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Two Highway Budgets---The Governor's Budget and That Of the Highway Commission

By RALPH W. BULL, Chairman, California Highway Commission

THE STATE OF CALIFORNIA will disburse \$106,432,790 for highway purposes in the two fiscal years extending from July 1, 1929, to June 30, 1931.

This is shown in the budget submitted by Governor C. C. Young to the Legislature. Incidentally this budget discloses the fact that there are two highway budgets in California. One budget is that of the California Highway Commission. It totals \$60,773,490. This budget comprises the biennial program of new construction and reconstruction projects and estimated maintenance expenditures on the state highway system. It comprises a part, but only a part of the Governor's highway budget.

The Governor's budget, on the other hand, in addition to expenditures outlined in the program of the California Highway Commission contains also disbursements of highway money for a number of other purposes. These include the apportionment to the counties of their share of the 2-cent gasoline tax, estimated at \$31,606,745 for the 1929-1931 biennium; payments out of the State's general fund of \$9,110,425 for interest on and redemption of state highway bonds; expenditures of the Division of Motor Vehicle totaling \$3,169,030 paid out of automobile registration fees; payment of county traffic officers in the sum of \$1,742,500 which is deducted from the counties' share of the 2-cent gasoline tax. The expenses of the Division of Contracts and Rights of Way, which works in conjunction with the Division of Highways, at a cost for the biennium of \$30,600. All of these items with the \$60,773,490 budget of the California High-

way Commission make a grand total in the Governor's budget of \$106,432,790.

It is interesting to note that the peak of payments for interest and redemption of state highway bonds has apparently been passed. Thus the amount paid from the general funds of the state for these items will be \$332,640 less during the 1929-1931 biennium than was paid during the 1927-1929 biennium.

The statement that accompanies Governor Young's budget reveals some interesting facts relative to the disbursement of highway funds.

Attention is called by Governor Young to the fact that "the highways of California now receive the largest portion of the state's funds, when state aided county roads are included. Highway expenditures at the present time amount to 44 per cent of the total budget. California spends vast sums upon her highways and does so at the dictum of her people who appreciate fully the value of good roads in the development of the state."

Governor Young also emphasizes the huge saving in highway cost made possible through the adoption of a pay-as-you-go plan as compared with the issuance of bonds. He states that the cost of new highway construction projects recommended by the California Highway Commission for construction in the 1929-1931 biennium totals \$27,400,000. If this were paid from the proceeds of 4½ per

cent bonds, maturing in forty years the cost of the same projects would be \$51,272,250. Commenting on this, Governor Young says: "The wisdom of the legislature in proposing and enacting a tax on gasoline, which all users of



RALPH W. BULL.

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State Highways in the Country Back of the Sierras



A Mono County view.

✧ ✧



In Inyo County between Lone Pine and Independence.

✧ ✧



A highway running into the clouds—between Alabama Gate and Manzanar, Inyo County.

✧ ✧



View of the mountains looking west in Inyo County.

Highway Development in Inyo County

By F. G. SOMNER, District Engineer

THE CONCLUSION in January, 1928, of contracts by the Southwest Paving Company, Diaz Lake to Alabama Gate, and by Montfort and Armstrong, between Tinemaha and Big Pine, marks the completion of an important link in highway development "east of the high Sierras;" i. e. the construction of an oiled surfaced road from Diaz Lake south of Lone Pine to Sherwin Hill at the head of Owens Valley, distance 83.6 miles.



F. G. SOMNER.

At least one venerable citizen of Bishop has expressed himself simply but fervently as being "thankful to the good Lord for being permitted to live to ride over a good road from Bishop to Independence, the county seat of Inyo County." Added happiness to declining years is in itself more than meager return to those of us not devoid of sentiment and whose endeavors may have brought about these changes.

At the creation of District Nine in October, 1923, a stretch of oiled macadam north of Bishop 8.37 miles in length, together with an eight mile stretch of 8 foot concrete pavement between Big Pine and Independence comprised the hard surfaced roads within the Owens Valley. The other portions may best be described as being in general "two ruts in the sand."

As the balance of the roads were generally in no better condition and in places much worse, it was the purpose to first facilitate travel over the whole district, always followed by an increase of travel with attending increased demand on the limited funds available. There was, therefore, little opportunity to concentrate in proper and orderly fashion on any particular stretch of road, so temporary expedients with recourse to the materials immediately at hand, such as sand, clay surface and decomposed granite was the order of the day.

The surface oiling in 1921 on the Sherwin Hill had proved a failure, necessitating the removal of several miles of corrugated oil cake, which did not have a tendency to encourage further attempts at oil processing, either mixing or penetration method. However,



Upper picture, Sand Dunes in Death Valley.
Lower view, At the summit of Mt. Whitney.

adverse conditions were offset by an appreciative spirit and an unanimous support on the part of the citizenship of the valley, unprecedented in the writer's experience, thus stimulating efforts to remedy matters. A marked improvement soon became noticeable throughout the valley.

In the season of 1926 experiments were made with both light and medium oil, applying from one-fourth to one-half gallon per square yard on stretches aggregating 30 miles, covering surfaces of volcanic cinders and decomposed granite. In the season of 1927-28 the road mixing method was employed throughout, covering both decomposed granite and crushed rock surfacing and including the rehabilitation by mixing method of portions of the roads oiled in the previous year by the penetration method, adding from three-

(Continued on page 17.)

1928 Road Developments in California

By C. H. PURCELL, State Highway Engineer *

PROBABLY the more important developments in this state during 1928 were: Application of fuel oil to crushed stone road surfacing.

Reduction of roughness on asphalt concrete pavement.

Increased use of timber bridges.

Increased attention to appearance of highways.

The State of California is faced with the problem of grading and surfacing a large mileage of highways. It is not possible financially to pave this mileage as fast as it is graded nor does good engineering practice permit of paving new grades involving substantial embankment until after several years' settlement. Also in desert and mountainous regions, present traffic does not at this time justify pavement. The Division of Highways, during the current year, is constructing a considerable mileage of crushed rock surfaced roads with the top three or four inches of the road metal treated with fuel oil. Three methods are employed in applying the oil; penetration method, plant mix method, road mix method. The major portion of this type of construction is located in the mountainous and desert region. In these localities it is believed that the oil treated crushed rock surface will be adequate for a number of years. In localities where traffic is heavier, the oil treated surface is intended only to bridge over the period until paving may be accomplished. The oil treated crushed rock furnishes a superior surface to the untreated metal and eliminates the necessity for restoring the road metal every few years; however, the general maintenance is not reduced.

In the construction of asphalt concrete pavements in this state it has always been very difficult to get a smooth surface; the asphalt concrete pavement could not compare in smoothness with Portland cement concrete pavements. The introduction of the machine finish on asphalt concrete pavements has resulted in producing a smoothness of finish which is but little inferior to the best Portland cement concrete pavement. The description of these machines and the methods of using them have been given in various technical magazines and are not repeated here.

In the past the great majority of short span bridges have been constructed of concrete.

These were constructed as permanent structures; however, the large increase in traffic, both in volume and in speed, has resulted in increasing the standard of highway construction, particularly the location, to such an extent that many of the small concrete bridges have to be abandoned. The Division of Highways is now constructing concrete bridges only on locations where there is no doubt as to the permanency of the location. In other locations and in the desert regions where the cost of concrete materials is prohibitive, timber bridges are being built, either of treated fir or untreated redwood. Untreated redwood compares very favorably with treated fir as regards life. The Bridge Department, with the cooperation of the California Redwood Association, has prepared a set of grading specifications which insure a dependable quality of redwood timber for structural purposes.

Attention is being given to having the highway right of way in as neat and slightly a condition as possible, as well as to take advantage of the scenic possibilities of the country as far as consistent with good highway location. Particular care is being taken to restrict the clearing operations to the end that only the timber and shrubbery which interferes with the road is destroyed; also that the cleared area is left in a neat condition. Care is also taken to see that the roadbed and slopes are left in a neat condition upon the completion of grading. The Surveys and Plans Department, the Construction Department and the Maintenance Department are cooperating with each other to the end that when the highway is constructed it is left in such shape that the entire width of right of way can be maintained in a neat condition by the Maintenance Department. A landscape engineer is employed to assist in this work.

The finances for highway construction and maintenance in this state are well provided for, the annual revenue available for state highway construction and maintenance being approximately thirty million dollars per year. This insures an extensive construction program after taking care of maintenance. The program for 1929 includes bridge work amounting to approximately three million dollars, a considerable mileage of heavy grading, and a substantial amount of paving. Highway work constitutes the major portion of con-

* This article was first published in the January issue of *The Earth Mover*.

Toll Bridge Report Submitted to Legislature by Highway Commission

“THE FURTHER construction of all privately owned toll bridges should be prohibited.”

In the above sentence, Governor C. C. Young summarized the findings of the Department of Public Works relative to toll bridges in California. The report was made in compliance with an act of the 1927 legislature requiring the California Highway Commission to investigate and report with recommendations upon the construction and operation of privately owned toll bridges in California.

The report was transmitted to the California Highway Commission by B. B. Meek, director of the Department of Public Works. Mr. Meek concurred in both the findings of the report and the recommendations contained therein.

The report comprises over 200 pages of typewritten matter, and in addition to the text contains many pages of maps, charts, exhibits and other supporting data. The investigation was made under the immediate direction of C. H. Purcell, State Highway Engineer, and Chas. E. Andrew, Bridge Engineer of the Division of Highways. The report constitutes a very complete and exhaustive study of toll structures.

SUMMARY OF FINDINGS

The recommendation that further construction of privately owned toll bridges in California be prohibited is based upon the following findings:

The cost and operation of the privately owned toll bridge is excessive;

Tolls are far in excess of those necessary to operate and amortize the cost of similar state-built and operated structures. The rates of tolls on the Carquinez and Antioch bridges “indicate that the cost of public service on the present bridges is at least 88 per cent higher than it would have been on similar bridges constructed and operated by the state.”

The state can not acquire private toll structures after their construction at a value consistent with that for which the state or counties can build or operate them.

ADVOCATE PUBLIC BRIDGES

As an alternative for the privately owned and operated toll bridges, the report recommends that “necessary steps be taken to permit the state or counties to finance or build toll bridges” by the issuance of bonds payable out of the income of such structures.

CONCLUSIONS REACHED

The conclusions contained in the report are summarized as follows:

1. The expense of promotion and organization of a privately owned toll bridge is in many cases a major item in its cost. The report states that promotion and organization expenses in the case of the Carquinez and Antioch bridges totaled \$1,166,776. Compared with this the organization costs of the same bridges had they been publicly financed and built by the state is estimated at \$153,500. Promotion and organization expenses of the San Mateo-Hayward bridge, including both money and stock allotments, are estimated at \$785,670 as compared with an organization charge of not to exceed \$160,000 for a similar state built structure.

2. Private interests have been quick to recognize the possibility of capitalizing for their own benefit the huge investment made by the public in state and county highways. In the case of the Carquinez bridge it is estimated that private interests anticipated state recognition by at least five years.

3. It is charged that private promoters often build or attempt to build toll bridges on locations where the traffic does not justify them. This is done for the apparent purpose of collecting promotion fees or because the probability of future increase in traffic seems to justify a present investment.

4. The cost of tolls on the San Mateo-Hayward bridge, if the structure had been state financed and built, but operated on a toll basis, is estimated at about 35 per cent of the present authorized toll schedule for the 47 years period that constitutes the life of the franchise.

5. The cost of financing privately owned toll bridges is declared excessive. Thus the report states that the cost of financing the Carquinez and Antioch bridges, owned by the American Toll Bridge Company, includes a stock bonus of 500,000 shares and an item of \$673,853 for bond discount. Computing the stock at par value of \$1 a share, the discount on a \$6,500,000 bond issue totals \$1,173,753. The bonds bear 7 per cent on \$4,500,000 and 8 per cent on \$2,000,000 as compared with 4½ per cent for which state bonds can be sold at par, or 6 per cent if bonds secured by the income of the bridge were used. On the San Mateo-Hayward Bridge, the interest rate on bond financing, including all charges, is given as 7.7 per cent and for the Dumbarton Bridge 7.3 per cent.

6. As far as the investigators were able to ascertain, no actual money was paid for any of the 120,000 shares of common stock issued by the company building the San Mateo-Hayward Bridge. On the lowest traffic estimate the stock will have a present worth of \$33 per share with a reasonable possibility that it will go to \$79.50 per share. This stock is held by those directly interested in the bridge. The worth (\$3,960,000 to \$9,540,000) will accrue to the common stock owners without capital investment, other than services rendered prior to the opening of the bridge.

7. The reproduction costs by the state of the Carquinez and Antioch bridges is estimated at \$7,675,900 as compared with the actual cost for the structures of \$9,520,789 to the American Toll Bridge Company. The difference in cost is attributed in part to lack of competitive bidding. In general it is estimated that

the cost of constructing a privately owned toll bridge is from 10 per cent to 25 per cent higher than for a public structure.

8. The cost of operation of these two bridges is declared excessive as compared with bridges built and operated by the state. The figures are: Combined annual cost of operating Carquinez and Antioch bridges, \$1,176,000; estimated cost if built and operated by state (6 per cent financing) \$918,000.

TOLL CHARGES COMPARED

It is declared that average tolls on the Carquinez Bridge, until 1948 when the bridge becomes free, if built and operated by the state, would be 44 cents a vehicle as compared to an average toll of 82 cents, under present conditions. If financed by the state on a 4½ per cent basis, the average state toll would in its turn be cut from 44 cents to 38 cents a vehicle. If the state had financed the San Mateo-Hayward Bridge, an average toll of 15 cents for pleasure cars and 58 cents for commercial vehicles would operate and amortize the cost of the structure during the life of the franchise (1930-1977), as compared with the following authorized tolls for the private structure: 1930 to 1950, 60 cents for pleasure cars, \$1.75 for commercial cars; 1950 to 1957, 56 cents for pleasure cars, \$1.66 for commercial vehicles; 1957 to 1977, 38 cents for pleasure cars, \$1.13 for commercial vehicles.

HIGHWAYS AND TOLL BRIDGES

Discussing the highway situation generally as it affects toll roads, the report calls attention to the fact that in California 95 per cent of the roads and bridges are owned and operated either by the state or by counties.

"It should not be necessary nor should private capital be allowed," the report continues, "to pick out advantageous points on the highway system and build toll bridges or roads that will take profits that would otherwise tend to lessen the average cost of highway service on the entire public highway system. * * *

"The economic construction and operation of the public highway system should be from a standpoint of the entire state or nation rather than from a local point of view as a city or county. * * * The argument that a city or county can make money from a toll bridge is fundamentally wrong. It is not economically sound that the citizens of one county or city should travel free on the roads of any other county or city or upon the state highway system, and in turn exact a profit from travelers outside of their boundaries using their roads or bridges.

"The present enormous investment by the public in state and county highways is being capitalized by private toll bridge companies."

RECOMMENDATIONS

Specific recommendations included in the report are:

Existing laws governing the issuance of franchises for toll bridges as well as their construction and operation are obsolete. If it is decided to continue to grant franchises for toll structures to private parties, it is recommended that the right to grant such franchise be vested either in the California Highway Commission or be made subject to the approval of that body, and that the rates of tolls be fixed by the Railroad Commission. The present laws relating to the right to operate toll bridges and the method of granting franchises therefor date back to 1872 and 1881. The report commenting upon this fact says: "No amendments have been made which change the principle of

the application of these laws. They are based upon the principle of delegating their rights to the counties and therefore are found to be more or less incompatible with the existing idea of a state highway system."

It is further recommended that the law vesting authority over franchises in a county on the left bank descending of a stream be amended, if franchises for privately owned and operated structures are to be continued. This provision is declared difficult of determination in the case of San Francisco Bay.

It is suggested that power be given to the Highway Commission or to the Department of Public Works to "locate, design, construct and operate" toll bridges and to finance the same by issuing income bonds having as their sole security the income from tolls.

If the legislature has the power to do so, it is recommended that legislation be enacted giving the Highway Commission or the Department of Public Works authority to acquire existing privately owned toll bridges by purchase. Methods of acquiring these bridges are discussed and the conclusion is expressed that condemnation is the only practical proceeding to employ. It is pointed out that there is a wide variance in the value placed upon a structure depending upon the valuation method employed.

COST OF BRIDGES

It is estimated that the acquisition of all of the privately owned toll bridges in California, either now operating or which will be operated in California in 1929 will require a capital investment of \$20,156,300, if the price paid is based on the cost of bridges to the toll bridge companies. The total cost of reproduction of all of these bridges by the state is estimated at \$16,250,900.

Computed on state traffic prediction and a 6 per cent reinvestment basis, the report finds that the price of the Carquinez and Antioch bridges would be \$11,846,400 and of the San Mateo-Hayward Bridge, \$14,457,490. Even paying \$11,846,400 for the Carquinez and Antioch bridges and financing their purchase with 6 per cent bonds, the report declares that the present average toll of 82 cents per vehicle on the Carquinez Bridge and 81.2 cents per vehicle on the Antioch Bridge can be reduced to 52 cents and 61 cents, respectively. A substantial reduction can also be made, the report declares, in the tolls that its franchise will permit the San Mateo-Hayward Bridge to charge, when that structure is opened to traffic.

The report calls attention to the fact that not all of the toll bridges in the state are located upon the state highway, but that all are more or less important links of highway traffic. Their acquisition would accordingly require additional expenditures for connections with the state system. The report discusses at some length this phase of the subject, and analyzes the bridge locations both with reference to the service that it affords travel, and the service afforded by alternate routes. The same analysis is made of proposed toll bridge projects.

TOLL BRIDGES IN CALIFORNIA

The report is based upon a close study and an expert analysis of the seven privately owned toll bridges in California. These include three bridges owned and operated by the Sears Point Toll Road Company in Solano and Sonoma counties; two bridges over the Sacramento and San Joaquin rivers, owned and operated by the American Bridge Company, one known as the Carquinez Bridge, the other as the Antioch Bridge; the Dumbarton Bridge crossing the southerly arm of the San Francisco Bay, owned and operated by the Dumbarton Bridge Company; a bridge

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Investigation Into Financing of Toll Bridges Asked in U. S. Senate

A CONGRESSIONAL investigation into methods of financing the construction of toll bridges is proposed in a resolution introduced in the U. S. Senate on December 10 by Senator Oddie, of Nevada.

The resolution calls for the appointment of a select joint committee of three senators and three members of the House who would be directed to carry on the investigation and to report at the first session of the next congress. Among the phases of the subject which would be investigated would be the question whether public or private construction of toll bridges is most advantageous to the public, and the degree of supervision which should be exercised by the public over the construction and financing of bridges erected by private capital.

The resolution was referred to the Committee to Audit and Control the Contingent Expenses of the Senate. It follows in full text:

Resolved by the Senate (the House of Representatives concurring), That a joint select committee is hereby created, to be known as the Select Joint Committee to Investigate Toll Bridges on the Public Highways and Ferries, which committee shall consist of three Senators who are members of the Committee on Post Offices and Post Roads, to be appointed by the Vice President, and three members of the House of Representatives who are members of the Committee on Roads, to be appointed by the Speaker, said appointments to be made from among those who are members of the seventy-first congress.

Sec. 2. Said committee shall investigate and report to the seventy-first congress during its first session upon the following subjects:

1. Whether existing congressional legislation authorizing private companies or persons to build toll bridges upon the public highways of the United States adequately provides for the safety and permanence of such structures erected or to be erected and for their adequate inspection during construction.

PUBLIC CONSTRUCTION SUGGESTED

2. Whether, since all such bridges will ultimately become the property of the public, it is in the public interest that it have control over their initial construction and future maintenance.

3. Whether, in view of the fact that under existing federal highway legislation congress has required the states to agree that the roads shall be free from tolls, which requirement the states have accepted, it be just and reasonable to grant franchises permitting a revival of a system of toll gates in the form of toll bridges.

4. Whether, as currently reported, franchises granted by congress for the building of private toll

bridges have been sold, offered for sale, or made the subject of trafficking.

CAPITALIZATION TO BE STUDIED

5. Whether there has been excessive and extravagant capitalization of toll bridge structures, which is reflected in the tolls paid by the public and in the value of the securities purchased by it.

6. Whether the public has demonstrated its willingness and ability to finance the construction of large bridges on as favorable or more favorable terms than private interests, and whether in such cases the use of such structures ultimately is made free to the public at an earlier period than when constructed by private capital, although a toll charge for their immediate use may have been temporarily necessary.

Sec. 3. Said committee shall also make investigation with respect to existing toll bridges on the public highways and ferries connecting therewith, such investigation to include the original investment therein, present value, outstanding securities, rate of tolls, dividends, salaries, traffic carried, and other related and pertinent matters; also the status of franchises granted, including the activities of agents in procuring such franchises, together with the disposition of such franchises by sale or otherwise.

New District Equipment

Shops at San Luis Obispo

New buildings to house the district and equipment shops are now being constructed in District Five at San Luis Obispo on a new site recently purchased by the state for this purpose.

The new site, containing 5.7 acres located on the Coast Highway, at the southerly city limits adjacent to the Pacific Coast Railway freight yards, one mile from the center of the city, is considered to be the most advantageous location to be found in the vicinity whereon to erect the buildings necessary for maintaining highway equipment. It is the ultimate purpose to have all district buildings, including administration office, maintenance shops and storage buildings, located on the same property.

The first unit of the construction under contract and under way includes a shop building 100 feet 6 inches by 60 feet and equipment storage shed 192 feet 6 inches by 25 feet, both structures being of timber frame covered with galvanized corrugated metal. Additional small buildings will complete the construction at this time.

OREGON—Mountain road contracts totaling \$1,423,000 have been in progress in Rainier National Park. Beauty spots heretofore to be seen only by slower means of travel will be visited by thousands of motorists in 1929.

Highway Research in the United States

T. E. STANTON, Materials and Research Engineer.

FOLLOWING attendance at the Fourteenth Annual Meeting of the American Association of State Highway Officials at Chicago last November the writer took advantage of the opportunity to visit the State Highway Testing Laboratories in Missouri, Illinois, and Iowa, as well as the laboratory of the Portland Cement Association and the Chicago Paving Laboratory in Chicago, and the laboratory of the American Rolling Mills Company at Middletown, Ohio.

A vast amount of highway research work is being done by the United States Bureau of Public Roads and by many of the state highway departments. The Association of State Highway Officials constitutes the principal medium for the exchange of ideas and the coordination of all such activities; in fact, the general interest which is now being taken in the subject may be said to date from the organization of the association, and if this were the only beneficial result the existence of the association would be justified.

STANDARDIZING SPECIFICATIONS

Standardization of specifications has resulted and the Department of Agriculture through the Bureau of Public Roads has issued Department Bulletin No. 1216 dealing with the "Tentative Standard Methods of Sampling and Testing Highway Materials as adopted by the American Association of State Highway Officials and approved by the Secretary of Agriculture for Use in Connection with Federal Aid Road Construction."

STANDARDS BETTERED

Before the inception of the policy of federal aid in road building and the organization of the State Highway Officials Association there were many states in which the standard of highway construction was at an exceedingly low ebb. Politics dominated to such an extent that not only were highways being built in improper locations but millions of dollars were being wasted on inferior construction. This situation was of vital concern to the entire United States, imposing as it did a heavy burden in operation cost on every motorist who desired to pass through or visit points of interest in states where a good road was an unknown quantity.

Through the magnificent work which has been done by the Bureau of Public Roads this situation has been or will very shortly be

entirely corrected. The bureau's efforts, however, would have been much less effective had it not been for the support and influence of the state highway officials working through their national association.

RESEARCH PROJECTS

The report of the research committee, of which V. L. Glover, Materials Engineer of Illinois, is chairman, shows 525 research projects reported completed or in progress by the various states. It is very probable that more than double this number have actually been undertaken, but many in such a small or haphazard way that they were not reported by the states.

Without doubt there is considerable overlapping of research work and a great deal of money and effort is being wasted by duplication of projects. One of the main problems of the research committee is to coordinate the activities of the various states and bring about a greater degree of cooperation. The results of the major part of the investigations carried on are seldom published. The value which might accrue to others is, therefore, lost, and those conducting the work also lose the valuable criticism which publication usually elicits.

WILL MAKE CONCLUSIONS PUBLIC

It will be the policy of the California Materials and Research Department to prepare for publication in the Official Bulletin from time to time articles dealing with its research activities to the end that any knowledge gained thereby may be made accessible to others.

RESEARCH EXPENDITURES

Over \$750,000 was reported by the Bureau of Public Roads and the State Highway Departments as being spent annually on research work. Without doubt the actual expenditures by all agencies engaged in this class of work is well over \$1,000,000 per year.

This is but a small fraction of the total expenditures for road work in the United States, however, which are reported to have been over \$1,200,000,000 for 1926 outside of incorporated cities and national forests and parks.

WORK IN OTHER STATES

While practically all of the states are taking an active interest in highway research the

states of Illinois, Iowa, Minnesota, Missouri, and Pennsylvania have particularly active departments presided over by capable executives.

A new building is being erected in Jefferson City, Missouri, to house all of the activities of the highway department. The materials and testing department will occupy the lower or basement floor of this building.

As in California, a special building has been erected for the materials department both at Springfield, Illinois, and Ames, Iowa.

There is a growing tendency to thoroughly equip and finance the materials and testing departments in the more important road building states, thus evidencing the importance which this branch of a highway organization is assuming.

WORK IN CALIFORNIA

None of the laboratories visited have any superiority over California in location and general set-up. Some are better equipped for certain lines of testing, but none of the states have the wide variety of work carried on in California and, for that reason, their research activities are, for the most part, confined to a narrower field.

Most of the pavement laid during recent years in Illinois, Missouri, and Iowa has been of the Portland cement concrete type. Most of the investigational work carried on by these states, therefore, has been concerned with this type.

INTEREST IN CALIFORNIA PAVEMENTS

The primary roads in these states, however, are nearly completed and they now face the problems of finding a cheap surfacing for their large mileage of secondary roads. Increasing interest was found, therefore, in the investigations which have been carried on by California in connection with the surfacing of our light traffic highways with what is known as the California oil mix type. At the request of the Program Committee the writer led the discussion on "Bituminous Surface Treatment of Crushed Rock and Gravel Roads" at the group meeting on maintenance and traffic control.

CURING CONCRETE

A number of investigations are being made by the laboratories relative to the value of different methods of curing concrete pavements in order to get away from the conventional curing method of wet earth covering or ponding with water. Many of the eastern states have adopted calcium chloride or sodium silicate as the preferred curing agent. Tests in California, however, where little rain

can be expected during the dry period of the year, indicate that these methods are not as effective as water curing.

As in California, most of the eastern states exercise close laboratory control over the materials used in concrete construction with the result that the pavements now being laid are of a much higher quality than the pavements of but a few years ago.

The practice in Missouri and Illinois is to drill cores from the pavement from 250 to 500 feet apart for the purpose of accurately determining the thickness of the constructed pavement and for making strength tests.

COOPERATION IN RESEARCH

It is the practice of the most active of the eastern and middle western states to maintain a close contact with the National Research Council and to send their material men to attend the annual meeting of the council in Washington. The men from these states also attend an annual summer meeting in Washington of the Committee on Materials of the State Highway Officials Association. Most of the real conference work of the committee is done at this special summer meeting.

On account of the distance few of the western states have sent their material men to attend the summer conference. In order to remedy this situation and make it possible for the western members of the committee to take an active part in the work it is proposed to revise the organization of the committee on materials so as to provide for a western section to be composed of those members of the committee representing the eleven Rocky Mountain and Pacific coast states, as follows: Montana, Wyoming, Colorado, New Mexico, Idaho, Utah, Arizona, Nevada, Washington, Oregon and California.

The western section is to be organized primarily in order that the members of the committee representing the eleven western states may have an opportunity of meeting for the purpose of discussing methods of tests and specifications with special reference to their application in the section of the country which they represent.

OTHER RESEARCH AGENCIES

The Portland Cement Association has a building of its own in Chicago and has a fully equipped research laboratory connected therewith. This laboratory is in charge of Mr. H. F. Gonnerman, a specialist in hydraulic concrete research. Mr. Gonnerman conducted the party through the laboratory in Chicago and participated in a general discussion relative to the results of some recent tests which have been conducted both by his association

(Continued on page 26.)

California State Highway Policies

By C. C. YOUNG, Governor of California

The following article comprises those portions of the Biennial and Budget Messages of Governor C. C. Young to the State Legislature of 1929 dealing with the progress of the State Highway System and the policies that govern its development and administration.

The director of the Department of Public Works serves as the head and administrative officer of the Division of Highways. The work of road building in California has of late years properly assumed very great importance, being only second to education in cost, both to the state and to the various counties. At the beginning of the present administration, only about \$5,000,000 a year was available for the construction of new state highways, the bond issues previously used for that purpose having been exhausted some years before. The gasoline tax then coming to the state was used entirely for reconstruction, maintenance and repair.

Gasoline Tax Allocated by Law. At the 1927 session of the legislature, the Breed Gasoline Tax Law was so amended as to provide a three-cent gas tax. Of this, one cent goes to the counties (to be shared with the cities as may be found desirable), one cent goes to maintenance and reconstruction of state roads, and one cent to the constructing of new state highways. A State Highway Commission of five members, serving without pay, acting on the basis of facts ascertained by the engineers, at the beginning of each biennium allocates the funds to various highways of the state. The percentage of overhead cost is being steadily reduced, efficiency of operation is being increased, and it can probably be said that, both in extent and quality of road construction and in its business-like administration, California stands at the forefront of all the states.

BUDGETING OF HIGHWAY EXPENDITURES

New Budget Policy. Up to two years ago, road construction was not mentioned in the state budget except an item of \$20,800 per year for the salaries of the highway commission and highway engineer. The 1927 budget, however, published not only an estimate of highway expenditures for the succeeding biennium, but also gave a list of specific expenditures proposed for reconstruction of state roads. This marked the inauguration of a new policy in state highway affairs in California, that of frankly telling the public in advance of expenditures just where and how it is proposed to spend highway funds.

Original Gasoline Tax Plans. The maintenance and reconstruction program in this first budget involved total expenditures of \$27,100,000, a like amount being allotted to the counties as their share of the two-cent gas tax. Supplemental allotments of increased revenue and savings on contract awards brought the total of this budget to \$28,577,517 for the biennium.

Highway Funds Total. In January, 1928, the additional cent gas tax for the construction of new roads became effective, and a detailed budget of the new roads proposed, and the amount to be spent on each, was at once published. This budget allocated \$15,100,000 for new construction, this being the estimated available income from the one-

cent gasoline tax for the eighteen months of the biennium during which the new law was effective. The budget for expenditures of federal road money (Third State Highway Fund) totals \$5,582,834. The total of the budgets of all these state highway funds for the present biennium, therefore, aggregated \$49,260,351. This does not include the money turned over to the counties for highway purposes, which aggregated \$26,000,000, and which was included in the budget, since it represents an allocation of revenue raised through state law.

Budget for Next Two Years. The budget for the 1929-1931 highway program with the funds specifically allocated for new construction and reconstruction has been completed, and is being submitted in the accompanying budget message. The highway program of the state has become so important, and the sources of its revenues are so distinct that, for the sake of convenience, it has been thought wise to segregate the highway budget from the budgets of expenditures for educational and for general purposes. Field work looking toward the preparation of the highway budget for the biennium of 1931-1933 has already been begun.

Highway System to Date. There are now 6565 miles authorized as the state highway system, 4273 miles being of primary and 2292 miles of secondary roads. Of this mileage 2465 are graded and paved; 1350 miles are graded and surfaced; 517 miles are merely graded and not yet paved or surfaced; while 2233 miles have as yet had no work done upon them by the state.

POLICY AS TO NEW STATE ROADS

Policy as to the Inclusion of New Roads in the State System. At this time it will be necessary to establish some policy relative to the inclusion of new roads within the state highway system. There is a certain "orphan" section of highway which, by error in description, by oversight, or through other fault, was not included in the state system when the parent roads were designated as state highways. This probably should be annexed to the present system at once. It comprises about 5 miles. But aside from this I am very doubtful whether other additions can be made just now without disrupting our entire highway program.

Method, Priority and Time of Adding New Roads. There are certain other roads, now a part of county highway systems, that are largely devoted to state rather than local uses. These roads clearly have prior rights to become a part of the state system, when that system is expanded. The question now is as to when such transfer should take place. I would suggest to the Director of Public Works that during the next two years he make a comprehensive traffic study of those county highways in California which now serve as arterial highways, or of routes not now in the state system of probable arterial value, to determine what roads should be added to the system, and the order in which they should be added as determined by

state use and traffic needs, together with an estimate of the probable time when such roads can be included in the state system without imposing an impossible burden on that system.

Recommendation of Department Necessary. No Governor should be asked or expected to sign a bill providing for the extension of the state highway system, except upon recommendation of the Department of Public Works—a recommendation in its turn based upon a careful study of traffic requirements and highway use, in line with the broad general policy of long-time planning. Any other plan will break down our program of highway construction and will savor of political expediency rather than of safe and business-like procedure. Whatever policy may be adopted must be based on traffic and not political pressure.

HIGHWAY AND BRIDGE CONSTRUCTION

Moneys Distributed as Required by Law. Particular attention is being given to increasing the volume of winter highway work as a means of assisting in the relief of seasonal unemployment. Allocation of funds, both for new construction and for reconstruction, has been made in strict accordance with the Breed bill. In this connection it should be clearly understood that a balance as between construction expenditure in the northern and the southern group of counties can not economically be maintained on a day to day, week to week, or month to month basis. In the northern counties work must be largely prosecuted during the summer months, if due regard is to be given to economy in construction. The southern group of counties offers advantages for winter work, work highly desirable because of the aid to seasonal unemployment that usually prevails during the winter months. Accordingly during the summer the northern group of counties will inevitably show a greater ratio of expenditure than the southern group, while in the winter conditions will be reversed. A biennial financial balance, however, is entirely possible and will be maintained.

Volume of Work. The importance to California of state highway expenditures is shown by the fact that the volume of these expenditures authorized to date (January 7th) for the biennium reached the huge total of \$41,346,184. This money is distributed all over California, furnishing a large, immediate market both for labor and goods, as well as contributing to the future development of the state.

Toll Bridges. The policy of the state can be expressed as opposed to privately owned and controlled toll bridges on the state system of highways, but not opposed to publicly constructed, owned and operated toll bridges where adequate public funds are not now available for the construction of free structures. In all cases, however, the aim will be to amortize these investments as rapidly as possible, in order to be able to turn them over to the public, free from all tolls, at the earliest possible date.

HIGHWAY SAFETY AND BEAUTIFICATION

Increasing Safety of Highways. Increased attention is being given to make the highways of the state safer for travel. This is being accomplished through the elimination of dangerous curves; the separation of railroad grade crossings; striping the highways and thus providing defined travel ways; the abatement of the dust danger through oiling operations; betterment in alignment; more adequate protective signing; reduc-

tion in the crown of roads; increase in road widths; filling borrow pits; increase in guard rails, etc.

Wider Rights of Way. During the present biennium, substantial progress has been made toward securing the 100-foot right of way as the minimum requirements of all main north and south state highways and on all other important arteries of travel. Notable examples of highways where the minimum right of way of 100 feet has been obtained are the Foothill Boulevard in Los Angeles and San Bernardino counties, and the Bay Shore Highway in San Mateo County. On practically every road which was built or reconstructed during the present fiscal year the ultimate width desired for right of way was obtained before contracts were let.

Highway Beautification. A definite campaign which is winning widespread support has been launched to save the scenic values of highways, by preventing their injury through unsightly roadside structures and by billboards which, while properly situated in commercial areas along highways, yet have no place along our scenic roads. Study of the highway system is being made to determine those areas of particular scenic charm, recreational value and historical interest, lying adjacent to the highways, that should be preserved. Model sections are being planned at various points to show planting methods by which roadside beautification can be accomplished. An effort has been made to assist in the "Save the Beaches" movement, and care has been given to the preservation of roadside trees and shrubs and other trees, of unusual interest or importance, although growing off the highway right of way.

PRISON ROAD CAMPS

Original and Purpose. Convict labor on highways is no longer an experiment in California. It has been in existence for fourteen years, being first authorized by the legislature of 1915. Although such labor costs practically the same as road building by contract, it has more than justified itself by the good it has done for the prisoners themselves. The work is for the most part in rough mountain country, and the men are practically unguarded; yet attempts at escape are very few, as are also the numbers of former road camp prisoners who drift back into crime after their release.

Convict Road Projects. The number of convict highway projects is now eight as compared with three such projects during the winter of 1927-1928. The expansion of convict camp work has meant the average employment on highway work from March 1, 1928, to December 1, 1928, of 490 prisoners. This has relieved the state of a considerable burden of expense in the maintenance of prisoners in San Quentin. It is estimated that the average employment of 650 convicts on road projects saves \$150,000 a year in their prison upkeep, besides doing immeasurable good in so rehabilitating them physically and mentally as to enable them to "go straight" at the expiration of their term. The small percentage that return to crime after a road camp experience is very gratifying.

Nearly Six Hundred at Work. There were 571 prisoners at work on state highways on December 1, 1928, all of them being paid a small wage for their work. Out of the earnings of the prisoners, a substantial sum has been allotted by them to the care of dependents. Those without dependents save something to aid them in starting life anew. It is worthy of note that out of every one dollar

spent on convict highway projects approximately eighty cents goes directly or indirectly to free labor.

BUDGET MESSAGE TO THE LEGISLATURE

In his budget message Governor Young discussed state highway matters as follows:

In order that those directly interested in state expenditures for highway purposes may find in one section all such items, the expenditures for highways have been segregated to comprise a separate highway budget. The highways of California now receive the largest portion of the state's funds, when state-aided county roads are included. Highway expenditures at the present time amount to 44 per cent of the total budget.

California spends vast sums upon her highways and does so at the dictum of her people, who appreciate fully the value of good roads in the development of the state. Revenues for state highway construction come mainly from the gasoline taxes which the people have voted and which seem to find universal approval, although there are considerable contributions to these revenues from automobile licenses and from the tax franchise imposed upon commercial automotive vehicles. The Governor has no control over these funds, even the allotment of them being apportioned by law. The budget for the coming biennium reaches the total of \$106,432,790.

This sum includes every expenditure for highway purposes, whether disbursed directly by the state, or indirectly through the agencies of the counties. Statute requirements are that one-half the original gasoline tax of two cents per gallon, less the cost of collection, shall be turned over to the counties. The same law applies to the revenues received from the annual issue of automobile licenses and the gross receipts tax levied upon commercial vehicles. The state receives in addition to its half of these funds, all the one-cent gasoline tax, but must spend it for new construction only. The state also receives additional revenues from federal aid.

The Highway Budget, therefore, is more a budget of and by the legislature, than a product of the Governor's office, but is included herewith in keeping with the general plan that every dollar of state expenditure shall be shown in this document. I congratulate the legislature that its plans for highway financing have been thoroughly successful, and that through the moneys now received an orderly program of maintenance, reconstruction and new construction of highways in California can proceed at good speed without recourse to bond issues. Your attention has been directed to the great saving effected through the "pay-as-you-go" plan of financing new road construction, as compared with the old bond issue method.

PAST AND PRESENT METHODS OF FINANCING HIGHWAYS

It is pointed out in my message covering the entire budget that if the \$27,400,000 of proposed expenditures for new highway construction in the next biennium had been provided by the issuing of bonds maturing over a period of forty years, at 4½ per cent interest, the construction eventually would have cost the people of the state \$51,272,250. The total highway bonds amounting to \$73,000,000 which already have been voted by the people during the past years for highway construction will cost \$153,869,913 when all of the interest has been paid and the bonds finally redeemed.

The wisdom of the legislature in proposing and enacting a tax on gasoline, which all users of the highway pay in proportion to their enjoyment of the benefits of these good roads, has been amply demonstrated. Construction through bond issue revenues increase such cost by 100 per cent. At the time of the beginning of the state highway system, when automotive equipment was in its infancy, the bond issue plan was the only one open to us. The immense growth of the use of gasoline-propelled vehicles and the consequent forging to the front of this fuel, permitted the employment of this special form of tax, with which to finance the highways necessary for the economical operation of such vehicles. The experiment has been so successful, the tax so easy of collection, the fairness of it so universally conceded, and the saving so great over the previous method of financing, it is most improbable that the people of California will ever revert to the issuance of interest-bearing securities for an enterprise of this character.

I pointed out in my message upon the General Budget that at the beginning of the present administration, only about \$5,000,000 a year was available for the construction of new state highways, the bond issues previously used for that purpose having been exhausted some years before. The gasoline tax then coming to the state was used entirely for reconstruction, maintenance and repair.

At the 1927 session of the legislature, the Breed Gasoline Tax Law was so amended as to provide a three-cent gas tax. Of this, one cent goes to the counties (to be shared with the cities as may be found desirable), one cent goes to maintenance and reconstruction of state roads, and one cent to the constructing of new state highways. A State Highway Commission of five members, serving without pay, acting on the basis of facts ascertained by the engineers, at the beginning of each biennium allocates the funds to various highways of the state. The percentage of overhead cost is being steadily reduced, efficiency of operation is being increased, and it can probably be said that, both in extent and quality of road construction and in its business-like administration, California stands at the forefront of all the states.

CALIFORNIA'S FIRST HIGHWAY BUDGET

Up to two years ago, road construction was not mentioned in the state budget except by an item of \$20,800 per year for the salaries of the highway commission and highway engineer. The 1927 budget, however, published not only an estimate of highway expenditures for the succeeding biennium, but also gave a list of specific expenditures proposed for reconstruction of state roads. This marked the inauguration of a new policy in state highway affairs in California, that of frankly telling the public in advance of expenditures just where and how it is proposed to spend highway funds.

The maintenance and reconstruction program in this first budget involved total expenditures of \$27,100,000, a like amount being allotted to the counties as their share of the two-cent gas tax. Supplemental allotments of increased revenue and savings on contract awards brought the total of this budget to \$28,577,517 for the biennium.

In January, 1928, the additional one-cent tax for the construction of new roads became effective, and a detailed budget of the new roads proposed, and the amount to be spent on each, was

at once published. This budget allocated \$15,100,000 for new construction, this being the estimated available income from the one-cent gasoline tax for the eighteen months of the biennium during which the new law was effective. The budget for expenditures of federal road money (Third State Highway Funds) totals \$5,582,834. The total of the budgets of all these state highway funds for the present biennium, therefore, aggregated \$49,260,351. This does not include the money turned over to the counties for highway purposes, which aggregated \$26,000,000, and which was included in the budget, since it represents an allocation of revenue raised through state law.

The budget for the 1929-1931 highway program, with the funds specifically allocated for new construction and reconstruction, is here presented. Field work looking toward the preparation of the highway budget for the biennium of 1931-1933 has already commenced. In all these the allocation is on the basis of traffic needs as determined by the Highway Commission, while the quota allotment as to the two ends of the state has been scrupulously followed.

There are now 6565 miles authorized as the state highway system, 4273 miles being of primary and 2292 miles of secondary roads. Of this mileage 2465 are graded and paved; 1350 miles are graded and surfaced; 517 miles are merely graded and not yet paved or surfaced; while 2232 miles have as yet had no work done upon them by the state.

The steadily growing costs of highway construction are shown by the following table showing budget totals and percentages of growth by bienniums:

Fiscal years of bienniums	Date limits of bienniums	Total expenditures for biennium	Percentage of increase
75th and 76th.....	1923-1925	\$48,171,317 48	-----
77th and 78th.....	1925-1927	69,132,927 74	43.51
79th and 80th.....	1927-1929	90,942,342 88	31.55
81st and 82d.....	1929-1931	106,432,790 00	17.03

No one objects, however, to these costs, partly because they are entirely borne by the users of the highways; partly because it is only proper that all the money coming from gasoline taxes and license fees should go to this purpose alone; partly because the public is convinced that our highways are being built in an efficient, economical, and business-like manner, with a minimum of overhead cost; and, finally, because our people are satisfied that California can have no greater asset than a well-planned, well-constructed, permanent system of state roads.

The train halted for a moment. A traveler reached out the window, called to a boy and said, "Here, son, here's 50 cents; get me a 25-cent sandwich and one for yourself." Just as the train started to pull out, the boy hurried up to the window and shouted "Here's your quarter, mister. They didn't have but one sandwich."

PENNSYLVANIA—More than a thousand miles of old stone roads have been reconditioned at moderate cost by applying two inches of new stone, rolling, adding tar, and then blading and rolling while tar is stiffening.

SCENIC DIKE ALONG KINGS RIVER HIGHWAY SAVED FOR PEOPLE

[From the *Fresno Bee*]

Forming the first spectacular approach to the Kings River Canyon on the new highway, for which location plans are now being completed, a great limestone dike that rises in a knife edge from the river just north of the Horseshoe Bend, will be preserved forever in its natural beauty, the Fresno County Chamber of Commerce was informed today by the National Forest Service.

The right to file on property in this area has been withdrawn by the forest service at the request of the chamber under an act of June 25, 1910, and June 10, 1920. The dike is the location of the famous Boyden Cave.

The new highway will be constructed by convict labor. The convict camp will be established on completion of the survey probably in the spring or early summer, according to Bert B. Meek, chief of the State Division of Public Works. Funds for operating the camp are obtained by special appropriation for the convict road building program.

Torches Are Used to Clear State Highway

[From the *San Bernardino Sun*]

Unique use of road torches has been discovered by the State Highway Commission, according to E. Q. Sullivan, district engineer. In addition to the use for which they were originally designed, melting down the bumps in asphalt pavement preparatory to smoothing them out, they can be used to advantage in melting away ice on the roads in the mountain districts.

This new use was first discovered last winter when one of the oil-burning road torches was used to melt ice which had formed on the highway in the "blue cut" in Cajon Pass. The Highway Commission now has two of these torches and yesterday a third was ordered at the request of Ben Bond, foreman of the Crest route, who believes a torch can be used to advantage on the road between Crestline Village and Squirrel Inn, where a heavy coating of ice forms during the winter months.

Mr. Sullivan explained that the torches cannot be used to clear the road of snow as well as ploughs, but they were very successful last winter in keeping the Cajon road clear of ice.

1928 ROAD DEVELOPMENTS IN CALIFORNIA

(Continued from page 4.)

struction activity on the Pacific coast, hence the competition among contractors is very keen.

With assured finances and a healthy contracting organization, it appears that highway construction in this state will proceed under favorable conditions for a number of years.

Traffic Stripes on Highway's Edge

THE TRAFFIC STRIPES recently painted on the section between the Herndon Bridge and Madera, have resulted in a popular demand for more of the same.

The pavement is 20 foot asphaltic concrete built in 1928. The striping consists of a white line 6 inches wide along each edge of the pavement and an orange line in the center. Oil mixed rock borders blended in so closely with the pavement that the edge of the roadway was hard to distinguish before the stripes were painted. The present lines define the traffic lanes and tend to speed up traffic considerably, particularly at night.

The orange line appears to have better visibility at night and in the fog. The white line along the edge is of particular advantage when meeting traffic as it defines the edge of the roadway and is always visible even when meeting a car with glaring headlights.

The center line draws traffic toward the normal driving lane and the side lines act to some extent in keeping it off the shoulders.

The side lines are more spectacular and therefore cause more comment, but District Engineer E. E. Wallace states that the center line is indispensable and the side lines are a great convenience. There is no question but that they add materially to the safety, speed and comfort of the traveling public.

The equipment used in marking the highway is a light truck and a Simons Paint Machine. The costs on this work vary according to the type and condition of the surface. A fairly open, porous surface will require as much as 18 gallons of paint per mile while a smooth, "close" surface will use about 13 gallons.

Where it is necessary to mark the line before painting, the cost of moving to the job, labor, equipment rental and supplies is about \$15 per mile of line. Where marking in advance is not required, the cost is from \$5.25 to \$6.35 per mile. This makes the total cost range between \$35 and \$55 per mile of line.

NEW YORK—In the Adirondack region traffic is largely for pleasure, and good stone is plentiful. These two factors combine to make bituminous macadam the most practicable type of road surface, a large mileage of which is being added each year.



View showing border stripes.

HIGHWAY STRIPES ARE LAUDED BY DRIVER FOR SAFETY ACCORDED TRAVEL

Corcoran, California, December 24, 1928.

California Highway Commission,
Sacramento, California.

Gentlemen:

Before I get out of the notion (which we so often do when in the mood to give credit to those who deserve) let me say that whoever inaugurated the idea of painting a wide yellow stripe down the middle of the highway and also when to this protecting line was added a white stripe painted along each edge of the highway such as I noticed in the neighborhood of Fresno, hit the safety idea right on the nose.

I recently made a night trip from Corcoran to Modesto and returned in the night, the round trip being made in a thick, heavy fog. I was able to jog right along and make good time in this dense fog at night, where the stripes guided me, with my windows frosted and fogged over badly. All other traffic moved along fine, but when we hit an unstriped highway, the timid dropped out one by one until dozens stood alongside the highway with their lights lit waiting for their nerve to pick up or the fog to lift or daylight to break. You know how pleasant that is. Those of us who absolutely had to move under such conditions drove blind and depended upon the quickness of our eye and hand.

If you are trying out this above safety idea I for one will say you are certainly doing the most important thing imaginable to keep traffic moving, and safely, in the foggy season of the year. It is also of almost as much benefit to night or day drivers the entire year around. I'm a one-time railroad train dispatcher, and safety first ideas are inborn. Those stripes on the highway, or which there are far too few, immediately struck me as one of the most practical and effective of any of the many safety devices yet employed to promote the safety of night and bad-weather drivers.

Yours very truly,

C. N. HAYES.

California Given \$2,495,345 Federal Aid Road Funds

A total of \$73,125,000 was apportioned by the Secretary of Agriculture for federal-aid highway construction for the fiscal year commencing next July 1, it was announced December 29 by the Department of Agriculture. The full text of the announcement, containing the allotments of federal-aid funds among the states and the Territory of Hawaii for the coming fiscal year, follows:

This apportionment has been authorized by Congress for continuing the federal-aid program, and the funds will be expended according to the same provisions which have governed past expenditures. In general the states pay half the cost of federal-aid construction. Federal-aid funds are administered by the Bureau of Public Roads and are available only for routes on the federal-aid system, which includes the main highways of the Nation.

During the last fiscal year improvements were completed on 8184 miles of federal-aid road which had not previously been improved with federal assistance, and advanced stages of improvement were completed on 2014 miles.

The apportionment is as follows:

Alabama, \$1,554,221; Arizona, \$1,061,111; Arkansas, \$1,254,352; California, \$2,495,345; Colorado \$1,388,755; Connecticut, \$477,110; Delaware, \$365,625; Florida, \$909,235; Georgia, \$1,980,443; Hawaii, \$365,625.

Idaho, \$932,902; Illinois, \$2,118,949; Indiana, \$1,917,030; Iowa, \$2,026,861; Kansas, \$2,056,396; Kentucky, \$1,417,634; Louisiana, \$1,026,096; Maine, \$678,501; Maryland, \$633,615.

Massachusetts, \$1,090,077; Michigan, \$2,204,966; Minnesota, \$2,108,104; Mississippi, \$1,311,391; Missouri, \$2,392,021; Montana, \$1,554,060; Nebraska, \$1,536,299; Nevada, \$960,375; New Hampshire, \$365,625; New Jersey, \$937,434; New Mexico, \$1,189,085.

New York, \$3,617,748; North Carolina, \$1,716,919; North Dakota, \$1,197,585; Ohio, \$2,754,446; Oklahoma, \$1,748,857; Oregon, \$1,191,989.

Pennsylvania, \$3,325,854; Rhode Island, \$365,625; South Carolina, \$1,061,447; South Dakota, \$1,229,282; Tennessee, \$1,609,662; Texas, \$4,531,162.

Utah, \$848,592; Vermont, \$365,625; Virginia, \$1,433,405; Washington, \$1,149,483; West Virginia, \$796,408; Wisconsin, \$1,854,580; Wyoming, \$939,536; total, \$73,125,000.

DO YOU REMEMBER WHEN —?

[From the *Orland Unit*]

B. B. Meek, director of the State Department of Public Works, estimates that about \$1,700,000 a year will be available in each of the secondary road districts of the state, northern and southern, for the coming six years. Does anybody present remember when road work depended chiefly upon poll taxes, and the big part of it was "worked out" by some one who had nothing in particular to do? In those days rails from a convenient fence were quite handy in boosting a wagon wheel out of a mud hole.

An association has been formed in Indiana to promote the construction of a 30-foot paved road from Lake Michigan to the Ohio River, opposite Louisville, Kentucky. Provisions will be made for sufficient right of way to permit building a 60-foot pavement later.

Courtesy of Highway Employee Praised By Newspaper Columnist

[From Rad's Ramblings in the *Merced Sun*]

We have additional reason for endorsing the work of the State Highway Commission, that gang of Bert Meck's that is making California highways the admiration of the tourist world. We mean an additional reason to the ordinary ones which include the conventional efficiency and all that sort o' thing.

We were motoring toward the beautiful mountains of Mariposa the other day, and you know if you've ventured up that way of late that the highway gang is straightening curves and widening the highway on that section of the road from Yosemite to the sea. We got up there about where Ben Cornett enjoys the blessings of bachelorhood and where the aforesaid highway gang operates a steam shovel or two. They have the highway rather mused up in two or three places, and we were proceeding blithely on our way with our much better half and as Harry Lauder puts it, we were just talkin' and speakin' to one another when all of a sudden we mounted a small hill and met up with a huge steam shovel which was cavorting around in a most menacing manner. That steam shovel looked about as big as the Tioga hotel. We might have dodged the shovel all right, but a member of the highway crew came running toward us waving his arms. We had already stopped to take a survey of the situation. The man said, "Back your car down that hill and wait!" meaning the hill we had just negotiated. We got out of the car and said to the highway workman, "Brother, if you want that car backed down that hill, you'll have to do it yourself. We're rather new at driving and thought we did pretty well to get up the hill. Rather than take a chance on backing it down we would prefer to mix it with the steam shovel." The man grinned and hopped in our car and backed it down, and everything was happy and friendly. When the big steam shovel got through swinging its tonneau around the fellow gave us the high sign and we traveled onward and upward.

We don't know who that highway workman is, but we're in favor of his promotion.

Asserted Gasoline Thieves Arrested in Chase Over Desert

SAN BERNARDINO—Accused of the theft of 20 gallons of gasoline from a crew of the State Highway Commission at Cronese Valley, along the Arrowhead trail, Elix Weigh, 19, and William Cherepkai, 18, were brought to the county jail yesterday from Yermo by Constable Tom Williams under sentence of 180 days.

The arrest of Weigh and Cherepkai followed a chase of over 30 miles across the desert by members of the State Highway crew. In addition to stealing gasoline Weigh and Cherepkai are asserted to have disabled the gas lines of tractors used in road work and caused a two-day layoff of the road crew while the machinery was being repaired.

Bayshore Highway Construction Proves Gigantic Project

THE BAYSHORE HIGHWAY, between San Francisco and South San Francisco, three and one-half miles under contract to H. W. Rohl for grading and surfacing, is progressing rapidly.

The main feature of this contract is the grading which, due to heavy slides, involves the excavation of nearly a million cubic yards of material. The new road cuts through two hills, the larger one with a maximum center line cut of 86 feet, and involves a long fill across the marsh adjacent to the Guadalupe Canal. This fill has proved to be a difficult piece of work as it is over a great depth of soft mud, the eroded material from the hills. The heavy fill displacing the mud, as anticipated, causes movement, often 400 to 500 feet away from the roadbed. During this work, the existing highway was displaced and tipped so that it lay at an angle, with one end elevated at least seven feet. The Spring Valley Water Company's pipe, placed on piles, was moved over a foot out of line, and much remedial work was necessary, dragging out surplus mud and building roads and counter weight fills.

One surprising feature is that the movement of the mud displaced by the fill often did not show for a considerable distance, in some cases, moving under the existing road, several hundred feet away, before showing on the surface of the marsh.

The cuts have been opened, the first hill at Visitation Point having been roughly finished, and the heavy cut at Sierra Point is well started.

A reinforced concrete subway, 123 feet long, 20 feet clear width and 22 feet six inches clear height, for use of a Southern Pacific Railroad spur track, has been completed. A massive rubble masonry wall on a concrete base has been built to protect the highway from a slide at the same time protecting a section of a forty-four-inch water main. The wall involved the placing of 2700 cubic yards of rubble masonry, 480 cubic yards of Class "A" concrete and 1250 cubic yards of Class "C" concrete.

The traffic has been well taken care of under the circumstances and few complaints have been received despite the fact that this road is very heavily traveled by both commercial and passenger cars.

Feather River Road Work Described by Convict Worker

[The following article was written by one of the prisoners assigned to this work.]

GRADE WORK on the Feather River Highway, in Butte County, under the supervision of Mr. Ed Rawson and a corps of experienced subforemen, is showing marked progress. Already nearly three miles of actual grade work is in evidence. Much rock wall and culvert work is completed. At one station on this stretch of new highway there has been constructed one of the largest concrete arch culverts in the state. This structure is located near the mouth of the historic Potter's Ravine, and just above where it empties into the beautiful Feather River. Two gas shovels of large capacity are digging their way through mountains of dirt and hard rock, and are keeping a fleet of iron mules (tractors) and dump trucks busy hauling the surplus dirt and rock to locations where filling is necessary.

Actual grade work on this piece of highway started about the 15th of July, 1928. The camp, a new one of all wood structure, is conveniently located and has accommodations for 150 men. Known as Camp No. 17, at Oroville, California, it is one of a number of day labor camps that are now operating throughout the state, under the jurisdiction of the Department of Public Works, Division of Highways, State of California, and employing convict labor. At present there are in this one camp 100 convicts working.

This new stretch of road that runs parallel with the beautiful Feather River for miles, is marked by nature's green mansions, historical monuments, entrancing views of mountains and valley, including the beauties of the country for miles around.

This artery will connect with the Forest Highway from Quincy to the Nevada state line, leading to Reno and eastern points, and will be a delight to the thousands of motorists who will use this mountain road on their way to and from many of America's attractions.

The remainder of the Bayshore Highway to San Mateo is open to travel and is an ideal stretch of level highway with an excellent oil macadam surface.

HIGHWAY DEVELOPMENT IN INYO COUNTY

(Continued from page 3.)

fourths to one gallon of "medium" oil, the quantity being gauged by the varying thickness of the surface.

The foregoing treats of oil processing done under specific maintenance, as applied to treatment of surfacing materials of crushed rock, decomposed granite and volcanic cinders, in many cases the subgrade being treated without any preparation, and does not include Diaz Lake-Alabama Gate, and Big Pine-Tinnemaha contracts, aggregating 18½ miles of standard construction of a rock base with a 3-inch top course of oil mix.

It is worthy of note that there was no opportunity for the proper grading for an oil mix and the requirements of the laboratory were observed only so far as the grading could be corrected from such materials as were immediately at hand.

The stretch of 10 miles of volcanic cinders north from Independence was surfaced in 1924. A clay binder was used which disappeared in dust, resulting in a loose, dusty, apparently wornout surface impossible to maintain. The penetration treatment of 1926 disappeared in the course of a season and it is a remarkable coincidence that in 1927 the laboratory test revealed an ideal grading for the oil mix. It may be added that this stretch is conceded by engineers familiar with the results of the road mix to compare favorably with the best of the oiled roads throughout the state. The fact that a shallow course of oil mix averaging possible 3 inches of light porous volcanic cinders on a sand subgrade can withstand heavy trucking at a maintenance cost so low as to be negligible should be a not unworthy chapter in the results of oil treated roads.

In the foregoing recital of the results of "hit or miss" methods, no challenge to the precepts of the Materials and Research Department is intended. Satisfactory results are often thus obtained and why should this be altogether strange? Contentions relative to methods of construction, specifications, materials, etc., are no less in accord with the theories of today than they were with the theories of yesterday. Engineers are divided in opinions; one class ignoring established principles, while another maintains that the fundamentals are sacred and must be respected.

In addition to the surfacing improvements were radical alignment changes and relocation, the construction of a steel bridge by the city of Los Angeles over its aqueduct near Georges Creek, and a reinforced concrete span across a spillway of the aqueduct at the Alabama Gate, constructed jointly by the State and the city of Los Angeles.

Thus have convenient transportation facilities been afforded the towns of Lone Pine, Independence, the county seat of Inyo County, Big Pine and Bishop; highway improvements which have a tendency to a better understanding of the citizenship of the valley with each other with corresponding closer relation-

ship in both social and business life. The oiled surfaced main streets traversed by the state highway insures added civic pride as evidenced by the activity of the residents of Lone Pine, who, with the cooperation of the board of supervisors and the city of Los Angeles have kept pace with the state by extending the oiled surface to the sidewalk curb at the same time installing a modern electrolier system of street lighting.

Owens Valley, the gateway to "East of the High Sierras," a most alluring empire of the "open spaces" has been served, to be followed by intensive maintenance and also by construction refinements from time to time as warranted by travel conditions, a policy of stage construction still recognized as being sound and economic.

Contracts are being advertised as rapidly as the conclusion of preliminaries will permit of, for oiled surfaced roads of standard width on permanent location south continuously from Lone Pine and northerly from Mojave.

Day by day the trip to the high Sierras is made with greater ease and comfort to soul, body and car, and the dreams of its patient people of the ultimate discovery by the outside world of this, the Switzerland of America, is fast becoming a reality.

TOLL BRIDGE REPORT SUBMITTED TO LEGISLATURE

(Continued from page 6.)

owned and operated by the California-Arizona Bridge Company, crossing the Colorado River about 3½ miles east of Blythe in Riverside County, and known as the Ehrenberg Bridge; a bridge now being constructed across San Francisco Bay between San Mateo and Hayward by the San Francisco Toll Bridge Company and which is to be known as the San Mateo-Hayward Bridge. A complete report on the promotion, financing, type of structure, construction and operation of the structures is made. All these bridges with the exception of the Ehrenberg Bridge are located in the vicinity of San Francisco Bay.

In addition proposed toll structures are which franchises have been asked are listed. These include:

Bridge across San Pablo Bay, from a point near Richmond to a point near San Rafael; O. H. Klatt, franchise applicant.

Bridge crossing San Francisco Bay from a point opposite Albany in Alameda County to a point near Tiburon in Marin County; franchise granted to T. A. Tomasini by Alameda County.

Thirty-nine applications to bridge San Francisco Bay from San Francisco to some point in the East Bay cities.

Applications to bridge the Golden Gate.

Effort to secure a franchise for a toll bridge across San Diego Bay from San Diego to Coronado.

The report analyzes these various proposed projects. The conclusion is expressed that the San Francisco Bay Bridge from San Francisco to Alameda is feasible only if publicly financed and constructed.

A Houston, Texas, sign painter says our danger signs are based upon a wrong psychology.

Tell a man to "Stop, Look, Listen," and he is impelled to do none of the three. He suggests the following signs for railroad crossings:

"Come ahead. You're unimportant."

"Try our engines. They satisfy."

"Don't stop. Nobody will miss you."

"Take a chance. You get hit by a train only once."

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official journal of the Division of Highways of the Department of Public Works, State of California; published for the information of the members of the department and the citizens of California.

Editors of newspapers and others are privileged to use matter contained herein. Cuts will be gladly loaned upon request.

B. B. MEEK.....Director
 GEORGE C. MANSFIELD.....Editor

Address communications to California Highways and Public Works, P. O. Box 1103, Sacramento, California.

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General Headquarters, Third Floor, Highway Building,
 Eleventh and P Streets, Sacramento, California

World Engineers Are to Study U. S. Highways

Highways representatives from all parts of the world are coming to the United States in 1930 to study methods of road construction in this country, the Chief of the Bureau of Public Roads, Thomas H. MacDonald states.

Mr. MacDonald has returned from Europe where he attended the meeting of the International Road Commission at Paris as the American representative. He explained that the wide diversity of climatic and soil conditions in the United States with the varied distribution of wealth and population approximated the fundamental problems of highway construction found in all sections of Europe.

The full text of Mr. MacDonald's statement follows:

The great distinction which exists between our program and that of other nations is that, while here the whole country has adopted motor transportation, elsewhere car use is still largely in the hands of a few.

The rapid expansion in the United States faced our engineers with an urgent demand for the immediate improvement of hundreds of thousands of miles of highway. At the same time, increased valuations growing out of bettered transportation facilities and a moderate tax upon the vehicle itself made it actually cheaper for the public to have roads than to go without them, so we were able to embark upon a construction program without parallel in the history of public works without dislocating our financial system.

Concurrently we were faced with the question of whether it was cheaper to build these roads slowly and laboriously by human labor, as most other countries now do, or whether we should work out mass production methods and so meet the national demand quickly. Experience has demonstrated that the latter plan is by far the more efficient and less costly.

Foreign highway engineers, who are as well versed as our own men in the technique of road building, or are better versed, are, in the main, only now arriving at the stage where they must meet similar problems in their own countries; hence their interest in the sessions here in 1930.

Further, because of the wide diversity of geographical, climatic, and soil, conditions in the United States, coupled with varying degrees of wealth and population, it is possible to approximate here the basic problems which confront engineers from abroad, whether they are interested in congested areas, such as England has, in primary roads, such as are needed in the newer countries, or in questions of mountain roads, such as those faced by Austria, Switzerland, and other nations.

So the United States in 1930 will be a giant laboratory in highway development and motor transportation where highway officials from other countries will find an opportunity to see not only what has been accomplished from an engineering point of view but also to observe the social and economic influences of our good roads.

Bridge Strength Is Determined By Actual Tests

AT THE SUGGESTION of the Bureau of Public Roads and the North Carolina Highway Department, engineers at last tested their mathematically proved theories of the maximum strength of a bridge by cracking the concrete of one by means of heavy loads in that state, according to a statement made public November 8 by the Department of Agriculture. The statement follows in full text:

Before the recent tests of a concrete arch bridge over the Yadkin River in North Carolina, engineers designing such structures were compelled to rely on theory alone for their assumptions as to the stresses produced by the expected loads. No full-sized bridge of the arch type had ever been tested to determine its maximum strength, either in this country or, so far as is known, anywhere in the world.

The theory—an extremely intricate one, intelligible only to those versed in higher mathematics—was known to be safe. That was demonstrated by the fact that bridges built in accordance with it have not failed. But whether it was too safe, whether the bridges were stronger and more expensive than necessary—that question had never been answered.

To answer it engineers have long looked forward to the opportunity that would give them a real life-sized bridge to test to destruction, and the opportunity came in 1927, when it was learned that a dam, then building on the Yadkin River, would eventually submerge the existing arch bridge on the road between Albemarle and Mt. Gilead, N. C., and necessitate its abandonment and the construction of a new bridge 30 feet higher.

The existing bridge, a beautiful modern structure, was completed in 1922 by the North Carolina Highway Department with the assistance of the Federal Government. Here was the long awaited opportunity and the engineers were not slow in taking advantage of it. At the suggestion of the North Carolina Department and the Bureau of Public Roads of the United States Department of Agriculture, an advisory committee was formed of members of technical societies and schools to propose plans and methods of procedure. The tests were made by five engineers, three from the Bureau of Public Roads and two from the State Highway Department.

The bridge was about a quarter of a mile long, of 17 spans, three of which were 146 feet in length, the others being concrete girder approach spans. Under the arch of one of the 146-foot spans, a scaffolding was erected upon which the engineers, with their instruments, took their measurements. Onto the floor of the bridge were rolled two huge water tanks, each about the size of a small two-story house or semibungalow, and weighing 23½ tons. Water was pumped into them until the maximum weight of 160 tons each was reached, the engineers taking measurements under the span of the effect on concrete of weights. Then the tanks were emptied, shifted to other positions on the floor of the bridge, and subjected to the same procedure. Thus the actual stresses in different parts of the span were measured.

AT THE DONNER SUMMIT



Just One of the Problems of the Maintenance Department.

Although the bridge did not collapse under even the heaviest load, it did develop some serious cracks which would have made it dangerous for traffic.

The Division of Tests and Research of the Bureau of Public Roads is compiling the test data and a technical report on the findings, to aid in the future development of reinforced concrete arch bridges.

Here lies the body of Samuel Crane
Who ran a race with a speeding train.
He reached the track, got near across,
But Sam and his car were a total loss.
The sexton softly tolled his knell,
Speeding Sam on his way to—well,
If he'd only stopped to look and listen
He'd be livin' now instead of missin'.

—Dallas Hurry Back News.

My Grandpa notes the world's worn cogs,
And says we're going to the dogs,
His Grandpa, in his house of logs,
Said things were going to the dogs.
His Grandpa, in the Flemish bogs,
Said things were going to the dogs.
His Grandpa, in his hairy togs,
Said things were going to the dogs.
But this is what I wish to state:
THE DOGS HAVE HAD AN AWFUL
WAIT!!

—Exchange.

The celebrated soprano was doing a solo when Bobbie said to his mother, referring to the conductor of the orchestra:

"Why does that man hit at that woman with his stick?"

"He's not hitting at her," replied the mother. "Keep quiet."

"Well, then, what's she hollerin' for?"—Answers.

Young Lady Motorist—"It's snowing and sleeting and I'd like to buy some chains for my tires."

"I'm sorry—we keep only groceries."

"How annoying! I understood this was a chain store."—Judge.

State Highway Progress Report; Budget Tells Construction Program

IN ORDER THAT A COMPLETE PICTURE of the State Highway System might be available, the following data was compiled by C. H. Purcell, State Highway Engineer, for transmission to Governor C. C. Young and B. B. Meek, Director of the Department of Public Works. The statement gives general facts regarding the different routes in the state highway system, the extent of their present improvement, work undertaken during the present biennium (1927-1929) and either completed or under way, together with a summary of improvements included in the budget for the construction program of the 1929-1931 biennium, and a list of the particular projects comprising that program. The statement follows:

SAN FRANCISCO TO OREGON LINE NEAR MONUMENTAL

(The Redwood Highway)

General Facts

Length of highway—409 miles.

Daily Travel (Summer)—South of Petaluma, 12,000 vehicles; Healdsburg, 4000; Willits, 1200; Eureka, 4000; Crescent City Junction, 1000; State line, 600.

Condition of Roads at Close of Present Biennium (June 30, 1929)

Distance Paved—130 miles.

Improved with Dustless, Oiled Surface—271 miles.

Surfaced with Gravel—8 miles.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Pavement—58 miles (bringing total pavement on highway to 188 miles).

Widening and Repavement—15 miles.

Grading and Surfacing—The remaining 221 miles has all been graded to some extent and surfaced. Grading work in recent years has been of a standard to permit of paving as the next step. The earlier jobs, however, must be regarded before further improvements in the surface is warranted. Twenty miles of this latter type will be graded and surfaced during the biennium.

Bridges—5 major bridges will be replaced, and one major structure repaired.

Grade Separations—5 grade separations will be affected.

Realignment—2.3 miles will be relocated to eliminate objectionable features of the present location. This will be graded and surfaced to standard alignment and width and a 4.4-mile section now being graded will be surfaced.

LIST OF PROJECTS IN 1929-1931 BUDGET

DEL NORTE COUNTY—South boundary to Wilson Creek, 12.8 miles, paving, \$110,900; Hardscrabble Creek, bridge and grading, \$18,200; Elk Valley to Smith River, 4 miles, paving, \$35,000.

HUMBOLDT COUNTY—Orick to north boundary, 15 miles, paving, \$130,000; Fortuna to Loleta, 4.1 miles, paving, \$165,000; at North Scotia bridge, 0.2 miles, paving, \$10,000; Arcata to Trinidad, 14.5 miles, paving, \$151,000; north of Big Lagoon, 2.5 miles, paving,

\$31,000; Loleta to Beatrice, 3.8 miles, paving and structure, \$150,000; Fish Creek to Meranda, 3.2 miles, grading and surfacing, \$200,000; Eureka Slough, bridge repair, \$55,000; Garberville to Redway Bluff, 2 miles, grading and surfacing, \$110,000; Hartsocks to Richardson Grove, 0.5 miles, grading and surfacing, \$61,000; south of Eureka, 0.6 miles, paving, \$15,000; Eel River at Dyerville, bridge repair, \$28,800.

SONOMA COUNTY—At Lytton overhead, 0.2 miles, paving, \$15,000.

MARIN COUNTY—Near Greenbrae, grade separation, \$18,000; near Schuetzen Park, grade separation, \$150,000; San Rafael northerly, 2.1 miles, grading and paving, \$219,200; Sausalito to Alto, grading and surfacing, \$400,000; Alto to San Rafael, surfacing, \$100,000; Corte Madera Creek at Greenbrae, bridge, \$125,000.

MENDOCINO COUNTY—Heagneys to Red Mountain Creek, 6 miles, grading and surfacing, \$110,000.

SONOMA-MARIN COUNTIES—Petaluma to Ignacio, 12.2 miles, grading and paving, \$604,800; San Antonio Creek, bridge, \$38,000.

SAN FRANCISCO TO SAN DIEGO

(The Coast Route)

General Facts

Distance—489 miles of state highway.

Travel—This road carries the heaviest traffic of the through routes of the state. The summer count at San Mateo was 29,000 vehicles per 16-hour day; north of Gilroy, 8500; south of Salinas, 4000; San Luis Obispo, 3200; south of Santa Barbara, 6500; Ventura, 8000; Los Angeles, 22,400; Anaheim, 15,000; Del Mar, 8000.

Present Conditions

Pavement—The entire route is paved, but much of the work was done before traffic demands were heavy, and there still remains a considerable mileage of narrow pavement on inferior alignment.

Improvements Recommended in the Budget for Construction Program of 1929-1931 Biennium

Pavement—73 miles of present narrow pavement to be paved to present standards. This will leave about 107 miles to be widened or graded to standard as the case may be.

Grade Separations—One grade separation will be made and two overhead structures improved.

Bridges—7 bridges will be rebuilt.

Borders—64 miles of hard rock border will be placed along road.

LIST OF PROJECTS IN 1929-1931 BUDGET SAN FRANCISCO TO SAN DIEGO

SANTA CLARA COUNTY—In San Jose, Mulia and Alameda, grade separations, \$75,000; Palo Alto to Butchers corner, 9.5 miles, grading and paving, \$514,400.

MONTEREY COUNTY—Salinas River near Ardo, bridge and grading, \$295,000; Salinas River near Bradley, bridge and grading, \$245,000; Salinas to Chualar, 9.7 miles, grading and paving, \$335,000; south of San Ardo, 0.6 miles, grading and surfacing, \$38,000.

SAN MATEO-SANTA CLARA COUNTIES—San Francisco Creek, bridge, \$20,000.

SAN MATEO COUNTY—At Colma, grade separation, \$60,000.

SAN LUIS OBISPO COUNTY—Santa Maria River to Arroyo Grande, 12 miles, grading and paving, \$582,500; Paso Robles to Atascadero, 10 miles, grading and paving, \$380,000; Graves Creek, bridge, \$12,000; San Luis Obispo to Cuesta grade, 3.1 miles, grading and paving, \$145,000.

SANTA BARBARA COUNTY—In Gaviota Canyon, 3 miles, grading and paving, \$219,500; Gaviota Creek, bridge, \$38,000; Wigmore to Zaca, 4.3 miles, grading and paving, \$200,000; near Nojoqui Creek, 0.3 mile, grading and surfacing, \$23,000; Nojoqui Creek, bridge, \$27,000.

ORANGE COUNTY—North of Serra, 0.5 miles, grading and paving, \$40,000; near Galivan, 1 mile, paving, \$50,000; along Serra Bluffs, drainage, \$35,000.

LOS ANGELES COUNTY—Sepulveda Boulevard to Calabasas, 10.5 miles, paving, \$150,000; near Whittier, grade separation, \$75,000.

VENTURA-LOS ANGELES-ORANGE-SAN DIEGO COUNTIES—(State Highway Routes 2 and 4)—Oil Rock border, 85 miles, \$171,000.

VENTURA COUNTY—Conejo Grade, grading, \$60,000; Camarillo to Conejo Creek, 2.3 miles, grading and paving, \$40,000.

SAN DIEGO COUNTY—San Mateo Flat, 0.6 miles, paving, \$55,000; San Luis Rey River at Oceanside, bridge and grading, \$405,000.

VENTURA-LOS ANGELES-ORANGE AND SAN DIEGO COUNTIES—This road participates with State Highway Routes 9 and 60 in cooperative projects—Grading, paving, bridges, and grade separations, \$1,086,349.71.

SACRAMENTO TO OREGON LINE VIA MARYSVILLE

(The Pacific Highway)

General Facts

Distance—384 miles.

Travel (Summer)—Sacramento, 13,000 vehicles per day; north of Roseville, 2400; south of Marysville, 3300; Oroville Wye, 1300; Chico, 3000; north of Redding, 2600; Dunsmuir, 2100; Gazelle, 1800; State Line, 1600.

Condition of Road at End of Present Biennium (June 30, 1929)

Pavement—On July 1, 1929, all of this road will be paved except 78 miles, which is oil surfaced and 18.6 miles which has been recently graded and surfaced.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Pavement—7.7 miles of new pavement to be laid.

Thickening and Widening—11.3 miles.

Grading and Surfacing—8.5 miles. (This will bring the route up to standard grading except for 2 miles on the section from the Klamath River to the Oregon line, which still remains to be graded. There will be 87 miles ready to be paved as funds permit.) The 18.6 miles recently surfaced will be oil treated to provide a satisfactory surface for traffic.

Bridges—8 bridges will be replaced and one new structure built.

Subways—The situation at the Cottonwood subway will be improved to eliminate delay to traffic during flood periods.

LIST OF PROJECTS IN 1929-1931 BUDGET SACRAMENTO TO OREGON LINE VIA MARYSVILLE

SISKIYOU COUNTY—In Shasta Canyon, bridges, \$165,000; Klamath River, bridge, \$82,000; Shasta River to Gazelle, 7.7 miles, paving, \$278,000; at Spring Hill, 0.6 miles, paving, \$15,000; Yreka to Klamath River, 8.5 miles, grading and surfacing, \$632,524.65; Shasta River to Gazelle, 7.7 miles, grading and drainage, \$77,000.

SACRAMENTO COUNTY—Ben Ali to Sylvan School, 8.1 miles, grading and paving, \$430,000; Arcade Creek, bridge, \$14,000.

PLACER COUNTY—Through Lincoln, 1.6 miles, grading and paving, \$77,000; Cook Creek Overflow, bridge, \$8,500.

YUBA COUNTY—Through Wheatland, 1 mile, grading and paving, \$40,000.

TEHAMA-SHASTA COUNTIES—At Cottonwood, bridge and grade separation, \$122,000.

SHASTA COUNTY—Mears Creek, bridge, \$20,000; La Moine to north boundary, 18.6 miles, surfacing, \$26,040.

SACRAMENTO TO LOS ANGELES

(The Golden State Highway—Valley Route)

General Facts

Distance—371 miles. (State highway mileage.)

Travel (Summer)—Sacramento, 7000 vehicles per day; Modesto, 7500; Merced, 5500; south of Fresno, 8400; Tulare, 3000; south of Bakersfield, 8200; Maricopa Road, 2500; south of Junction with Mojave Road, 8200.

Condition of Road at End of Present Biennium (June 30, 1929)

Pavement—The road is paved throughout, though much of the early pavement is too narrow for present traffic. Reconstruction now underway as authorized during the present biennium will reduce the pavement requiring widening to about 120 miles by July 1, 1929.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Reconstruction—68 miles.
 New Location—8.9 miles (To relieve Newhall Tunnel section).
 Bridges—9 new bridges to be built.
 Grade Separation—One.
 Shoulder Improvement—21 miles.
 Widening—Program of widening on Ridge route to be continued.

LIST OF PROJECTS IN 1929-1931 BUDGET

MERCED COUNTY—Bear Creek, bridge and grade separation, \$62,000.

FRESNO COUNTY—At Calwa, grade separation, \$70,000; Fresno to south of Fowler, 10 miles, grading and paving, \$380,000.

SACRAMENTO COUNTY—Arno to McConnell, 3.2 miles, grading and paving, \$212,600; Cosumnes River and overflow, bridge, \$125,000.

SAN JOAQUIN COUNTY—Calaveras River to Huston School, 12.3 miles, grading and paving, \$340,000; Forest Lake to north boundary, 1.4 miles, grading and paving, \$61,500; Mosher, Bear and Live Oak creeks, bridges, \$40,000; Calaveras River, bridge, \$14,000; Mokelumne River, bridge, \$78,000; north of Turner Station, 0.8 of a mile, grading and surfacing, \$41,700; north of Turner Station, bridge, \$15,000; Huston School to Forest Lake, shoulders, \$39,000.

LOS ANGELES COUNTY—Tunnel Station to Santa Clara River, 8.9 miles, paving, \$175,000; north of Newhall Tunnel, 1 mile, grading and paving, \$60,000; Ridge route, grading and surfacing, \$220,000; Castaic School, northerly, 3.8 miles, paving, \$60,000; Castaic, northerly 1 mile, grading and paving, \$25,000.

MADERA COUNTY—At Berenda to north boundary, 10 miles, grading and paving, \$370,000; Cottonwood Creek, bridge, \$28,000.

TULARE COUNTY—South boundary to Tipton, 20.9 miles, grading and paving, \$688,000.

STOCKTON TO SANTA CRUZ VIA OAKLAND
 (The Altamont Road)

General Facts

Distance—118 miles.
 Travel (Summer)—Mosssdale, 5300 vehicles; Altamont, 6000; Dublin, 7000; south of Hayward, 8300; Mission San Jose, 5600; north of Mission San Jose, 9900; west of San Jose, 11,000; at Santa Cruz County line, 9700; Santa Cruz, 8200.

Condition of Road at End of Present Biennium
 (June 30, 1929)

Pavement—The road is paved throughout, and is gradually being improved to a high standard.

Work Planned in Budget for Construction Program for 1929-1931 Biennium

Pavement—By June 30, 1931, the work of bringing road to a higher standard of pavement improvements will be practically completed to San Jose, leaving only the distance of 32 miles between San Jose and Santa Cruz a 15-foot pavement.

Relocation—A portion of the Valley route (Stockton to French Camp) is to be abandoned and the Stockton to Santa Cruz road is to be extended from French Camp into Stockton. This will provide a more convenient entrance and eliminate the present road, which is on a high fill.

Grading and Surfacing—To provide the above connection 2.9 miles of road will be graded and surfaced.

Bridges—The new connection will also necessitate the construction of two new bridges between French Camp and McKinley avenue; two other bridges to be replaced, one of which will be widened.

Paving—14.6 miles of pavement will be widened and thickened.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN JOAQUIN COUNTY—Banta to Mosssdale, 3.2 miles, grading and paving, \$155,000; Tom Paynes Slough, bridge, \$12,000; French Camp to Stockton, 2.9 miles, grading and paving, \$73,500; near French Camp, bridges, \$30,000; near Banta, 1.9 miles, grading and paving, \$69,500.

ALAMEDA COUNTY—Hayward to Niles, 8 miles, grading and paving, \$395,600.

SANTA CLARA COUNTY—Coyote Creek to San Jose, 1.5 miles, paving, \$80,000; Coyote Creek, bridge, \$55,000.

SACRAMENTO TO WOODLAND JUNCTION

General Facts

Distance—15 miles.
 Travel (Summer)—West of Sacramento, 6000; Davis, 4800; Woodland "Y," 4900.

Improvements Undertaken During the Present Biennium (1927-1929)

Grading and Resurfacing—3 miles completed by July, 1929.

Widening and Drainage Betterments—Cooperative improvements completed in Davis for widening pavement and caring for drainage.

Future Work—The above improvements have taken care of immediate necessary corrections in grade and drainage. Further widening of pavement can be deferred for several years until traffic has materially increased.

BENICIA VIA WEST SIDE OF THE SACRAMENTO VALLEY TO RED BLUFF

(The Pacific Highway)

General Facts

Distance—156 miles.
 Travel (Summer)—Cordelia Junction, 5700 vehicles a day; Dixon, 4400; north of the Woodland Wye, 2600; Williams, 1600; Red Bluff, 1700.

Work Included in Budget for Construction Program for 1929-1931 Biennium

Bridges—4 county constructed bridges to be rebuilt and widened.

Pavement—5.1 miles of pavement will be laid on section recently graded.

Widening—10.7 miles of the present 15-foot pavement will be widened and protected by oil rock shoulders, which will later serve as a base when the pavement is thickened.

Grading—8 miles where present 15-foot pavement has failed under poor rut grade and drainage conditions, to have grade raised.

LIST OF PROJECTS IN 1929-1931 BUDGET

GLENN COUNTY—Logandale to Willows, 5.1 miles, paving, \$200,000.

COLUSA COUNTY—Hershey to Berlin, 10.7 miles, shoulders, \$42,800; Williams, northerly, 8 miles, grading and surfacing, \$200,000.

SOLANO COUNTY—Dixon to Vacaville, bridges, \$16,000.

IGNACIO TO CORDELIA VIA NAPA

(The Napa Lateral)

General Facts

Distance—38 miles.

Travel (Summer)—Schellville, 2100 vehicles per day; Napa Junction, 6300; Cordelia Junction, 5100.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Widening and Surfacing—3.2 miles of present 15-foot pavement to be surfaced and widened to 20 feet.

Bridges—One bridge to be repaired and deck replaced.

LIST OF PROJECTS IN 1929-1931 BUDGET

NAPA COUNTY—Greenwood corner to east boundary, 3.2 miles, grading and paving, \$125,000.

MARIN COUNTY—Petaluma Creek, bridge repair, \$35,000.

SAN FERNANDO TO SAN BERNARDINO

General Facts

Distance—57 miles.

Travel (Summer)—Tujunga, 6100 vehicles; La Canada, 7200; Azusa, 10,600; east of Uplands, 4900; San Bernardino, 5400.

Present Condition—All paved.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Grading and Paving—12.1 miles (cooperative projects).

Bridges—One bridge to be widened to 42-foot roadway with sidewalk added; another bridge to be widened.

Grade Crossings—One grade crossing to be eliminated by overhead structure (cooperative project).

Widening and Paving—1.5 miles (pavement to be 30 feet in width).

LIST OF PROJECTS IN 1929-1931 BUDGET

LOS ANGELES COUNTY—Azusa to Glendora, 1.5 miles, grading and paving, \$75,000; San Gabriel River, bridge, \$170,000. This route shares with routes 2 and 60 in an allotment of \$1,086,394.71 cooperative projects for grading, paving, bridges, and grade separations.

SAN BERNARDINO COUNTY—Near Malaga, grade separation, \$75,000; Lytle Creek, bridge, \$65,000.

VENTURA-LOS ANGELES-ORANGE AND SAN DIEGO COUNTIES—This road participates with State Highway Routes 2 and 60 in certain cooperative projects—Grading, paving, bridges, and grade separations, \$1,086,394.71.

SAN LUCAS TO SEQUOIA NATIONAL PARK

General Facts

Distance—147 miles.

Travel (Summer)—San Lucas, south of city, 110; Coalinga, south of city, 383; Oil Fields, at Oil Kings Pool, 400; Hanford, west of city, 1600; Goshen Junction, 1700; east of Visalia, 1500; east, Three Rivers, 1400.

Present Condition of Road—92 miles pavement; 7 miles oiled road; 11 miles gravel, as July 1928. Balance, earth road.

Improvement Undertaken During the Present Biennium (1927-1929)

Widening and Surfacing—During the present biennium widening and surfacing of the Monterey Grade in Monterey County has been completed.

Oiling—12.3 miles to be oiled during the early part of 1929.

SALIDA TO JUNCTION ROUTE 23

(Sonora Road)

General Facts

Distance—132 miles.

Traffic (Summer)—East of McHenry Road, 2200 vehicles per 16-hour day; west of Oakdale, 1500; south of Sonora, 2300; each of Confidence, 800.

Condition of Road at the End of the Present Biennium (June 30, 1929)

Pavement—48 miles.

Oiled Surfacing—9 miles.

Rock Surfacing—12 miles.

Unimproved—63 miles.

Improvements Included in the Budget for Construction Program for 1929-1931 Biennium

An 11.8-mile section which was graded and surfaced by the Bureau of Public Roads, will be oil treated.

LIST OF PROJECTS IN 1929-1931 BUDGET

GALAVERAS-TULUMNE COUNTIES—An allotment of \$43,680 has been made for surfacing 27 miles on this route and Route 24.

SACRAMENTO TO NEVADA LINE VIA PLACERVILLE

General Facts

Distance—107 miles.

Travel (Summer)—East of Sacramento, 4300 vehicles per 16-hour day; El Dorado, 1200; east of Placerville, 2000; east of Riverton, 1100; west of Meyers, 550; at Lakeside, 200.

Condition of Road at End of Present Biennium (June 30, 1929)

Pavement—49 miles.

Graded with Oil Rock Mix Surface—18 miles.

Unsurfaced—40 miles.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Grading—Portions of 8.6 miles (cooperative projects).

Surfacing—4.2 miles (cooperative project).

Relocation, Grading and Surfacing—Present county road to be abandoned for distance of eight miles, new section 5.25 miles in length to be graded and surfaced.

Bridges—3 new bridges to be built.

LIST OF PROJECTS IN 1929-1931 BUDGET

EL DORADO COUNTY—Riverton to Kyburz, 8.6 miles, grading and surfacing, \$150,000; American River at Riverton, bridge, \$20,000; Strawberry to Phillips, 4.2 miles, surfacing, \$25,000; Mays to state line, 5.2 miles, grading and surfacing, \$50,000; Trout Creek and Upper Truckee River, bridges, \$20,000.

SAN DIEGO TO EL CENTRO*General Facts*

Distance—114 miles.

Travel (Summer)—West of El Cajon, 6200 vehicles; Jacumba, 1500; El Centro, 2000.

Condition of Road at the End of the Present Biennium (June 30, 1929)

Pavement—86 miles will be paved.

Surfacing—19 miles will be rock surfaced, of which 5.7 miles is oil treated. 9 miles will still be earth.

Improvements Included in the Budget for Construction Program for 1929-1931 Biennium

Paving, Grading and Surfacing—31 miles to be graded and surfaced, 8 miles of which will be paved; temporary surface to be placed on balance, pending settlement of fills; alignment to be improved. Of the 3-mile section from Meyers Creek to 2.0 miles west of Coyote Wells, 2.4 miles recently graded will be paved and 0.6 miles of the present pavement widened and thickened, as will 5 miles between Dixieland and Seely.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN DIEGO COUNTY—Viejas Valley to Tecate Divide, 31 miles, grading and paving, \$300,000.

IMPERIAL COUNTY—West of Coyote Wells, 3 miles, grading and paving, \$210,000; Dixieland to Seely, 5 miles, paving, \$165,000.

**ROUTE 1 NEAR CALPELLA TO ROUTE 37
NEAR CISCO**

(Tahoe-Ukiah Highway)

General Facts

Distance—182 miles.

Traffic (Summer)—Upper Lake, 700 vehicles per 16-hour day; west of Williams, 400; east of Colusa, 800; east of Marysville, 1000; west of Grass Valley, 600; east of Nevada City, 300.

Condition of Road at the End of the Present Biennium (June 30, 1929)

Pavement—26 miles.

Oiled Surface—35 miles.

Rock Surface—28 miles (12.8 miles about to be advertised).

Unimproved—73 miles (This distance will be shortened about 9 miles when final location is made).

LIST OF PROJECTS IN 1929-1931 BUDGET

From the Abbott Mine to Williams portions of the route totaling some 14.7 miles in length are to be graded and surfaced, \$300,000. This work will be on new location and will shorten the distance between these two points and eliminate portions of the old county road, part of which is now improved with a rock surface.

ALBANY TO MARTINEZ*General Facts*

Distance—23 miles.

Travel (Summer)—Albany, 22,000; Franklin Canyon, 10,700; Crockett, 2000; Martinez, 1300.

Present Condition—All paved.

Improvements Undertaken During the Present Biennium

Bridges—Wildcat Creek Bridge built and completed. Widening—Cooperative widening of pavement

through Cerrito completed; widening of pavement through San Pablo now under way; plans and specifications are being prepared for grading and paving through Pinole and Hercules, it being planned to complete this work in the present biennium. With the completion of these projects a 30-foot or wider pavement will be provided from Oakland to the Carquinez Bridge.

HOPLAND TO LAKEPORT*General Facts*

Distance—19 miles.

Travel (Summer)—Hopland Jct. Redwood Highway, 800; South Lakeport, 1500.

All oiled.

Present Condition—The route has been graded, surfaced and oiled, and is now serving the traffic using it in a satisfactory manner.

ROSEVILLE TO NEVADA CITY*General Facts*

Distance—41 miles.

Traffic (Summer)—Roseville, 3700 vehicles per day; Auburn, 3400; Grass Valley, 1400; Nevada City, 1000.

Improvements Included in the Budget for Construction Program for 1929-1931 Biennium

Pavement—3 miles, graded during present biennium, is to be paved.

Railroad Crossings—New subway to be built and approaches graded and surfaced.

Alignment—Alignment on portion of the road to be corrected and bettered by mile of new grading and surfacing.

LIST OF PROJECTS IN 1929-1931 BUDGET

PLACER COUNTY—At Newcastle, 0.9 mile, grading and grade separation, \$200,000; Roseville to Rocklin, 3 miles, paving, \$30,000; Wise Power House to Auburn, 1 mile, grading and surfacing, \$60,000.

MERCED TO ROUTE 40 NEAR SEQUOIA

(Yosemite All-year Lateral)

General Facts

Distance—70 miles (paved 16 miles; oil mixed surface, 39 miles; earth road, 15 miles). Contract recently awarded for grading and surfacing 7 miles of this latter section.

Travel (Summer, 16-hour count)—East of Merced, 2700 vehicles; Mormon Bar, 2400; Briceburg, 1700.

Improvements Included in Budget For Construction Program for 1929-1931 Biennium

Grading and Surfacing—Balance of earth section (8 miles) will be graded and surfaced.

Bridges—One bridge to be replaced.

Grade Crossings—One grading to be eliminated by overpass structure (cooperative project with railroad).

Oiling—6.3-mile section now being graded and surfaced will be sealed with oil.

LIST OF PROJECTS IN 1929-1931 BUDGET

MERCED COUNTY—Bradley Overhead, grade separation, \$45,000.

MARIPOSA COUNTY—West of Cathay to Agua Fria Creek, 8 miles, grading and surfacing, \$259,600; Owens Creek, bridge, \$10,000; west boundary to Orange Hill School, 0.3 miles, surfacing, \$8,820.

WEST OF CLAREMONT TO RIVERSIDE*General Facts*

Distance—17.6 miles.

Travel (Summer count, 16-hour day)—Chino Cross Roads, 10,000 vehicles; at Los Angeles County line, 10,700; at Ontario, 3500; at Riverside, 6500.

Present Condition—The entire route is paved.

Improvements Included in Budget for 1929-1931 Construction Program

Bridges—Three narrow bridges are to be widened. Two bridges are to replace dips in the pavement.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN BERNARDINO COUNTY—Near Collins and Pomona, bridges and grading, \$39,500. Near Ontario, bridges, \$12,500.

REDDING TO ARCATA*(Trinity Lateral)**General Facts*

Distance—150 miles.

Travel—Willow Creek, 144 vehicles per day; Big Bar, 59; south of Weaverville, 122; between Redding and Tower House, 310.

Present Condition—Oil seal surface, 22 miles; rock surfaced, 33 miles; earth road, 95 miles.

Improvements Included in Budget for 1929-1931 Construction Program

Bridges—8 bridges, originally built by counties, and deemed too narrow for travel and structurally unsafe, to be replaced; a suspension bridge to be replaced by new structure located some distance upstream from present bridge; approaches to be graded and surfaced.

LIST OF PROJECTS IN 1929-1931 BUDGET

TRINITY COUNTY—North Fork Trinity River, bridge and grading, \$65,000; west of Burnt Ranch, grading, \$37,500; Trinity River at Douglas City, bridge and grading, \$98,500.

HUMBOLDT COUNTY—Redwood Creek to Three Creeks, bridges, \$96,000.

RICHVALE TO QUINCY VIA OROVILLE*(Feather River Lateral)**General Facts*

Distance—80 miles (approximately).

Travel—New route.

Present Condition—Two convict camps now at work on highway.

LIST OF PROJECTS IN 1929-1931 BUDGET

BUTTE COUNTY—Grading and Surfacing—Portions of section 8.4 miles in length from Big Bend to Pulga will be graded and surfaced; convict camp work to continue.

SAN JUAN BAUTISTA TO ROUTE 32 VIA HOLLISTER*(The Hollister Road)**General Facts*

Distance—15 miles.

Travel (Summer, 16-hour count)—At junction with Coast Route, 2600; at junction with Pacheco Pass Road, 1100.

Present Condition of Road

Pavement—10 miles.

Oil Surface—5 miles.

Improvements Included in the Construction Program for the 1929-1931 Biennium

The five miles of oil seal surface will be paved, thus providing a permanent surface for the entire route.

**LIST OF PROJECTS IN 1929-1931 BUDGET
SAN JUAN BAUTISTA TO ROUTE 32 VIA HOLLISTER**

SAN BENITO-SANTA CLARA COUNTIES—Hollister to San Felipe, 5 miles, paving, \$45,000.

**SAUGUS TO ROUTE 11 AT ALPINE JUNCTION
(The Bridgeport Road)***General Facts*

Distance—410 miles maintained as State Highway. Travel (Summer, 16-hour count)—Saugus, 2300 vehicles; north of Mojave, 500; at Freeman Junction with the Walker Pass Road, 400; at Big Pine, 1000; north of Bishop, 1300; Markleeville, 47; Alpine Junction, 125.

Condition of the Road at the Close of the Present Biennium (June 30, 1929)

Pavement—87 miles.

Oil Mixed Surface—93 miles.

Disintegrated Granite Surface—33 miles.

Earth Road—197 miles.

From a point north of Coleville to the Ebbetts Pass Road there is no road. Travel by way of Gardnerville to Woodford or Minden to Lake Tahoe.

Improvements Included in the Construction Program for 1929-1931 Biennium

When the program for 1929-1931 biennium is completed, the route will be graded and paved or oil surfaced for approximately 250 miles.

Present graded section to be extended north about 10 miles.

LIST OF PROJECTS IN 1929-1931 BUDGET

KERN COUNTY—Cinco to 5 miles north of Ricardo, 14.2 miles, grading and surfacing, \$325,000.

KERN-INYO COUNTIES—Freeman to Narka, 20.4 miles, grading and surfacing, \$239,000.

INYO COUNTY—Narka to Little Lake, 3.5 miles, grading and surfacing, \$42,500; Coso Junction to Olancho, 21.3 miles, grading and surfacing, \$210,500.

MONO COUNTY—Grading and surfacing in Mono County, \$250,000.

ROUTE 4 NEAR LODI TO ROUTE 23 NEAR SILVER CREEK*(Ebbetts Pass Road)**General Facts*

Distance—113 miles.

Travel (Summer, 16-hour count)—Junction Valley Highway near Lodi, 950; between San Andreas and Valley Springs, 700; near Murphy's, 500.

Condition of Road at the Close of the Present Biennium (June 30, 1929)

Pavement—11 miles.

Oil Seal—34.5 miles.

Rock Surface—15.5 miles.

Earth—52 miles.

*Improvements Included in the Budget for the
Biennium of 1929-1931*

15.5 miles of rock surfacing between Murphy's and Big Trees will be oiled to conserve the material and provide suitable surface for traffic.

LIST OF PROJECTS IN 1929-1931 BUDGET

CALAVERAS AND TUOLUMNE COUNTIES—An allotment of \$43,680 has been made for surfacing projects on 27 miles of this road and Route 13.

NEVADA CITY TO DOWNIEVILLE

General Facts

Distance—46 miles.
Travel (Summer)—North Nevada City, 380; Comptonville, 290; Downieville, 127.
Present Condition—The road has been previously constructed by convict labor, and is now satisfactorily serving the traffic using it.

SAN BERNARDINO TO EL CENTRO

General Facts

Distance—151 miles.
Travel (Summer, 16-hour count)—Redlands, 3500 vehicles; Banning, 2100; Westmoreland, 1500; El Centro, 2200.

*Condition of Road at the Close of the Present
Biennium (June 30, 1929)*

Pavement—140 miles will be paved.
Oil Mix Surface—11 miles.

*Improvements Included in the Budget for the
Biennium of 1929-1931*

Pavement—10.5 miles.
Widening and Thickening—31.9 miles.
Extension of Culverts and Grading Adequate Shoulders—7.2 miles.
Protection—Provision to be made to protect highway for approximately 20 miles in length from the effects of cloud bursts is included in the set-up.

LIST OF PROJECTS IN 1929-1931 BUDGET
SAN BERNARDINO TO EL CENTRO

SAN BERNARDINO COUNTY—Mill Street to Santa Ana River, 1.8 miles, grading and paving, \$79,000.

IMPERIAL COUNTY—Brawley to Westmoreland, 6.5 miles, paving, \$307,700; Westmoreland westerly, 4 miles, paving, \$186,400; Arroyo Salado to north boundary, 13.3 miles, grading and paving, \$539,000; Trifolium Canal to Kane Springs, 6.3 miles, grading and paving, \$172,000.

RIVERSIDE COUNTY—Beaumont to north boundary, 7.2 miles, grading and drainage, \$42,500.

REDDING TO NEVADA LINE VIA ALTURAS

General Facts

Distance—189 miles.
Travel (Summer)—Redding, 500 vehicles; Montgomery Creek, 260; Canby, 213; East of Alturas, 134; Cedarville, 63.

*Condition of Road at the End of the Present Biennium
(June 30, 1929)*

Oil Seal Surface—61 miles.
Rock Surface—36 miles.
Earth Road—92 miles.

*Improvements Included in the Budget for the Con-
struction Program of 1929-1931 Biennium*

Bridges—9 bridges deemed too narrow and structurally unsafe will be replaced.
Grading and Surfacing—18.2 miles.
Oil Treatment—12.5 miles.

SHASTA-LASSEN COUNTIES—Fall River to Big Valley, 18.2 miles, grading and surfacing, \$285,900.

SHASTA COUNTY—Dry and Salt Creeks, bridges, \$18,000; Canyon Creek, 0.8 mile, bridge and grading, \$11,500; Montgomery Creek, bridge, \$7,000; Burney to Fall River, bridges, \$15,000.

LASSEN-MODOC COUNTIES—Bieber to Adin, 12.5 miles, surfacing, \$20,000.

MODOC COUNTY—Pit River and Shields Creek, bridges and grading, \$54,500.

EL CENTRO TO ARIZONA LINE AT YUMA

General Facts

Distance—57 miles.
Travel—El Centro, 1700 vehicles; Holtville, 1100; Yuma, 1900.
Present Conditions—Paved, 27 miles; oil mix surface, 30 miles.

*Improvements Included in the Budget for Construction
Program of 1929-1931 Biennium*

Pavement—14 miles.
Drainage Improvement—Drainage conditions will be corrected over 5-mile section.

LIST OF PROJECTS IN 1929-1931 BUDGET

IMPERIAL COUNTY—El Centro to Holtville, 9.0 miles, paving, \$482,400; state line at Yuma westerly, 5 miles, grading and paving, \$234,000.

**RED BLUFF TO NEVADA LINE NEAR PURDY'S
(Susanville Lateral)**

General Facts

Distance—182 miles.
Travel (Summer)—Red Bluff, 600 vehicles per day; Westwood, 1000; Susanville, 1200; Melford, 200.

*Condition of the Road at the Close of the Present
Biennium (June 30, 1929)*

The route will be improved by grading and oiled surfacing except for about 51 miles.

*Improvements Included in Budget for Construction
Program for 1929-1931 Biennium*

Bridges—7 bridges originally built by the county to be replaced by new structures.
Grading and Oil Surfacing—3 miles.
Rock and Oil Surfacing—9.4 miles.
Treated With Oil—23.5 miles.

LIST OF PROJECTS IN 1929-1931 BUDGET

TEHAMA COUNTY—Red Bluff to Paynes Creek, bridges, \$38,000; Mineral to Morgan Springs, 9.4 miles, surfacing, \$42,500.

PLUMAS COUNTY—Feather River at Chester, bridge, \$13,000; south of Chester, 3 miles, grading and surfacing, \$39,300.

PLUMAS-LASSEN COUNTIES—Westwood to Devil's Corral, 13.5 miles, surfacing, \$21,000.

LASSEN COUNTY—Doyle to Long Valley, 10 miles, surfacing, \$16,000.

SAN BERNARDINO TO NEVADA LINE NEAR JEAN

(The Arrowhead Trail)

General Facts

Distance—188 miles.

Travel (Summer)—North of San Bernardino, 2200 vehicles a day; Victorville, 1,400; Barstow, 800; Baker, 200.

Present Condition—Paved 40 miles; oil surface, 58 miles; unimproved, 90 miles.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Grading and Oil Rock Surfacing—22.3 miles.

Alignment Improvement—3.5 miles.

Bridges—2 bridges to be rebuilt.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN BERNARDINO COUNTY—Cajon Pass westerly, 3.5 miles, grading and surfacing, \$175,000; near Cajon Station, bridge and grading, \$18,000; Barstow to Yermo and easterly of Dunn, 22.3 miles, grading and surfacing, \$435,000; Mojave River near Victorville, bridge and grading, \$140,000.

VALLEY ROUTE NEAR BAKERSFIELD TO PASO ROBLES

(Cholame Lateral)

General Facts

Distance—92 miles.

Travel (Summer)—East of Paso Robles, 900 vehicles daily; Kern County line, 400; Lost Hills, 400; Famosa, 300.

Condition of Road at the Close of the Present Biennium (June 30, 1929)

Pavement—76 miles.

Oiled Surface—16 miles.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Pavement—21.3 miles.

Grade Crossing—One grade crossing to be eliminated by substitution of subway.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN LUIS OBISPO COUNTY—Estrella River to Sacramento Ranch, 5.8 miles, paving, \$65,000.

KERN COUNTY—West boundary to Junction Pumping Station, 15.5 miles, grading and paving, \$325,000; at Wasco, grading separation, \$20,000.

ROUTE 4 NEAR ARNO TO ROUTE 23 AT PICKETTS JUNCTION

General Facts

Distance—107 miles.

Travel (Summer)—Twin Cities, 375; west of Ione, 300; west of Jackson, 1200; Pine Grove, 500; Picketts Junction, 128.

Present Condition—This lateral from Twin City on the Sacramento-Stockton road to East of Jackson has been graded, surfaced and oiled and is satisfactorily serving the traffic.

PEANUT TO KUNTZ

Distance—31 miles.

Travel (Summer)—Peanut, 91.

Comment—This secondary road in Trinity County

is without connection at either end with the state highway system. This situation is due to the fact that it antedates the present state highway system, having been made a state highway by the legislature of (1907). It carries a maximum traffic of about 50 vehicles a day, and is maintained by the state to a standard satisfactorily serving the traffic.

AUBURN TO NEVADA LINE NEAR VERDI

(Donner Pass Route)

General Facts

Distance—93 miles.

Travel (Summer, 16-hour count)—East of Auburn, 2400; East of Colfax, 1700; Emigrant Gap, 760; Donner Lake, 900; West of Truckee, 1900.

Condition of Road at Close of Present Biennium (June 30, 1929)

Paved—16 miles.

Oil Mix Surface—45 miles.

Grading and Surfacing—11 miles now under way.

Earth Road—22.5 miles.

Improvements Included in Construction Program for 1929-1931 Biennium

Pavement—10.6 miles.

Grade Crossings—3 grade crossings are to be eliminated (cooperative project with railroad).

Change of Route—New road 10 miles in length to be graded and surfaced to eliminate stretch of narrow, unimproved road.

Bridges—1 new bridge to be built.

LIST OF PROJECTS IN 1929-1931 BUDGET

PLACER-NEVADA COUNTIES—Indian Springs to Soda Springs, 10.7 miles, paving, \$160,000; Airport to Indian Springs, 10 miles, grading and surfacing, \$579,800; at Emigrant Gap and Yuba Gap, grade separation, \$85,000.

NEVADA COUNTY—Yuba River, bridge, \$15,000.

PLACER COUNTY—At New England Mills, grade separation, \$40,000.

MYERS TO NEVADA LINE VIA TRUCKEE RIVER

(Lake Tahoe and Truckee River Highway)

General Facts

Distance—65 miles.

Travel (Summer, 16-hour count)—Tahoe City, 2400; south of Truckee, 1100; east of Truckee, 1400; at Nevada-California state line, 1800.

Condition of Road at Close of Present Biennium (June 30, 1929)

Grading—Entire road now graded to high standard except about 10 miles.

Surfacing—By end of present biennium road will be surfaced for distance of 55 miles, and oiled except for 22.3 miles.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Oiling—22.3 miles.

Grading—1.5 miles.

Bridges—1 new bridge to be built.

LIST OF PROJECTS IN 1929-1931 BUDGET

EL DORADO COUNTY—At Emerald Bay, 1.5 miles, grading, \$150,000; Tallac Creek, bridge, \$8,000;

Emerald Bay to Meeks Bay, 7.5 miles, surfacing, \$12,000.

PLACER COUNTY—Tahoe City to Truckee, 14.8 miles, surfacing, \$22,200.

TAHOE CITY TO NEVADA LINE AT CRYSTAL BAY

General Facts

Distance—12 miles.
Travel (Summer)—Tahoe City, 3400; Brockway, 400.
Present Condition—This road, along the northerly end of Lake Tahoe, has been graded, surfaced and oiled.

FROM ROUTE 13 NEAR MONTEZUMA TO ROUTE 23 NEAR MONO LAKE

(Oak Flat Road)

General Facts

Distance—68 miles.
Travel (Summer)—Junction with Sonora Road, 400; east of Groveland, 273; Checking Station at Yosemite, 146.

Present Condition—This is the Big Oak Flat road entrance to the Yosemite National Park and the connection from the easterly side of the park down the Levining grade to a connection with Route 23 east of the Sierra. Improvements of the Priest grade by widening and regrading during the present biennium with other minor corrections have done much to increase the safety for traffic on this road. Relocations of a major nature in order to eliminate excessive grades are in prospect, but definite plans for these changes have not yet been developed.

GENERAL GRANT PARK TO KINGS RIVER CANYON

General Facts

Distance—21 miles.
Travel (Summer)—West of Hume, 83; east of Hume, 27

Present Condition—During the present biennium an exhaustive study of the various routings was made and a definite routing adopted by the Commission. The location survey plans are now under way and, on their completion, in all probability a convict camp will commence construction.

FROM CALIFA TO GILROY

(Pacheco Pass)

General Facts

Distance—84 miles.
Travel (Summer, 16-hour count)—Junction of the road with Hollister, 2000 vehicles; Pacheco Pass, 1800; Los Banos, 1700; Califa, 900.

Present Condition—Paved, 54 miles; oil seal surface, 30 miles.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Pavement—16 miles of oil seal surface to be replaced with a higher type of surface.

LIST OF PROJECTS IN 1929-1931 BUDGET

SANTA CLARA COUNTY—San Felipe to east boundary, 16 miles, paving and draining, \$240,000.

SARATOGA GAP NEAR REDWOOD PARK TO BLOOM'S MILL

(In Santa Cruz County)

General Facts

Distance—20 miles.
Travel—Saratoga Gap at Redwood Park Gate, 64 vehicles.

The route is unimproved at present.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Grade and Surface—7 miles.
The improvement of the Skyline Boulevard to Saratoga Gap and of the county road from Boulder Creek makes it necessary to improve this road to provide an entrance to Redwood Park for traffic thus developed.

LIST OF PROJECTS IN 1929-1931 BUDGET

SANTA CRUZ COUNTY—Saratoga Gap to Waterman Switchback, 7 miles, grading and surfacing, \$147,000.

SAN BERNARDINO (END OF COUNTY PAVEMENT) TO BEAR LAKE

(Crest Route)

General Facts

Distance 51 miles.
Traffic (Summer, 16-hour count)—Watermans Canyon, 3000 vehicles; Pinecrest, 2200; Big Bear Dam, 1600.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Grading and Surfacing—Heavy grading and surfacing will be constructed, portions of 6 miles of exceptionally heavy work being authorized in the biennial budget.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN BERNARDINO COUNTY—Crest Road, grading and surfacing, \$550,000.

BOULDER CREEK TO REDWOOD PARK

General Facts

Distance—8 miles.
Travel (Summer)—Boulder Creek at Park line, 2100.

Present Condition of Road—This road has been widened and regraded under day labor authorization during the present and past biennium. A considerable portion has been surfaced.

WILLOWS TO ROUTE 3 NORTH OF BIGGS

(Oroville-Willows Lateral)

General Facts

Distance—32 miles.
Travel (Summer, 16-hour count)—Willows east of city 600; Butte City, 400; Cherokee Canal, 63.

LIST OF PROJECTS IN 1929-1931 BUDGET

BUTTE COUNTY—Butte Creek to Cherokee Canal, 7.7 miles, surfacing, \$10,780.

SAN FRANCISCO TO ROUTE 5 NEAR GLENWOOD

(Skyline Boulevard)

General Facts

Distance—64 miles.

Travel (Summer, 16-hour count)—Swimming Pool, 9300; at county road to Colma, 5700; Santa Clara-Santa Cruz County Line, 63.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN MATEO-SANTA CLARA-SANTA CRUZ COUNTIES—Skyline Boulevard, 13.8 miles, surfacing, \$17,940.

KLAMATH RIVER HIGHWAY*General Facts*

Distance—183 miles.

Traffic (Summer)—Junction Pacific Highway, 400; Thompson Creek, 68; Weitchpec Junction, 48.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Bridges—31 bridges, pronounced unsafe, to be replaced.

LIST OF PROJECTS IN 1929-1931 BUDGET

SISKIYOU COUNTY—Thompson Creek, bridge and grading, \$11,000; Oak Flat Creek, bridge, \$8,000; Seiad Valley to west boundary, bridges, \$25,250.

HUMBOLDT COUNTY—Trinity River to east boundary, bridges, \$18,500.

ORLAND TO CHICO*General Facts*

Distance—19 miles.

Travel (Summer)—Orland Junction, 700; Hamilton City, 800; West Chico, 1300.

Present Condition of Road—The construction of the Hamilton City Bridge and approaches and the surfacing and oiling out of Orland enables this route to serve traffic in a satisfactory manner.

MCDONALDS TO THE SEA*General Facts*

Distance—50 miles.

Travel (Summer)—Junction with Redwood Highway, 275 vehicles per day; Booneville, 500; Navarro, 400.

Improvements of Present Biennium

Number of old bridges reconditioned; 8 miles of road improved; 12 miles of oil surface placed.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Grading with Portions Surfaced—9 miles.

Bridges—A number of timber bridges considered unsafe will be replaced.

LIST OF PROJECTS IN 1929-1931 BUDGET**ROUTE 1 NEAR McDONALD TO MOUTH OF NAVARRO RIVER**

MENDOCINO COUNTY—Booneville to Flynn Creek (portions), grading and surfacing, \$62,000. Same section, bridges, \$50,000.

CALISTOGA TO ROUTE 15 NEAR CLEAR LAKE*General Facts*

Distance—88 miles.

Travel (Summer)—North of Calistoga, 1300; Middletown, 1200; Lower Lake, 600.

Present Condition of Road—Minor improvements of this route from Mt. St. Helena northerly toward Middletown, together with efficient maintenance of the remaining section, enables this road to serve traffic in a satisfactory manner.

RUMSEY TO ROUTE 15 NEAR WILBUR SPRINGS*General Facts*

Distance—15 miles.

Travel—No road; probable location will be away from existing road.

Present Condition of Road—Further studies to determine location of this route are under way. Upon their completion and the conclusion of a location survey, it is probable that construction by convicts will be undertaken.

SANTA ROSA TO SCHELLVILLE*General Facts*

Distance—22 miles.

Travel (Summer)—East Santa Rosa, 4200; at Sonoma Creek Bridge, 2800; Schellville Junction, 2500.

Present Condition of Road—This road has been constructed to satisfactorily serve travel.

TIBURON TO ALTO

Distance—5 miles.

Travel—Belvedere Junction, 2200.

Present Condition—State maintained road. No construction.

FAIRFIELD TO LODI VIA RIO VISTA*General Facts*

Distance—56 miles.

Travel (Summer)—Denverton Overhead Crossing, 670; Rio Vista Bridge, 1560; West of cannery near Isleton, 3000; Thornton, 1500; Lodi, 1258.

Present Condition of Road—This secondary road is being maintained to satisfactorily serve traffic.

NEAR MICHIGAN BAR TO CENTRAL HOUSE*General Facts*

Distance—9 miles.

Travel (Summer)—Central House, 284.

Present Condition of Road—This road has been graded and oil rock surfaced.

CARMEL TO CAMBRIA*General Facts*

Distance—108 miles.

Travel (Summer)—South of Carmel, 1575; San Simeon, one mile south, 240.

Present Condition of Road—Two convict camps are now prosecuting construction on this road. This work will most probably be continued in the next biennium.

SANTA MARIA TO FREEMAN

(Cuyama and Kern River Route)

General Facts

Distance—193 miles.
 Travel (Summer)—Santa Maria, 200 vehicles a day; Kern County Line, 270; Maricopa, 500; 10 miles east of Bakersfield, 1100; Mojave, 100.
 Present Condition—Paved, 5 miles; oil mix or seal, 36 miles, gravel surface, 36 miles; earth, 116 miles.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Surfacing and Oiling—46 miles (portions).
 Grading and Surfacing—21.9 miles.
 Widened and Improved—30 miles (portions).

LIST OF PROJECTS IN 1929-1931 BUDGET

SANTA BARBARA-SAN LUIS OBISPO COUNTIES—Upper Cuyama Valley to east boundary, 46 miles, surfacing, \$285,000.

KERN COUNTY—Pentland to Route 4, 21.9 miles, grading and paving, \$232,000; Democrat Springs to Welden, 30 miles, grading, \$40,000.

MOJAVE TO ARIZONA LINE NEAR TOPOCK VIA BARSTOW

(The National Old Trails)

General Facts

Distance—249 miles.
 Travel—Mojave, 100 vehicles daily; Barstow, 300; Daggett, 500; Amboy, 300; Needles, 600.
 Present Condition—29 miles improved with oil surface.
 Under Way—14 miles grading and surfacing.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Grading and Surfacing—41 miles to be graded and surfaced with oiled rock.

LIST OF PROJECTS IN 1929-1931 BUDGET

SAN BERNARDINO COUNTY—Argos easterly, 41 miles, grading and surfacing, \$725,000.

EL RIO TO SERRA*General Facts*

Distance—81 miles.
 Travel (10-hour count)—Santa Monica, 30,000 vehicles; Lomita, 10,000; Seal Beach, 21,000; Newport Beach, 13,300.

Condition of Road at the Close of the Present Biennium (June 30, 1929)

Pavement—73.5 miles.
 Oil Mix Surface—7.5 miles.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Widening Grade and Pavement—Portions of 45.5 miles.
 Paving Portion Previously Graded and Surfaced—2 miles.
 Grade Separation—One, involving improvement of 1.2 miles of connecting road.
 Protection Work Against Damage from Ocean Storms Through Slope Walls or Rip Rap—34 miles.

LIST OF PROJECTS IN 1929-1931 BUDGET

LOS ANGELES-VENTURA COUNTIES—Santa Monica to Point Mugu, 34 miles, shore protection, \$185,000.

LOS ANGELES COUNTY—Latigo Creek to Nicholas Creek, 2 miles, grading and surfacing, \$90,000.

ORANGE COUNTY—Seal Beach to Newport Beach, 11 miles, paving, \$300,000.

VENTURA-LOS ANGELES-ORANGE COUNTIES—This route shares with Routes 2 and 9 in an allotment of \$1,086,349.71 for grading, paving, bridges and grade separations.

LOS ANGELES COUNTY—Santa Monica north-erly, shore protection, \$60,000; Santa Monica to Topanga Canyon, 4.5 miles, grading and paving, \$350,000.

LANCASTER TO BAILEYS*General Facts*

Distance—38 miles.
 Travel (Summer)—Lancaster Junction, 636; at Bailey's Ranch, 107.
 Present Condition of Road—State maintenance keeps this road in a satisfactory condition.

LA CANADA TO MOUNT WILSON ROAD VIA ARROYO SECO*General Facts*

Distance—25 miles.
 Travel (16-hour count)—At Pasadena, 2300 vehicles.
 Present Condition—3.8 miles graded by the county, balance of route not improved.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Grading—Portions of 20-mile section.

LIST OF PROJECTS IN 1929-1931 BUDGET

LOS ANGELES COUNTY—Arroyo Seco Road, 20 miles, grading, \$500,000.

AZUSA TO PINE FLATS IN SAN GABRIEL CANYON*General Facts*

Distance—28 miles.
 Travel—Not under state maintenance.
 Present Condition of Road—Proposed construction of the San Gabriel Dam and possible construction of the Pasadena water supply in this canyon will delay the undertaking of any construction projects on this road for several years.

BIG PINE TO OASIS*General Facts*

Distance—41 miles.
 Travel (Summer)—Big Pine Junction, 68.
 Present Condition of Road—This secondary road is being maintained from state funds.

MECCA TO BLYTHE*General Facts*

Distance—91 miles.
 Travel—Desert Center, 80 vehicles daily; Blythe, 150.
 Present Condition—About 16 miles has been graded and 32 is now improved with oil surfacing.

Improvements Included in Budget for Construction Program for 1929-1931 Biennium

Grading and Surfacing—20-mile section will be graded and surfaced with oiled rock.

LIST OF PROJECTS IN 1929-1931 BUDGET

RIVERSIDE COUNTY—West of Hopkins Well, 20 miles, grading and surfacing, \$300,000.

VENTURA-LOS ANGELES-ORANGE AND SAN DIEGO COUNTIES—This road participates with State Highway Routes 2 and 9 in certain cooperative projects—Grading, paving, bridges, and grade separations, \$1,086,349.71.

AUBURN TO SONORA
(The Mother Lode Highway)

General Facts

Distance—93 miles.

Travel (Summer, 16-hour count)—At wire bridge near Auburn, 264; north of Placerville, 200; north from Central House near Plymouth, 500; Martell, 850; near Sonora, 300.

Present Condition—Short sections of the route have been improved and surfacing placed. There are 19 miles of oil seal surface; 9 miles of gravel and 65 miles still to be improved both for grading and surfacing.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Bridges—3 bridges pronounced structurally unsafe to be replaced with improvement in alignment and approaches.

Grading and Surfacing—9.6 miles to be graded and surfaced with alignment and grade improvement.

LIST OF PROJECTS IN 1929-1931 BUDGET

EL DORADO COUNTY—American River near Lotus, 1 mile, grading, surfacing, bridge, \$70,000.

AMADOR COUNTY—Amador City to Martell, 4.2 miles, grading and surfacing, \$260,000. Cosumnes River, bridge and grading, \$37,000.

CALAVERAS COUNTY—Near Calveritas City, 2.8 miles, grading and surfacing, \$90,000; Calveritas Creek, bridge, \$25,000.

AMADOR-CALAVERAS-TUOLUMNE COUNTIES—Surfacing Mother Lode Highway, \$52,000.

MANTECA TO ROUTE 5, NEAR MOSSDALE SCHOOL

General Facts

Distance—4 miles.

Travel (Summer)—Mossdale Junction, 5350.

Present Condition of Road—The construction in the present biennium, now practically completed, puts this road in a satisfactorily serviceable condition.

PAJARO RIVER TO ROUTE 2 NEAR SAN BENITO BRIDGE

General Facts

Distance—3 miles.

Travel (Summer)—San Juan Bautista, 3390.

Present Condition of Road—This route has been graded and surfaced with bituminous macadam pavement.

SAN FRANCISCO TO SAN JOSE

(The Bayshore Highway)

General Facts

Distance—41 miles.

Travel (Summer, 16-hour count)—San Bruno Junction, 3700; north city limits of South San Francisco, 10,000; South San Francisco Underpass, 10,000.

Condition of Road at the Close of the Present Biennium (June 30, 1929)

By that date 13 miles of the route will be open to travel.

Improvements Included in Budget for Construction Program of 1929-1931 Biennium

Grading and Surfacing—13.9 miles.

Bridges—2 bridges, each 100 feet in width, to be constructed.

Grade Separation—One railroad grade separation (cooperative project with railroad).

Oil Treatment Section Now Graded and Surfaced—3 miles.

LIST OF PROJECTS IN 1929-1931 BUDGET
SAN FRANCISCO TO SAN JOSE

(Bayshore Highway)

SAN MATEO COUNTY—San Mateo to Redwood City, 7.4 miles, grading and paving, \$815,000; Redwood Slough, bridge, \$85,000; grade separation near Dumbarton, \$120,000; in San Mateo, 3 miles, surfacing, \$6,000.

SAN MATEO AND SANTA CLARA COUNTIES—Redwood City to Embarcadero Road, 6.5 miles, grading and paving, \$498,868.64. San Francisquito Creek, bridge, \$55,000.

SAN RAFAEL TO SAN QUENTIN

General Facts

Distance—3 miles.

Travel (Summer)—San Quentin Hill, 4450.

Present Condition of Road—A project for the improvement of this route is now being advertised.

UKIAH TO MENDOCINO STATE HOSPITAL

General Facts

Distance—2 miles.

Travel (Summer)—At Ukiah Junction, 873.

Present Condition of Road—This is a short lateral serving the state hospital and is being satisfactorily maintained.

OREGON LINE NEAR CHETCO TO CRESCENT CITY

General Facts

Distance—16 miles.

Travel (Summer)—North of Crescent City, 900; Oregon line, 319.

Present Condition of Road—The construction of a small project near the Oregon line to connect with the Oregon coast road and the rock surfacing from there south to Crescent City makes this road satisfactory for traffic.

DOWNIEVILLE TO MT. PLEASANT

General Facts

Distance—6 miles.

Traffic—9 cars.

Present Condition of Road—This road was made a state highway by legislative act in 1907. Travel upon it is purely local. The road is unimproved.

THE BRIDGE

By VIVIAN CARTER in the *Rotarian*

The Lord, He said to me, "Sambo!
You gotta go, you gotta go.
You'se gonna live no more; instead
I'se gonna make you something dead.
Sambo, what would you like to be
When you have given your life to me?"

I said unto the Lord, I said,
"If you'se gonna make me something dead,
Rather than anything else, I'd choose
To be a bridge, and have my nose
On one bank of a river wide,
My toes upon the other side.

Across my back they'd come and go—
Friend and enemy, fast and slow,
Man and beast, wagon and car,
Jogging along from near and far,
While underneath, unheeding me,
The waters flow on to the sea.

If I were a bridge, mos' blessed Lord,
I'd give you service, 'pon my word;
Helping my fellow man in style,
Philosophising all the while,
Feeling more powerful than a king,
Yet never *doing* a doggone thing."

"I don't see why you call your place a bungalow,"
said Smith to his neighbor.

"Well; if it isn't a bungalow, what is it?" said the
neighbor. "The job was a bungle, and I still owe
for it!"

Mrs. Smythe—"I'm soliciting for the charity organi-
zation. What do you do with your cast off clothing?"

Mr. Smith—"I hang them up carefully and go to
bed. Then in the morning I put them on again."
—*Pointer*.

"What's the fuss in the school-yard sonny?" asked
a gentleman passing a ward school.

"Why, the doctor's just been around examin' us,
an' one of the deficient boys in knocking hell out of a
perfect kid."

They were discussing silk stockings.

"They were invented in Queen Elizabeth's time,"
said the man who knows everything.

"Yes," commented another, "but they weren't dis-
covered till the twentieth century."—*Tit Bits*.

In Detroit, recently, two autoists met in an alley
too narrow to permit them to pass each other. One
of the autoists rose in his car and shouted at the
other:

"I never back up for any d--n fool."

The other driver quietly put his car in reverse,
backed out, and replied:

"That's all right. I always do."

IN OTHER STATES

NEW MEXICO has joined the growing ranks of
the states which use the oil-mix type of gravel road.
An 11-mile section was built in Valencia County in
June, and if this proves satisfactory other sections
are to be built.

MINNESOTA—Maintenance work on state high-
ways is being gradually motorized. Motor equipment
is now used exclusively on 3600 miles, while teams
used on 3400 miles are in many places supplemented
with power graders.

SOUTH DAKOTA—The South Dakota County
Commissioners Association is urging the adoption of
standard county road markers throughout the state.
Signs conforming to the proposed standards have been
installed by a leading county.

TEXAS—Contracts were awarded by the state
highway department for 1533 miles of new construc-
tion during 1927 and the first half of 1928. The total
estimated cost is \$21,340,000. In addition 1056 miles
of maintenance contracts were let.

OHIO—A new law provides that all traffic lights
erected along state highways by cities and villages
must receive the O. K. of the state highway depart-
ment before being operated. This law covers lights
now in service as well as future installations.

NORTH CAROLINA—Buncombe County recently
completed a parallel highway to relieve congestion on
state route No. 69 entering Asheville. The new high-
way, 8½ miles long, is at no point more than one
mile from the old route.

IOWA—Contracts for 186 miles of pavement were
let during July, August and September. With the
additional lettings made during the fall months more
than 200 miles of hard surfacing was initiated or com-
pleted on the state highways during 1927.

Twenty-five years ago the family horse was fed in
the stable and paid for before it was driven. Today
the family car is nourished with gasoline at a public
filling station and may or may not be paid for before
it is used, writes William Boyd Craig, in the Nation's
Business. A quarter of a century ago gasoline was
known in the home principally as a fluid which would
remove spots from clothing and was dangerous near
flames. Last year more than 12,000,000,000 gallons
were produced to satisfy an ever-growing demand.

By the latest registration figures there is a motor
car for every sixth American and a gas station for
every 80 automobiles in the country. In some states
there is probably a filling station for every 50 cars.
Of the 29,000,000 cars and trucks now running the
average uses just under 500 gallons a year, and
between 20 and 25 gallons of oil.

"We are more heavily taxed by our idleness, pride
and folly than we are taxed by government."

We found this gem among Benjamin Franklin's
sayings when we were glancing through his writings
on his birthday last week. What he wrote a century
and a half ago is just as true today.

If we may be permitted to paraphrase "Poor
Richard," we could well say today:

"We are more heavily taxed by poor roads, which
consume our gasoline, wear our tires and ruin our
cars, than we are taxed for good roads."—Exchange.

Progress Reports From the Counties

ALAMEDA COUNTY

Bids were received in District IV office for the construction of 16,800 feet of laminated guard rail to be placed on the Dublin Canyon road between Dublin and Hayward. This section of road as recently reconstructed by Ariss-Knapp Company is an extremely high speed highway with wide swinging curves and rolling grades. As the fills are high and the oil macadam pavement does not allow of paint strips, the traffic tends to swing off center rendering the fills unsafe and the construction of the guard rail will be a valuable safeguard. The contract has been awarded to the low bidder, Lee J. Immel of Oakland, and work is rapidly progressing.

ALPINE COUNTY

All roads in Alpine County with exception of Markleville to Woodfords are closed for winter; the latter stretch has been rocked to allow all-year travel between Woodfords and Markleville.

AMADOR COUNTY

Maintenance forces have just completed surfacing all muddy spots on Mother Lode Highway between Plymouth and Cosumnes River, placing this stretch in excellent condition for winter travel.

Maintenance forces have started widening and straightening the Alps Highway between Chapmans and Dew Drop Inn.

BUTTE COUNTY

The construction of the highway between Butte Creek and Biggs road has recently been completed. A graded roadbed 30 feet wide has been surfaced with pit run gravel 20 feet wide by 6 inches thick. L. C. and W. E. Karstedt were the contractors on this work.

CALAVERAS COUNTY

The Big Trees Highway from Angels Camp to Big Trees was freed from snow and placed in excellent condition for the annual snow frolic at Big Trees on January 13. A large crowd attended as usual.

COLUSA COUNTY

Portions of the present highway from the westerly county line to Mountain House (Venado), which were greatly in need of resurfacing, have been surfaced with gravel by Hemstreet and Bell, the contractors. The work was completed in December, 1928.

CONTRA COSTA COUNTY

Contract for the reconstruction of a section of the Oakland-Martinez road, from the boundary of the town of Richmond 1.3 miles northerly to San Pablo, has been awarded to the Warren Construction Company of Oakland. The work to be done consists of widening the existing roadbed to 55 foot and 45 foot widths and widening the existing pavement to 40 foot and 30 foot widths, surfacing same with asphalt

concrete. The amount of 9600 tons of type "A" asphalt concrete is not large but the low price of \$4.25 per ton for same marks a record price for asphalt concrete in this District as this material has always been relatively high priced. The contractor has accomplished much in the short time since he started work on November 15th and ought to be finished in several weeks.

EL DORADO COUNTY

Plans have been made for 5 1/2 miles of construction of a 24-foot graded roadbed between Riverton and Kyburz on the Placerville route to Lake Tahoe.

It is proposed to follow the grading shortly after completion with surfacing on the first 3 1/2 miles of the project. This section of the highway is in the El Dorado National Forest, and will be financed jointly by the state and federal government. This work will be a continuation easterly of the improvement already made from the west limits of the national forest (near the Pacific Ranger Station) to the beginning of this proposed project.

The improvement of this unit will eliminate a number of sharp dangerous curves, and will greatly increase the enjoyment of travelers to Lake Tahoe and Nevada.

FRESNO COUNTY

Erection of steel on the Herndon Bridge has been completed by Carl H. Peterson, contractor.

Funds have been allotted for continuing the placing of gravel in Warthan Creek Canyon on the Sierrato-the-Sea Highway west of Coalinga.

GLENN COUNTY

The 5 miles of grading roadway between Logandale and Willows, and which D. McDonald is under contract to build, has progressed slower than expected. It will probably be some time in April before the work will be completed.

A contract was let in December, 1928, to E. B. Skeels for the building of a three-span reinforced concrete bridge across Quint Canal, about four miles east of Willows. Traffic is being detoured across the canal by means of a temporary timber bridge close to the site of the new structure.

KERN COUNTY

The Valley Paving Company, which has the contract for surfacing 10 miles of Route 33 from Famosa to Wasco, with asphaltic concrete, are making good headway with the grading work and will start laying surface about February first.

Force, Currihan & McLeod have started work on their contract for grading and oil-mixed surfacing on the Kern River Highway from Bakersfield to the mouth of the Kern Canyon.

The contract for grading and surfacing from Pentland to Conners Station Road on Route 57, has been awarded to C. W. Hartman of Bakersfield.

The survey from Bakersfield to Mojave, over the Tehachapi Pass is in charge of S. A. Cobb and good progress is being made.

KINGS COUNTY

Maintenance crews are widening roadway and enlarging the drainage system near Armona.

LAKE COUNTY

The rocking and oiling of the section of state highway from Kelseyville Junction to Lakeport, 1.1 miles, by state forces has met with hearty appreciation of the local inhabitants. This job, the building up of the existing road metal to a depth of 7 inches and width of 20 feet with two applications of 95% Bitumuls in two applications of 1/3 gallon each with screenings, shows up as a fine specimen of this type of road, and there is much local talk of how to have more road so improved.

The grading of a 24-foot highway between Lucerne and Abbott Mine, which is being built by the convict labor forces, is progressing satisfactorily, and will be completed about March.

A contract was let in December, 1928, for 10.6 miles of grading and surfacing with oil treated crushed stone between Lucerne and Clear Lake Oaks.

Von der Heller, Pierson and Logan, the contractors, expect to have the work finished by October.

LOS ANGELES COUNTY

Work is in progress on the reconstruction of about seven-tenths mile of highway between the northerly boundary of the city of Los Angeles and Newhall Tunnel, where the alignment will be improved and the roadway widened to forty feet, and paved with bituminous macadam.

The construction of eight and five-tenths miles of new state highway between Tunnel Station and the Santa Clara River, through Weldon and Gavin canyons, is well under way with much heavy equipment on the job to carry on the work.

Grading and culverts have been completed and the asphaltic concrete pavement 30 feet wide is now being placed on a 1.4 mile stretch of Poothill Boulevard between Glendora and La Verne.

Through the Malibu Ranch and extending into Ventura County along an eleven and a half mile stretch of highway, the construction of a twenty foot Portland cement concrete and bituminous macadam pavement is in progress. Over two miles of half width concrete pavement, 10 feet wide, is now in place.

MADERA COUNTY

A. W. Kitchen has completed the substructures at Ash and Berenda sloughs on the Pacheco Pass Highway and is pouring the concrete surface.

Haurahan Company have completed about a mile of pavement on their asphaltic concrete job north of Madera on the Golden State Highway. Work has also been started on the approaches to the San Joaquin River Bridge at Herndon.

MARIN COUNTY

Hanrahan Company have almost finished the 4 1/2 miles of second story pavement from Ignacio to Gallinas Creek, just north of San Rafael. It is a beautiful specimen of concrete pavement and the inconveniences suffered during the rather protracted construction period are soon forgotten in smoothly riding over the new work.

M. C. Foggate, resident engineer on this job, having completed a good job on this contract, is now busy superintending the construction of the San Rafael-San Quentin road.

Granfield, Farrar and Carlin of San Francisco are contractors on this job and have made a flying start, driving piles to carry concrete structures in the low marshy lands and opening up cuts preparatory to making fills across the marshes. This improvement is a connection between the Redwood Highway at San Rafael and the Richmond-San Quentin Ferry at San Quentin.

The first half mile out of San Rafael is a portion of the proposed new road to Sausalito and the remainder follows, in general, the old toll road with improved alignment and grades.

The new work consists of grading a 56-foot roadbed and building a 40-foot by 4-inches bituminous macadam pavement on the first half mile and grading

a 36-foot roadbed and a 20-foot bituminous macadam roadway on the remaining section.

Simultaneous with this contract, Granfield, Farrar and Carlin are low bidders for a contract for a connection near Alto of the Redwood Highway with the section of the Alto to Tiburon road that was constructed in 1914. This is a small job, about 0.6 mile of bituminous macadam pavement similar to the San Rafael-San Quentin job. It is expected that the contract will be awarded and work started very soon and that the contract will be completed in the 100-day period allowed by contract.

MARIPOSA COUNTY

Rasich Brothers, contractors, are making good progress on their contract for grading and surfacing on the Yosemite All-Year Highway. Culverts and bridges are nearing completion and surfacing will be started by February 15.

The day labor crew, under Superintendent Carl Nelson, is widening and straightening line on the famous Briceburg Grade at the entrance to Merced Canyon.

Fourteen inches of snow fell at the Bear Creek Summit on the Mariposa road on the night of January 20 and by working all Saturday night, the maintenance forces had the road completely cleared by Sunday noon.

MERCED COUNTY

Considerable widening is being done by maintenance forces on the narrow grade west of Los Banos on the Pacheco Pass Highway.

Repairs to the drawbridge over the San Joaquin River near Los Banos have been completed.

MONTEREY COUNTY

Plans have been completed for an extensive line change, south of the Salinas River Bridge at San Ardo. Realignment 0.5 of a mile in length will eliminate a blind 300 foot radius curve on practically a right angle turn and on a 6 per cent grade.

On the Coast Highway, between San Ardo and San Lucas a line change 0.4 mile in length is now under construction with the work consisting of a graded roadbed 30 feet in width with 20 feet by 6 inch waterbound macadam surfacing. The work is being carried on under contract with W. A. Dontanville. Another accident-causing curve will be done away with.

Between Greenfield and King City two line changes approximately 0.2 and 0.5 miles in length are now under construction. The work consisting of a graded roadbed 36 feet in width with 20 feet by 6 inches waterbound macadam surfacing. Work is being done under contract with Granite Construction Company. Three bad curves where numerous accidents have occurred are eliminated by this contract.

Surveys are now in progress for the proposed reconstruction of the Coast Highway between Salinas and Chualar.

Between Salinas and Chualar plans have been prepared for an overhead crossing over the Southern Pacific Railroad, at a point locally known as Spence crossing. The plans prepared involve realignment for a distance of 0.6 miles with an overhead bridge approximately 1000 feet in length.

On the Carmel-San Simeon Highway construction work is in progress both north and south of the Little Sur River and between Salmon Creek and Villa Creek. The work being carried on by the use of State convict labor. A crew of approximately 80 men and two power shovels are working in the vicinity of the Little Sur River and 180 men and two power shovels are building north from Salmon Creek.

In the vicinity of the Carmel Highlands surveys have been completed. Preliminary investigations and studies are now being made to determine possible relocations of the highway in this vicinity.

NEVADA COUNTY

The work under contract by the Callahan Construction Company, between Indian Springs and Soda Springs, consisting of a 24-foot graded roadbed 10.6 miles in length, was suspended on November 17, 1928.

A heavy snowfall at that time stopped the operation of the work; other snowfalls since have made conditions such that a resumption of work will hardly be made before the middle of March of this year. It is expected, however, that the work will be completed by August, which is the date set for completion.

Between Donner Lake and Truckee, inclement weather conditions have caused a suspension of the grading and surfacing, which have been under way since September. The Mathews Construction Company are under contract to do this work, which was suspended January 12. It is expected that a resumption of work can be made about April 1, and the completion of the work will be about the middle of May.

Plans are complete, and an estimate has been made, for the construction between Nevada City and Washington Road of 12½ miles of a graded roadbed 24 feet wide and surfacing with 6 inches thick, 20 feet wide, crushed rock with the top 3 inches oil mixed.

The road is a unit of the Tahoe-Ukiah highway, and connects Nevada City with a county road leading to the town of Washington on the South Yuba River.

ORANGE COUNTY

The reconstruction of the state highway between Anaheim and Fullerton has been completed and opened to traffic. The new pavement, which is of Portland cement, is 56 feet wide between curbs.

The paving of two-tenths mile of highway with cement concrete on an improved alignment near San Clemente has been completed and opened to traffic.

PLACER COUNTY

A contract has been let to Frederickson and Watson Construction Co. and Frederickson Bros. for grading and paving with bituminous macadam the approaches to the Bowman and Weimar overhead crossings. The total length of the work is 2 miles.

The overhead crossings which are being built under contract, and which separate the tracks of the S. P. R. R. from the highway, are expected to be completed about March.

The paving of the approaches will be completed about the end of May.

E. F. Hilliard, contractor, has completed the work of surfacing with bituminous macadam 2 miles of state highway between Sheridan and the northerly county line.

SACRAMENTO COUNTY

The paving on the contract from Galt to Arno is complete; traffic will soon be routed straight through, eliminating a detour which has been in use several months. Frederickson & Watson Construction Company and Frederickson Bros. are the contractors. C. M. Butts is the resident engineer.

The new asphalt concrete pavement between North Sacramento and Del Paso Park was completed by Clark and Henery Construction Co., contractors, in December, 1923.

Survey plans are being proposed for the improvement of the highway between Ben Ali and Sylvan School.

SAN BENITO COUNTY

Preliminary surveys for an improved road connecting Hollister and Pinnacles National Forest by way of Paicines are nearly complete and plans for construction are now being prepared in the District Office. This work is being carried on to cooperate with the Board of Supervisors of San Benito County.

On the Coast Highway, north of San Juan, a non-skid surface is now being placed. South of San Juan and over the San Juan grade the traffic stripe is being renewed. Work being done by the District Maintenance.

SAN DIEGO COUNTY

On the San Diego to El Centro Highway are three reconstruction jobs in progress.

From Viejas Creek to Guatay Creek, a distance of 7.2 miles, the Hauser Construction Co. is reconstructing the highway along an improved alignment and widening the roadway. They are well equipped and have already completed the rough grading on three miles of heavy work.

Between Guatay Creek and Pine Valley, about 3.9 miles, the Nevada Contracting Company is placing culverts and grading for the improved roadway.

Easterly from Pine Valley and extending 7.2 miles to Kitchen Creek the highway is to be paved with a 20 foot Portland cement concrete pavement. The Basich Brothers Construction Company have the contract for the work. The opening of quarries, grading, culvert placing and other preliminary work is in progress.

SAN JOAQUIN COUNTY

The traffic is now using the new entrance to Stockton on the north. Gannon and McCarty completed this work in fine time. Geo. R. Hubbard was the resident engineer.

A small grading and surfacing job to connect the new pavement with the road north of French Camp is under way. Willard & Biasotti are the contractors. Geo. R. Hubbard is resident engineer.

The grading and oil mix surfacing job on the new location between Mossdale and French Camp is nearing completion. The contractor is Mankel & Staring. C. M. Butts is the resident engineer.

SAN LUIS OBISPO COUNTY

On the Coast Highway between Arroyo Grande and Pismo the construction of 3.3 miles of grading and paving has recently been started by the Cornwall Construction Company.

Extending from Pismo to San Luis Obispo on the Coast Highway, the construction of a project 10.8 miles in length, including grading and paving, was recently completed in a very satisfactory manner by J. F. Knapp, contractor.

This project involved considerable realignment and resulted in a highly improved roadway connecting San Luis Obispo and the beach.

On the above project a reinforced concrete bridge 266 feet in length is now under construction by Chas. and F. W. Steffgen as contractors, and is under the supervision of the Bridge Department.

North from the city limits of San Luis Obispo the highway is to realign for one mile and graded to a roadbed width of 36 feet and surfaced with waterbound macadam 20 feet by 6 inches in width with an oil treated surface. Contract for this construction was recently awarded to the Ariss-Knapp Construction Company.

At Santa Margarita, survey and plans have been completed for reconstruction on a line change at the north end of the town. The proposed construction will eliminate a sharp curve on which is located a narrow concrete bridge of early design. The proposed work will include the construction of a new bridge with a change in the existing creek channel.

Surveys and plans are in progress for the reconstruction of the Coast Highway over a distance of 10.2 miles, between Atascadero and Paso Robles. The work contemplated consists of widening the existing roadbed to an overall width of 36 feet, and the paving reconstructed to a width of 20 feet. Changes in alignment will eliminate several dangerous curves.

On the Cholame Lateral, from a point 1.7 miles west of Shandon to the San Luis Obispo-Kern County line, a distance of 15.4 miles, the existing highway is now being regraded to a roadbed width of 24 feet and surfaced with bituminous macadam 18 feet in width. The construction is being carried on under contract with A. Teichert and Son.

On the Carmel-San Simeon Highway two wooden bridges are now under construction, one 266 feet long across the Arroyo la Cruz Creek and one 171 feet long across the San Carpojo Creek. These bridges are being built by Chas. and F. W. Steffgen, under the supervision of the Bridge Department.

The approaches to both the above bridges involving the grading and surfacing of approximately one mile of roadway, on realignment, is being handled under contract with W. J. Taylor.

Construction of the new equipment shops and storage sheds in San Luis Obispo is progressing under contract with W. J. Smith.

SAN MATEO COUNTY

See article entitled "Bayshore Highway Construction Proves Gigantic Project."

SAN MATEO, SANTA CLARA AND SANTA CRUZ COUNTIES

The Skyline Boulevard between the La Honda Road and Saratoga Gap has been rough graded by the contractors, Twoby Eros Co. and J. F. Shea Co. The work was practically completed before the rains set in and little remains to be done but the surfacing.

An excellent quarry has been opened and while most of the equipment has been released as no longer needed and of little use during the wet weather, the surfacing is progressing as the quarry can be operated and rock surface placed despite rains and storms.

None of the road is open to traffic but it is expected that by about July the rocking will be finished and the road will be ready for use. It is certain that the traveling public will appreciate it as the new work will be a beautiful addition to the present road which is already one of the finest roads in the State as well as a connecting link in the road to the California Redwood Park and Santa Cruz.

SANTA BARBARA COUNTY

On the Coast Highway between Bonham and Carpinteria a line change over the Rincon Hill is under construction, which involves the grading of a roadbed 46 feet wide, to be paved with concrete 30 feet in width. This work is being carried on under contract with McCray Company.

Included in the above line change a steel and concrete overhead bridge 570 feet in length is being constructed over the main line tracks of the Southern Pacific Railroad. A reinforced concrete arch culvert 20 feet by 17.5 feet, of special design, is being constructed at the Rincon Creek. The two structures are being built under contract with Paul M. White and are being handled under the supervision of the Bridge Department.

South of Montecito 0.3 miles of construction is under way, involving the grading of a roadbed 46 feet in width to be paved with concrete 30 feet wide. The work is being carried out under contract with the Cornwall Construction Company.

Between Golata and Naples, for a distance of 3.5 miles, construction is in progress involving the grading of a roadbed 36 feet in width, to be paved with second story asphaltic concrete 20 feet in width. This work is being carried on under contract with San Hunter.

In the Gaviota Canyon between Las Cruces and Gaviota, surveys for an extensive realignment of the existing highway have been completed and plans for construction are now in progress in the district office.

SOLANO COUNTY

The widening of the roadway with earth, and grading line changes from Fairfield north for five miles is progressing. The contractor is Mankel & Staring. R. H. Lapp is the resident engineer.

Oil mix borders will be placed along present pavement and as a surface on the line changes.

The cut-off back of Cordelia has been completed, but is not open to traffic. This is a grading and plant oil mix surfacing job; also a concrete bridge over Green Valley Creek. The contractor was Larsen Brothers of Sonoma, and J. W. Cole was the resident engineer.

A considerable part of the asphalt concrete pavement between Fairfield and Dixon has been planned to free the pavement of excess asphalt and make it more non-skid, and therefore much safer for winter traffic. It is noted that accidents have been greatly reduced over recent years.

SONOMA COUNTY

In this county also the Redwood Highway is receiving attention.

The 11.44 miles of road from Santa Rosa to Willow Brook just north of Petaluma, is being improved by

grading a 36-foot roadway and the placing a 20-foot Portland cement second-story pavement on the existing 15 feet of concrete.

The contract, as awarded to H. H. Peterson, was assigned to E. Paul Ford, and is well under way. Grading, including several line changes and extensions of existing concrete boxes and small bridges have been practically completed. The laying of concrete pavement is well started. The completion of this section will provide a finished high standard concrete and asphalt pavement 18 feet wide from Cloverdale to Healdsburg and 20 feet wide to one mile south of Petaluma.

TULARE COUNTY

C. W. Wood, contractor on the concrete shoulder job from the Plaza Garage to the Oak Grove School, has made a rapid start and should have this work completed well ahead of scheduled time.

Fred W. Nighbert, who received the contract for placing an oil-mixed surface on the portion of the Sierra-to-the-Sea Highway connecting with the General's Highway in Sequoia National Park, has completed his crusher and mixing plant set-up and is ready to start placing surfacing.

HIGHWAY RESEARCH IN THE UNITED STATES

(Continued from page 9.)

and by the California Division of Highways to determine the relative value of different methods of curing concrete pavements. Mr. Gonnerman is also conducting some interesting tests relative to the permeability of designed concrete mixtures, and also the causes of checking and "crazing" of concrete surfaces, as well as of the lasting quality of various pigments used as an admixture to color concrete surfaces.

At the Chicago Paving Laboratory an opportunity was afforded to have a discussion with Messrs. H. W. Skidmore and Gene Abson. Skidmore and Abson are considered authorities on asphalt pavement design and construction and in connection with their work have published a number of articles and have designed equipment for making special tests of the stability of asphaltic concrete mixtures.

TWO HIGHWAY BUDGETS

(Continued from page 1.)

the highways pay in proportion to their enjoyment of the benefits of these good roads has been amply demonstrated. * * * The experiment has been so successful, the tax so easy of collection, the fairness of it so universally conceded, and the saving so great over the previous method of financing it is most improbable that the people of California will ever revert to the issuance of interest-bearing securities for an enterprise of this character.

"The percentage of overhead cost is being steadily reduced, efficiency of operation is being increased and it can probably be said that both in expense and quality of road con-

struction and in its businesslike administration, California stands at the forefront of all of the states."

MASSACHUSETTS—The state registrar of motor vehicles employs a special squad of trained investigators to determine the underlying causes of fatal traffic accidents reported.

Record of Bids and Awards

IMPERIAL COUNTY—Between El Centro and Brawley, 9.8 miles grading and Portland cement concrete pavement. Dist. VIII, Rt. 26, Sec. F-G. J. F. Knapp, Stockton, \$372,434; V. R. Dennis Const. Co., San Diego, \$429,461.90; Wells & Bressler, Santa Ana, \$375,894; R. F. Hazard Contract Co., San Diego, \$315,411.50; Geo. Herz & Co., San Bernardino, \$329,331.80; Match Bros., Elsinore, \$331,423.10. Contract awarded to R. E. Hazard Contracting Company.

MADERA COUNTY—Approaches to Ash and Berenda Slough bridges, about 9.3 mi. in length to be graded and surfaced with oil treated crushed gravel or stone. Div. VI, R. 32, Sec. A. Contract awarded to C. W. Wood of Stockton, \$10,895.

MARIN COUNTY—At Alto, 0.6 mile to be graded and paved with bituminous macadam. Dist. IV, Rt. 52, Sec. A. Allied Contractors, Inc., Omaha, Nebr., \$34,316.60; Larsen Bros., Sonoma, \$32,180.10; Tieslau Bros., Berkeley, \$38,004.10; J. F. Collins, Stockton, \$32,419; J. V. Galbraith, Petaluma, \$34,996.29; Frederickson & Watson Const. Co., Oakland, \$28,389.50; Cranfield, Farrar & Carlin, San Francisco, \$27,267.10; M. J. Bevanda, Stockton, \$34,867.50; H. V. Tucker, San Francisco, \$27,300.80; J. P. Holland, Inc., San Francisco, \$28,826.30; James Currie, Burlingame, \$38,256; McDonald and Maggiora, Sausalito, \$32,823. Contract awarded to Cranfield, Farrar & Carlin, San Francisco.

MARIN COUNTY—Bet. Alto and Sausalito, about 3.6 miles to be surfaced with asphalt concrete. Dist. IV, Rt. 1, Sec. B. Pacific States Const. Co., San Francisco, \$54,158; A. G. Raich, San Francisco, \$49,238.60; Hollywood Paving Co., Los Angeles and San Rafael, \$32,440. Contract awarded to Hollywood Paving Co.

KERN COUNTY—Bet. Bakersfield and 1.5 mi. E. of Cottonwood Cr., 11 mi. grading and oil treated crushed gravel or stone surfacing. Dist. VI, Rt. 57, Sec. E-F. G. W. Ellis, Glendale, \$203,364.50; Schelling & Schellinger, Burbank, \$226,963.80; The Callahan Const. Co., Inc., Los Angeles, \$213,728.75; J. F. Collins, Stockton, \$203,640; Frederickson & Watson Const. Co. & Frederickson Bros., Oakland, \$192,086.30; C. W. Wood, Stockton, \$225,943.50; A. J. & J. L. Fairbanks, Inc., South San Francisco, \$249,490.95; Isbell Const. Co., Fresno, \$200,142; Fred W. Nighbert, Bakersfield, \$182,030.60; John Jurkovich, Fresno, \$209,289; Lewis Const. Co., Los Angeles, \$194,496.50; Force, Currihan & McLeod, Oakland, \$176,685.50; C. W. Hartman, Bakersfield, \$193,365.10; Hanrahan Company, San Francisco, \$209,837.80; A. Teichert & Son, Inc., Sacramento, \$237,031.50; C. R. Adams, Oakland, \$179,574; George Pollock Co., Sacramento, \$238,168. Contract awarded to Force, Currihan & McLeod of Oakland.

KERN COUNTY—Bet. Pentland and San Emigdio Road, 12.2 miles grading and surfacing with crushed gravel or stone. Dist. VI, Rt. 57, Sec. B-D. C. W. Hartman, Bakersfield, \$70,158.40; John Jurkovich, Fresno, \$88,457; Charles W. Wimmer, Taft, \$79,779.50; G. W. Ellis, Glendale, \$94,792.86; Force, Currihan & McLeod, Oakland, \$91,048.50; Tieslau Bros., Berkeley, \$87,577.60; Chas. Harlowe, Oakland, \$79,574.50; A. J. Grier, Oakland, \$95,000; G. E. Finnell, Sacramento, \$89,137; J. F. Collins, Stockton, \$71,726; S. W. Gleim, Los Angeles, \$88,879.50; Frederickson & Watson Const. Co. and Frederickson Bros., Oakland, \$73,569. Contract awarded to C. W. Hartman, Bakersfield, \$79,158.40.

LOS ANGELES COUNTY—Bet. Glendora and Claremont, 5.5 miles grading and asphalt concrete pavement. Dist. VII, Rt. 9, Secs. I, J-C. George R. Curtis Paving Co., Los Angeles, \$359,947.50; Griffith Co., Los Angeles, \$289,100; Geo. H. Oswald, Los Angeles, \$337,296; Gibbons and Reed, Burbank, \$319,925; Osborn Co., Pasadena, \$294,855; Ed. Johnson, Los Angeles, \$325,322.50; Hall-Johnson, Alhambra, \$367,240. Contract awarded to Griffith Co., Los Angeles.

LOS ANGELES AND SAN BERNARDINO COUNTIES—Dist. VIII, Rt. 9, Sec. D-A. George R. Curtis Paving Co., Los Angeles, \$330,592.25; Griffith Co., Los Angeles, \$302,813.40; Geo. H. Oswald, Los Angeles, \$327,618; Gibbons & Reed, Burbank, \$359,172.99; Southwest Paving Co., Los Angeles, \$291,845.90; Steele Finley, Santa Ana, \$275,533; Hall-Johnson Co., Alhambra, \$332,119.75. Contract awarded to Steele Finley, Santa Ana.

MONTEREY COUNTY—Between north end of Nacimiento Bridge and Bradley, about 4.9 miles of rock borders to be constructed on each side of existing Portland cement concrete pavement. Dist. V, Rt. 2, Sec. I. Granite Const. Co., Watsonville, \$8,694; Geo. French, Jr., Stockton, \$4,452; Tiffany, McReynolds & Tiffany, San Jose, \$5,265; E. T. Carter, Santa Barbara, \$7,566; W. A. Dontanville, Salinas, \$7,250. Contract awarded to Geo. French, Jr., Stockton.

PLACER COUNTY—At Bowman and Welmar, 2 miles grading and bituminous macadam pavement. Dist. III, Rt. 37, Secs. A-B. Mathews Const. Co., Sacramento, \$58,479.50; Nate Lovelace, Sacramento, \$55,841; C. W. Wood, Stockton, \$54,833; Young Bros., Berkeley, \$68,331; G. E. Finnell, Sacramento, \$52,382; Frederickson & Watson and Frederickson Bros., Oakland, \$50,080; Isbell Const. Co., Fresno, \$79,996; E. B. Skeels, Roseville, \$79,777; A. Teichert & Son, Sacramento, \$66,868; J. P. Holland, Inc., San Francisco, \$61,750; C. R. Adams, Oakland, \$51,676; S. H. Palmer Co., San Francisco, \$61,093. Contract awarded to Frederickson, Watson and Frederickson Bros.

SAN BERNARDINO COUNTY—Bet. Pomona and 1 1/2 mile east of Ontario, 2.5 miles grading and paving with Portland cement concrete. Dist. VIII, Rt. 19, Sec. A-B. Griffith Company, Los Angeles, \$80,937; Flemming Const. Co., Pomona, \$85,368; George Herz & Co., San Bernardino, \$84,792; Match Bros., Elsinore, \$79,294.70; J. F. Knapp, Stockton, \$82,151; Hall-Johnson Co., Alhambra, \$54,841.99; Bartlett & Mathews, Pasadena, \$90,225. Contract awarded to Match Bros., Elsinore.

SAN LUIS OBISPO COUNTY—Between San Luis Obispo and City Reservoir, 1 mile grading and surfacing with oil treated crushed gravel or stone. Dist. V, Rt. 2, Sec. D. Cornwall Const. Co., Santa Barbara, \$57,336; C. T. Malcom, Walnut Creek, \$62,167; W. C. Colley and C. C. Gildersleeve, Felton, \$59,044; Arisa Knapp Co., Oakland, \$54,841.99; John C. Gist, Arcadia, \$53,256; W. A. Dontanville, Salinas, \$56,153. Contract awarded to Arris Knapp Co., Oakland.

SANTA BARBARA COUNTY—Overhead crossing over S. P. R. R. near Beneham, and Rincon Creek culvert. Dist. V, Rt. 2, Sec. H. Anton Johnson Co., Los Angeles, \$104,489; McWilliams & Ritchey, Los Angeles, \$110,355; John Simpson Co., Los Angeles, \$106,569; Otto Parlier, Tulare, \$108,961; Butte Const. Co., San Francisco, \$102,991; Barrett & Hill, San Francisco, \$108,585; Paul M. White, Santa Monica, \$97,258.50; E. S. Johnson, Pasadena, \$104,913; DeWaard & Son, San Diego, \$163,737; Byerts & Dunn, Los Angeles, \$106,940; Frederickson & Watson and Frederickson Bros., Oakland, \$104,182. Contract awarded to Paul M. White, Santa Monica.

SANTA BARBARA COUNTY—Between Stoney Creek and Tecolote Creek, 2.4 miles grading and surfacing with asphalt concrete. Dist. V, Rt. 2, Sec. I-G. Cornwall Const. Co., Santa Barbara, \$127,164; Force, Currihan & McLeod, Oakland, \$123,106; Sam Hunter, Santa Barbara, \$111,052; Griffith Co., Los Angeles, \$124,146. Contract awarded to Sam Hunter.

SANTA BARBARA COUNTY—Bet. Ortega Hill and Montecito, 0.3 of a mile grading and paving with Portland cement concrete. Dist. V, Rt. 2, Sec. J. Sam Hunter, Santa Barbara, \$23,987.50. Contract awarded to Cornwall Const. Co., Santa Barbara, \$20,679.75.

SISKIYOU COUNTY—Structural steel and timber sidewalk on existing bridge across Sacramento river near Dunsmuir. Dist. II, Rt. 3, Sec. A. C. C. Gildersleeve, Felton, \$6,269; R. B. McKenzie, Gerber, \$6,622; A. Young, Yreka, \$6,414; M. B. McGowan, San Francisco, \$7,160; J. P. Brennan, Redding, \$7,894. Contract awarded to C. C. Gildersleeve.

TEHAMA COUNTY—A bridge across Paynes Creek about 18 miles east of Red Bluff. Dist. II, Rt. 29, Sec. A. R. B. McKenzie, Gerber, \$3,314; J. P. Brennan, Redding, \$10,122; Harry Porter, Gerber, \$11,016. Contract awarded to R. B. McKenzie.

TULARE COUNTY—Bet. Plaza Garage and Oak Grove School, 2.1 mi. to be widened with Portland cement concrete. Dist. VI, Rt. 4, Sec. D. Lambert & Wood, Fresno, \$25,261; Edgar Noble, Marysville, \$24,530; Valley Paving and Const. Co., Visalia, \$28,310. Contract awarded to C. W. Wood, Stockton, \$22,821.

STATE HIGHWAYS IN CALIFORNIA SHOWING THE PRIMARY AND SECONDARY ROAD SYSTEMS AND THE DIVISION OF THE STATE UNDER THE BREED BILL.

