffee.

On Sundays, two eggs per man.

Dinner: Soup, roast beef or stew, boiled beans, potatoes—boiled, baked or roasted, pie or pudding, coffee.

On Sundays, canned corn or tomatoes. Boiled beef may be used once a week only.

Supper: Hamburger, hash or stew, beans, boiled or fried, potatoes, pie or stewed fruit and cake, coffee.