CALIFORNIA HIGHWAYS

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WHERE ARE WE DRIFTING IN HIGHWAY CONSTRUCTION?

In this issue of the HIGHWAY BULLETIN *Mr. Morton* takes stock of the situation in answer to this question — The information presented by the State Highway Engineer is necessary to a proper understanding of the problem now confronting California.

THAT FEDERAL AID BALANCE

Do you know what it is and how it is determined? — What part does it play in the *financing of California highway construction*? — An answer to these questions will be found in the article on page seven of this number.

STATE WINS IMPORTANT LAWSUITS

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WHERE ARE WE DRIFTING IN HIGHWAY CONSTRUCTION?

STATE'S CHIEF ENGINEER TAKES STOCK OF SITUATION

By R. M. MORTON, State Highway Engineer.

THE building of the state highway system in California had its inception in 1910 when the first highway act was approved by the people. This issue was for $18,000,000, and under the terms of the law enacted at that time, a state highway commission of three members and the office of state highway engineer were created. The commission had within its jurisdiction the specific location of the general routes described in the bond measure, which provided for a main north and south road through the coast counties, and other roads necessary to connect county seats with these main lines.

R. M. MORTON

This general plan remains the nucleus of the California state highway system; but in 1924, fourteen years later, eight county seats are still unconnected with the main trunk lines.

The First Bond Issue.

The mileage of state highway acquired under the terms of the first act was 3064. Of this total, to April 1st of this year, 1746 miles have been paved by the state, 715 miles have been graded or graveled by the state, or with forest service cooperation; 178 miles, paved by the counties, have been taken over by the state; 34 miles built by the counties have not yet been taken over, *and 391 miles remain in the same condition as in 1910—with no state expenditure.*

The construction accomplished was not defrayed entirely from proceeds of the first bond issue. In 1915, with the first finances practically expended, a second bond issue of $15,000,000 was voted. Of this sum, $3,000,000 was to be matched by an equal amount by certain counties, through which additional roads were located and, by the second bond act, added to the state highway system. These additional laterals aggregate 701½ miles.

Owing to the war inflation of construction costs, and the necessity of raising money for the support of our armies, no contributions were made by the counties toward the construction of the additional 700 miles. This feature of the law was finally repealed by the third bond act, with the result that the $15,000,000 was expended almost entirely toward the completion of the older roads.

Second Bond Roads.

Of the 701 miles of second bond issue roads, 454 miles have been graded, graveled or paved by the state; 45 miles of paved road have been taken over from the counties and are now under state jurisdiction; 24 miles have been paved by

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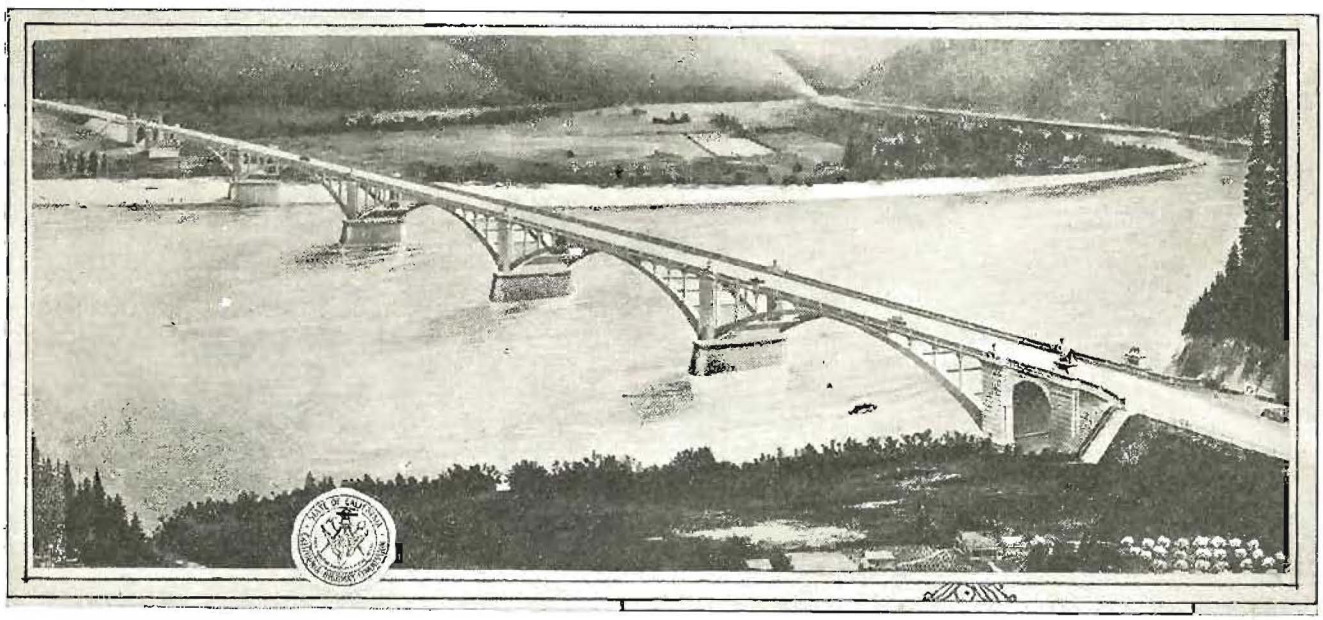
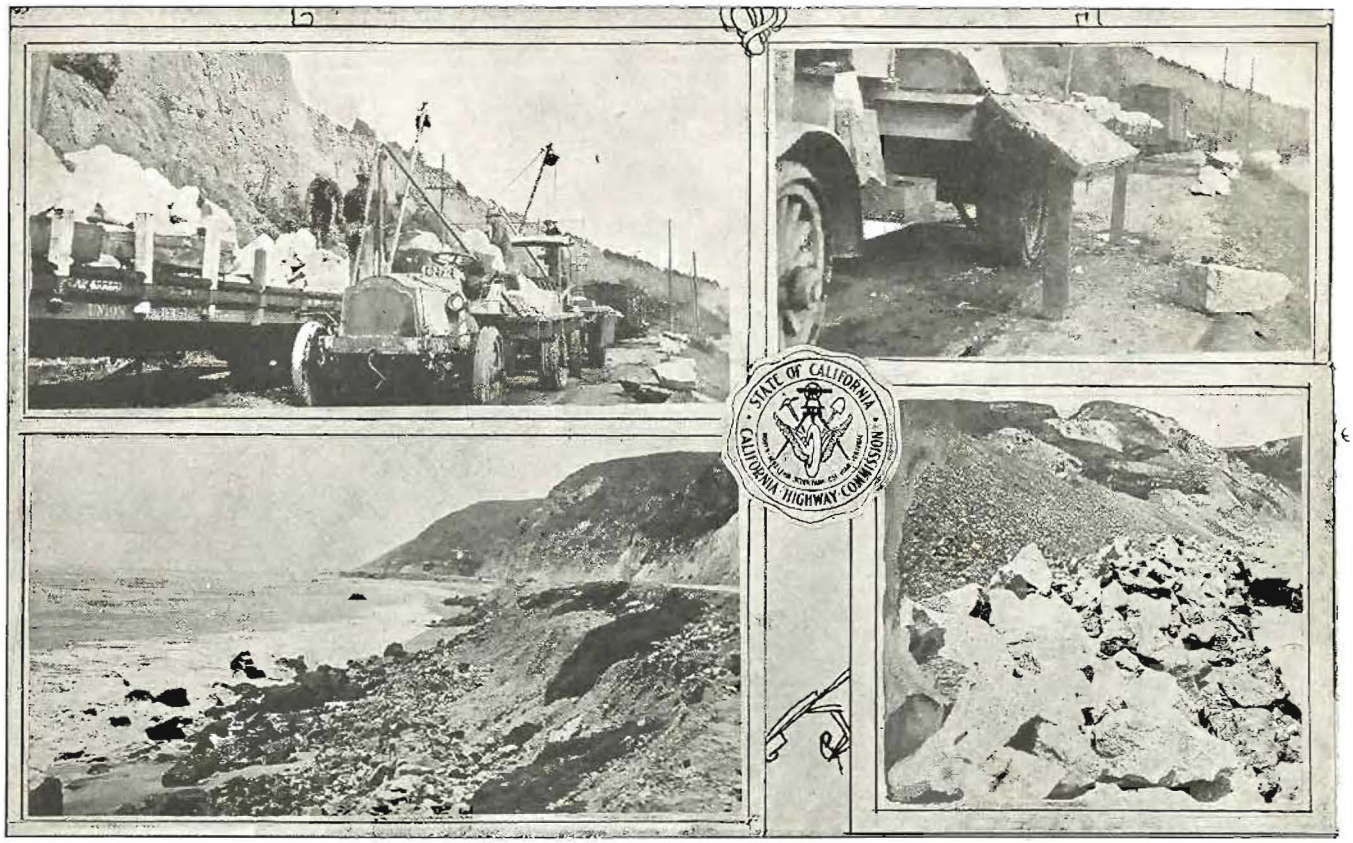


KLAMATH MEMORIAL BRIDGE—The above is a conception of the Dr. G. H. Douglas Memorial Bridge over the Klamath River near Requa, Del Norte County, now under construction. The drawing was prepared for the bridge department by E. M. Muse. The bridge will be the largest on the California state highway system.



PROTECTING THE HIGHWAY FROM OCEAN WAVES, DIVISION VII.—Upper left, trucks equipped at the Lankershim shops with stiff leg boom, chain block and stone hooks for rapid handling of rock. Upper right, incline chute hinged to side of truck and supported by posts for unloading rock over embankments. Lower left, view showing bank wash caused by waves along the Santa Monica coast; and, lower right, rip rap in place on the beach.

PROTECTING THE HIGHWAY FROM OCEAN WAVES

TO prevent further encroachment by the waves, over 2,000 tons of heavy granite rip rap rock, two to five man size, have been placed by maintenance crews of Division VII at the foot of embankment slopes, along the Coast boulevard north of Santa Monica. (L. A. 60 B.)

The rip rap was made necessary by wave action during high tides and wind storms of recent months. The waves were washing away the embankment slopes in numerous places, making protection of the pavement imperative.

Trucks used for hauling the heavy rock were equipped at the division shops at Lankershim with a stiff leg boom, provided with chain block and stone hooks, which greatly facilitated the work. An incline chute, hinged to the side of the truck and supported by posts when in use, was employed where necessary to chute the rock over high embankments.

Rock was unloaded from flat cars, hauled an average of three and a half miles, and placed in approximately its final position at a cost of 94 cents per ton.

MORTON TAKES STOCK

(Continued from page 3.)

the counties, but are not taken over; *and 177 miles remain to be built.*

In 1919, the people, informed by state officials that still more money was required to complete the highway system, authorized, by constitutional amendment, a third bond issue of $40,000,000. With this fund it was planned to complete all of the previously designated state highways, and also to construct certain additional roads, by the 1919 act transferred from the counties to the state highway system.

Third Bond Situation.

It was realized at that time that a large amount of money was necessary to complete the work already started. Unfortunately, however, for the roads of the first and second bond issues, it was considered necessary, in order to popularize the measure, to include numerous additional roads, aggregating 1848 miles.

To April 1st of this year, there had been graded, graveled or paved by the state highway commission a total of 403 miles of these additional roads; 29 miles paved by the counties had been taken over by the state; 24 miles paved by the counties had not been taken over; *and 1392 miles are yet to be constructed.*

Bond Road Summary.

Summarizing the situation relative to all the state's bond issue roads: the total mileage is 5614, of which 2085 miles have been paved by the state; 252 miles have been paved by the counties and taken over by the state; 83 miles paved by the counties are still under county jurisdiction; 1233 miles have been graded and graveled by the state; and roads on which no work has been done total 1961 miles.

Since 1910, and in fact prior to that time, the legislature at various sessions has designated certain roads as state highways. Sometimes appropriations have been made for construction or repair work, but more frequently the roads have been designated state highways without funds for construction purposes. The total length of these special act routes is now 1009 miles, for the greater part of which no funds have been provided. The upkeep of practically the entire distance is, however, a charge against the state's maintenance funds.

Of these legislative act roads, 37 miles have been graded, graveled or paved; 29 miles, paved by the counties, have been taken over by the state; and 943 miles have had no expenditure except from limited maintenance funds.

40 Per Cent Unconstructed.

THESE FIGURES MAKE A TOTAL OF 6623 MILES OF STATE HIGHWAY, OF WHICH 143 MILES HAVE BEEN DESIGNATED BOTH IN BOND ISSUES AND LEGISLATIVE ACTS. THE NET MILEAGE OF STATE HIGHWAYS, THEREFORE, IS NOW 6504 MILES. OF THIS TOTAL, THE STATE HAS PAVED 2085 MILES; COUNTIES HAVE PAVED AND THE STATE HAS ADOPTED 280 MILES; COUNTIES HAVE PAVED AND THE STATE HAS NOT ADOPTED 83 MILES; THE STATE HAS GRADED 1240 MILES; LEAVING 2814 MILES ON WHICH NO CONSTRUCTION WORK HAS BEEN DONE.

These unconstructed state highways constitute about 40 per cent of the present total state highway mileage of California.

A study of the location of the unconstructed roads shows that the state has made good progress toward the completion of the originally specified north and south routes through the valleys and along the coast. Many important sections, however, have not been finished.

Interstate Connections Unimproved.

In the country north of Eureka only two grading and graveling contracts have been undertaken.

Only in March of this year, was the original grading completed on the last unit between Dunsmuir and Yreka, on the Pacific highway, a route on which construction was authorized in 1910. At the beginning of this year, 117 miles remained unpaved between Redding and the Oregon line, although through Oregon and Washington the main north and south highway is paved from the California line to Vancouver.

Additional locations to which little attention has been paid are on other interstate connections, such as the line from Colfax to Verdi, the important connection from the east for northern and central California. The Needles-Barstow highway, one of the heaviest traveled interstate roads, is only a wheel rut across a sandy desert for 200 miles. On the road from El Centro to Yuma, an expenditure of hundreds of thousands of dollars will be required to make a creditable interstate connection. The interstate travel in the south is heavy and is served by a third state highway route located in Riverside County, extending from the Colorado River at Blythe to Mecca and San Bernardino. No work has been done on this road—100 miles across the desert.

The state highway system also includes many roads largely of recreational value. Little has been done thus far to develop highway service to Yosemite Valley, to Lake Tahoe, and many other vacation areas reached by the projected state highway system.

Reconstruction Big Problem.

In addition to the problem of completing the roads which have been state highways for many years without construction money being expended, the state already has reached a point where it must consider the rebuilding of many roads where traffic has increased far beyond expectations of previous years.

The enactment of the gasoline tax measure at the last session of the legislature as a means of providing revenue, was an attempt to solve the reconstruction problem. During the year 1924, the first year in which the state's share of the tax has been available, the highway commission will expend $4,500,000 on reconstruction work. The constructed state highway system, in many places, is already far behind traffic requirements. The highway commission could easily expend, if available, $10,000,000 annually for several years to catch up with the demands of existing traffic for wider and heavier pavements.

This feature of the work, however, is only one of the immediate problems facing the people of California. The gasoline tax revenues will increase as the traffic increases and by continuous effort over a period of years, the most serious conditions will be gradually corrected.

The other vital problem facing the state is that of providing revenues for new work so that primary construction may proceed. If funds are not provided, state highway construction will be at an end in the very near future.

California has seen the highway commission face alternately periods of scarcity of funds and times when more money was available than could be expended quickly enough to satisfy the people. This has proved a decidedly uneconomical way to forward road construction. Efficient employes can not be retained when the highway organization is expanded for short periods and then reduced. Any new plan of financing should provide the organization with sufficient funds to lay out each year's program well in advance. When this is possible, details can be planned so that the work will go forward with economy and dispatch.

Expenditures From First, Second and Third State Highway Bond Funds.

The record of annual expenditures from bond funds is interesting and shows the fluxation of highway activities:

Year	First state highway fund	Second state highway fund	Third state highway fund	Total
1912	$594,110 58			$594,110 58
1913	2,098,745 61			2,098,745 61
1914	4,555,224 73			4,555,224 73
1915	7,846,255 05			7,846,255 05
1916	3,084,412 81			3,084,412 81
1917	223,985 20	$1,769,501 96		1,993,487 16
1918	109,056 49	5,854,446 78		5,963,503 27
1919		5,564,523 63		5,564,523 63
1920		524,092 78	$6,716,033 32	7,240,126 10
1921		774,217 18	10,048,126 92	10,822,344 10
1922		1,143,611 24	12,685,253 42	13,828,864 66
1923		299,908 58	11,539,430 54	11,839,339 12
1924 (to May 31st)		799,217 91	2,933,949 53	3,733,167 44
Total to May 31, 1924	$18,511,790 47	$16,729,520 06	$43,922,793 73	$79,164,104 26

NOTE.—Amounts include federal aid paid into the three funds, county contributions, and bond premiums.

This statement is remarkable in that it shows capital expenditures for the years 1921, 1922 and 1923 averaging

$12,000,000 per year. These expenditures do not include receipts from the motor vehicles or gasoline tax revenues, which, in 1924, will be about $8,000,000.

Highway construction should proceed only at the rate desired by the people. However, if the state is to meet the insistent and universal demand that the highway system be completed as soon as possible, at least $12,000,000 per year will be required for new construction. And if, in mileage of new construction, the state is to progress faster in the future than it has during the past four years, this expenditure of $1,000,000 per month will be too little.

Cost to Complete System.

Even an expenditure of $12,000,000 annually on original construction is small when compared with the total estimated cost of completing the highway system as at present designated, which, early in 1923, was placed at $200,000,000 by the department in response to an inquiry from the legislature. The period required to expend such a sum on the highways would witness increases in traffic and other developments that would require increasingly higher standards of construction. The total of $200,000,000, therefore, should be considered the minimum when computing the cost of completing the state highways of California.

At the present time the engineering forces, at the request of the Committee of Nine, are making a more careful estimate of the cost of completing the system. This information will be available sometime this fall.

Higher Standards Increase Costs.

In considering the completion of the system, it should be borne in mind that we have been compelled to raise standards of construction. This has increased initial expenditures per mile above average costs of past years. Highways must be built which will anticipate traffic requirements, at least for a few years, in order not to immediately add to the reconstruction program—a burden already heavy on the previously built highways.

Future costs also will increase because many of the remaining unconstructed units are located in the remoter and mountainous sections of the state where the cost of grading and surfacing is far above the average for similar work in the valleys, where much of the highway building has been done in the past.

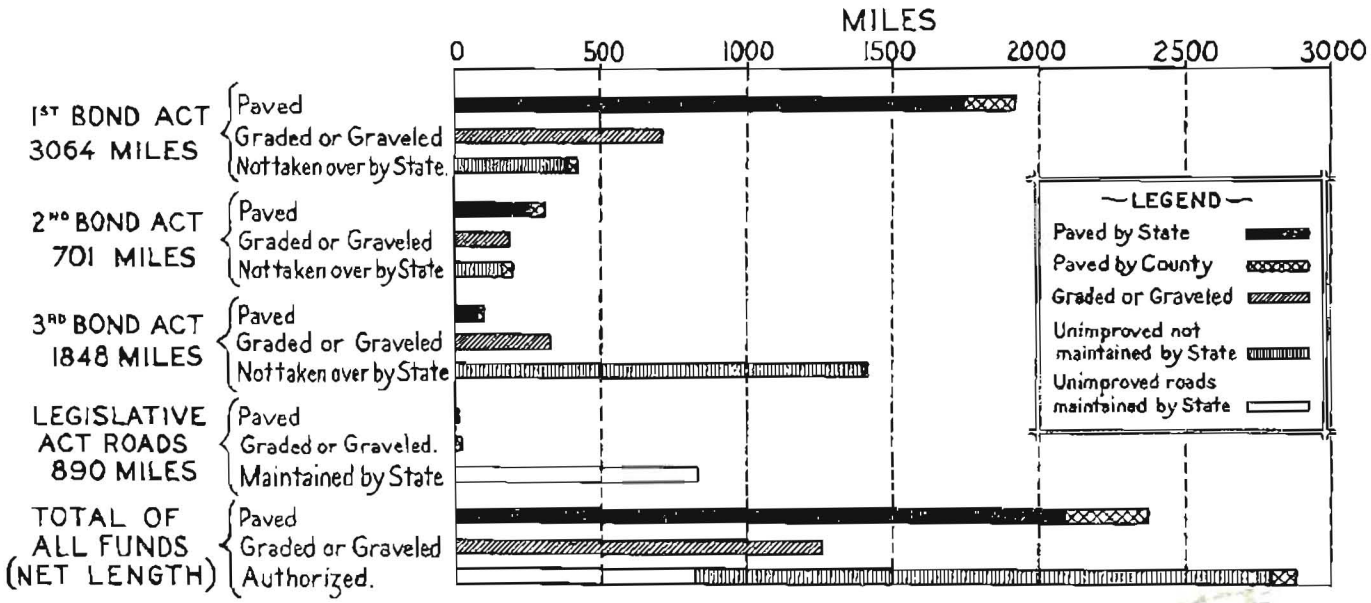
The total of all expenditures passing through the books of the highway commission during the fiscal year 1922–23 was $18,000,000. The total during the year 1923 was $16,000,000. An expenditure of $20,000,000 annually would require practically no change in the highway organization.

Those who come in contact with the insistent demands from all parts of the state for highway construction are well aware that $20,000,000 annually will not meet the desire of the people for immediate extension of the improved highway system. Proper maintenance, necessary reconstruction to save investments in old pavements, and only a limited program of new construction on the present state highway system, will require all of $20,000,000 a year.

Twenty Millions a Year Minimum.

It is the conviction of the writer that this sum is the minimum annual expenditure for state highway maintenance and construction which should be considered when the people of California, through the legislature, take up the solution of the highway financing problem.

CALIFORNIA HIGHWAY SITUATION AT A GLANCE



The above is a graphic summary of Mr. Morton's article. Particular attention is called to the consolidated summary at the bottom which clearly shows the comparative lengths of improved and unimproved state highways as they exist at the present time.

CALIFORNIA'S FEDERAL AID BALANCE

There is no more misunderstood highway term than "federal aid." In the minds of many it is a mysterious something that keeps highway work going. This article briefly explains how the state's share is determined, how much California has coming, and the part it plays in highway construction. THE EDITOR.

THE agricultural appropriation bill signed by the President on June 5th, last, under which the Secretary of Agriculture on June 6th apportioned the $75,000,000 authorized by the act of June 19, 1922, for the fiscal year 1925—July 1, 1924 to June 30, 1925—added $2,464,990.78 to the amount of federal aid legally available for California.

This sum brings the total of federal aid apportioned to California, from 1916, the date of the inception of the cooperative system, to 1924, to $17,093,306. Of this amount, $14,335,716.95 had been obligated or was in process of obligation by the state highway commission on July 1, 1924—that is, cooperative agreements between the state and the Secretary of Agriculture to this total have been signed or agreed upon.

The unobligated balance apportioned to California on July 1st was $2,757,589.05. Under the law, the state has until June 30, 1927, in which to take up the greater part of this balance on new projects.

Federal Aid Uncollected.

Of the $14,335,716.95 in federal aid already obligated by California, $9,461,376.47 had been collected up to the beginning of the present fiscal year, and deposited in the bond funds, *leaving an uncollected balance on July 1st of $7,631,929.53. This latter sum may be termed the working fund of the California Highway Commission for primary construction.*

Federal aid comes to the state only in the form of reimbursements from the national government for its share of the cost of approved projects on the federal aid system. Thus, the $7,631,929.53 still due California will be paid as it is "earned" by expenditures on contracts now under way and expenditures on contracts to be awarded in the future.

The rate at which this comes in will determine the construction program in the immediate future. Recent payments average about $240,000 per month.

The recent act of congress and the apportionment order of the Secretary of Agriculture obviate any interruption to federal aid road work. The apportionment is made to the states on the same basis as for preceding years, except that Hawaii, for the first time, is admitted to a share.

How State's Share is Determined.

The method of determining each state's share of the federal aid appropriations as contained in the federal aid act is as follows:

One-third in the ratio of the area of the state to the total area of all the states;

One-third in the ratio of the population of the state to the population of the entire country as determined by the latest available federal census;

One-third in the ratio that the mileage of rural delivery and star mail routes of the state bear to the total mileage of rural delivery and star mail routes in all the states.

It is also provided that no state shall receive less than one-half of one per cent of each year's appropriation.

Except in the public land states, the law limits the federal government's participation to not more than 50 per cent of the cost of any given project and not to exceed $15,000 per mile. The provision, applying to the ten public land states of the West, where large areas of land are in the ownership of the federal government, enables them to secure an additional percentage of the cost of federal aid projects in the proportion as the public land is to the total area of the state, but not additional funds.

California is one of the public land states and gets 59 per cent federal aid on approved projects, but not to exceed $17,795.90 per mile. The state's total apportionment is not increased.

In other words, on a project costing $30,000 a mile, the California Highway Commission can collect from the government 59 per cent of the cost, but no matter how much the project may cost in excess of $30,000 a mile, the federal aid allotment will be only $17,795.90 for each mile. Bearing in mind this limitation and the heavy cost of much of the primary construction now under way in California, the slowness with which federal aid accrues to the state will be readily understood.

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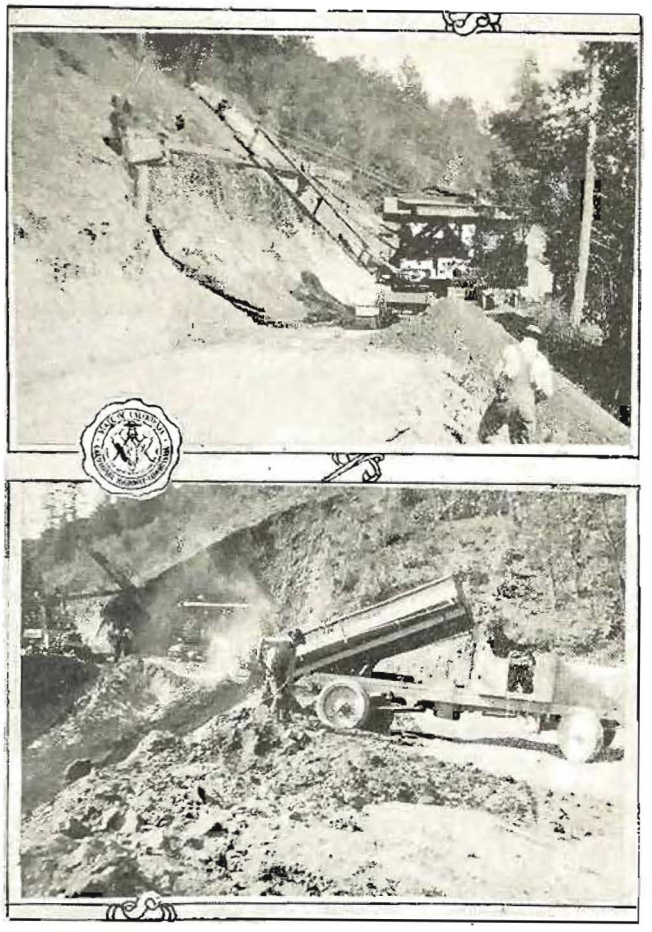


MAKING THE REDWOOD HIGHWAY SAFE—Steam shovel and truck outfit busy in Division 1 widening the Redwood Highway, Mendocino County, a federal aid route.

CALIFORNIA'S FEDERAL AID BALANCE EXPLAINED

(Continued from page 7)

Repeal of Limitation Pending.

Bills are pending in congress to repeal the $15,000 per mile limitation and permit the states to collect one-half of the cost of approved projects regardless of the amount. Legislation also is pending which would permit the federal government to advance the entire cost of construction on certain federal aid highways through the more sparsely settled public land states.

Enactment of these measures would be of inestimable benefit to such states as Arizona and Nevada and will hasten the day when there will be connected and improved highways from the east to the west.

Federal aid allotted to California by the recent apportionment of the Secretary of Agriculture represents about 3½ per cent of the total appropriation for the entire country. California's $2,464,990 is exceeded by the allotments made to Illinois, New York, Ohio, Pennsylvania, and Texas, which latter state gets the largest apportionment of all—$4,410,169.

Since 1916, a total of $540,000,000 has been made available by previous acts of congress. The Bureau of Public Roads of the United States Department of Agriculture which administers these funds, reports the status on May 31st as follows: Completed 32,099 miles, under construction 17,000 miles, approved for construction 2518 miles, and $33,106,126 available for new projects. A continuation of the policy is to be expected.

In California, a total of 128 projects have been approved for federal aid since 1916, when the federal government first began to assist in the building of highways. These projects involve construction of a number of bridges and more than 1000 miles of state highway.

Small Part of California Income.

From 1917 to June, 1924, the California Highway Commission expended $60,985,355 from the first, second and third bond funds, including $9,461,376 federal aid collected during this period, as previously stated in this article, and deposited in the bond funds. The federal aid, therefore, represents approximately 15.5 per cent of California's income for primary construction and not one-half of the total expended as many presume.

For the country as a whole federal aid represents, according to reports, an average of 19.6 per cent of the income of the various state highway departments.

In the above statement of expenditures in California, no account was taken of funds disbursed for maintenance and reconstruction of state highways, which amounted to $18,931,932 in the period between 1917 and June, 1924. Some of the gasoline tax money now being expended on reconstruction of the state highways is "earning" federal aid in the same way that expenditure of bond funds has in the past.

The Federal Aid System.

From 1916 to 1921 federal aid, with the approval of the Bureau of Public Roads, was granted on any post road of the state. Since the passage of the amended act in 1921, federal aid has been restricted to a definite system of highways, designated the "7 per cent system." This federal aid system comprises 7 per cent of the total road mileage of the state outside of incorporated cities, and is divided three-sevenths interstate and main trunk lines and four-sevenths intercounty laterals.

The California federal aid system was agreed upon in 1922 by the State Highway Commission and the Bureau of Public Roads. The routes selected aggregate approximately 4467.6 miles. This total may be increased in the future by approval of supplemental routes to a maximum of 4900 miles—the full federal aid mileage allowable based on 7 per cent of the total highway mileage of the state at the time of the passage of the Federal Highway Act in 1921.

California 7 Per Cent System.

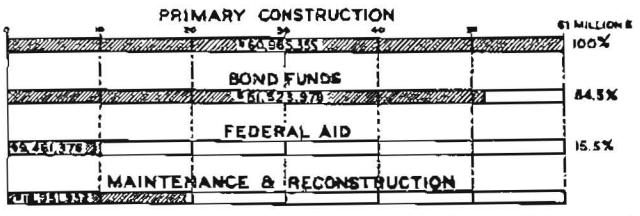
The following routes, practically all state highways, comprise the 7 per cent federal aid system in California:

Route	Description	Length, miles
	Primary Roads.	
1	Oregon line to San Francisco	410.0
2	San Francisco to San Diego	499.0
3-7-6	Oregon line to Sacramento	295.6
4	Sacramento to Los Angeles	357.4
12-27	San Diego to Yuma	170.6
14-7-3 17-37	San Francisco to Verdi	198.0
5	San Jose to French Camp	84.3
	Total mileage primary roads	2,014.9
	Secondary Roads.	
9-26	Los Angeles to El Centro via San Bernardino	203.2
31-58	San Bernardino to Needles via Barstow	240.0
	Needles to Arizona line at Mellen	16.0
	Route 58 near Goffs to Nevada line	25.0
63	Big Pine to Oasis	38.6
	Oasis to Nevada line	4.4
29	Red Bluff to Susanville	107.5
21	Richvale Junction to Quincy	93.4
3	Roseville to Red Bluff	116.9
23	Saugus to Bridgeport	330.1
55	Skyline Boulevard	62.1
5	San Jose to Santa Cruz	33.1
32	Gilroy to Califa	83.5
18	Merced to Yosemite National Park via El Portal	70.5
15-17	Ukiah to Cisco	165.0
28	Redding to Alturas	157.7
	Alturas to Oregon line	35.0
20	Redding to Route 1 via Weaverville	161.6
45	Willows to 3 miles north of Biggs	32.2
11	Sacramento to Nevada line via Placerville	107.9
10	San Lucas to Sequoia National Park via Visalia	149.0
57	Santa Maria to Freeman via Bakersfield and Walker's Pass	200.0
1	Crescent City to Oregon line (via Coast)	20.0
	Total mileage secondary roads	2,452.7
	Summary.	
	Total length primary roads	2,014.9
	Total length secondary roads	2,452.7
	Total length of system	4,467.6

(See map of federal aid system on back cover)

GRAPH OF EXPENDITURES ON STATE HIGHWAYS

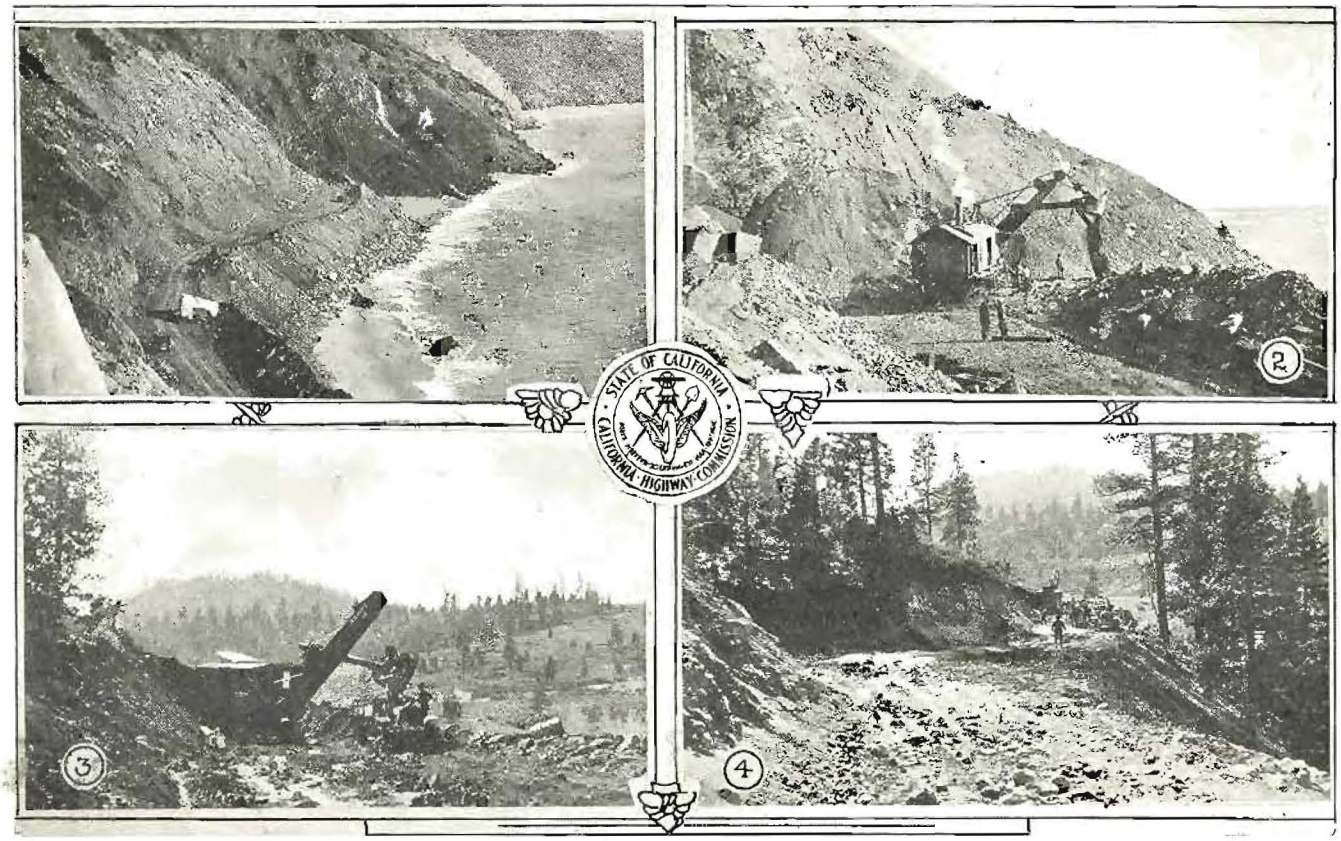
1917 TO 1924



The above graph shows federal aid to be a small part of the capital expenditures of the commission, as explained in the above article, and less than the maintenance and reconstruction fund.

"The character and civilization of any community can be properly judged by the class of roads it has."—*Gibbon.*

"California's highways are all that roads should be. California always is worth seeing and good roads make the time spent doubly worth while."—*General H. W. Grimwade, Melbourne, Australia.*



STEAM SHOVEL OPERATIONS ON THE STATE HIGHWAYS.—Upper views show activities on the Hauser contract, along the Ventura coast, Division VII. The two lower views were taken in the Truckee River canyon and show the actual beginning of the first contract on this section of the state highway between Truckee and Boca, Division III.

ELIMINATION OF GRADE CROSSINGS GRAVE PROBLEM

By J. B. Woopson, Division Engineer, Fresno.

ACCORDING to published records, 2268 persons were killed and 6314 injured at grade crossings in the United States during the year 1923, and in the past five years 9101 have been killed and 24,208 injured. The average person does not give much thought to statistics. If, by chance, he happens to note a placard setting forth the appalling facts, he merely classifies it with other nonimportant notices.

But the above figures are significant. Any of us may be next. And, despite the fact that it is incumbent upon every driver to be positive that there is no train wanting to use the crossing at the same time he does, obviously, there is but one solution for this nationwide menace, and that is, separation of grades.

Must Use Brain.

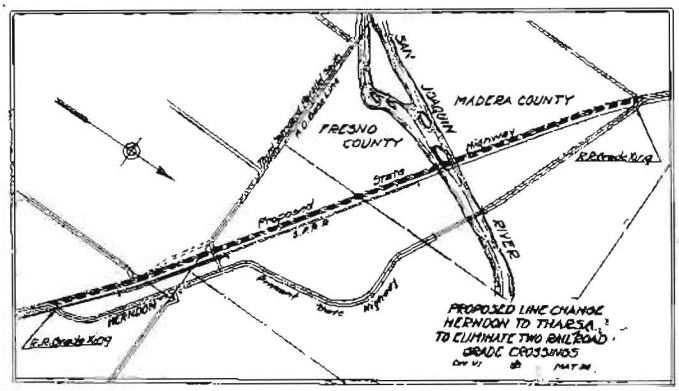
Stages, school busses, and trucks are now compelled by law to stop upon approaching railroad crossings. Drivers of these vehicles, however, go on from month to month, perfunctorily stopping and starting without accident, until the duty becomes so mechanical that drivers come to consider the stopping their primary duty, while, as a matter of fact, the purpose is to ascertain whether or not a train is approaching.

It is no uncommon thing to note the driver of a motor bus or truck come to his prescribed stop, and then start across the track without looking in either direction. Signal bells, signs, warnings—all are of no avail unless the brain is used.

The obstacle in the way of grade separations is the cost.

There are two types of grade separations: the overhead crossing and the subway. Except where natural physical conditions warrant, for example, depressed railroad tracks or tracks through a cut, construction of subways is preferable. In level country, especially in built-up areas, an overhead crossing is unsightly, obscures the light, and detracts from the value of surrounding property. A long, high trestle is not comparable with a concrete subway built on easy grades and adequate curves. Divergencies from the common grade elevation are also much more favorable for construction of subways than overhead crossings; the former being 14 feet (California Railroad Commission Rules) below structure girders, whereas with the overhead crossing 22 feet above the rails is required.

In the opinion of the writer, the California Highway Commission has no more important problem than the elimination of these death traps.



Proposed elimination in the San Joaquin Valley.

STATE WINS IMPORTANT LAWSUITS

By Paul F. Fratessa, Attorney, California Highway Commission.

TWO lawsuits have recently been decided in favor of the California Highway Commission which are of considerable importance.

The first is the suit brought by Palmer & McBryde against the state for extra compensation claimed by them on a contract in Del Norte County. The road was built along the side of a cliff, overlooking the ocean. The contractors put in some heavy blasts and caused large quantities of material to slide into the sea. The bank broke back beyond the original slop-stakes and the contractors sued for this additional material. The defense was that the over-break was due to over-shooting.

Paul F. Fratessa

The contractors sought a writ of mandate to compel the State Highway Engineer to amend his final estimate to include this extra material. The case was decided chiefly upon the ground that the proceedings in mandamus were not the proper remedy and that the contractors should have begun a straight suit on their contract.

Important in Future.

The court pointed out that the engineer is the agent of the state for the examining of the work and the estimating of the amount payable, which necessarily requires the exercise of judgment. The examination having been made, the court is without power to direct the engineer to make a different finding.

There was another point in the case which is instructive in future transactions. The court held that the check given in payment for the final estimate was so worded that, by its acceptance, the contractors waived all further claims. It is important that the division engineers, and others making final settlements with claimants, should have it definitely understood and clearly stated that by accepting the money the contractor waives all further claims and demands against the state under the contract or purchase order. That will save much trouble and litigation.

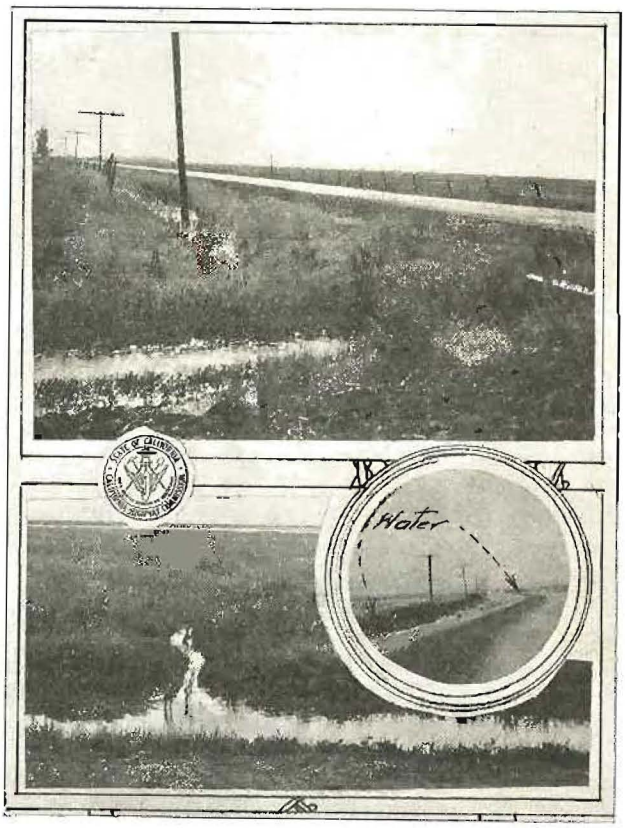
Injunction Asked.

The second case was brought by the California Highway Commission against a rice grower in Colusa County to enjoin him from permitting irrigation water to drain upon the highway. There is much alkali in the adobe soil beneath the pavement on portions of this road and when it becomes wet it greatly weakens the foundation of the pavement. Many rice growers in the neighborhood were using the drains on each side of the highway right of way as drainage canals and were causing the pavement to crack and crumble.

The draining of this water upon the right of way or even the permitting of it to seep upon the road is directly prohibited by Section 588 of the Penal Code, and by Section 5 of "An act providing for the care, management and protection of state highways," found on page 43 of the pamphlet of "Important Statutes Relating to the California Highway Commission."

Immediately upon the injunction being served, the grower in question stopped draining water on to the road and the commission accomplished the end desired.

The case demonstrates that persistent acts of damage to or interference with the highways can thus be effectively stopped by injunction proceedings. The commencement of this suit is evidence of the determination of the commission to protect the state highways from unlawful damage by every rightful means within its power.



Views showing unlawful drainage of irrigation water from rice fields along highway right of way in Colusa County. This was stopped when the Commission asked for an injunction.

The Oklahoma Highway Commission is considering the use of convicts in the construction of state highways.

With the completion of the construction work maintenance begins, and upon the efficiency of the system of maintenance of the roads of the state depends in a very large measure the success or failure of a state's road program.

WAGNER RESIGNS - - TO BE SACRAMENTO CITY ENGINEER

A. J. WAGNER, chief maintenance engineer, and for nine years connected with the engineering staff of the California Highway Commission, has tendered his resignation to State Highway Engineer R. M. Morton to accept a position as city engineer of Sacramento. He assumed his new duties August 1st, under an appointment by City Manager H. C. Bottorff.

A. J. WAGNER

Wagner was a chief of party in Division IV in 1912, and before and after that date was engaged in railroad work in California and Oregon.

Since 1915, he has been chief bridge designer, office engineer, chief construction engineer, field inspector, and since the reorganization of the department under Mr. Morton, maintenance engineer.

Throughout the department, regret has been expressed by Mr. Wagner's many friends because of his resignation. All join in wishing him success.

WINSLOW AND HASELWOOD ARE GIVEN PROMOTIONS

APPOINTMENT of G. R. Winslow, division engineer, Division III, to the position of assistant highway engineer in charge of maintenance to succeed A. J. Wagner, resigned, is announced by State Highway Engineer R. M. Morton. The appointment became effective August 16th. F. W. Haselwood, assistant bridge engineer, will succeed Mr. Winslow as acting division engineer in Division III.

G. R. WINSLOW

Mr. Winslow, new head of the maintenance division, has been with the department from the beginning, having entered the state's service January 1, 1912, the day of the organization of the first state highway commission. He served as headquarters office engineer, assistant highway engineer, and division engineer.

Pioneer Road Builders.

Before coming to California, Mr. Winslow was connected with initial state highway construction in Massachusetts and New York.

F. W. HASELWOOD

Mr. Haselwood also has long been in the service of the California Highway Commission. He joined the forces of Division I at Willits in February, 1912, as assistant division engineer, a position which he held continuously until last October when he was transferred to headquarters as assistant bridge engineer. For some time he has been engaged in making special studies of grade crossing elimination.

ROAD BUILDERS AT PLAY

McKINLEY PARK PICNIC—Employees of the commission from headquarters, Divisions III and X, and the headquarters shops, gathered at McKinley Park, Sacramento, on the evening of August 7th for an outdoor dinner and frolic followed by a dance in the park clubhouse. Leaders in arranging the affair were Tom Wright, Elizabeth Etzel, Charlotte Barnes, Fern Dunkeson, and Mrs. Nathan. A volunteer orchestra from the Motor Vehicle Department furnished music for the affair. Nearly 200 were in attendance.

At a recent luncheon of the Sacramento Chapter of the American Society of Civil Engineers, of which he is a member, Mr. Wagner, retiring maintenance engineer, was presented with a handsome gold watch, the gift of his many friends in the highway department. Mrs. Wagner also was remembered.

There must be a limit in weight per wheel base beyond which a motor truck will not be permitted so that a highway can be constructed with the known weight that its surface will have to sustain. This is essential.—*Highway Engineer and Contractor.*

WHAT THE DIVISIONS ARE DOING

Steam vs. Gasoline.

STEAM and gas shovels are having a hard fought battle for supremacy in work accomplished in the reconstruction and straightening of the alignment of the Redwood highway, approximately forty miles north of Willits, in Division I. In three weeks, 31,000 cubic yards were excavated by and hauled from a ¾-yard P. & H. gas shovel and a ¾-yard Erie steam shovel working double shifts. In one week's run, there was a difference of only nine swings between the two shovels.

Contractor Ahead of Schedule.

The Nevada Contracting Company is 29 per cent ahead of its schedule on the widening and straightening work on the Pacific highway between Bayha and Halfway Creek, Shasta County, in Division II. The progress chart shows 100,000 cubic yards moved. At this rate the roadway excavation will be completed by November 1st. The concrete work is even with the schedule and the surfacing should be completed before the heavy winter rains.

For eight days, recently, the Kaiser Paving Company, working north of Redding, laid 630 feet per day of twenty-foot pavement, or 252 cubic yards of concrete per day. At the present rate of progress, the ten-mile contract will be completed and the road opened for traffic by October 20th.

Polk and Polk, contractors, are at work on the asphalt macadam paving job east of Susanville, Lassen County, and are planning to rush the work to completion before the end of the warm weather. The same firm expects to complete the Chester surfacing contract by September 15th. Crushed gravel has been substituted for pit run for surfacing.

On the surfacing contract between Janesville and Milford, Lassen County, the Warren Construction Company has completed more than half of the base course. Sandy subbase and lack of water are adding to the problems of the contractors.

Division II has permanent stations under construction near Susanville, Lassen County, and Canby, Modoc County.

Dirt Flying on Auburn Route.

Five power shovels are working night and day on two contracts on the state highway between Auburn and the Nevada line, in Division III. Irey and Holden have three shovels at work between Truckee and Boca. The rough grading is more than half finished.

Between Colfax and Gold Run, C. R. Adams has two shovels on the job, operating night and day. Excellent progress is being made on the eight miles of grading.

Extensive repairs are being made to the bridge over the Sacramento River at Butte City, on the Oroville-Willows route.

A power shovel is still at work widening the road around Lake Tahoe. About $12,000 has been expended on this road to date.

Oiling is being tried on the highway east of Auburn in an effort to prevent raveling and lessen the dust.

Work is under way by state forces on widening and other improvements on the northerly end of the Mother Lode highway, just south of Auburn. In cooperation with Placer County, $10,000 will be expended.

Drainage is being improved on the Downieville lateral by installation of corrugated metal pipe culverts.

Studies are under way looking to the elimination of the historic Slippery Ford and Meyers grades on the Placerville route to Lake Tahoe.

Contracts Nearing Completion.

Barricades are rapidly disappearing in the Valley of the Moon where rapid progress is being made by Galbraith and Janes, contractors on the Schellville-Beltane paving and grading contract, Sonoma County, reports Division IV. Paving has been completed between Boyes Springs and Schellville. A considerable part of the road is open to traffic.

The asphalt output at the commission's plant at San Jose was 232 tons per day in connection with the Milpitas to Coyote Creek widening and thickening job recently completed by the Federal Paving Company. This exceeded expectations of both the division and the contractor.

Motor equipment entirely is handling the grading contract of J. P. Holland on the Skyline Boulevard between Half Moon Bay and the La Honda road. Grading has been completed on the original six-mile contract and the contractor is now at work on the extension. A force of five steam shovels, seven tractors, and fifteen five-ton trucks are in operation.

Four miles of narrow road were widened to thirty feet between Boulder Creek and the State Redwood Park before lack of funds made it necessary to shut down operations which were being conducted with state forces.

Operations have been started by Freeman and Whiting, contractors, on the Redwood City-Palo Alto widening and thickening job, on the Peninsula highway.

W. A. Dontanville, contractor, is at work on the "flush" concrete shoulder job between Greenville and Livermore, Alameda County.

Foreman After Law Breakers.

Verne Simpson, maintenance foreman in the Tulare district, Division VI, has been making quite a record lately for prosecuting truck and tractor drivers who violate the law relative to use of the state highway. Simpson recently secured the conviction of a truck driver who had an insufficient amount of rubber on his solid rubber truck tires. A tractor driver also was fined, through Simpson's efforts, for driving his machine over the highway without removing the flanges.

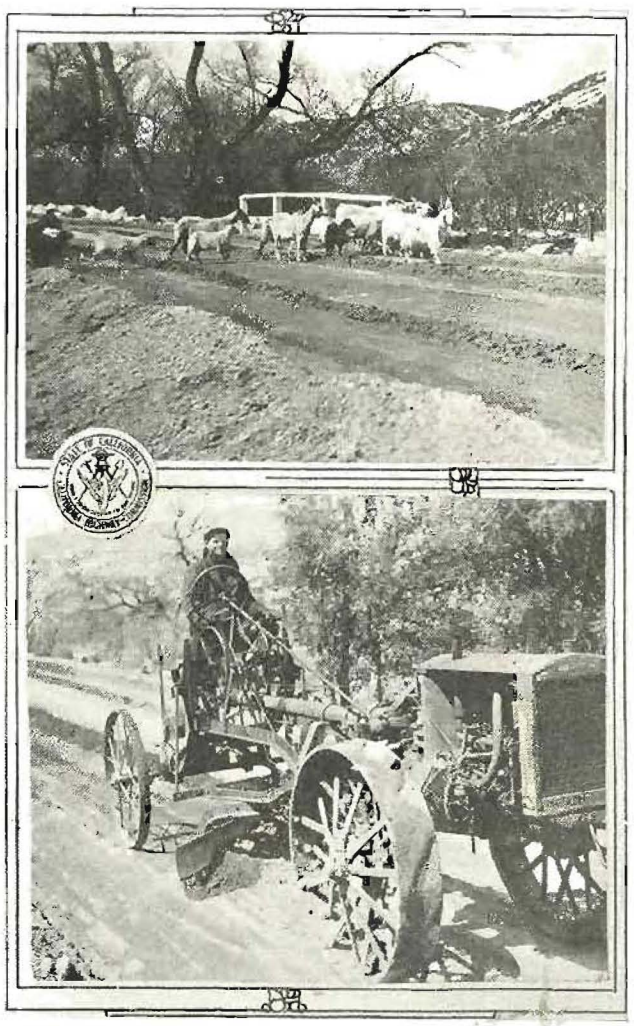
Curing Pavement With Calcium Chloride.

Calcium chloride is being used extensively for the curing of concrete pavement on the George Oswald contract between Shoup avenue and the westerly boundary of Los Angeles County, due to lack of water. Over seven miles of pavement have been completed and cured by this method.

Good progress is being made on this job and also on the San Diego to Oceanside and the Camarillo paving and grading contracts.

Construction of the 56-foot pavement on the Whittier boule-

(Continued on next page.)



IN THE SAN DIEGO HILLS—It gets Foreman Glenn Cheeseman's goat to see so many kids running loose on the highway, but in spite of it he manages to keep his section of the highway in fine shape.

DIVISION ACTIVITIES

vard is progressing rapidly. Curb work is well advanced and laying of concrete pavement has commenced.

Williams and Singletary have completed their contract for widening the grade and improving drainage on the Bakersfield route between the westerly boundary of Los Angeles County and Quail Lake.

The Los Angeles County bridge department is designing bridges for Las Flores Canyon and Malibu Creek, on the Coast boulevard north of Santa Monica. An additional allotment to continue grading in this section by state forces has been granted.

Grading is well advanced on the Huntington Beach-Corona Del Mar contract, in Orange County, and paving has been begun.

Underpass Completed.

Traffic is now using the new underpass under the Santa Fe railroad at Oro Grande, Division VIII. Highway improvements in the vicinity by state forces are about completed. H. T. Smith has been in charge.

News From East of the Sierra.

Until recently, Division IX has been almost isolated from the outside world by numerous quarantine stations against the hoof and mouth epizootic. However, the quarantine has been lifted and hundreds of motorists from the cities are flocking to the mountains, with its lakes and rivers, where they may breathe deeply and forget their daily cares.

The experiment of surfacing the highway south of Independence, Inyo County, with crushed volcanic cinders is a success, reports Division Engineer F. G. Sonmer, despite most unfavorable conditions. The cinders have been placed on a sand subgrade in the dry season with an unprecedented scarcity of water, but the job presents a fairly compacted surface. Since May 1, 1924, the crushing plant at Division Creek has produced over 21,000 cubic yards of surfacing material.

Fair progress is being made at Sherwin Hill, twenty miles north of Bishop, where surfacing with crushed rock is under way. A well-compacted surface has been secured without any moisture whatever. The results are a striking example of what can be accomplished by persistent dry dragging.

Between Big Pine and Independence, widening of the eight-foot concrete pavement is under way. Shoulders are to be built with volcanic cinders, compacted by watering and dragging.

At Bishop, additional land has been acquired for the extension of the maintenance yard. The division office is undergoing changes, which will provide much needed additional space.

Sacramento Paving Completed.

Laying of concrete on the Sacramento-McConnell station contract of the Kaiser Paving Company, 13.03 miles was completed July 29th, ten days ahead of schedule, and will be open for traffic about September 1st. Polk and Polk, contractors, are rushing work on bridges in connection with this improvement which is one of the largest gasoline tax jobs contracted to date. The Sacramento Chamber of Commerce is planning an opening celebration.

Work has started on the construction of "flush" concrete shoulders on four miles of the trunk line highway between Rockville and Fairfield, Solano County.

In the same county, widening of the roadbed between Vacaville and Batavia was done with new soil "borrowed" from nearby fields to cover the adobe subbase and provide a better base for the new asphalt concrete pavement which will be laid twenty feet wide.

The Valley Construction Company has assembled a plant at Tracy for the widening and paving to be done between Banta and the westerly boundary of San Joaquin County.

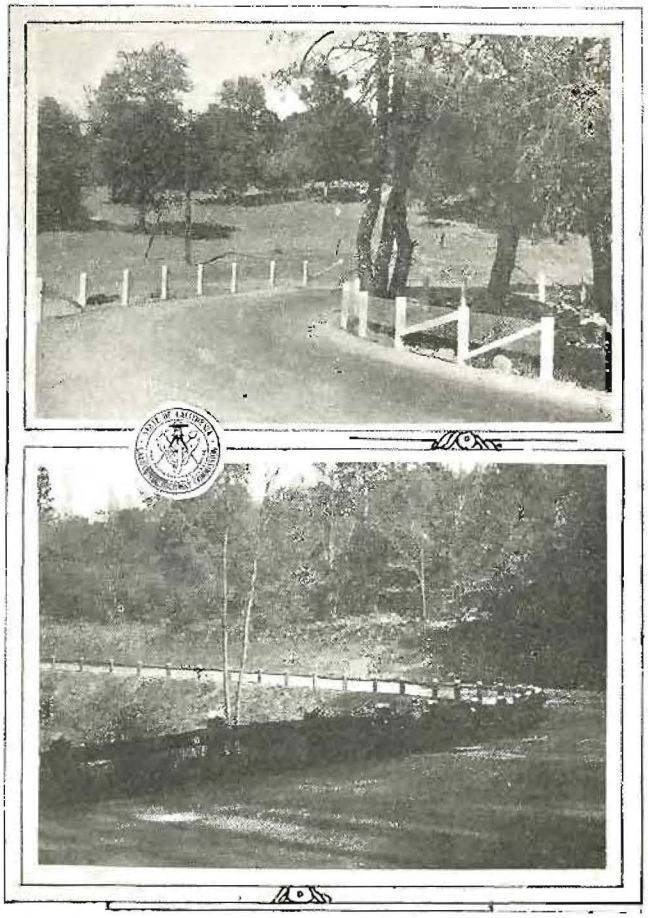
Surveys have been completed for the improvement of the Alpine highway east of Jackson, Amador County, C. W. Springer was in charge.

Division X reports the completion of important line and grade changes in Alpine County on the road between Silver Mountain and Markleeville, a road much used by vacationists. Work is under way on line and grade changes at Pacific summit.

Maintenance forces have been using the old oil macadam wasted at the time of the paving through Galt to build shoulders along the pavement and to connect up the state highway with the paved streets of Galt.

Construction of considerable guard rail between Clay and Jackson, on the Jackson lateral, has been completed. Guard posts are being placed in San Joaquin County, between Banta and Mossdale.

On August 1st, W. P. Hodgson, with headquarters in Davis, took over the maintenance of the highway between Batavia and Putah Creek, relieving J. H. Cates.



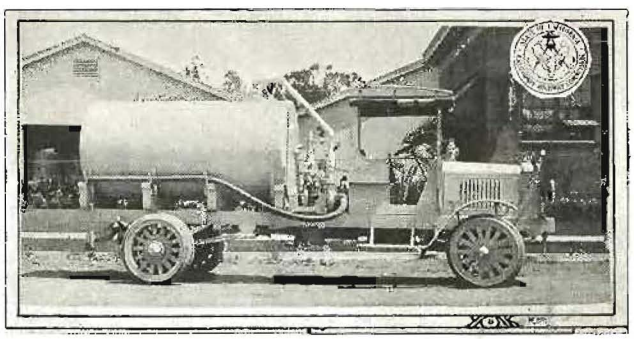
DIVISION III GUARD RAIL—Above, A new type guard fence erected on the Sacramento-Placerville road; below, rustic guard rail constructed of local materials near Grass Valley on the Nevada City lateral.

NEW SPRINKLERS ASSEMBLED

THE headquarters shop is just completing the assembling of seven new 980-gallon capacity sprinkler outfits, mounted on Standard model 66-S trucks. The outfit includes a 2½" x 7" centrifugal pump, capable of filling the tanks in four to five minutes. The pump is operated by a "take off" from the transmission of the truck motor.

The outfit was designed at the shop where the various units were assembled and put together. It is the very latest in the way of a sprinkler for use in the various divisions.

Delivery of two of the sprinklers was made during July.



One of the new sprinklers ready to leave the headquarters shop at Sacramento.

CALIFORNIA HIGHWAYS

OFFICIAL PUBLICATION OF THE

CALIFORNIA HIGHWAY COMMISSION

SACRAMENTO, CALIFORNIA

HARVEY M. TOY, Chairman;
N. T. EDWARDS and LOUIS EVERDING, Commissioners.

ROBERT M. MORTON, State Highway Engineer.

W. F. MIXON, Secretary.

FRANK B. DURKEE - - - Editor
P. O. Box 1103, Sacramento, California.

Vol. I. AUGUST, 1924 No. 8

JUST AMONG OURSELVES

☆ ☆ ☆

HIGHWAY NEWS NOTES

Milliken Should Look Into This.

WHILE returning home from a dance, L. S. Gatiss, shop foreman of Division I at Willits, was sandbagged and robbed when he stopped to assist two motorists by the roadside who represented that they were stalled.

Funds of the Redwood highway baseball team, composed of employees of the commission at Cummings, were stolen when the home of Mr. and Mrs. H. H. Hubbs was ransacked by burglars. Hubbs is an employee of the highway commission, residing at Cummings.

C. F. Oliphant, draftsman, has been transferred from Dunsmuir to Division I at Eureka.

Former Mechanic Drowns.

George M. Roe, former employee of Divisions II and III and also Division V and for a time mechanical inspector for the headquarters shop, lost his life recently while bathing in the surf at Santa Monica.

Division I hopes the Committee of Nine can find the "wherewithal" to complete the Redwood highway to which the members enthusiastically pledged their support during their recent tour of the north coast counties.

Division Engineer L. H. Gibson and Assistant Division Engineer E. E. Wallace from Division V were visitors at Willits recently.

I. F. Cramer, Division I clerk, has appropriated the appellation of daddy. An eight-pound son now rules his home.

Miss Helen Condon has been transferred from the Willits office to Eureka where she will act as clerk in the equipment department.

Division II Notes.

Division Engineer H. S. Comly reports Chief Clerk E. N. Babb has traded his French Ford touring car for a sedan of the same make. Division II must be a good place to work.

H. N. Nelson has been appointed resident engineer on the bituminized macadam job east of Susanville, Lassen County.

Resident Engineer T. W. Voss has been transferred to Division VI at Bakersfield. Others who have been transferred to the same division are: Draftsmen E. M. Hilton, E. R. Weigand, and rodmen J. N. Baroni and C. R. Fitzgerald.

Tour North on Vacations.

Division Engineer T. A. Bedford with his family recently enjoyed a vacation motor trip through Oregon and Washington.

Paul F. Fratessa, of San Francisco, attorney for the commission, is another who recently enjoyed a trip as far north as Seattle.

Comly With Committee.

Division Engineer H. S. Comly accompanied the Committee of Nine on two recent trips through his division.

News From Division III.

Division Engineer George R. Winslow recently accompanied the supervisors of El Dorado County on an inspection trip between the Meyers-Tallac Junction and the Nevada line, in connection with the securing of rights of way for the highway around Lake Tahoe. He also accompanied the Committee of Nine on its trip to Reno, via the Auburn road.

H. C. Darling, now resident engineer on the Irey and Holden grading contract between Boca and Floriston, suffered a sad bereavement when his three-year-old daughter sustained fatal injuries when she fell from a hammock at Dutch Flat.

C. O. Dingle, recently resident engineer on the Stony Creek bridge in Glenn County, has been transferred to Division X, where he will act in a similar capacity on the asphalt paving job in western San Joaquin County.

W. H. Irish, chief of party, has been assigned to the Cool grading job in Placer County, as assistant resident engineer. The work is being done by state forces.

H. R. Church, assistant resident engineer, is among those who have resigned due to the reduction in forces.

San Francisco District Notes.

Miss Caroline L. Bauer, stenographer with Division IV for three years, has resigned.

R. I. Dunn, former assistant resident engineer on the Skyline boulevard, is now resident engineer for the Bureau of Public Roads on a grading contract at Glorieta, New Mexico.

Wedding in Division V.

The office force of Division V. knowing well the timid ways of Chief Clerk James T. Hays, were given the surprise of their lives recently when Hays disappeared for a few days and returned with a bride, the former Miss Dorothy Ross of Lankershim.

W. L. Judkins, resident engineer on the repairing of the Nacimiento bridge, enjoyed a vacation at Pismo Beach following the completion of the job.

Doings in the Southland.

Carl Marckhoff has been transferred from Division III to Encinitas, in Division VII, as assistant resident engineer on the Whittier boulevard paving.

Meldon L. Bauders, assistant resident engineer in Division VII, was called east recently following the death of his mother in a railroad accident.

W. J. Nelson and L. C. Potter, from Division VI, are now assistant resident engineers on the Sam Hunter contract at Camarillo.

A. W. Schmuck, assistant superintendent in Division VII, is the proud daddy of a nine-pound son.

From Division VIII.

J. G. Moran, chief of party in the Imperial Valley, declares the country down there lies flat on its back instead of standing on its hind legs as it did in Division II, from which he was transferred.

C. L. Jencks, of Division II, has been transferred to Division VIII as transitman.

Division VIII reports a delightful visit from Chairman Harvey M. Toy, who was in San Bernardino recently.

Regan Resigns.

C. F. Regan has resigned as chief clerk in Division X and has been succeeded by E. W. Zumwalt, formerly of the equipment department, as acting chief clerk.

Mrs. D. M. Nugent, stenographer, is back after a vacation in Oregon and Washington.

Doings Around Headquarters.

H. J. Peacock announces the stork left a husky young bridge engineer at his home on July 19th, just too late for last month's issue.

F. H. Cushman, assistant engineer in the drafting department, and Joseph F. Fite, chief of the filing department, recently enjoyed vacations with their families at Camp Sacramento.

E. M. MacKusick of the drafting department has resigned to accept a position with the George Pollock Company in connection with the Big Sur grading contract.

G. G. Gale of the drafting department and family enjoyed a vacation tour over the Redwood highway and through southern Oregon.

Claude Simpson reports the National Guard encampment at Del Monte the best ever.

SMILEWAYS

All Right if You Don't Lose the Key.

Down in Division IV, recently, it was necessary for the police and fire departments to join one of the division's fair alphabet pounding mermaids in a search of several hours for a lost key. She had left her clothing safely locked in a closed car while she took her morning dip, but the fog was mighty cold when she couldn't find the key. Some even declare the police prolonged the search while they studied the latest creation in bathing suits.

Verily, 'Tis So.

Son (Reading)—"Pop, what is a pedestrian?"
Pop—"A pedestrian, my son, is the raw material for an automobile accident."

The song of a modern grandmother:

Hippity hop to the bobber shop,
There to lose my tresses;
I believe in comfort and short hair,
Knocked-kneed knickers and no dresses.

A Chestnut B-r-r-r.

First Waiter—"What's the difference between a boat and a Scotchman?"
Second Waiter—"I pass. What is it?"
First Waiter—"Well—a boat tips—"

A Slam at the Old Man.

The daughter of a strict-principled old deacon had attended a dance the previous night, much against her father's wishes. When she appeared for breakfast he greeted her with the words:
"Good morning, daughter of Satan."
To which the maiden respectfully replied:
"Good morning, father."

—*The Earth Mover.*

She was as pure as snow; but—she drifted.—*Lyre.*

She'll Learn.

Phyllis—"Your husband is simply wild about you, isn't he?"
Lois—"Yes, he raves about me in his sleep, but the poor absent-minded boy nearly always calls me by the wrong name."

Autointoxication.

At a dinner-party an elderly lady of very prim and severe aspect was seated next to a young couple who were discussing the merits of their motor-cars.
"What color is your body?" the young man asked the girl.
"Oh, mine is pink. What is yours?"
"Mine," replied the young man, "is brown with wide yellow stripes."
This was too much for the old lady. Rising from the table, she exclaimed to her hostess:
"I really must be excused. When young people ask each other the color of their bodies at a dinner-party it is time I left the room."

TRANSPORTATION

I am the pioneer, the blazer of the trail;
Upon my prowess mankind shall succeed or fail.
I am the benefactor and the artisan
Whose skillful hand is evident in every plan.
I am a living monster huge whose endless girth
Entwines and succors every nation of the earth.
I am the educator and the builder great;
Upon my footsteps progress of the world shall wait.
All things of human consequence do I embrace;
I am the conqueror of distance and of space.

—*Joseph S. De Ramus.*

And the Overhead.

"Are you sure you have shown me all the principal parts of this car?" asked the fair prospective purchaser.
"Yes, madam, all the main ones," returned the dealer.
"Well, then, where is the depreciation? Tom told me that was one of the biggest things about a car."

What Old Caesar Did.

When Cæsar took a westward ride
And grabbed the Gauls for Rome,
What was the first thing that he did
To make them feel at home?
Did he increase the people's loads,
And liberty forbid?
No; he dug in and built good roads—
That's what old Cæsar did.

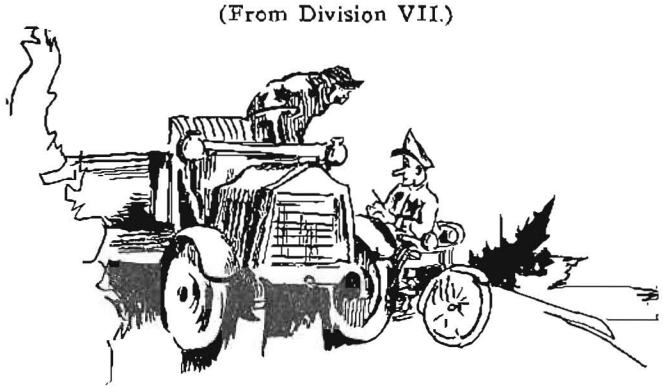
Did Cæsar put the iron heel
Upon the foemen's breast,
Or did he try to make them feel
That Rome rule was the best?
What did he do to make them glad
As he came their lands amid?
He built good roads, in place of bad,
That's what old Cæsar did.

He built good roads from hill to hill,
Good roads from vale to vale;
He ran a good roads movement
Till Rome got all the kale;
He told the folks to buy at home,
Built roads their ruts to rid,
Until all roads led up to Rome—
That's what old Cæsar did.

If any town would make itself
The center of the map,
Where folks will come and settle down
And live in Plenty's lap;
If any town its own abodes
Of poverty would rid,
Let it go out and build good roads—
Just like old Cæsar did.

—*Author Unknown.*

(From Division VII.)

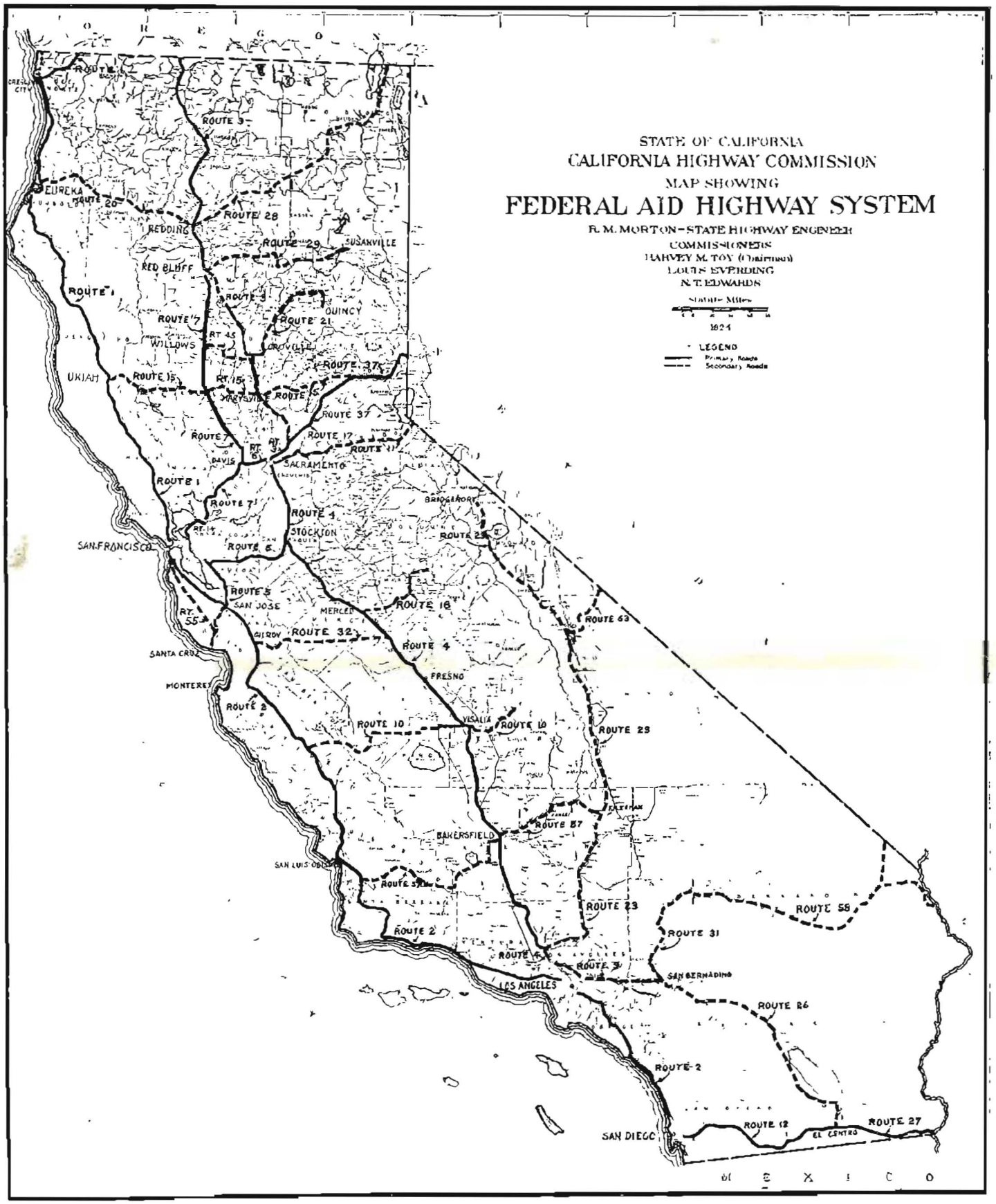


Doings Among Our Maintenance Foremen.

Cop—"How about your windshield?"
Carter—"Aw, this ain't no commercial vehicle."
Cop—"Tell that stuff to the judge."
And Carter did.

Nevada has equipped its state police with loadometers for the purpose of detecting overloaded motor trucks.

The federal aid policy accomplished far more than the mere granting of money to build good roads. It served to place the building and upkeep of public roads in the hands of trained engineering organizations by the requirements that construction of federal aid highways must be under the direction of competent state highway departments.—*Highway Engineer and Contractor.*



The map above does not show all of the state highways in California but only those included in the federal aid system, representing approximately 7 per cent of the total road mileage of the state, outside of cities. See article on federal aid on page seven of this issue.

CALIFORNIA STATE PRINTING OFFICE
FRANK J. SMITH, Superintendent
SACRAMENTO, 1924

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