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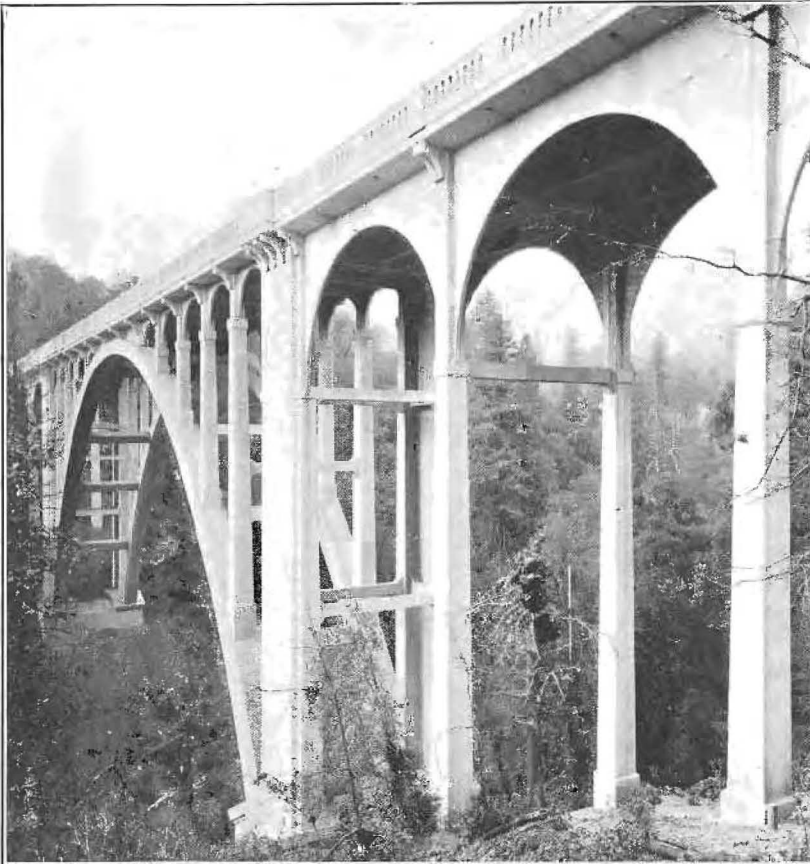
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*Bridges  
Along  
the  
State  
High-  
way  
System*





# Bridges on California State Highways

By C. E. ANDREW, Bridge Engineer.

IT HAS once been said that no objects in America more greatly mar the landscape than the bridges, and none in Europe are more attractive. This perhaps was true of a great portion of the older bridges constructed in America, particularly so of railroad bridges. The condition can be attributed largely to the following causes:



C. E. ANDREW.

Lack of artistic training in engineers, limited resources, competition and haste in construction, undesirable or unsymmetrical location, inadequate materials, absence of state or municipal supervision.

It is gratifying, indeed, to know that the age which designed for strength alone is past, and the principal hindrances, as above mentioned, no longer stand in the way of building, in America, bridges that are most attractive and at the same time most adequate. In fact, an era of higher ideals in bridge designing has been assured in creating the necessity of having specialized and well trained men to do this work.

## CALIFORNIA PROBLEMS

As to the general bridge situation in California, the problems confronting the Department are of rather vast proportions. As mentioned previously a large percentage of bridges now existing on our highways were built by the counties. As time passed these structures were gradually taken over by the state until in 1925 practically all of those which were of acceptable design were taken over for maintenance. The enormous increase in traffic both as to volume and weight, of which you are all aware, has very greatly complicated the general bridge situation.

Many, in fact the larger per cent of the bridges built by the counties were for much lighter loading than is now considered adequate. The roadways are necessarily much too narrow for the vastly increased traffic volume. The alignment in many cases is dangerous. These statements are not in any

way made as a criticism on past practices. Not only California but every state in the Union has done likewise and nearly all are confronted by the same problem.

Engineers generally could not foresee the effect that the automobile would have. Nor did they have the money to provide for the increasing requirements even though some might have been able to predict the future. In many cases, then as well as now, it was, and is, economy to build not too far into the future if in so doing it is necessary to invest too large an amount of money.

## FUTURE DEVELOPMENTS

We must all admit that even though we have in the last ten or fifteen years experienced the greatest transformation in the traffic requirements in history, it is still conceivable that still greater developments will occur.

The fact remains that we now have the large number of light, narrow and poorly aligned bridges and one of our hardest problems is to decide whether we should widen and strengthen our existing structures accepting a certain amount of overstress and its attendant inferiority or entirely remove or relocate and build new structures which will adequately take care of present and future traffic as we are able to predict it.

## THE FLOOD PROBLEM

We find that often the problems of what to do about the present structures is much harder to solve than the design and construction of an entirely new structure. The bridges are widely distributed over more than 6000 miles of state highway in all conceivable sorts of climate and conditions. Foundations involve the worse and best conditions from solid rock to silt 200 and more feet deep. On many streams it is hardly conceivable to one uninformed why a bridge 2000 feet long should be spanning nothing but sand or brush, and sometimes it is hard for an engineer to convince himself that it should remain so. Floods, however, become very convincing if one waits long enough.

It is probable that no other state has localities which are subject to more erratic or unexpected floods, all of which tend to complicate the bridge question.





### Typical Bridges

Frontispiece—Upper picture, Doney Creek bridge on the Pacific Highway. Middle picture, bridge across Middle Fork of Smith River on Redwood Highway. Lower picture, bridge across Truckee River on Victory Highway.

This page—1. Merced River bridge at El Portal; 2. Bridge in Shasta County; 3. Upper Bear Creek bridge; 4. Feather River bridge at Oroville; 5. Bridge over South Fork of Merced River; 6. Sweetwater Creek bridge; 7. Wilson Creek bridge, Glenn County; 8. Bridge over Slough in Colusa County; 9. Redwood Timber bridge over Myrtle Creek; 10. Stoney Creek bridge.

Back cover picture: Donner Summit bridge.



### on State Highways



There now exists on the state highway system between 1500 and 1600 bridges of over 20-foot spans. Almost all types of structure are among these as well as almost any degree of physical condition. Their combined length is approximately 42 miles and their combined cost approximately \$30,000,000.

#### BRIDGES FROM THE LAYMAN'S VIEW

It is, perhaps, safe to say that the strongest appeal modern highway bridge engineering has for laymen comes from the bold, spectacular structures which the scenic highway routes have made possible, and of which routes California has her due share. The more rugged and mountainous the country is, the more often such opportunity is presented and economically justified for constructing an attractive bridge. Against ill adopted structures in alignment and unsightly in appearance, perhaps constructed at an early date, and located in sections of the country which have little charm, suggest slight appeal of the profession to the layman, and only impress him with a feeling that a touch of a trained hand or service of a specialist is required in the fitting of a bridge to the needs of a highway.

#### BRIDGES FROM THE ENGINEER'S VIEW

Bridges and their construction appeal to engineers on account of the many engineering problems involved.

First and foremost is the problem of financing. Will a slight change in alignment giving a better but more expensive bridge be justified, and how wide should a bridge be constructed to take care of the heavy increasing traffic, are questions to be answered.

The investigation of foundation conditions is very important in order that the proper and best adapted materials will be selected for a bridge at any given location. The investigation of foundations should be so thorough that no change in type of foundation should be required after construction is under way. In selecting type of bridge, and kind of materials, it is important to take into consideration the climatic conditions in order that the structure will have a long life and will require a minimum amount of repairs and upkeep.

Investigation of the amount of opening for this waterway to provide unobstructed flow requires that a careful study be made as to the area of the water shed, the amount and rapidity of run-off. Structures built to offer obstructions to flow during extreme high water often cause scouring of channel that endangers the structure or approach roads.

## Traffic Control and Highway Efficiency

By C. S. POPE, Construction Engineer.

A TEN-FOOT heavy traffic lane costs from \$15,000 to \$20,000 per mile to build, and the interest charge at  $4\frac{1}{2}$  per cent is from \$675 to \$900 per year for the mile.

If traffic is efficiently controlled and the fullest use made of each lane, it may be possible to do with three lanes what might require four lanes under poor control. If one traffic officer can handle only five miles of road, he can be paid \$300 per month to handle traffic so efficiently that the construction of an extra lane for traffic may not be necessary.



C. S. POPE

Traffic control is therefore so closely bound up with economical highway design that the utmost cooperation between the traffic control department of a state and its highway organization is most necessary.

The Peninsula Highway is a case in point. It would be an interesting study to compare the traffic delivery on this road as at present operated with fast and slow lanes for traffic as against a strict control of traffic under which all vehicles are required to keep to the right at all times and to immediately turn into the right hand lane after passing a slower vehicle.

Studies in traffic control may show that the benefits to be derived from wider highways, expensive grade separations at cross roads or railroads may be secured more economically by a more drastic use of the police powers of the state, or the installation of gates or crossing men.

In selecting the kind of material a bridge is to be built of, concrete, steel, timber, treated or untreated, etc., it is important that no oversight is made in figuring the cost of raw material at its source, cost of transportation, cost of erection, painting, finishing and upkeep.

Records showing life of bridges, with cost of upkeep, are important so that the type of bridges built from year to year will give a maximum value for the money invested.

Complete plans and specifications that will insure against extra work being required

(Continued on page 18.)



# The Distribution of State Highway Moneys

By B. B. MEER, Director of the State Department of Public Works.

**T**HE MANNER in which California collects the funds by which its state highway is being constructed and maintained is familiar to the great majority of the people of this state. The laws and policies, however, that govern the distribution of this money are perhaps not so well known.

Briefly, one may summarize the general sources of state highway income as follows:

Taxes on gasoline, including the two-cent and one-cent tax.

Taxation imposed on highway transportation companies.

Registration of motor vehicles.

Federal aid.

Gifts and contributions.

The grand total of all such income for the biennium of 1927-1929, as near as it can be estimated, will be approximately \$50,000,000.

The distribution of this money is determined by certain very definite legal requirements and economic facts. For the purpose of clarity, these may be considered separately. The legal requirements for the distribution of highway money will be discussed first.

*Two-cent gasoline tax*—This tax, collected by the state, is divided equally between the state and the counties. The counties' share

of this money is in turn prorated on the basis of their relative automobile registration. The law requires that the state's share of this fund be devoted to widening, thickening, reconstruction and maintenance of existing highways. No portion of it may be used for new construction.

*One-cent gasoline tax*—The money derived from this tax goes in its entirety to the state highway system, and shall be used for new construction. However, it is subject, under the terms of the Breed Bill, to distribution both upon a geographical and a road-classification basis. The forty-five counties in the northern group receive 54.7 per cent of 75 per cent of the money raised under the bill for primary roads and 50 per cent of 25 per cent

of the money raised under the bill for secondary roads. The thirteen counties comprising the southern group receive 45.3 per cent of 75 per cent of the money raised under the bill for primary road construction, and the same quota for secondary roads as is accorded these state highways in the northern group of counties.

*Registration fees*—This money can be used only for the maintenance of state highways.

*Taxation imposed on highway transportation companies*—These funds are derived from taxes imposed on licensed carriers on the highway system of California. They are divided equally between the state and counties and the state's share of these moneys is dedicated exclusively to the maintenance and repair of highways.

*Federal aid*—These funds consist of contributions from the Federal road fund to California. The money thus contributed must be used on projects approved by the U. S. Bureau of Public Roads. That body will approve expenditures only within what is known as the State's Seven Per Cent System. This Seven Per Cent System is made up of selected highways within the state, the total mileage of which can not exceed seven per cent of the total highway mileage of the state. With a few minor

exceptions the mileage in the Seven Per Cent System consists of roads in the present state highway system.

*Gifts and contributions*—These are made up of donations of rights of way, or money, generally made by counties, but sometimes by corporations or individuals, and intended to promote the early improvement of some particular road project. By the terms of the gift or agreement these funds are dedicated to the use of the particular projects that they were designed to promote.

It will be apparent then that the discretion of the highway authorities in the expenditure of road money is confined within certain very definite limits established by the law. The factors that determine the exercise of these

How is state highway money spent?

How is its distribution determined?

To what extent is its disbursement controlled by law?

What policies govern state highway officials in the expenditure of road funds in the field where their power is discretionary?

In this article prepared for and first published in the California Tax Digest, B. B. Meek, director of the Department of Public Works answers these questions and tells of the laws, policies and mechanics that control the expenditure of state highway funds.

discretionary powers are largely economic. They may be summarized as follows:

*Geographic distribution*—The work requires a large geographic spread, not only to enable road service to be given to the whole state, but also to provide employment over the state and to prevent the undue disturbance of labor conditions that an over-concentration of work in any one place would cause.

*Balanced development of highway system*—There must be a coordination of development in the highway system of the state as between rural areas and urban communities. This is necessary in order that there may be an easy flow of traffic between the country and the city, between business and recreational areas, and between populated centers separated from each other by some distance.

*Necessity for caring for traffic*—Volume of traffic is again one of the determining factors in the distribution of highway money. The purpose of roads is to serve traffic. As Governor Young well put it "traffic pressure rather than political pressure" must determine where highway money is to be spent.

These are general principles that determine where and how highway money shall be spent within the limits fixed by law. They are applicable to large areas of the state and operative over large units. The question constantly arises, however, as to the policies that determine the priority of improvement in the smaller units, namely particular roads.

The answer to this question is that those sections of any given highway are first improved that will make possible the greatest general improvement to the whole road. This priority may be determined by the volume of travel that some particular section of highway is called upon to serve. Again it may be determined by the physical condition of some section. In any event sequence in improvement in any highway as between its various sections is determined by a consideration of the relative benefit that will be conferred upon the traveling public.

#### THE ELEMENT OF TIME

It must be recognized that the highways of California can not be built except over a period of years. The desire of the Department is that they be completed as rapidly as is compatible with sound engineering economic construction. Haste is desired but waste will not be knowingly tolerated.

There are also certain construction factors that enter into the distribution of highway money.

Thus the Department of Public Works through its Division of Highways is making a most careful study of the state highway system of California in an effort to develop a ten-year building program through which waste and duplicated effort will be reduced to a minimum, with a consequent saving of many millions of dollars to the taxpayers of California.

#### CONSTRUCTION FACTORS

Again a close study of each is being made to determine the type of highway that will adequately serve the traffic of that road. It is hoped that this study will enable the Division of Highways to avoid the danger of both underbuilding and overbuilding highways.

An effort is being made to look into the future so that rights of way can be secured that will permit the development of the highway system to proceed in an economical manner, serving future traffic in an orderly manner as that traffic develops.

Types of low cost pavement are being developed that will permit the early improvement of a large mileage of state highways where the present traffic use is relatively small. These pavements are so designed that they will become a satisfactory base for a higher standard of pavement when increased traffic requires such better pavement.

These are the policies that govern the distribution of construction and reconstruction money.

#### MAINTENANCE EXPENDITURES

The expenditure of maintenance money is governed by the necessity for maintenance. Two factors determine the distribution of the expenditure of these funds. They are:

First, the necessity to adequately care for traffic.

Second, the necessity to adequately protect the investment in highways.

General maintenance allotments to the various roads are determined largely by the relative volume of travel over those roads and the age and condition of the highways.

Specific and emergency allotments are determined by special conditions that may exist requiring special maintenance either to protect existing highways from actual damage or anticipated deterioration or to care for unexpected or unusual traffic that may develop.

Early maintenance is the demand of highway officials from the maintenance forces. "Every Maintenance Man a Minute Man" is the slogan of the Department.

(Continued on page 24.)



# The July Traffic Count

By T. H. DENNIS, Maintenance Engineer.

ON JULY 15th and 16th the semiannual count of traffic on the state highways was made. A few stations on the Redwood Highway were not taken until July 22d and 23d.

This count is made regularly each year by the maintenance organization of the Division of Highways on the Sunday and Monday nearest the middle of January and July at some 836 stations. The count covers the hours from 6 a.m. to 10 p.m. each day. The count was first initiated in 1920 and 1922. Since 1924 the count has been taken at regular intervals at a complete system of stations. The records thus obtained become yearly more valuable.



T. H. DENNIS

The information serves as a guide in the planning of new construction and reconstruction of roads and bridges and in the allocation of maintenance funds. It is sought by many industrial and commercial companies as an aid in their work.

The field record is made by hourly periods. Vehicles are segregated as follows: Automobiles, light trucks, heavy trucks, trailers, buses, tractors and horse-drawn. The number of foreign cars; that is, cars registered outside the state are shown separately.

The information has been summarized in some detail below. It is presented in the same form as the count of January 15th and 16th which was published in the February-March issue of this journal.

The July, 1928, count shows the following variations from the count of July, 1927:

	Sunday	Monday
Main north and south routes.....	+ 9%	+8%
Laterals between inland and coast routes.....	- 4%	-4%
Interstate connection routes.....	- 1%	-1%
Recreational routes.....	+17%	+7%

The percentage gain or loss in comparison with the count of July, 1927, is shown for the various state routes:

Route No.	Sunday		Monday	
	Gain %	Loss %	Gain %	Loss %
1. Sausalito to Oregon line.....	13		2	
2. San Francisco to San Diego.....	6		5	
3. Sacramento to Oregon line via Marysville.....	13		11	

Route No.	Sunday		Monday	
	Gain %	Loss %	Gain %	Loss %
4. Sacramento to Los Angeles (Valley mt.).....	16		17	
5. Stockton to Santa Cruz via Oakland.....		7		6
6. Sacramento to Woodland junction.....	11		16	
7. Tehama Junction to Benicia.....	8		18	
8. Ignacio to Cordelia via Napa.....		13		14
9. San Fernando to San Bernardino.....		3		5
10. San Lucas to Sequoia National Park.....	2		8	
11. Sacramento to Riverton via Placerville.....	9		7	
12. San Diego to El Centro.....	3			11
13. Salida to Sonora.....	7		17	
14. Albany to Martinez.....	9			2
15. Route 1 near Calpella to Grass Valley.....		2		3
16. Hopland to Lakeport.....	12		6	
17. Roseville to Nevada City.....	2		6	
18. Merced to El Portal.....	15			4
19. Route 9 west of Claremont to Riverside.....	8		16	
*20. Redding to Route 1 near Arcata.....	99		27	
21. Route 3 near Richvale to Quincy.....		7		2
22. San Juan Bautista to Route 32 via Hollister.....	19		5	
23. Sausalito to Bishop.....	12		6	
24. Route 4 near Lodi to Valley Springs.....	10		2	
25. Nevada City to Downville.....	8		0	0
26. San Bernardino to El Centro.....		9		2
27. El Centro to Yuma.....		9		16
28. Redding to Nevada line via Alturas.....		2		8
29. Red Bluff to Nevada line via Susanville.....	13		16	
31. San Bernardino to Jean.....	5		5	
32. Route 4 near Califa to Route 2 at Gilroy.....	25		26	
33. Route 4 near Bakersfield to Paso Robles.....		1		5
34. Route 4 near Arno to Pine Grove.....		6		0
37. Auburn to Colfax.....		2		7
43. San Bernardino to Big Bear Lake.....	42		6	
44. Boulder Creek to Redwood Park.....	6		14	
*47. Oriand to Chico.....	52			12
*48. McDonalds to Wendling.....		23		47
49. Calistoga to Lower Lake.....	22		26	
51. Santa Rosa to Schellville.....	22		6	
*52. Alto to Tiburon.....	56		36	
53. Fairfield to Lodi.....		4		13
55. San Francisco to Spring Valley Dam.....		4		29
57. Santa Maria to Bodfish via Bakersfield.....		16		21
*58. Mojave to Topoc.....	48		25	
60. El Rio to San Juan Capistrano.....	28		5	
*61. Mecca to Blythe.....	69		57	
65. Auburn to Sonora.....	16		27	
*66. Mantoca to Route 5 near Mossdale School.....	73		75	
68. San Francisco to Burlingame.....		15		7
71. Crescent City to Oregon line.....		6		53
Average of all routes.....	7		6	

The routes marked \* show an unusual increase in percentage which is due in some cases to construction operations which necessitates detouring traffic from some regular route. For instance route 66 is carrying the traffic which normally goes from French Camp to Mossdale. The average of all routes is more representative of the increase in traffic throughout the state in 1928 over the same

period in 1927 as the small counts on the lateral routes and the detoured traffic assume more nearly their true relation.

The actual counts as taken at the most representative points are shown in the following table in comparison with the July count of last year:

Station	July, 1927		July, 1928	
	Sun. 17	Mon. 18	Sun. 15	Mon. 16
<b>Route 1. San Francisco to Oregon Line</b>				
San Rafael, north of city at top of hill	8,965	8,847	12,226	4,897
Petaluma, north of city	8,942	6,019	10,213	6,539
Santa Rosa, south of city: Triangle service station	4,191	2,878	4,000	2,967
Santa Rosa, north of city at railroad crossing	5,193	3,641	5,399	3,846
Healdsburg, south of city at railroad crossing	3,691	2,869	4,953	2,602
Ukiah, south of city, junction route 70	1,873	1,733	2,241	1,987
Ukiah, north of city, junction route 15 to Colusa	1,961	1,526	1,761	1,515
Willits, north of city, junction road to Pt. Bragg	1,179	1,068	1,163	963
Eureka, south of city limits	4,928	3,575	4,454	2,696
Arcata, north of city at junction route 20	2,297	2,648	901	454
				not taken
Crescent City, junction of road	1,639	1,042	1,652	taken
At Oregon line	350	362	573	472
<b>Route 2. San Francisco to San Diego</b>				
Colma, junction road to South San Francisco	18,862	8,538	24,855	19,133
San Bruno Junction Day Shore Road	25,250	11,049	24,951	19,496
San Mateo, south of city at 16th Ave.	26,001	12,480	29,162	17,693
Redwood City, north of city limits	23,001	11,199	25,474	11,771
Palo Alto, at road to Federal Tel. Sta.	18,837	8,466	18,709	8,774
San Jose, north of city at lumber yard	19,336	20,923	29,548	21,856
San Jose, south of city limits	9,191	6,562	19,151	8,602
Gilroy, north of city, junction road to Watsonville	7,703	5,156	8,481	5,816
Sallinas, south of city limits	5,317	3,175	3,666	3,709
Paso Robles, north of city limits	2,809	2,909	2,736	2,385
Paso Robles, south of city limits	3,422	2,586	3,488	1,777
San Luis Obispo, north of city limits	3,477	2,562	3,191	3,297
San Luis Obispo, south of city limits at railroad crossing	4,787	3,538	no count	
Santa Maria, north of city junction, Route 57 to Bakersfield	3,636	2,379	4,046	2,759
Santa Barbara, west of city, junction San Marcos road	5,494	3,501	5,977	3,535
Santa Barbara, 300 feet east of city limits	8,470	6,892	9,524	7,798
Ventura, west of city at bridge	6,128	4,665	8,069	4,646
Ventura, east of city limits	7,100	1,649	7,472	8,879
Los Angeles, east at Indiana St.	22,385	21,135	22,586	21,511
Whittier, at junction with Hadley St.	12,354	8,863	18,216	19,459
Anaheim, north of city limits	14,403	9,559	14,927	9,731
Santa Ana, north of city at junction county road to Orange	12,911	7,905	19,567	7,621
San Juan Capistrano, north of city	8,947	3,096	4,045	2,230
Oceanside, near south city limits	7,168	4,382	8,453	5,278
Delmar, at Santa Fe Railroad crossing	6,695	3,788	5,005	3,838
<b>Route 3. Sacramento to Oregon Line, via Marysville</b>				
Sacramento, north at junction with Garden Highway	11,693	10,891	12,690	12,096
Marysville, south of city at junction Hamilton road	2,650	1,961	2,880	2,650
Yuba City, north of city at junction, route 15	3,129	3,065	3,690	3,736
Chico, at junction county road to De Sable	1,585	2,257	3,054	2,467
Chico, north of city, junction county road east	2,136	1,902	2,109	1,911
Red Bluff, at junction route 29 to Sunnysville	1,259	1,451	1,554	1,515
Redding, south of city, junction route 28 to Alturas	2,870	2,281	2,993	2,928
Dunsmuir, north of city limits at bridge	3,888	3,385	3,799	3,375
Treka, south city limits	3,328	1,921	2,431	2,342
At Oregon line	1,468	1,260	1,568	1,372
<b>Route 4. Sacramento to Los Angeles (Valley Route)</b>				
Sacramento, south of city limits	7,694	6,283	7,174	6,591
Lodi, junction route 24 to San Andreas	3,493	2,732	3,866	2,857
Stockton, north of city, junction county road to Lockeford	6,199	5,159	6,111	5,227
Modesto, north of city	6,297	5,292	7,459	6,258
Modesto, south of city	4,597	4,319	7,842	7,210
Turlock, north of city	4,674	3,023	5,928	5,473

Station	July, 1927		July, 1928	
	Sun. 17	Mon. 18	Sun. 15	Mon. 16
Turlock, south of city	3,771	3,099	4,956	3,996
Atwater, north of city	3,921	3,290	4,455	3,483
Merced, north of city at bridge	4,922	4,597	5,402	4,432
Merced, south of city at bridge	5,441	3,199	3,572	3,663
Presno, south at maintenance yard	8,121	8,129	8,367	8,349
Kingsburg, south of city near Kings River bridge	2,980	2,314	3,522	2,890
Tulare, south city limits	5,264	2,750	2,936	2,910
Bakersfield, north of city, junction county road to Oil Center	5,645	5,973	6,365	6,425
Castaic, junction county road to Santa Paula	1,829	1,129	4,026	2,583
Saugus, junction route 23 to Mojave	6,334	4,026	6,769	5,142
Newhall, end of section L.A.+E.	7,680	4,168	8,599	5,415

<b>Route 5. Stockton to Santa Cruz via Oakland</b>				
Tracy, west of city, junction county road to Byron	4,696	2,744	5,209	3,313
Livermore, east of city, junction county road to Livermore	5,286	3,410	3,488	1,942
Hayward, junction with Castro Valley road	4,449	2,277	4,201	1,822
Niles, junction Niles Canyon road	12,993	6,388	6,115	3,523
Nine miles north of San Jose, junction county road to Centerville	14,133	4,324	8,984	2,169
Five miles north of San Jose	12,512	5,661	12,384	5,619
San Jose, at north city limits	8,932	4,710	9,945	5,614
San Jose, west of city at sanitarium	9,942	9,498	11,915	8,961
Los Gatos, northeast of city	6,213	2,787	6,765	2,995
Santa Cruz, north of city	7,712	2,691	8,254	2,668

<b>Route 6. Sacramento to Woodland Junction</b>				
West of Sacramento, at underpass	5,519	3,583	6,131	4,828
Davis, east of city, at underpass	4,513	3,162	4,794	2,458

<b>Route 7. Tehama Junction to Benicia</b>				
Benicia, north of city	764	413	779	444
Fairfield, east of city	5,963	3,215	5,418	3,204
Dixon, south of city	4,917	3,704	4,437	2,048
Woodland, south of city	2,679	2,311	2,615	2,646
Williams, south of city	1,423	1,193	1,648	1,372
Willows, south of city	1,787	1,757	1,696	1,836
Orland, at junction route 47 to Chico	1,571	1,473	1,827	2,456
Red Bluff, south of city at Reed Creek bridge	1,435	1,453	1,767	1,942

<b>Route 8. Ignacio to Cordelia via Napa</b>				
Petaluma Creek bridge			not taken	
Schellville, junction route 51 to Santa Rosa			not taken	
Napa, junction county road to Vallejo	2,134	886	2,426	1,000
Cordelia, junction route 7	8,619	3,912	6,111	2,892
	4,710	2,887	5,169	2,973

<b>Route 9. San Fernando to San Bernardino</b>				
San Fernando, 1 mile east	2,721	1,290	Relinquished to city of L. A.	
La Crescenta, west of Pennsylvania Ave.	6,764	4,124	6,474	8,317
Pasadena, east of city limits	10,824	7,001	8,924	6,033
Arroyo, west of city limits	9,303	4,998	10,670	5,408
Upland, east of city at junction county road to Upland	4,582	2,209	3,809	2,132
San Bernardino, west of city	5,933	3,807	5,423	4,186

<b>Route 10. San Lucas to Sequoia National Park</b>				
San Lucas, south of city at junction route 2	123	156	110	155
Coalinga, west of city	442	396	383	319
Hanford, west of city limits	1,602	1,761	1,642	2,025
Hanford, east of city, intersection; county road to Kingsburg and south to Corcoran	2,829	2,611	2,865	2,879
Visalia, east of city at Kreter Junction	1,801	1,564	1,931	1,663

<b>Route 11. Sacramento to Nevada Line via Placerville</b>				
Sacramento, east of city limits	3,811	3,035	4,352	2,971
Folsom, west of city at junction with Pratts road	1,850	1,083	1,774	1,605
Placerville, west of city	1,834	1,143	2,175	1,446
Placerville, east of city	1,876	1,216	1,995	1,368
Between Riverton and Kyburz	1,133	546	1,112	762

<b>Route 12. San Diego to El Centro</b>				
San Diego, east of city, Euclid Ave. at Cajon Ave.	4,382	4,517	under const.	
El Cajon, west of city limits	5,577	4,493	road closed	
Jacumba, at junction county road to El Campo	1,271	560	1,346	696
El Centro, west of city at junction route 26 to San Bernardino	2,428	2,393	1,960	1,760

(Continued on page 22.)



# Maintaining the State Highways

By W. A. SMITH, Assistant Maintenance Engineer.

**T**HE MAINTENANCE of the state highways is highly important to the social and economic welfare of California. Money has been invested not alone in the building of the roads, but also in ranches,



W. A. SMITH

stores, factories and the many varied activities of the state, as a direct result of opportunities offered by improved transportation. Continued success of such industries is dependent on continued ease of communication.

It is the duty of the maintenance department of the Division of Highways to preserve the investment and to provide service and insure safety for the stream of traffic that

flows over these channels of communication. As an organization we believe this work to be more than a duty.

In this work it is especially essential that a man shall feel his job to be important.

Maintenance is the doing of little things; the endless repetition of the same tasks. Occasionally there is an emergency to test the metal of a man but, in general, the better the maintenance the less is the need for extensive repairs. A man who is not guided by a high spirit of loyalty and service will never make a "Highway Man."

The growth of the work has been gradual with the development of the highway system. Nearly every condition of climate and soil must be dealt with from the snow and rain of the mountains and coast to the summer dryness of the valleys and the heat and sand of the desert. Every type of traffic

must be served; heavy, long distance freight hauling, high speed tourist traffic and the congestion of the city street.

The Governor's budget for the present two-year period provides \$9,580,000 for the needs of the maintenance department. This sum is being expended for routine maintenance, for emergency work in connection with removal of major slides, specific improvement and storm damage, for oiling gravel and crushed rock roads and for purchase of property and construction of improvements thereon for use as headquarters for the crews. The investment in maintenance stations is of a permanent character which will increase in value. The work of oiling roads is of a semi-permanent nature as it conserves material already in place. Some of the specific work is also of an enduring nature, for instance: superelevating curves, improving sight distances, drainage, etc.

The annual operating expenditure is approximately \$4,500,000. This is a large sum, but when it is remembered that over 1,700,000 vehicles were registered in 1927, and that the annual upkeep of your state highways, exclusive of reconstruction, cost less than \$2.70 for each vehicle, the economy is obvious. A few bumps against shattered concrete, a few hours slow driving on rough roads result in damage to your car and loss of your

time far in excess of this sum. The investment in motor equipment is so great and operating costs so high that first class maintenance is economically justified.

The maintenance department is not only interested in the upkeep of the roads, but is concerned in the control and eradication of noxious weeds; in caring for the natural and planted trees; in assisting toward proper improvement of the highway by limiting encroachments which would interfere with future development or cause an unsightly appearance; in reducing fire hazards; in safeguarding your children by maintaining warning signs at schools; and in pro-

## DISTRIBUTION OF 1927 MAINTENANCE DOLLAR ON STATE HIGHWAYS

### Class of Work

Where spent	Amount of each dollar spent
Traveled way .....	54.5 cents
Road sides .....	30.7 cents
Improvement of shoulders .....	3.0 cents
Structures .....	6.4 cents
Safety devices .....	2.0 cents
Drifts .....	0.6 cent
Trees .....	1.2 cents
Miscellaneous .....	1.6 cents
<b>Total .....</b>	<b>\$1.00</b>

### Class of Expenditure

Labor .....	44.2 cents
Equipment cost .....	32.8 cents
Materials .....	20.6 cents
Service and expense .....	2.4 cents
<b>Total .....</b>	<b>\$1.00</b>

## Protecting the Freshly Painted Traffic Line



Flagging the white stripe.

Even with the use of very fast drying paint for traffic lines, it has been quite difficult to prevent vehicles from running over the freshly painted line and tracking it to other parts of the pavement.

The paint is applied with such rapidity that great lengths of line are painted in a very few minutes, and to station flagmen along the highway to direct traffic, for they would have to be numerous, would be too expensive. The placing of an occasional sign

protecting traffic by means of traffic lines and other devices.

The organization engaged in this work varies from 1400 to 1700 men depending on the season. The 200 engineers, superintendents and foremen in charge have been carefully selected. Many of the men have been with the state since the start of highway work in 1912. The average length of service for these 200 men is 7 years. In every county of the state these men are daily patrolling the state highways, trained and equipped for the detail of routine work, but ready at a moment's notice for the emergencies of fire, storm or flood.

The accompanying table shows under "class of work" the portion of each dollar expended in 1927 on various phases of routine maintenance. This represents the service given for your dollar. Under "class of expenditure" is shown the proportion of this same dollar as it is returned to the citizens of the state in payment for labor, for purchase and upkeep of equipment, for materials and miscellaneous expense.

along the newly painted line helps, but it is not sufficient.

A method of protecting the freshly painted traffic line, developed in District VII and which has been very successful, consists of the use of a great many small red flags placed at intervals of from five to six feet along the newly painted line.

The device for supporting the small piece of red flagging consists of a piece of No. 8 iron wire bent with a loop about six inches in diameter for a base, with a single strand of the wire, about six inches long, at right angles to the plane of the base and having a small loop or kink at the end to receive the piece of flagging.

The little flags and their supports are so light and capable of being stacked, that a man can easily carry a hundred or more on his arm. He walks immediately in back of paint machine placing the flags about five feet apart along the line.

Three parallel white lines were recently painted to establish lanes along Whittier boulevard in Los Angeles County, and the work was protected with the little red flags. In several miles of lines painted, not one case of smearing of the fresh paint occurred, in spite of the fact that the traffic count during working hours along this stretch of highway averages more than 1200 vehicles per hour.

## BAD ROADS ARE

### A COSTLY TAX

Poor roads are costly to motorists. Motorists of the United States, according to dispatches, pay a bad roads tax equivalent to 22.3 cents on every gallon of gasoline consumed on a poor highway.

Experiments at Washington State College, Iowa State College, and the North Carolina State College, show that on a basis of speed of 33 miles an hour, the cost in tires and gasoline per 1000 miles over a certain rough road for an average four-cylinder car weighing 3500 pounds loaded, was \$35.10. At the same speed, the cost for the same car over a very smooth, improved road was only \$12.80.

## CORRECTION

In the issue of CALIFORNIA HIGHWAYS AND PUBLIC WORKS for May-June an error was made in the statement of equipment used on two projects listed there. In District IV, San Mateo County, Route 2, Section A, Hanrahan Company, contractors, the mixer used was a No. 27-E MultiFoot Paver. In District VII, Orange County, Route 2, Section B, George Herz Company, contractor, the same paver was used.



# Congress Adds Over \$6,000,000 to California Highway Building Fund

By T. E. STANTON, Assistant State Highway Engineer.

THE seventieth congress, just closed, continued the constructive policy of the United States government in furnishing federal funds for cooperation with the states in road building activities. This was done by the passage of the bill authorizing appropriations of \$75,000,000 annually for 1930 and 1931 for federal aid cooperation with the state highway departments and an additional \$7,500,000 annually for forest highway and trail construction and maintenance, making a total of \$165,000,000 for the two years.

By this action, the United States government has committed itself to appropriations totaling \$1,087,088,330 since the policy of federal aid was first inaugurated. For this total commitment, California has already profited or will have profited by the end of 1931 to the extent of over \$43,000,000.

## CALIFORNIA'S SHARE

California's share of the 1930 and 1931 appropriations will amount to approximately \$2,500,000 annually for federal aid on the 7 per cent system and an addition of approximately \$625,000 annually for forest highway construction, or a total of approximately \$6,250,000 for the biennium exclusive of forest development funds which will be available to the Forest Service for the development of roads and trails necessary for the opening up and protection of the national forests.

Following is a summary of California's share of federal aid appropriations to date and expenditures or obligations incurred in connection therewith:

Total appropriations to June 30, 1929.....	\$27,042,667 00
Appropriated by 70th Congress for 1930 and 1931 fiscal years (California's share approximately).....	4,972,830 00
California's total share of appropriations to date.....	\$32,015,497 00

## OBLIGATIONS—JULY 1, 1928

(a) Projects completed and paid for.....	\$19,858,085 42
(b) Projects in force and under agreement.....	2,996,543 89
(c) Plans, specifications and estimates recommended for agreement.....	1,153,892 35
(d) Estimates submitted for agreement.....	161,885 44
(e) Estimates to be submitted; contracts pending award or advertised.....	717,609 09
Total amount obligated.....	\$24,888,607 19
Balance available for additional projects up to June 30, 1931.....	\$7,127,489 90

Federal aid, other than forest highway appropriations, comes to the states as a reimbursement for expenditures made by them in highway construction on what is known as the 7 per cent system.

The 7 per cent system is a system approved by the United States government, in connection with the construction of which federal aid will be extended to the states by the government, and which consists of 7 per cent of the estimated road mileage at the time of the adoption of the Federal Aid Act of 1921.

At that time, the California Highway Commission determined the total road mileage in the state to be 70,000 miles, so that 4900 miles of highways in California could be designated as federal aid highways.

## MAY PLANT TREES

Senate Bill No. 1341 by Oddie, which has just been passed by the seventieth congress and signed by the President, provides that in every case in which, in the judgment of the Secretary of Agriculture and the highway department of the state in question it shall be practicable to plant and maintain shade trees along the highways, the planting of such trees shall be included in the specifications.

The above provision makes permissible the expenditure of federal aid money in the planting of shade trees.

## OTHER PROVISIONS

The Oddie bill likewise provides that federal funds may be expended on that portion of a highway or street within a municipality having a population of 2500 or more, along which from a point on the corporate limits inwardly, the houses average more than 200 feet apart; provided, that no federal funds shall be expended for the construction of any bridge within or partly within any municipality having a population of more than 30,000 as shown by the latest available federal or state census; but this limitation shall not apply in the case of an interstate bridge, including approaches, connecting such municipality in one state with a point in an adjoining state which may be within a municipality having a population of not more than 10,000.

## 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.

BERT 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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 CORNING DE SAULES, Deputy Director, Department of Public Works  
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General Headquarters, Third Floor, Highway Building, Eleventh and P Streets, Sacramento, California.

## CALIFORNIA HIGHWAY RIGHTS OF WAY KEPT FREE FROM BILL BOARDS

The action of the highway commission of Arizona in ordering advertising signs and bill boards off the rights of way of the state highways of that state has been widely commended in the editorial columns of the newspapers of California. A number of these editorials, however, mix with their praise of the action of the Arizona officials, the suggestion that California highway authorities should do likewise.

For the information of both the press and the public of California, it might be well to call attention to the fact that all advertising signs and devices have been barred from the rights of way of California's state highways since 1915. Chapter 400, Statutes of California, enacted in 1915 reads in part as follows:

"Sec. 6. No sign, picture, transparency, advertisement or mechanical advertising device shall be placed upon or over any state road or highway without a permit from the department of engineering or its appropriate officers, and, if so placed, shall be a public nuisance and may be forthwith removed from any such road or highway by the department of engineering, its officers or employees, and any person who shall so place the same shall be GUILTY OF A MISDEMEANOR; provided further, that nothing herein shall be so construed as to prevent the posting of any notice provided by law or order of any court to be posted."

This law has been very rigorously enforced in California, and it is made the special duty of state highway maintenance forces to see that the law is obeyed to the letter.

The method by which this law is enforced in California is to warn all persons found posting signs or building bill boards on the rights of way of the state highway system that their action constitutes a violation of the law. Where signs have been placed on the highway before their posting could be stopped a formal notice is served upon the owners of the signs that they must be removed immediately. If the signs are not forthwith removed by the owners, state highway officials immediately clear the highway right of way of the offending advertisements.

Vigorous enforcement of the 1915 law has resulted in freeing rights of way of both bill boards and posters.

It may be of interest to the public to read the text of the notice served upon those responsible for erecting bill boards or posting signs in the forbidden right of way area. This notice reads:



## MEMORIAL OPPORTUNITY SEEN IN ELIMINATION OF GRADE CROSSINGS

The following editorial appeared in the *San Francisco Chronicle*:

For persons who wish to create monuments for themselves or for others the erection of splendid structures to carry highways over or under dangerous railroad crossings is an unequalled opportunity.

The task of eliminating grade crossings on all the highways of the state is so vast that it must be many years before it is all done. Here is a chance to set up lasting memorials that will have the added value of testimonials to the humane interest and public spirit of their givers.

Such givers may be assured that the Highway Commission will not be niggardly in full and permanent public acknowledgment of their benefactions. A grateful state will see that official titles and enduring bronze keep the memorial purpose always before the public.

Though in a slightly different form, we have already striking examples of this combined purpose of memorial and public benefaction in the gifts of beautiful groves along the Redwood Highway. Four fine redwood groves on this highway have been presented to the state by private persons as memorials to their loved ones. The groves now known to all travelers over the Redwood Highway as the Raynal C. Bolling, the Charles N. Felton, the Frederick Saltonstall Gould and the Joseph Russ will keep those names green in the ever-living trees and at the same time will pleasure generation after generation.

So, too, fine structures to carry the highways over or under dangerous railroad crossings will cause generations of highway users

to bless the names that stand on their memorial tablets.

Surely there must be a great satisfaction in the public honor attending such meritorious enterprise and concern for the life and safety of the millions upon the highways, far beyond that which comes from purely ornamental memorials.

## MEMORIAL MARKER ON VICTORY HIGHWAY FORMALLY DEDICATED

The front cover picture for this issue of CALIFORNIA HIGHWAYS AND PUBLIC WORKS is a view of the State of California Memorial Marker on the Victory Highway at Verdi, California. This marker was dedicated on July 24, 1928, with James K. Fisk, adjutant, The American Legion, Department of California, presiding. The following program was rendered:

### Invocation

Frank Davis, Chaplain, Hague-Thomas-Hegarty  
Post 130, Grass Valley.

### Address

By W. A. Shepard, California Commissioner,  
Victory Highway Association.

### Address

Mrs. Cora M. Woodbridge, Assemblywoman,  
Ninth District.

### Address

J. C. Durham, Reno and A. W. Moore, Oakland,  
Directors, Victory Highway Association.

### Address

By George W. Malone, Commander, American  
Legion, Department of Nevada.

### Address

Hon. Frederick Balzar, Governor of Nevada.

### Address

Hon. C. C. Young, Governor of California.

### STATE OF CALIFORNIA CALIFORNIA HIGHWAY COMMISSION

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We note that a \_\_\_\_\_ advertisement  
reading \_\_\_\_\_

has been placed within the limits of the State High-  
way at \_\_\_\_\_

Your attention is called to the following from  
Statutes of California, 1915, Chapter 400: (printed  
above).

Such advertisement being in violation of the law  
you are advised to remove same from limits of high-  
way within \_\_\_\_\_ days from date, otherwise  
action will be instituted against you according to the  
law in such cases provided.

Yours very truly,

\_\_\_\_\_  
Division Engineer

## State Scales Prove Effective Detectors of Overloading Violations

[From San Bernardino Index]

Judge Lee Childers is busy with traffic cases, due to the overloaded trucks here, or trucks with too little rubber, that persist in traveling over highways. The state scales located between Banning and Beaumont are responsible for the detection of offenders.

FLORIDA—The Tamiami Trail, a 300-mile high-  
way crossing the Everglades from Miami to Tampa,  
was completed last fall after fourteen years of effort  
and millions of dollars expenditure.

## West End of the Yolo Causeway Lowered; How Job Was Accomplished

By C. E. BOVEY, District Maintenance Engineer.

THE Yolo Causeway situated in Yolo County has on the west end 2470 lineal feet of wooden trestle, the grade line of which is 6 feet higher than the paved highway connecting it. The run-off as constructed was very short and the vertical curve in the trestle itself is only 75 feet in length, giving a sight distance of less than 500 lineal feet. On account of the fast traffic across and adjacent to the causeway, a great many accidents have occurred due to this short sight distance.

As on all wooden deck bridges topped with asphalt surface, moisture gathered during the night and in freezing weather turned to ice, creating a more hazardous condition during the night and early morning hours. As the wheel guard and guard rail on this trestle were of the old standard type, they proved insufficient to keep skidding machines from crashing through to the ground some eighteen feet below. To correct this condition, it was decided to resurface the trestle with a non-skid layer of  $\frac{3}{4}$ -inch rock and asphalt and replace the old wheel guard and guard rail with a new and heavier type, the wheel guard to be constructed of 8-inch by 12-foot timber placed on 3-foot blocks, making it 15 feet high, which is one inch higher than the concrete wheel guard on the main structure, which has always proven sufficient to keep

decided to lower the last nineteen bents of the wooden trestle in order to substitute a 400-foot vertical curve in place of the 75-foot one, thus increasing the sight distance of less than 500 feet to over 1500 lineal feet, thereby



Showing the jacks in place and the crew making the cut-offs. Note the swinging stage from which the men are working.

materially adding to the safety of the traveling public.

The bents were of the standard four-pile type, the two outer piles being on a batter.

It was decided to contract the lowering of the trestle and the placing of new wheel guard and guard rail, but the bids received were all entirely too high and were, therefore, rejected. Most of the bids were particularly high for the lowering item ranging from \$1,000 to \$3,808, while the Engineer's estimate was \$600. The highest bidder on the lowering of the trestle was the lowest bidder on the placing of the wheel guard and guard rail, and it was thought best by the district office, since the contractors were evidently worried about the lowering of the trestle, to have the lowering done by state forces and to readvertise for bids for the placing of the wheel guard and guard rail. Therefore, the lowering of the nineteen bents was undertaken with the district maintenance forces, using a crew of four men under the leadership of Foreman D. G. Hasse of Stockton.

The cut-offs ranged from one inch to two feet. All the sway brace bolts and braces had to be removed first and then jacks placed under each bent separately, the cap raised just enough to take the weight off the piles



Showing the bents after cut-offs have been made with 4"x12" shims in place and showing part of the scabs holding them in place.

machines from crashing through; the guard rail to be constructed of 8 by 8 posts and 6 by 6 railing securely bolted to the stringers and wheel guard.

In addition to these corrections, it was



while they were being cut off to the new grade.

The old drift bolts extended into the piles approximately 10 inches and in most cases were left intact.

Where the cut-off was over 12 inches, the drift bolts were cut off at the cap for the batter piles, because of the change in the position of the drift bolt with respect to the pile.

In order to save cutting as many drift bolts as possible and the driving of new ones, the old drift bolts were forced into the pile below the cut-off by placing blocks between the deck and the cap directly over the top of the drift bolts. The weight of the deck forced the drift bolt into place without any difficulty. Where the drift bolts were removed, new ones were placed by boring through the deck and cap and driving them into place by use of a follower.

A swinging stage was used entirely, the staging being suspended from the wheel guard. This proved far more economical than staging nailed to the piles or set-up on the ground.

It was planned to lower the deck not over four inches at a time, therefore, as soon as the cut-offs were made, 12 by 4 shims were placed between the top of the pile and cap and held firmly in place by 2 by 12 scabs nailed to the cap and piles. Where the cut-off was less than four inches, the deck was lowered to position as soon as the cut-off was made. After all cut-offs were made, the deck was lowered four inches by removing the 4-inch shims, and this process continued until the entire deck was in place. Sway braces and drift bolts were then replaced and the tops of all piles were treated with creosote paint in order to make them conform with the original job.

The only difficulty encountered was caused by the springing of the piles. Many of them, after the cut-offs were made sprung as much as three feet out of line and had to be pulled back into place and anchored, which raised the cost considerably.

The final cost bore out the judgment of the district office, as the entire lowering was completed for slightly less than \$550 as compared with the low bid of \$1,000.

Some of the contractors, in bidding, figured on having house movers do the lowering by placing jacks under all of the nineteen bents and lowering simultaneously. House movers, however, wanted approximately \$1,200 to do the work in this manner, while our four-man maintenance crew handled the work very efficiently, doing an excellent job for only

### HIGHWAYS MAY SERVE TO HALT FIRES, ALSO

Highways may do double duty as thoroughfares and also as fire trails, according to co-operative plans being worked out. The recent range and grain fires in Yolo county exacted a damage of more than \$1,000,000, besides resulting in a heavy loss to wild animal life, Fred G. Stevenot, State Director of Natural Resources, told the Governor's Council.

A report that already this season there have been 335 field and forest fires in state-patrolled areas, turned the Council into a discussion of methods of reducing the number of blazes.

Governor C. C. Young named a committee, consisting of Stevenot, Bert B. Meek, Director of Public Works, and G. H. Hecke, Director of Agriculture, to make a study of the situation.

Informed that at least 60 per cent of the fires have their origin along the highways, the Governor particularly suggested to the committee that they investigate the possibility of inducing insurance companies to make rate adjustments to farmers and other land owners who take precautions to protect their crops against fires spreading to their property from the highways.

#### "Be What You Is"

Don't be what you ain't;  
 Jes' be what you is,  
 'Cause if you is not what you am,  
 Den you am not what you is;  
 If you is jes' a little tadpole,  
 Don't try to be a frog;  
 If you is jes' de tail,  
 Don't try to wag de dog.  
 You can always pass de plate  
 If you can't exhort and preach;  
 If you is jes' a pebble,  
 Don't try to be de beach.  
 Don't be what you ain't,  
 Jes' be what you is,  
 Cause de man that plays it square  
 Am gwine to get his.  
 It ain't what you is has been,  
 It's what you now am is.

—Badger Highways.

\$550, by lowering each bent separately. Traffic was not interfered with in any way, and the traveling public was unaware that anything was being done to the structure.

New bids received for the placing of the wheel guard and guard rail justified the action of the district in rejecting the original bids and doing part of the work by force account. With the lowering feature eliminated, better prices were obtained for the placing of the guard rail and wheel guard. The lowest original bid was \$12,559.60, while the lowest bid for the placing of the guard rail and wheel guard alone was \$9,781.20, which, added to the cost of lowering, \$550, makes the total cost of the job \$10,331.20, effecting a total saving over the original low bid of \$2,228.40.

# The Division of State Highways; Its Powers and Responsibilities

From the California Blue Book, 1928.

**A**LL POWERS AND DUTIES formerly granted to or imposed upon the California Highway Commission, except those enumerated below, have been transferred to the Department of Public Works and are exercised through the Division of Highways.

The duties retained by the California Highway Commission are briefly as follows:

The power to alter or change the route of any state highway and to abandon any portion thereof, when in the opinion of the Commission such alteration, change or abandonment shall be necessary or advisable; the power to abandon any lands or parts thereof which have been taken or acquired by the state for highway rights of way; the power to designate the fund or funds for the construction of highways into which federal aid money shall be placed; except as may be otherwise provided by law, the power to select, adopt and determine the routes for new state roads and highways and to allocate moneys for the construction or repair of the various roads and highways under the jurisdiction of the Department of Public Works and to determine in each case the maximum sum of money that shall be made available therefor and to conduct preliminary surveys for the determination of the advisability of including in or excluding from the state highway system any road, or portion thereof (provided that not more than one-half of the cost of any such preliminary survey shall be paid from state funds available for such purposes); the Department of Public Works may not take property by eminent domain until the California Highway Commission shall have passed a resolution declaring the public interest and necessity require such acquisition.

The powers and duties of the Division of Highways may be summarized as follows:

1. To take and have full possession and control of all roads and highways which have been declared and adopted state roads and state highways and all state roads and state highways which may hereafter be acquired or constructed.

2. To acquire rights of way, subject in case of eminent domain to the authorization of the California Highway Commission.

3. To maintain all traversable roads which now are or that may be hereafter included in the state highway system.

4. To do any and all things necessary or proper for the erection, construction, maintenance, management and control of all roads, highways, and other properties which are now or hereafter may be placed under its control, including the construction and maintenance of detour roads, and subject to the Depart-

ment of Finance, the purchasing, leasing, renting or otherwise obtaining all tools, implements and supplies which it shall deem necessary or proper for the performance of the duties imposed upon it by law. (Political Code 365d.)

5. To cause to be prepared and to approve all plans and specifications for all work done under its direction.

6. To determine the kind, quality and extent of such work.

7. To direct whether any such work shall be done by contract, in whole or in part, or by day labor in whole or in part, and, after the approval of the plans, specifications and estimates, if, in its opinion the acceptance of any bid or bids shall not be for the best interests of the state, or if, in its opinion the acceptance of any further bids, after the rejection of all bids submitted, shall not be for the best interests of the state, the division may direct that the work or improvement be done upon a day labor basis.

8. The full control of such day labor work is placed under the Department of Public Works and the department or a division may do all things necessary to properly carry out the work.

9. To let any subdivision or unit of said day labor work by contract upon informal bids.

10. When it appears from the plans, specifications and estimates of cost that the cost and expense of doing any construction, reconstruction, alteration, maintenance, repair or other work authorized to be done by or under the direction of the department, will not exceed fifteen thousand dollars, the director may direct that said work be done under contract awarded to the lowest possible bidder or bidders upon public notice. (Political Code 365e.)

11. In the name of the people of the State of California, to condemn, subject to the approval of the California Highway Commission, or to purchase or receive by donation or dedication or lease any right of way, rock quarry, gravel pit, sand or earth borrow pit, land necessary or proper for offices, shops, storage yards, lands adjoining or near such highways for parks, and also lands and trees within three hundred feet on each side of the center line of any state road or state highway



for culture and support of trees, when in the judgment of said commission the acquisition of said lands and trees, or either, shall be for the benefit of a state highway in aiding in the maintenance and preservation of the road-bed thereof, or aid in the maintenance of the attractiveness or the scenic beauties thereof, and likewise acquire lands for the construction and maintenance of drainage ditches in connection with the highways, also all other lands which said commission shall deem necessary for the construction, use or maintenance of state highways.

12. To acquire, construct and maintain stock trails, paralleling and adjoining or near any state highway in such portions of the state as said commission shall deem necessary or proper. (Political Code 365f.)

13. To make such investigations as will put at the service of the state the most approved methods of highway improvement.

14. To compile statistics relative to the public highways of counties and municipalities.

15. To cause to be prepared plans, specifications and estimates for the repair and improvement of highways and bridges, also act as the consulting engineer for any county, road or boulevard district or division, or municipal authorities, when requested.

16. To investigate and determine various methods of road construction adapted to different sections of the state, as to the best methods of construction and maintenance of highways and bridges and to make such experiments relative thereto as deemed expedient.

17. To call upon any state, county or municipal official to furnish any information contained in his office which relates to, or is in any way necessary to the proper performance of the work of said division.

18. To obtain and pay for insurance protecting said commission and individual members thereof, the state highway engineer and the various assistants and employees of said commission and engineer, all while on state business, against loss or damage because of injury to person or property of others by said insured while driving any truck or automobile and to pay the premium on such insurance.

19. To prepare biennial reports relating to road and highway work which are submitted to Governor thirty days before each session of the legislature. (Political Code 365h.)

20. To have jurisdiction of cooperative highway work to be engaged or existing in by the state with the United States government, subject to the authority of the California Highway Commission to allot funds. All plans, estimates and specifications of road

## Gasoline Taxes For 1928 Show 5.58% Increase

Thirty-two million dollars will be the 1928 return from the three-cent gasoline tax in California!

This is the estimate by the State Board of Equalization which announces that the quarterly return on the tax for the last quarter broke all records.

The total receipts for 1927 were \$24,443,137. The additional cent of tax did not go into effect until July 29 of last year.

For the months of April, May and June, the tax levied against gasoline distribution companies in California amounted to \$8,477,293.14, an increase of \$3,124,699.10 over the assessments for a corresponding quarter in 1927 and slightly over \$1,000,000 more than was collected for the preceding quarter.

While the heavy increase was largely due to the enforcement of the additional 1 cent gasoline tax, there was an actual gain of 5.58 per cent in the gas consumption in the state as compared with the second quarter of 1927.

Oil companies in the state distributed 285,430,743.7 gallons in the three months' period against 270,333,079.2 gallons for the same months last year.

Figures compiled by the state board indicated that the rate of increase in gasoline consumption in the state apparently is slowing up. For the first six months of 1927 the gain in consumption over the first six months of 1926 amounted to 14.31 per cent, while the half year gain of 1928 over 1927 has been but 9.63 per cent.

"Age is a quality of mind.  
If you've left your dreams behind,  
If Hope is cold,  
If you no longer look ahead,  
If your ambition's fires are dead,  
Then you are old!  
But—if from Life you take the best,  
If in Life you keep the Zest,  
If Love you hold,  
No matter how the years go by,  
No matter how the Birthdays fly,  
You are not old!"

—Selected

work shall be approved by the commission and said commission shall have full powers to determine the kind, quality and extent of such work. (Political Code 365i.)

## Aids in Traffic Control on State Highway System

There is every evidence that the state motor vehicle department is being operated in a highly efficient manner under the direction of its present chief, Frank G. Snook, says the *Motor Carrier*. Aiding in this efficiency is the system of bulletins which Snook sends out to the many branch offices, inspectors, captains and traffic officers as well as to automobile clubs.

These bulletins acquaint the personnel with any available facts concerning stolen machines or fugitives known to be traveling in automobiles; answer questions which may arise as to enforcement of motor vehicle regulations, and detail the numerous auto accessories which have been approved, and the regulations concerning them.

Chief Snook recently announced that the license plates for 1929 will be dull black with the numerals in bright orange, tests by the Bureau of Standards having determined this contrast to be of highest visibility. Borders have been eliminated on the plates for next year as reducing visibility. The steel will be of 24 instead of 26 gauge to prevent bending or cracking.

The system of numbering has been changed to keep the numerals down to six, with the use of 20 letters from the alphabet, thus allowing 2,300,000 number variations. The digits will be grouped by twos and dividing hyphens will be vertical instead of horizontal, another aid to eye and mind.

The painstaking thoroughness with which the selection of the new type of plates has been made is typical of the entire administration of the motor vehicle department. Every user of the state's highways, whether private or commercial, has good reason to feel indebted to the department for the innumerable ways in which it is policing the roads, facilitating traffic and helping to maintain a high degree of safety.

Recognition of the excellent work being done by the department under Snook's administration was given at the recent convention of the Municipal Traffic League held in San Francisco, which adopted the following resolution:

"Whereas the Division of Motor Vehicles has adopted for the year 1929 a license plate for motor vehicles larger in size and with increased visibility of approximately 200 per cent over previous license plates, and with

improved color combinations thus providing for more ready identification of motor vehicles in the event of accidents and violations of law, now therefore

"Be it resolved that the Municipal Traffic League commend Colonel Frank G. Snook and the Division of Motor Vehicles for its action in adopting such improved and more readily visible license plate for motor vehicles in the State of California."

## Recreational Highway Policies are Announced

Commenting on the proceedings of the eighth annual conference on state parks held in San Francisco, the *Stockton Record* said:

"One of the most significant addresses of the convention was made by B. B. Meek, director of the California Department of Public Works, whose subject was 'Building of Parks and Forest Roads.' The speaker said that roads could be divided into two classes—commercial and recreational. On commercial highways the director was quite willing that the engineers should dictate their ideals—straight line even grades, no curves. Recreational highways, however, should be laid out to take advantage of scenic and historic spots.

"The speaker referred to the southern California beach situation and declared that his department, in running new lines for highway paralleling the ocean front, would insist that the intervening narrow strip between the highway and the beach be secured and dedicated to public use. Furthermore, he said, legislation would be sought at the next session of the legislature empowering the state highway commission to acquire beach strips in connection with ocean highway rights of way in order that scenic values might be preserved for all time and made available to the general public."

## BRIDGES ON CALIFORNIA STATE HIGHWAYS

(Continued from page 4.)

after a contract is let are very important, and it will invariably save considerable money although adding slightly to the cost of preparation of the plans.

When all of the foregoing is properly complied with, it is only the first step, for in order to get a good bridge it is necessary to construct it properly which requires rigid inspection and proper testing and placing of materials.

### IDEAL OF GOOD BRIDGES

It is the hope of the bridge engineer that the finished structures will be durable, pleasing in appearance, conform to the canyon or stream; so that both layman and engineer will gain the impression that bridge construction is being kept abreast with building of modern highways.



## Cooperation Wins Contractors' Praise

[From the *California Constructor*.]

**H**IGHWAY contractors affiliated with the Associated General Contractors of America have been greatly pleased with the cooperative spirit shown by State Highway Engineer C. H. Purcell and the prompt way with which Mr. Purcell considers the suggestions made by contractors.

Recently four requests were made upon the highway department by contractors as follows: First, that monthly estimates be made promptly upon the 25th of the month and include all work up to the 24th of the month; second, that monthly progress payments be made not later than the 10th of the calendar month; third, that final payment be made promptly on the 35th day after the completion and acceptance of the work; fourth, that certified checks which accompanied bids of other than the lowest responsible bidder be returned after the opening of bids.

Engineer Purcell has arranged definitely to have the estimates and payments made in accordance with the first three requests and with regard to the last request Mr. Purcell writes as follows:

"Would advise that your request has been given careful consideration and arrangement made whereby in lieu of the present plan of retaining the certified checks of the three lowest bidders, only the checks of the two lowest bidders will be retained pending award of contract.

"The balance of the checks will be returned not later than the day following the opening of bids. Upon award of contract the check of the unsuccessful bidder will be returned to him, and upon advice of the approval of the contract by our attorney the check of the successful contractor will be returned to him.

"I hope that this plan will meet with favor by contractors of the state."

### Warns Against Low

#### Proposal Checks

There seems to be some misunderstanding among highway contractors regarding the amount of the check required with proposals submitted to the Department of Public Works, Division of Highways, State of California, according to C. H. Purcell, State Highway Engineer, who writes as follows:

"Your attention is called to recent bids received for state highway construction work wherein several

### HIGHWAY COMMISSION HELPS BEAUTIFY STATE

The California Highway Commission should receive a medal for the Preservation of the Natural Beauty of the State, in the opinion of L. L. Norris of the National Automobile Club, after an extensive trip over many gravel roads throughout the state, which have been oiled.

It is most noticeable in driving through those sections where the roads have been oiled, that the ferns, shrubs, trees and flowers are much more beautiful, as they are not covered with a gray coating of dust, but instead, retain their natural shades of green and other colors.

### New Order Governs Heavy Hauling Permits

"**M**OVEMENT of heavy construction equipment over the state highways in the past year has become so great that it was felt necessary to limit this movement in order to protect the highways," declares C. H. Purcell, State Highway Engineer. In this respect Mr. Purcell issued a circular letter as follows:

"The movement, under permit, of heavy construction equipment such as shovels, cranes, etc., over state highways is becoming so great in certain districts that it is felt a uniform limit should be established.

"In the future, permits are to be issued for movement of such equipment only over sections of the highways where railroad transportation is not available for freight shipments. This applies to loads of equipment the gross weight of which exceeds the 22,000 or 34,000 pound limit as specified by the Motor Vehicle Act."

bidders have submitted checks insufficient of 10 per cent of the total bid, two of whom would have been low and no doubt would have been awarded the contracts.

"Section 2, paragraph f, of our Standard Specifications dated July, 1927, reads as follows: 'Each bid is to be presented under sealed cover and shall be accompanied by cash, a certified or cashier's check made payable to the Secretary, California Highway Commission, for an amount equal to at least 10 per cent (10%) of the amount of said bid, and no bid shall be considered unless such cash or check is enclosed therewith.'

"The special provisions for each particular project shows in detail the engineer's estimate of quantities, which is the basis to be used in figuring the total bid. In the case of alternate item or items wherein it is specifically stated in the special provisions that only one practice will be used, the certified check can be based on the lowest of the two alternatives."

## Wayside Refreshment-Stand Campaign

**H**IGHWAY OFFICIALS of California are greatly interested in the campaign for the improvement of wayside refreshment stands now being conducted in New York.

This campaign, consisting of a series of four competitions, was initiated by Mrs. John D. Rockefeller, Jr., who contributed an initial amount of \$7,000 to be applied, through the medium of the Art Center of New York and the American Civic Association of Washington, D. C., toward bettering the appearance of the roadside stands which, through ugliness of conception or carelessness of construction, are beginning to menace the beauty of our highways.

An additional contribution of \$10,000 was made by the Adolf Gobel Company for the support of these competitions.

In the initial contest, which was concluded December 15, seven prizes were given for photographs and plans of the best stands already in existence. Awards were made to the following:

(1) "Pinkie's Pantry," \$300, owned and operated by Norma Bamman, 2704 Park avenue, Plainfield, N. J.; (2) "The Bee Hive Cabin," \$200, George A. Parker, 34 River street, Hoosick Falls, N. Y.; (3) "Young's," \$150, W. J. Young, Ontario, California; (4) "The Hut," \$125, Helen Dana, 4761 Morena boulevard, San Diego, California; (5) "Mott's Taverns," \$100, H. E. Meinhold, 502 West 25th street, N. Y.; (6) "The Cabin," \$75, Louise Jacques, Auburn, Kings County, Nova Scotia; (7) "Rio Del Mar Service Station," \$50, Mrs. Harrison N. Lusk, Aptos, California.

The second competition, which was architectural in character, was concluded March 15 and offered prizes for the best original designs of stands which will improve the present conditions. Ten awards, five for stands without gas stations and five for stands with gas stations, were made, the amounts ranging from \$500 to \$100 in each group.

The basis of the awards was:

1. Fitness of the design as a whole to meet the needs and spirit of the problem.
2. Esthetic merit of the design.
3. Excellence and ingenuity of plans.
4. Practicability and economy of construction.

The third competition, which has just been announced by the Adolf Gobel Company, is for the purpose of encouraging the building

of stands from information gleaned in the first and second contests. *\$100 each will be paid for the first fifteen stands that are built from the prize-winning designs.* Complete plans and specifications of any of the prize-winning stands may be had for the nominal cost of \$20. Requests should be addressed to Secretary of Wayside Refreshment-Stand Competitions in care of the Art Center, 65 East 56th street, New York.

Stands must conform with the prize-winning designs, must be in harmony with the surrounding landscape, and must show good taste and restraint in the use of advertising matter. Photographs of the completed stand, ready for opening, must be submitted to the Art Center, together with the name of the architect whose plan was used, and an estimate of the cost of construction.

The fourth competition will be of the nature of annual awards over a term of years for the good appearance and upkeep of those stands which have been built as a result of the second and third competitions.

### TRIBUTE TO ROAD BUILDERS

To the builders of the highways  
That skirt the canyon's brink,  
To the men who bind the roadbed fast,  
To the men who grade and the men who blast,  
I raise my glass and drink.  
Theirs the great endeavor,  
And the deed of high emprise,  
For they fight with naked hands  
'Gainst forest, swamp and shifting sands,  
And the fury of the skies.  
To the builders who have fallen,  
Whose graves mark out the line,  
To the blind, who never more shall see,  
To the maimed that halt in their misery,  
In silence drink your wine.  
For them no crashing volleys,  
Nor roll of muffled drums,  
Only the roar of the great rock blast  
Is their requiem song when the day is passed,  
And the final darkness comes.  
To the engineers, the wizards,  
Whose words brook no delay;  
Hearing, the sleeping glens awake,  
The snow-plumed hills obeisance make—  
And lo! the Open Way!  
For them no flaunting banners  
When a bitter fight is won;  
No cheering thousands in the streets,  
These gallant heroes ever meet,  
Though dauntless deeds be done.

—Evelyn Gunn.



## Appointments Are Announced on Highway Staff

Announcement of appointments to positions in the Division of Highways has been made by C. H. Purcell, State Highway Engineer, as follows:

T. H. Dennis, who has been serving on the headquarters staff as Acting Maintenance Engineer, has been appointed Maintenance Engineer.

Chas. H. Whitmore has been appointed District Engineer of District I, with headquarters at Eureka. Mr. Whitmore was formerly Assistant District Engineer of District IV, with headquarters at San Francisco, and was also Assistant Construction Engineer with headquarters at Sacramento. Mr. Whitmore succeeds T. A. Bedford, who resigned to accept a position in Cuba.

R. E. Pierce and E. E. Wallace have been appointed District Engineers for District X, headquarters, Sacramento, and District VI, headquarters, Fresno, respectively. Both have been serving in an acting capacity.

## Subway Is Widened; Traffic Hazard Cut At Small Expense

A considerable hazard to highway traffic has been eliminated on the highway between Ione and Jackson where an old narrow subway under the Amador Central Railroad has been widened at a very moderate expense.

The old structure consisted of a truss on timber foundation and bents with only 14 feet clearance across the highway. A number of accidents occurred here, and when the county board of supervisors agreed to cooperate in the building of a wider structure, plans were made of several different types of construction, the one adopted having six 30-inch I beams on timber bents with concrete foundations, and having a 24-foot clear width across the highway.

The construction was handled by the Tenth District. The county furnished all labor and materials for the concrete foundations. The railroad company furnished labor and materials for the track work and all labor and materials for connecting either side of the subway, and hauled timber and steel over their railroad free from Ione.

The cost to the state for this improvement is \$3,400, which is a very small item.

## San Bernardino and Redlands Now Served by New Projects

TWO STATE HIGHWAY reconstruction projects netting over fourteen miles have been completed in the vicinity of San Bernardino and Redlands since October, 1927.

Over nine miles of the Foothill boulevard (San Fernando to San Bernardino) extending westerly from San Bernardino has been widened and resurfaced with asphaltic concrete pavement 30 feet wide. This is the first contract to be completed on this route and is typical of the improvement soon to be extended to Claremont under a second contract.

Nearly five miles of the Los Angeles-Imperial Valley highway has been reconstructed between Redlands and the Riverside County line. The completed road is a Portland cement concrete pavement 20 feet wide. Three-foot salvaged macadam borders were placed along each edge of the pavement.

Both projects can now be traveled with a sense of keen enjoyment. The Foothill boulevard, formerly a highway of the straight and narrow type, is now impressive for its roominess. The natural ease and safety of driving over the new pavement permits looking to the side and accentuates beauty in the even lines of the highway and the bordering trees and orange groves.

The Redlands project has been transformed from a road with a broken and uneven surface to a smooth concrete pavement. The white strip of pavement can at times be seen for a considerable distance ahead avoiding low hills with easy curves or crossing slight ridges and depressions with neatly finished cuts and fills.

## Carl B. Wirsching Resigns

It is with regret that District VIII announces the resignation of Carl B. Wirsching, Assistant District Engineer. Mr. Wirsching leaves the state service to go with the Rock Producers Association of southern California.

Bill tells a friend of his—a beginner at golf—who, when asked how he came out on the first day on the links, replied that he made it in eighty.

"Eighty," ejaculated Bill, "that's really remarkable. Most oldtimers would envy you that score. You'll surely be an enthusiast from now on."

"Yes," said the novice, condescending, "I'm going back tomorrow and try the second hole."

## Contractor Solves Problem of Moving Finishing Machine

The operation of the 30-foot asphaltic concrete raking and finishing machine on the recent foothill boulevard project presented some unusual moving problems.

Specially constructed for raking and finishing asphaltic concrete surface mixture for the full width of 30 feet this machine was necessarily heavy. During operation its entire weight is carried on car wheels running on the side forms as a guide or track. To secure rigidity in the frame of such a wide machine, it is necessary that the transverse members of the frame be rigid steel trusses. Except by driving by its own power on a 30-foot gauge track moving this machine would appear to be a job for special equipment.

The contractor, Mr. Steel Finley, found that the job could easily be done with two of the dump trucks he uses for hauling the asphaltic mixture from the plant to the highway. Operation number one was to roll the machine by its own power on planks laid temporarily under the wheels to a position parallel with the highway. When the machine was turned to this position, dump trucks were backed to each end of the machine with bodies raised as for dumping material. A heavy chain was passed across the rear end of each dump body and fastened to the end of the machine. The dump bodies were then lowered to hauling position. Due to the slightly forward position of the hinges this caused a raising of the extreme rear end of the dump bodies thereby lifting the finishing machine from the ground. The remainder of the moving was a matter of team work of the two truck drivers, one driving forward and the other backing, both moving at the same speed. At the end of the move, the operation was reversed and the finishing machine returned to its working position across the highway.

The machine was moved a number of times during the progress of the contract. It was first moved from the railroad station to the San Bernardino end of the job. A few days later it was picked up and moved across Lytle Creek bridge, later it was moved from Rialto to the westerly end of the contract, later over an exception at the Pacific Electric Railroad crossing, and finally it was moved back to the railroad yards to be reshipped.

## THE JULY TRAFFIC COUNT

(Continued from page 8.)

Station	July, 1927		July, 1928	
	Sun. 17	Mon. 18	Sun. 15	Mon. 16
Route 13. Salida to Sonora				
East of Salida, at McHenry's Ave. to Modesto.....				
	1,353	1,123	1,855	1,260
Oakdale, west of city.....	1,365	1,213	1,496	1,179
Sonora, south of city.....	1,809	1,659	2,364	1,740
Sonora, east of city.....	2,221	1,226	1,850	1,174

Route 14. Albany to Martinez				
Albany, at county line.....	22,832	11,944	21,947	15,330
Junction county road to Richmond.....	17,365	19,641	18,329	16,637
Junction Franklin Canyon road.....	9,473	4,466	9,762	4,621
Crockett, 1 mile south of city, junction county road to Crockett.....	2,355	1,550	1,089	1,398
Martinez, west of city limits.....	1,595	664	1,319	692

Route 15. From Route 1 near Calpella to Grass Valley				
Ukiah, north at junction route 1.....	1,049	641	889	620
Mendocino and Lake County line.....	545	315	not taken	
Near Venada, junction county road to Bartlett Springs.....	102	64	167	116
Williams, west of city.....	381	477	435	494
Williams, east of city.....	471	451	458	431
Colusa, east of city.....	1,197	806	802	673
Marystown, east of city.....	766	675	1,054	634
Grass Valley, west of city.....	508	370	575	322

Route 16. Hopland to Lakeport				
Hopland, at junction route 1.....	765	631	776	808
Lakeport, south of town.....	830	778	993	638

Route 17. Roseville to Nevada City				
Roseville, east of city.....	3,549	2,058	2,761	2,129
Auburn, south of city at S. P. R. R. crossing.....	3,430	2,183	2,567	1,978
Auburn, north of city at junction County Club road.....	1,565	885	1,447	786
Grass Valley, south of city.....	1,651	859	1,492	678
Nevada City, south of city.....	1,598	1,197	1,599	1,236

Route 18. Merced to El Portal				
Merced, at intersection county road and 21st street.....	2,341	2,144	2,694	2,369
Merced, 12 miles east at junction county road to Le Grand.....	1,969	1,969	1,847	1,186
Moerman Bar, at junction county road to Mormon Bar.....	2,231	1,879	2,413	1,477
Briceburg, Bear Creek bridge.....	1,853	1,363	1,663	999

Route 19. From Route 9 West to Claremont to Riverside				
Between Pomona and Ontario, at Chino cross roads.....	6,026	3,553	9,304	6,872
Los Angeles County line, east limits of Pomona.....	11,835	6,922	19,477	1,071
Riverside, west of city near Santa Ana River bridge.....	7,165	6,215	6,354	5,500

Route 20. Route 1 near Arcata to Redding				
Arcata, north of city at junction route 1.....	794	618	1,647	831
Weaverville, 3 miles south.....	144	132	123	133
Between Bedding and Tower House.....	197	176	216	203

Route 21. Route 3 near Richvale to Quincy				
Oroville, east of city.....	1,268	642	1,149	707
Quincy.....	351	319	312	269

Route 22. San Juan Bautista to Route 32 via Hollister				
San Juan Bautista, south of city at junction route 2.....	2,209	1,463	2,662	1,825
Hollister, junction route 32.....	971	589	1,130	614

Route 23. Saugus to Bishop				
Saugus, junction with route 4.....	3,661	2,233	4,733	2,669
Lanaster, junction with route 59 to Neenach.....	1,216	906	1,416	1,188
Freeman, 1 mile north, junction to route 37.....	351	287	386	222
Lone Pine.....	1,368	1,165	887	812
Bishop, half mile north junction county road north and county road easterly.....	1,163*	853	1,596	895

Route 24. Route 4 near Lodi to Valley Springs				
Lodi, junction route 4.....	1,333	1,162	1,543	1,189
Det. San Andreas and Valley Springs.....	763	493	767	359

\* 24 hour count.



Route 25. Nevada City to Downsville					Route 47. Orland to Chico				
Station	July, 1927		July, 1928		Station	July, 1927		July, 1928	
	Sun.	Mon.	Sun.	Mon.		Sun.	Mon.	Sun.	Mon.
Nevada City, north of city.....	361	264	382	246	Orland, junction with route 7.....	374	306	698	652
Comptonville, north of city.....	260	211	289	230	Chico, west of city.....	1,261	999	1,458	1,257
Route 26. San Bernardino to El Centro					Route 48. McDonalds to Wendling				
San Bernardino, S. of city at N. end of Santa Ana Rr. county rd. to Colton.....	3,456	2,639	3,234	2,132	McDonald, junction route 1.....	261	200	275	316
At Intersection Mt. View Ave., west of Redlands.....	2,270	1,593	3,164	2,001	Wendling, 3 miles west of town.....	645	359	427	330
Beaumont, junction Jack Rabbit Trail.....	3,708	1,178	1,826	1,282	Route 49. Calistoga to Lower Lake				
Coachella, south of city at junction county road to Thermal and Mecca.....	885	724	917	1,123	North of Calistoga at foot of grade.....	1,049	528	1,320	536
Westmoreland at railroad crossing.....	1,136	1,162	1,529	1,432	Lower Lake, junction Kelseyville and Lower Lake road.....	507	294	537	333
Brawley Junction, southwest of city.....	2,363	2,956	1,793	1,926	Middletown, junction Cobb Mtn. road.....	1,373	599	1,615	881
El Centro, west of city, junction Rt. 15.....	2,226	2,432	2,210	2,477	Route 51. Santa Rosa to Schellville				
Route 27. El Centro to Yuma					Route 52. Alto to Tiburon				
El Centro, east of city at junction county road north to Brawley and south to Calxico.....	2,125	2,081	1,711	2,226	Belvedere, junction.....	1,616	779	2,295	1,060
East of Holtville.....	1,122	1,085	1,162	1,594	Route 53. Fairfield to Lodi				
Sand Hills maintenance station.....	359	276	492	326	Deerston, at overhead crossing.....	372	366	671	370
Yuma, at S. D. A. plant quarantine station.....	2,145	1,541	1,922	1,666	Rio Vista bridge.....	1,530	1,693	1,965	1,177
Route 28. Redding to Nevada line via Alturas					Route 54. San Francisco to Spring Valley Dam				
Redding, south of city at junction with route 3.....	624	271	527	567	At swimming pool.....	10,395	1,631	9,941	2,436
Four miles east of Pittville at maintenance station.....	115	82	142	93	Junction with county road to Coama.....	5,941	752	3,869	1,166
Canby.....	192	135	218	181	Junction with county road to Belmont at earth dam.....	3,745	636	4,030	644
Twelve miles east of Alturas at maintenance station.....	162	60	134	78	Route 57. Santa Maria to Freeman via Bakersfield				
Route 29. Red Bluff to Nevada line via Susanville					Route 58. Mojave to Topos				
Red Bluff, east at junction route 3.....	411	495	632	599	Barstow, north of city at junction county road.....	235	221	286	256
Susanville, 1 mile west of town.....	961	466	1,130	554	Dalgett, junction Arrowhead trail.....	274	297	647	517
Susanville, 1 mile east of town.....	1,237	1,075	1,236	1,052	Vicinity Amboy.....	217	177	395	270
Five miles south of Constantia.....	222	124	131	143	Needles, west of city limits.....	566	494	611	471
Route 31. San Bernardino to Jean					Route 60. El Rio to San Juan Capistrano				
San Bernardino, north of city at junction Mt. Vernon and Hillland Aves.....	2,463	1,369	2,247	1,313	Santa Monica, 500 feet west of Santa Monica Canyon.....	15,486	7,213	*27,535	*7,421
South of town limits of Victorville.....	1,229	994	1,490	1,069	Lomita.....	11,222	6,058	10,261	6,842
Southwest town limits of Barstow.....	640	645	823	676	Seal Beach, at Los Angeles Orange County line.....	18,889	8,500	20,786	8,516
Nevada state line.....	143	135	212	254	Route 63. Big Pine to Oasis				
Route 32. Route 2 near Gilroy to Route 4 near Califa					Route 64. Mecca to Blythe				
Hollister, junction with route 22.....	1,634	1,615	1,616	900	Desert Center.....	53	58	84	58
Pacheco Pass at Merced-Santa Clara county line.....	1,565	943	1,869	958	Blythe, S. D. A. quarantine station.....	90	55	157	119
East of Los Banos at junction county road to Dos Palos.....	795	483	1,094	1,276	Route 65. Auburn to Sonora (Mother Lode Highway)				
Califa.....	876	629	870	685	Auburn to wire bridge.....	404	189	192	111
Route 33. Paso Robles to Route 4 near Bakersfield					Route 66. Manteca to Route 3 near Mossdale School				
Paso Robles, east of city.....	1,370	1,428	1,297	1,317	Mossdale, junction route 5.....	2,985	2,694	5,350	3,971
Paso Robles, ¼ mile east of city.....	888	951	888	901	Route 68. San Francisco to Burlingame				
Lost Hills, intersection of Main St.....	340	375	405	398	San Bruno, junction with route 2 to San Francisco.....	8,175	4,355	3,855	2,581
Route 34. From Route 4 near Arno to Pine Grove					Route 71. Crescent City to Oregon line				
Twin Cities, junction route 4.....	569	308	375	287	Crescent City, north of maintenance yard At Oregon-California line.....	1,022	572	902	872
West of Ione, junction county road to Michigan Bar.....	324	142	230	111	At Oregon-California line.....	218	145	318	257
North of Jackson, junction route 65 to Placerville.....	706	544	915	628	* Taken at different station, but comparable.				
Pine Grove, east of town.....	463	230	563	192					
Route 37. Auburn to Nevada line near Verdi					Route 69. Manteca to Route 3 near Mossdale School				
Auburn, east of city.....	2,190	1,435	2,276	1,425	Mossdale, junction route 5.....	2,985	2,694	5,350	3,971
Colfax, east of city, junction Nevada city road.....	1,493	934	1,729	968	Route 68. San Francisco to Burlingame				
Truckee, east of city, junction route 28 to Nevada.....	1,377	820	949	583	San Bruno, junction with route 2 to San Francisco.....	8,175	4,355	3,855	2,581
Route 43. San Bernardino to Big Bear Lake					Route 71. Crescent City to Oregon line				
Foot of Waterman grade.....	2,169	656	2,957	831	Crescent City, north of maintenance yard At Oregon-California line.....	1,022	572	902	872
Pinecrest, junction county road to Arrow- head Lake.....	838	244	1,264	393	At Oregon-California line.....	218	145	318	257
Running Springs Park, Junction City Creek road.....	757	324	1,032	371	* Taken at different station, but comparable.				
West end of bridge over Big Bear dam.....	609	531	1,301	523					
One mile from end of route 43, junction county road to Pine Knot.....	442	328	468	257					
Route 44. Boulder Creek to Redwood Park					Route 66. Manteca to Route 3 near Mossdale School				
Boulder Creek at park line.....	2,010	1,146	2,126	1,259	Mossdale, junction route 5.....	2,985	2,694	5,350	3,971

\* Taken at different station, but comparable.

## THE DISTRIBUTION OF STATE HIGHWAY MONEYS

(Continued from page 6.)

Covering as wide a geographical area as does the work of the Division of Highways; involving as many different projects as it does, and employing as many people scattered over the whole state as are engaged in building the California highway system, the accounting methods by which highway money is disbursed become of great importance.

The rule is that no money can be spent without written authorization given in advance of its expenditure. This rule is severely enforced. Allotments for all work are set up. If for any reason an allotment proves insufficient a supplementary authorization must be secured before the work can be continued. In this way disorganized expenditure of state highway money is avoided and an immediate check is maintained upon all persons responsible in its disbursement.

### THE BUDGET

The most radical change in highway spending methods in the history of the California system was undoubtedly the inauguration of the budget system by Governor Young. Through the budget the people are informed of where and how highway money is to be spent in advance of its actual disbursement. At every legislature a complete budget of recommended highway expenditures, along with other proposed expenditures of the state, is submitted to that body. The budget system is a proper recognition of the change in highway financing from the "stop-go" bond issue plan of highway financing to the "pay-as-you-go" method now in vogue. The budget enables the people to "sit in" on the expenditure of highway money just as they "sit in" in raising this money. The budget is a duty and a trust that both the state administration and the Department of Public Works takes most seriously.

We have attempted to give a birds-eye view of the limitations imposed by law upon the highway officials and the policies that determine the how, when and where of highway expenditures within the discretion permitted these officials. The record of state highway expenditures in California is that millions of dollars have been spent without taint of graft, or breath of scandal. This is a record of which California can be proud, a record which is a badge of honor to all who have been connected with the work.

## State Aiding the Puncture Vine Control

Of interest to the farmer and landowner are the efforts of the Maintenance Department of the Division of Highways in controlling noxious weeds within the highway limits.

Particular attention is given each season to the control of puncture vine. This pest reproduces itself from seed continuously, almost, from the time it starts above the ground. It thrives amazingly during the hot weather and constant watchfulness is necessary to make any headway in its control.

During 1927 the roadsides along 575 miles of the state highways were sprayed once at least and on many miles several applications were necessary.

There are four orchard power spray outfits regularly assigned to this work and a number of small pump outfits for infestations of slight extent. Spray material made of stove distillate, fuel oil, and caustic soda mixed with water is used. The cost of the work in 1927 was \$8,200.

### HIGHWAY WORKERS ARE COMMENDED BY SOLANO COUNTY FARM BUREAU

THE SOLANO COUNTY FARM BUREAU

R. F. D., Suisun, California, June 12, 1928.

Mr. R. E. Pierce,  
Acting Engineer, District No. 10,  
Division of Highways, Strub Building,  
Sacramento, California.

DEAR SIR: Several serious fires have occurred recently in the vicinity of Suisun and Fairfield. There was a particularly bad fire on the Leslie Anderson ranch near Cordelia last week. At that time, Mr. C. L. Caine, Foreman of Maintenance District No. 10, brought his highway crew and did exceptionally fine work in helping fight the fire. Mr. Caine and his men stayed until the fire was out.

We wish to commend Mr. Caine for his splendid work and thank him and your department for this assistance.

Assuring you of our appreciation, we are

Very truly yours,

SOLANO COUNTY FARM BUREAU,

ASA L. SCARLETT, President.

AS/KS

IDAHO plans to apply oil on 300 miles of state highways during 1928, concentrating this mileage along the Yellowstone Park Highway, the Old Oregon Trail, and the North and South Highway. Contracts will be let for most of this work.



## Pioneer Compares Stage Driving with Modern Bus Ways

By ALMON COONROD, Engineer, District Eight,  
Division of Highways.

The responsibility of stage drivers is increasing. The busses are being built larger with more capacity and the traffic on the highways is increasing the chance of collision or injury to passengers many fold. Such was the gist of a conversation which started between the writer and the driver of a modern automobile stage en route over a modern highway in California. It happened that I occupied that part of the front seat next to the driver's seat. An hour or more would pass before the next stop. No sign hung on the windshield to forbid talking to the driver and merely watching the road ahead had become monotonous.

The subject seemed to amuse the driver, a broad smile crept over his face and then he began. "You should hear what the old gentleman who sat next to me a few days ago had to say. I had boasted somewhat of the number of life lines I held in my hands as I held the old bus between the line of passing automobiles and the right-hand edge of the pavement. The old man gave me the laugh and began as follows: 'In my day stage driving was the most skilled of professions. To get the job the driver must serve an apprenticeship for a number of years. He must know the roads as well as men and horses and must be highly trained in the use of rawhide ropes and whips and firearms.

Along the stage lines at convenient distances were stations where supplies were kept and there was board and lodging for men and horses.

Each day at noon the stage came to a sliding stop before one of these stations. The stage driver immediately took command of the entire station. He sat like a statue in his top story seat until the attendants had taken the horses. The passengers remained in their seats until the stage driver had dismounted.

He walked straight to the dining room where stood the long table crowded with steaming hot food. The passengers followed, but remained standing until the stage driver was seated.

He sat at the head of the table. The passengers sat quietly and no one tasted food until the stage driver had started eating.

After the meal he arose from the table and walked to the barroom. The bartender filled his glass from his special bottle. The passengers arranged themselves along the bar but no one took a drink until the stage driver had taken his drink.

As he passed out the door of the station one attendant helped him put on his coat while another gave him his hat and a big black cigar. He walked to the stage where the fresh team was waiting, but the passengers did not take their seats until the stage driver was in his seat.

The horses had been hitched to the stage blindfolded and each animal was held by the bit by an attendant. To insure an even start the less spirited beasts were cudgeled.

The stage driver sat still in his seat until the lines were handed to him by an attendant. At a warning signal the passengers settled in their seats and grasped the leather hand holds. Then by cracking his whip and releasing the break with the heel of his boot, the stage driver gave the signal for the start. The blind-

## Study Is Made of Toll Bridges on Roads of Nation

TOLL BRIDGES numbered 233, of which 191 were privately owned in operation in the United States January 1, 1928, according to a survey recently completed by the Bureau of Public Roads, Department of Agriculture.

At present, there are 29 new toll bridges under construction and 163 proposed for construction. Included in the number proposed for construction are all projected bridges regarding which some definite step has been taken, such as the filing of application for franchise or organization of a company to finance construction.

Of the 233 toll bridges now in operation, 86 were built within the last 10 years, according to the survey. If the bridges now under construction or proposed are completed, and none of the existing bridges is freed in the meantime, the number of toll bridges in the United States will nearly double in a few years.

### BRIDGES ON FEDERAL-AIDED ROADS

The study also shows that the majority of toll bridges in the country are on roads which are part of the Federal-aid Highway system, the reason being that this system of 186,000 miles includes the most important state and interstate roads, which are consequently the most heavily traveled roads in the country. Of the 425 toll bridges in operation, under construction, or proposed at the beginning of the year, 217 or more than half were on the Federal-aid systems, 69 were on roads included in state highway systems but not in the Federal-aid system, and 148 were on other roads.

### GRANTED LEAVE OF ABSENCE

A leave of absence for three months has been granted E. Forrest Mitchell, secretary of the California Highway Commission. During his leave of absence, Mr. Mitchell will continue the work he carried on during his vacation, when he was in charge of the Hoover state headquarters in San Francisco.

folded were dropped from the eyes of each animal and the stage lurched forward on its rocking journey along the dusty trail.

'Now,' said the old gentleman 'I'm not saying a word about fighting Indians or holdup men or anything about the roads in those days, but until the stage was stopped at the next station the driver was responsible for himself, the express and mail on board as well as all the passengers.'

'There,' said the old man, pointing at an object beside the road, 'that stone marks the grave of one of the early stage drivers.'

"I looked at the stone," said the modern stage driver, "and saw it was only a mile post but I did not wish to remind the old gentleman of his failing eyesight so I did not tell him of his mistake. After all who knows but that the old timers buried their gullant stage drivers a mile apart and marked their graves with milestones. It is a positive fact, however, that the man holding the leather straps, a steering wheel or the throttle of a locomotive is responsible for his passengers."

## Puzzling Drainage Problem Solved on Contra Costa Road

The question of drainage is a most vital one in highway construction and maintenance.

On the highway between Oakland and Martinez it was found necessary to build a portion of the road near Rodeo over an old reservoir. The bottom of this reservoir was silted up and a fair-sized creek, Rodeo Creek, had left its former course and eaten a way over to the highway which it followed for about a half mile. During heavy storms of 1926-27 and 1927-28 the seepage of water into the silt subgrade softened it until it squeezed out and caused settlement of the roadbed and it was evident that in time this section of road would be totally destroyed.

The problem had been under discussion for some years, with the idea of cutting a new ditch channel to keep the water from approaching the roadbed, but objections from property owners were too great to allow of this solution.

After studying the situation with the idea of building a flume or culvert to carry the water safely over the dangerous section, negotiations were again taken up with the neighboring property owner and an agreement finally reached whereby a new ditch channel was cut parallel to and about 150 feet easterly from the roadbed. This channel is about one-half mile long and it was necessary to cut through a small clay hill.

The work was recently completed by maintenance forces and has satisfactorily relieved the heavy roadside drainage.

## Business Frontage and Expected Population

How much business property to plat in new subdivisions and to zone for commercial use in established communities is a question always before subdividers and zoners.

The Chicago Regional Planning Association recently undertook to determine the relationship between population and the amount of business frontage. The Association made measurements in forty cities and villages in the region of Chicago. Thirty-two of the communities measured were medium sized suburbs both residential and industrial, in varying directions and distances from Chicago. Eight larger cities were used.

At each place exact measurements were made of the ground floor store frontage actually in use and the number of stores was recorded under fifteen main classifications.

Approximately 50 feet of business property are in use by every 100 persons in the forty cities and villages measured.

The character of the community (residential or industrial) has little effect on the amount of business frontage in use.

The area covered by the community makes little or no difference in the relationship.

The Association recommends that subdividers and zoning authorities adopt the figure, 50 feet of business frontage for every 100 persons of expected population, as a basis for platting and for zoning business property.

## States Show Tendency To Increase Allowable Speed of Auto Traffic

At least ten states increased the allowable speed limit on open highways outside of corporate limits, during the past year. The American Automobile Association gives the following states as having increased their limits:

Idaho—From 30 to 35 miles an hour in the open country.

Indiana—35 to 40 miles an hour.

Iowa—20 to 25 miles per hour in residential district of cities.

Maine—8 to 15 miles at street intersections in built in areas of municipalities.

Maryland—35 to 40 miles an hour on highways outside of cities.

New Hampshire—25 to 35 in open country and from 15 to 20 miles in business sections of municipalities.

North Carolina—35 to 45 miles an hour in open country.

North Dakota—30 to 35 miles an hour on highways outside of cities.

Oregon—30 to 35 miles per hour.

Washington—From 30 to 40 miles an hour.

### Michigan Speed Limit Abolished

The state of Michigan has abolished the speed limit on open highways throughout the state. A new traffic law, which has recently gone into effect, eliminates the previous 35 miles an hour maximum and puts in its place a provision which places upon the motorist the responsibility for driving only at a reasonable and proper speed. This applies only to the highways outside the corporate limits of cities. The new law sets a limit of 15 miles per hour on all highways in the business district and 20 miles an hour in residence and park districts, subject to other speed regulations adopted by local committees.

### In Indiana

The forty-mile-an-hour legal maximum speed has been adopted in Indiana under a new vehicle code. It also provides that no person other than a police officer in uniform is permitted to interfere with traffic.

### Can Not Advertise Speed

Auto salesmen in the state of Washington are forbidden to refer to the speed of their cars in advertisements. This law has been passed with the hope it would decrease reckless driving.

VIRGINIA—During the past year the state used an allotment of \$1,250,000 for improving secondary roads.



# State Highway Work in the Counties

## ALAMEDA COUNTY

Ariss-Knapp Company of Oakland have been busily engaged during the past month in completing oil macadam pavement between Dublin and Hayward. Construction on this project began during the summer of 1927 and has therefore extended through the heavy winter season, which necessitated closing down operations for long periods at a time. Grading work was, however, carried on between storms and at such locations as the work would permit where it did not interfere with the movement of traffic. Some small line changes were completed but not until the early spring of this year did the major heavy grading work begin and rough subgrade completed for placing of the bituminous macadam pavement. Both grading work and rock surfacing have been carried on continuously of late and the roadbed was completed to a state where it was permissible to throw the entire road open to both east and westbound traffic prior to July 4th. The contractors had worked with this in mind knowing that the heavy holiday traffic would traverse their contract and it left little for them to do other than to force to an early completion. The contract will not be completed within the original allotted time but will be extended for a short period in order to allow of completion of shoulders, side roads, cleaning out of ditches, culverts and other work pending final acceptance, which it is hoped will be made sometime the forepart of August.

The construction of three reinforced concrete bridges across Hollis, Palomares and Cull creeks has permitted Ariss-Knapp Company to complete the approach fills and paving over these structures. The completion of this unit, together with that section constructed between Dublin and Livermore during the summer of 1927, completes our work during the present biennium in this section of Alameda County.

The entire distance of 16.88 miles is much improved, affording better sight distance and reducing many hazards which formerly existed.

## ALPINE COUNTY

A few weeks ago a small replica of the St. Francis Dam disaster occurred in Alpine County when an irrigation dam, known as Crater Lake Dam, located near Hope Valley burst and the flood waters crossed the state highway depositing large boulders and debris of all kinds along the frontage of approximately one-quarter of a mile, making it necessary to build a detour road to take care of travel. This was particularly annoying as it happened on the day we had scheduled for the opening of the Alpine Highway which had but one remaining barrier, the snow drifts on Red Lake Grade. With the aid of the maintenance crews from the Amador County side both the snow removal and the detour road were taken care of and the road was opened on the evening of the day planned for the opening.

Preliminary survey is progressing on Route 23 connecting Markleeville with Route 23 near Coleville, in Mono County.

## AMADOR COUNTY

The Alpine Highway has been treated with oil from Pine Grove to Ranger Station, greatly improving this road as no oil had been placed above Dew Drop Inn in previous years.

The contract to G. E. Finnell for grading east of Jackson is nearly complete.

## BUTTE COUNTY

Construction of the wooden convict camp for the accommodation of prisoners who will construct the Feather River Highway north of Oroville, was completed in June, and the first convicts were received early in July. Work is now well under way on the grade, and the actual highway will be in evidence from now on.

## CALAVERAS COUNTY

State forces are clearing a new right of way at Blacks Springs, removing trees and brush preparatory to asking for bids for the construction of 2 miles of new road to eliminate the Black Springs Grade.

## CONTRA COSTA COUNTY

The approaches to the Wilcat Creek Bridge near Richmond, recently completed by Tieslau Bros. of Berkeley, have been oil treated by District IV maintenance forces. The entire work is now completed and open to traffic.

## DEL NORTE COUNTY

The contract for producing crushed rock surfacing and oiling 35 miles of state highway, southerly from the Oregon-California line on the Redwood Highway, has been let to the Holdener Construction Company, and the contractors are preparing to immediately set up their crushing plants and begin operations.

On the Roosevelt Highway, bids have also been received for the surfacing between Crescent City and a point 0.7 mile south of the Oregon line. The Holdener Construction Company are also low bidders on this work, and it is expected that they will immediately begin work on this contract also.

John R. Hill was the low bidder for constructing 0.7 of a mile on the Roosevelt Highway, from the Oregon-California line, southerly to connect with the Holdener Contract of surfacing.

H. W. Webber is progressing satisfactorily in the production of approximately 9000 cubic yards of surfacing material to be used in connection with surfacing and oiling of state highway between Crescent City and a point 15 miles southerly.

On the two contracts which have been awarded to J. E. Johnston of Stockton, for constructing approximately 10 miles of state highway between the southerly Del Norte County line and a point 15 miles south of Crescent City, the contractor has moved approximately 24,000 cubic yards of material during the past month and by June first, it is expected that he will have five power shovels working double shift in order that he may complete his work before the winter season. There are only a few points along the Johnston contract which interfere with the present traveled way and therefore, this work will inconvenience the summer tourist traffic very little.

The Holdener Construction Company has the contract for furnishing surfacing and oiling from the Oregon-California line southerly along the Grants Pass road for 35 miles along the Redwood Highway, and are expected to be placing crushed rock on the road by the tenth of July, 1928, from two crushing plants and starting their oiling operations very shortly thereafter.

The Parker-Schram Company, which has the contract for constructing the Smith River Bridge approach 7 miles easterly from Crescent City on the Grants Pass road, has completed the grading operations to the easterly approach to the bridge, and the foundation excavations for the bridge piers are being made.

The grading and surfacing of the 3.9 miles of roadway leading up to the new proposed Smith River bridge is now being completed by the state forces and the Parker-Schram Company. It is expected that three power shovels will be in operation on the section within another week.

*Roosevelt Highway, Crescent City north to the Oregon Line.* John R. Hill has the contract for grading and surfacing 0.7 of a mile from the Oregon line southerly, and he has started his excavating and constructing of culverts, and it is expected will start his grading operations in the very near future.

The Holdener Construction Company are starting the clearing and grading operations preparatory to the widening and surfacing of the Roosevelt Highway from Crescent City north 21.6 miles.

*Redwood Highway, Crescent City south.* State forces are making decided improvement in the alignment of the roadway from Crescent City southerly along the steep bluffs of the coast.

J. E. Johnston has two contracts aggregating 10.8 miles in length northerly from the Humboldt-Dei Norte county line along the Roosevelt Highway.

The contractor's operations of clearing and grading do not interfere with the traveling public excepting in two or three short stretches, as the new alignment is almost entirely away from the present old county road, which is now maintained by the state. The contractor has five power shovels running double shift on the work, and he intends to complete the work during the present working season.

#### FRESNO COUNTY

Construction work on the Herndon Bridge over the San Joaquin River has been started by Contractor Carl H. Peterson of Fresno.

Additional equipment has speeded up the work of widening and straightening the highway west of Coalinga on Route 10. This work is being done by day labor under the direction of Foreman O. D. Gaston.

#### HUMBOLDT COUNTY

Bids are to be received July 18, 1928, for the grading and surfacing of the roadway between Fortuna and Fernbridge, a distance of 2 miles.

The district contract calling for bids on the construction of a change in alignment at the southerly approach to the North Scotia bridge over Eel River are being received July 5, 1928.

The Engelhart Paving and Construction Company are again operating full time on the contract from the northerly Humboldt County line, approximately 6½ miles southerly, and the work is about 75 per cent completed.

W. H. Hauser, who has the grading and surfacing contract for 8.15 miles, Orick northerly on the Redwood Highway, now has his contract approximately 90 per cent complete. Traffic will be carried through these two jobs during the summer but the control system will be used as soon as the quantity of traffic demands it.

Oiling work, both repairing the old work and placing of new oil surfacing, will be in progress throughout the coming month at various points in Humboldt County, between the southerly Humboldt County line and Big Lagoon. On all of this oil work, one of the first considerations is the traveling public and wherever there is any fresh oil through which it is necessary to travel, traffic is under control and is led through the fresh oil by a traffic officer at a slow rate of speed, so that there will be no splashing of the oil on the cars.

The Engelhart Contract, which extends 5.7 miles southerly along the Redwood Highway from the Humboldt-Dei Norte county line, is progressing rapidly considering the very difficult situation of dense redwood forests and occasionally heavy summer rain falls which delay the work and impair traffic through the construction at times. The contractor has made a new set up of his rock crushing plant, and is again

producing surfacing and fast getting the road in shape for the use of the public.

The Hauser contract, which extends from Orick northerly along the Roosevelt Highway for 8.1 miles, is practically complete except for a small amount of surfacing and the finishing work.

E. V. Skeels, who has the contract for two small bridges on the Hauser contract section, has completed the driving of the piles and his foundation work is progressing satisfactorily.

Mercer-Fraser Company have just completed erecting the steel for the bridge over Redwood Creek at Orick and will very shortly be placing the concrete floor.

State forces are continuing the oiling of portions of the roadway between Scotia and Garberville, but traffic is not being inconvenienced by this work.

#### IMPERIAL COUNTY

The Jahn and Bressi contract between El Centro and Seely on the San Diego-El Centro route is closed down for the summer. The grading and culvert work has been completed and the job has been left in shape to start laying the new asphaltic concrete surfacing the last of September.

The Callahan Construction Company is making substantial progress with their bridge and storm drain contract on the Los Angeles-Imperial Valley highway between the Trifolium Canal and Arroyo Salado Wash. When this section of highway is safeguarded from storm damage a contract for a 26-foot asphaltic concrete resurfacing will be advertised.

#### KERN COUNTY

Considerable oiling work is being done on the state highways in Kern County and the widening and straightening program on the Kern River Canyon Road is being vigorously followed.

State forces on Route 57, through the Kern River Canyon between Democrat Springs and Hobo Hot Springs, are rapidly eliminating the more dangerous curves. The increasing traffic on this road necessitates a higher standard of alignment. Work is under the direction of Foreman A. Womacott.

#### KINGS COUNTY

Shoulders and roadsides from Hanford west to the Fairgrounds have been oiled by state forces to eliminate the dust nuisance, particularly during the county fair.

#### LASSEN COUNTY

Work is now under way on the treatment of the highway from the foot of Chester Grade to Westwood, by the oil mix process. This will result in a smooth and dustless road for traffic, over a portion which has been quite loose and dusty for traffic during the past several summers. The resurfacing of the constructed highway from Westwood for 2 miles eastward, and from Coppervale to Devil's Corral, is now well under way, and will be completed during August. This will result in a surface which it will be possible to treat with oil early next summer, and this will result in a practically continuous oiled surface from Chester to Susanville.

Oil treatment of the constructed highway from Lassen to Milford, by the mix method, will start about the 26th of July, and will be completed in about a week thereafter. The oiling of this 10 miles of road will make a continuous pavement or oil surface from Susanville to a point near Milford, and will greatly relieve dust conditions on this high speed road.

Bids will be opened on the construction of a graded and surfaced highway from Bieber to Adin this month, and with good weather, this section may be com-



pleted by the first of the year. The completion of this section will shorten the present traveled road between Bieber and Adin, and incidentally from Redding to Alturas, by 4.5 miles, and as it is on excellent alignment, will result in 12 miles of very high speed road, which will materially lessen the time of travel between the above mentioned points.

Four miles of constructed highway from Bieber westward will be treated with the surface treatment of oil during the latter part of July. This will relieve dust conditions for traffic and effectually preserve the surface of the highway and insure its smoothness from now on.

#### MADERA COUNTY

The Callahan Construction Company of Los Angeles are making first rate progress on their contract for reconstructing the highway south of Madera. Production has reached over 500 tons per day and the paving work should be completed by July 25th.

The Callahan Construction Company are making progress on their reconstruction job between Herndon Bridge and Madera.

Carl H. Peterson is assembling equipment for building the new bridge across the San Joaquin River at Herndon on Route 4.

#### MARIN COUNTY

Hanrahan Company of San Francisco have commenced work on the reconstruction of a portion of state highway from Gallinas Creek about two miles north of San Rafael to Ignacio, the junction of the Redwood Highway and the Black Point Cutoff. There are numerous line changes to be made in this reconstruction work involving the straightening out of many curves, lowering of heavy grades to 6 per cent maximum and the extension of many drainage structures. At the present time the contractors have two power shovels employed on grading work. Also a large force is employed in extending drainage structures. Some of the utilities are busy moving telephone pole lines and power poles. As soon as grading work has progressed to where it will be permissible to begin paving, a 20-foot second-story concrete slab will be placed over the existing pavement for the entire length of the improvement except on heavy fills where a bituminous macadam pavement will be placed as a temporary expedient pending final settlement.

#### MARIPOSA COUNTY

The Yosemite All-year Highway is now oiled and in good condition to take care of the traffic to the park which is expected to break all records this season. The prison camp crew near Midpines is widening and straightening the road but the work interferes very little with the traffic.

The convict crew at Midpines, on the Yosemite All-year Highway, are making good progress on the work of widening and straightening the roadway from Mariposa to the King Solomon Mines. The dirt sections of this highway have also been graded and oiled and the road is in good shape for the extremely heavy traffic to the park.

A survey party under the direction of Locating Engineer S. A. Cobb is making a survey between Cathay and Mariposa on Route 18.

#### MENDOCINO COUNTY

Day labor work is making a great improvement on the alignment of the very narrow and crooked roadway in the vicinity of Lane's Redwood Flat for a distance of approximately 5 miles northerly.

Oil surfacing is being applied on an 8-mile stretch between Piercy and Lane's Redwood Flat, on the Redwood Highway, and in the same vicinity the day

labor work of improving the alignment is in progress. Both these jobs are making a wonderful improvement in the condition of the Redwood Highway at this point.

District IV maintenance forces have been busily engaged during the past month in minor widening and improving of the existing traveled way on the McDonald-to-the-Sea Highway, Route 48, from McDonald's to Booneville. The work has consisted chiefly of cutting off sharp points and daylighting sharp curves, thus increasing the line of vision, installing small wooden drainage structures and blading up the roadway and placing some broken stone or gravel surfacing. While this work is not of a permanent nature it is, however, a marked improvement over the previously traveled road. The principal effect is a marked increase in running time between Booneville and the Redwood Highway.

#### MERCED COUNTY

Highways in the vicinity of Merced are being improved by filling the old borrow pits.

Sand-shoulders and roadsides in the northern part of the county on Route 4 have been oiled and reshaped, providing a much more satisfactory surface free from dust.

Contractor H. C. Whitty has practically completed widening bridges on the Golden State Highway south of Merced.

#### MODOC COUNTY

It is expected that bids will be opened during August, on the construction of three bridges in the town of Adin, and with favorable weather conditions, these bridges may be completed this year. These bridges take the place of three very old wooden structures, which have long been a source of worry to the local authorities, and with the grading of the highway through the town of Adin and to the Modoc County line on the road to Bieber, will greatly improve travel conditions through Adin.

Work is now under way on the oil mix surfacing of the constructed highway from Alturas 11 miles eastward. Work will be completed in a week or ten days. This will result in a much improved condition for the traffic between Alturas and Cedarville, and also to Lakeview.

Work was started during June on the improvement of the connection from the end of Cedarville Causeway to the Nevada state line. This improvement consists in straightening up the graded road and surfacing it with gravel from pits near the state line. On account of the extremely unstable nature of the light alkali soil over this section, it was found necessary to postpone this work until the early fall rains set in, in order to make possible the construction of a suitable subgrade. The only other alternative was to resort to expensive watering, the cost of which would be prohibitive. Work will be resumed at the earliest practicable opportunity and rushed to completion, so that the road will be in first-class condition for winter traffic.

#### NAPA COUNTY

District IV maintenance forces have recently completed the oil treatment of the scenic mountain road between Callistoga and the Lake County line on that section of state highway commonly known as the Mt. St. Helena Grade. The oiling of this portion of state highway has been anticipated for the past two years by the various improvement organizations of Lake and Napa counties and considerable comment is now being received from interested parties giving favorable impressions and commenting upon the pleasure it is to these communities to have a dustless road over Mt. St. Helena.

The completion of this surfacing work and the widening work recently completed by our forces in southern Lake County will materially reduce the running time between Callistoga, Middletown and other Lake County points.

### PLUMAS COUNTY

The new contract for the grading and crushed rock surfacing of the section of highway from the Tehama County line to a connection with the present road 2 miles southwest of Chester got under way during the past month, and excellent progress is being made by the contractors. It is expected that this 7-mile connection will be completed before the winter sets in, and with the completion of the adjoining section from the Tehama County line westward to Morgan Springs, which is expected to be next summer, will complete the gap between Morgan Springs and the vicinity of Chester, and result in the elimination of the high route followed by the present county road, through a heavy snow belt.

The resurfacing of the Chester Causeway and the mile of highway east of the causeway, extending from Chester to the foot of Chester Grade, has been completed, and will be oiled during July, and also, the main street of Chester will be oiled at the same time. This will relieve a very dusty and disagreeable condition for traffic which has existed for some time.

The convict camp near Paxton, on the Feather River Highway, was completed early in June, and the force has now been built up to 120 convicts who, with two power shovels and other equipment, are making rapid progress in the construction of the upper section of the Feather River Highway. The work is exceedingly heavy on this section, and involves the movement of very large quantities of material and the construction of an unusually large amount of retaining wall. The section now under construction will result, when completed, in a permanent connection to the town of Twain from Quincy and Greenville and other points in Plumas County.

### RIVERSIDE COUNTY

A survey has been made and plans completed to construct a portion of the Mecca-Blythe highway (Sun Kissed Trail). The contract will extend from Desert Center to the beginning of the oiled gravel road at Black Butte. The project will consist of grading, constructing a number of timber bridges and a system of storm channels for protection against desert floods, and surfacing with oil treated crushed gravel.

Under this project about 22 miles will be constructed. Approximately 10 miles extending from Black Butte to Blythe has been completed under a former contract.

Graveling and oiling between Mecca and the mouth of Box Canyon has also been authorized. This work will be started at once.

### SACRAMENTO COUNTY

Mankel and Staring's contract for placing premixed oil rock shoulders from McConnell to Sacramento has been completed. Their contract for grading the line change at Arno is again going forward after a delay due to water in borrow pit.

### SAN BERNARDINO COUNTY

Surveys have been completed and plans are nearly complete for constructing about 35 miles of the National Old Trails Highway between Daggett and Lavic, and about 30 miles of the Arrowhead Trail Highway from Daggett to Beach Line. These two projects will be graded and surfaced with oiled crushed gravel. This is the same type of surfacing now giving excellent service on the highway between Victorville and Daggett.

Approximately 24 miles of the Crest route (San Bernardino to Big Bear Lake), extending from one mile west of the Allison Ranch to Fawnskin and from Big Bear dam to Pine Knot is being treated with fuel oil by the "mix in place" method. This work is nearly complete.

### SAN JOAQUIN COUNTY

The concrete paving being placed under contract by Fredrickson & Watson Construction Co. between Mossdale and French Camp is progressing very satisfactorily. A contract for rebuilding the approach to the New Hope Landing Bridge near Walnut Grove has been awarded to Ben C. Gerwick. Work will start soon.

### SAN MATEO COUNTY

Granfield, Farrar & Carlin of San Francisco have entirely completed their contract covering grading and placing of a crushed stone surface on that portion of the Bayshore Highway from South San Francisco to Broadway, Burlingame. The grading work consisted principally of restoring to grade sunken areas in the previously graded road across the salt marshes. A crushed stone surface 40 feet wide and 5 inches thick was placed over the entire distance between these cities. The entire contract was completed within the allotted time even though the work extended through the wet winter period, and these contractors, who are new in state highway work, did a very creditable job. The completed roadway surface was treated with a light bituminous surfacing by the maintenance forces of District IV and during the past month, since this road has been completed, it has been subjected to extremely heavy traffic developing in this section of San Mateo County.

The other section of the Bayshore Highway is at present under construction commencing immediately at the south end of the present improved section at Broadway, Burlingame, and extending over entirely new rights of way and J street to Fifth street, San Mateo. A contract for this work was recently awarded to C. W. Wood of Manteca, who at the present time has this grading work well under way. The clearing of right of way for this new line and the actual commencement of grading work has created considerable interest in the cities of Burlingame and San Mateo in that in a relatively short time an entirely new state highway will be available for fast traffic to and from San Francisco. While this section is barely over three miles in length it is a most important connecting link as its completion will permit of a large amount of heavy Peninsula traffic being routed through the streets of San Mateo to the new road and thence to and from San Francisco via South San Francisco.

The most important link in the Bayshore Highway, the section between San Francisco and South San Francisco, is being advertised for bids to be opened August 1, 1928. This is an extremely heavy piece of work involving a total of 805,000 cubic yards of excavation in a length of 3½ miles.

It is expected that contract will be let and a large proportion of the grading and structures completed before the winter rains.

### SAN MATEO, SANTA CRUZ AND SANTA CLARA COUNTIES

Following the County Lines along the Crest of Coast Mountains; Twoby Bros. and J. F. Shea Co. of Oakland have the contract for constructing a graded road with crushed rock surfacing on the Skyline Boulevard from the present southerly terminus of the completed road at La Honda Summit over entire new rights of way to a connection with the county and state roads at Saratoga Gap, a distance of 12.8 miles. These contractors have at the present time six power shovels that work in double shift, as follows: One shovel at the La Honda Summit working southerly; two shovels at the Alpine Road working opposite directions; one shovel centrally located between the Alpine Road and Saratoga Summit and two shovels at the Saratoga Summit working north. Inasmuch as this contract involves over 990,000 cubic yards of excavation these contractors will be busily engaged during the present summer and fall season in making an effort to complete all grading work before winter. Additional forces are clearing right of way and installing culverts and setting fences and it is expected this contract will take approximately one year to complete.



## SANTA CLARA COUNTY

On the Peninsula Highway near Sargent, the dangerous grade crossing of the Southern Pacific tracks is to be eliminated. Plans for an overhead crossing, consisting of two 64-foot thru plate girder spans and one 30-foot concrete deck steel girder span constructed on a line change to obtain a better crossing, have been prepared by the Bridge Department and bids for contract are to be opened August 1, 1928. As a benefit to the traveling public, this proposed improvement is of inestimable value as this is one of the most dangerous railroad crossings in the state.

## SHASTA COUNTY

The convict camp located at the Greenhorn Mine, 20 miles west of Redding, on the Weaverville road, is now making excellent progress in the construction of the highway over the Buckhorn Summit. This construction involves some extraordinarily heavy earth work, the yardage running very close to 100,000 cubic yards per mile for a continuous distance of 5 miles. It is expected that this very heavy section will be completed in a little over a year from the present time.

The contractors started work on the two remaining sections of the Sacramento Canyon reconstruction work during the past two months, and are rushing this 12-mile section to completion before the winter rains set in. This will complete the reconstruction of the Pacific Highway from a point 2 miles north of Redding to Dunsmuir, and with favorable weather conditions during the fall, traffic may expect to travel over a very modernized highway next winter and thereafter.

The resurfacing of the Redding-Alturas Highway between Montgomery Creek and Burney, is now under way, and this will result in an 18-foot rock-surfaced road over these 17 miles. It is planned to allow this surfacing to go through the winter, and to oil it early next spring.

## SISKIYOU COUNTY

During the month of June the oil surface between the Shasta River near Edgewood and the Oregon line was completely rehabilitated, and also sand and oil shoulders were constructed on the portion of this highway from Hornbrook to the Oregon line. These improvements have placed the Pacific Highway through Siskiyou County in better condition than at any time in the past.

The widening, surfacing and other improvements which have been made all along the lower Klamath River road, from Walker to Orleans and Weitchpec, and also the construction and restoration of numerous bridges on this section, have resulted in a far better road for traffic than at any time in the past, and greatly facilitate the heavy recreational traffic which is going into this beautiful section of country this summer.

Work is just starting on the construction of a maintenance yard at Fort Goff Creek, on the lower Klamath River, about 5 miles west of Selad. This yard will be a permanent station, and will greatly facilitate the handling of the maintenance organization on this section.

## SOLANO COUNTY

Larsen Brothers are making good progress on grading the line change back of Cordelia. This contract includes a concrete bridge over Green Valley Creek and crushed rock premixed oil surface.

## SONOMA COUNTY

Larsen Bros. of Los Banos have completed the grading and surfacing with crushed rock of the approaches to the Sonoma Creek Bridge near Schellville. This improvement is on a line change obviating two very sharp curves and the completed work presents an improvement pleasing to the travelling public as it includes the construction of a new pony steel truss span across Sonoma Creek and the grading of the approaches to present day standards of a 30-foot road-bed with a crushed rock surface 20 feet wide. As soon as the work of Larsen Bros. had been completed to a state where the rock surface was ready for oil treatment a thin oil treated surface was placed as a dust palliative by the maintenance forces of District IV.

## STANISLAUS COUNTY

Bids have been received for rebuilding the south approach to the Stanislaus River Bridge near Ripon. The low bidder was Mr. C. W. Wood. The contract has been awarded but not approved. This job consists of a fill to replace part of the old trestle and three timber bents. The fill will be surfaced with premixed oiled rock.

## TEHAMA COUNTY

The convict camp engaged on the construction of 17 miles of state highway on the Inskip Grade section, about 20 miles east of Red Bluff, is now well organized and at work. The progress reported is very satisfactory. This work will result in the elimination of the worst grade on the Red Bluff-Susanville Highway, and it is expected the convict construction will be completed early next spring.

During the past month 12 miles of road east of Red Bluff has been oiled over the crushed rock surface which was provided during the winter season. This results in a smooth and dustless road for traffic, over what was the roughest and most disagreeable portion of the Red Bluff-Susanville Highway during previous summers. Also, dust laying oil was applied over the following 8 miles to Paynes Creek, and the constructed highway from Paynes Creek for 8 miles eastward was reoiled, as were several short sections of the highway west of Mineral. The combined result of this oil gives a very serviceable and dustless road into Lassen National Park, and this summer season's traffic over this recreational road will be better served than in previous years.

## TRINITY COUNTY

The convict camp which started work in May, on the section of highway between the Buckhorn Summit and Grass Valley Creek, on the Redding-Weaverville road, is making excellent progress, and this section of the highway will be completed this summer, thereby eliminating several narrow and dangerous sections of the old road.

With the completion of the bridge across the Trinity River at Cedar Flat, this spring, and the general cleaning up and the minor improvement here and there of the lower Trinity road, travel conditions between Weaverville and Eureka this summer have been better than at any time in the past.

## TULARE COUNTY

The unpaved portion of the Sierra-to-the-Sea Highway from Three Rivers to the Sequoia National Park boundary has been oiled and is in good shape for the summer travel.

The unpaved portion of the Sierra-to-the-Sea lateral connecting with the General's Highway in Sequoia National Park, has been oiled and is serving the heavy traffic to the park in good shape.

### TUOLUMNE COUNTY

On the Sonora-Mono Highway, oil has been placed from Sonora to Strawberry with the exception of the government road. Between Pooleys and Long Barn, the Big Oak Flat road has been oiled from Mountain Pass to the South Fork of the Tuolumne River, and from Mather Turnout to the Park Line on the Tioga road, leaving only 17 miles on the entire Big Oak Flat road which have not been oiled. These 17 miles are being maintained with sprinkler trucks so the road is free from dust.

### YOLO COUNTY

The last 19 bents on the west end of the Yolo Causeway were lowered by state forces to give greater visibility for the purpose of eliminating accidents. The bents were lowered to a maximum cut of two feet which made a great improvement in the structure. Bids were recently asked for but being too high, it was decided to do the work by state forces and all work was completed for less than the original engineer's estimate.

Rock shoulders have just been completed between the M street subway and 1½ miles east of the Yolo Causeway.

The contract for filling the borrow pits and placing premixed rock borders for 1½ miles east from the Causeway in West Sacramento is progressing rapidly. The work is being done by D. McDonald, contractor.

### Last Tollgate Quits the Road

The last tollgate in England was removed this week and the woman keeper who had guarded it for sixty years has retired with the distinction of being the last of her calling.

Thus ends a system of highway building and maintenance that reached its peak in the era of the stage coach. In 1820 Great Britain had 114,829 miles of turnpike roads and highways, for the most part well surfaced with easy grades and many fine bridges. Indeed, so great was the power ascribed to the highway system that it is the claim of some writers that the Union of England and Scotland was more due to the building of the famous "Old North Road" from London to Edinburgh in 1707 than to dynastic reason. Certainly the extension of the road to the north of Scotland, a total distance of 340 miles, played a part in stimulating the industries of both nations.

It may be asked, now that the turnpikes are abolished, what will become of the misanthropes who were supposed to take naturally to the keeping of toll gates? Samuel Weller, Sr., made the dreadful threat that he would retire and "keep a pike" as evidence of his hatred of men. The sour temper of the pike-keeper is proverbial. Only the power of female beauty could soften it. Of the entrancing Irish widow it was written that she so dazzled the pike-keeper that he

Never asked for the toll  
But scratched his bald poll  
And looked after the lowbacked car.

Those days are gone forever. Yet we continue to pay toll and to build and maintain highways without the pike-keeper. Our toll is paid in gas tax and license tax and there is not a tollgate to impede our progress.—*St. Paul Pioneer Press.*

### Highway Officials

#### Warned To Beware

#### Of Impostor's Activity

The following self-explanatory letter has been sent to all heads of departments and district engineers by C. H. Purcell, State Highway Engineer:

"June 25, 1928.

"Our attention has been called to the fact that a man has been approaching employees of the Division of Highways with the statement that he has important political connection with the administration, even claiming to have connection with the highest officials of the state. He also claims that he has close connection with rock and material companies and that he has power and influence enough to coerce engineers or secure their removal. It has been reported that he has approached rock contractors with the same story and that he can make it easy for them if they will enter into an arrangement to pay him a royalty.

"If this man should present himself to your district, please report all the circumstances to this office immediately by wire.

"At least two employees of this Department have reported the activities of this man. Their action in this respect is very commendable and I am sure that any of our employees would act in the same way under the circumstances.

"Needless to say this man is misrepresenting facts and all cases will be investigated immediately and effort made to put a stop to his activities. We hope you will emphatically inform this man that his kind can not reach any member of this division and that you will take action to see that the matter is reported immediately.

"We believe it desirable that each of your engineers be informed of the facts contained in this letter. Also any rock companies in your vicinity which may possibly have been approached by this man should be given this information."

### Record of Bids and Awards

GLENN COUNTY—Between Butte City and the easterly boundary 6.3 miles of gravel surfacing. Dist. III, Rt. 45, Sec. C. Engr's Est. \$18,400. Bids opened July 25th as follows: Kern & Kibbe, Portland, \$24,725; William C. Ellsemore, Eureka, \$16,995; Force, Curigan and McLeod, Oakland, \$13,225; L. C. and W. E. Karstedt, San Jose, \$17,135; C. W. Wood, Stockton, \$24,150; J. F. Collins, Stockton, \$19,550; E. B. Bishop, Sacramento, \$18,630; Tieslau Bros., Berkeley, \$16,675; Mankel & Staring, Sacramento, \$16,675; A. Telchert & Son, Sacramento, \$15,870; A. F. Giddings, Sacramento, \$24,725. Contract awarded to Henstreet & Bell, Marysville, for \$13,225.

HUMBOLDT COUNTY—Between Fortuna and Fernbridge, 2.1 miles grading and crushed gravel or stone surfacing. Dist. I, Rtt. 1, Sec. G. Engr's Est. \$51,795.35. Bids opened July 18th as follows: Mercer-Fraser Co., Eureka, \$57,341.15; Engelhart Paving Const. Co., Eureka, \$47,775.45; Tieslau Bros., Berkeley, \$48,126.95; W. H. Hauser, Orick, \$46,803.10; Aris-Knapp Co., Oakland, \$54,509.60. Contract awarded to W. H. Hauser.

HUMBOLDT COUNTY—0.2 mile grading and surfacing approach to North Scotia bridge near Scotia—Redwood Highway. Dist. I, Rtt. 1, Sec. E. Engr's Est. \$9,786.30. Bids opened July 5th as follows: Marle and Hurey, Berkeley, \$9,537; Smith Bros., Eureka, \$9,375.10; Engelhart Paving & Const. Co., Eureka, \$10,714. Contract awarded to Smith Bros. of Eureka for \$9,375.



**IMPERIAL COUNTY**—Near Araz Junction, an undergrade crossing of the Inter-California R. R.; also a bridge and  $\frac{1}{2}$  mile grading and surfacing with oil treated surfacing. Dist. VIII, Rt. 27, Sec. B. Engr's Est. \$35,133.66. Bids opened July 11th as follows: L. Worel, Alhambra, \$23,805; McWilliams, Ritchey, Los Angeles, \$40,432.50; Pioneer Transfer Co., Calexico, \$34,933.50; M. Blumenkranz, L. A., \$40,946; W. M. Ledbetter, L. A., \$32,315.45. Contract awarded to L. Worel for \$25,805.

**LAKE COUNTY**—Across Cache Creek, reinforced concrete girder bridge. Dist. III, Rt. 15, Sec. C. Engr's Est. \$59,780. Bids opened June 13th as follows: Geo. Ulrich Const. Co., Modesto, \$64,600; McDonald & Maggiora, Sausalito, \$56,820; Chas. and E. W. Steffgen, San Diego, \$76,771.50; Otto Parlier, Tulare, \$53,715; M. B. McGowan, San Francisco, \$62,750. Contract awarded to Otto Parlier.

**LASSEN and MODOC COUNTIES**—Between Bieber and Adin, 12.5 miles grading and surfacing with screened gravel. Engr's Est. \$135,291. Bids opened July 18th as follows: Harlan White, San Francisco, \$128,839; J. P. Brennan, Redding, \$153,379.40; Isbell Const. Co., Carson City, Nev., \$134,065; Tieslau Bros., Berkeley, \$127,376; Hemstreet & Bell, Marysville, \$141,378; Kern & Kibbe, Portland, \$111,997; Coolidge & Scott, Reno, \$107,156.50; Ariss-Knapp Co., Oakland, \$136,422.50; C. T. Malcolm, Walnut Creek, \$134,534; Earl L. McNutt, Eugene, Ore., \$125,894.40. Contract awarded to Coolidge & Scott.

**MONO COUNTY**—2.1 miles of grading from Dogtown to Point Ranch. Dist. IX, Rt. 23, Sec. I. Engr's Est. \$18,243.20. Contract awarded to Coolidge & Scott, Minden, Nevada, \$15,478.70.

**ORANGE COUNTY**—Grading and paving with Portland cement concrete 0.3 mile between Anaheim and Fullerton. Dist. VII, Rt. 2, Sec. E. Engr's Est. \$38,752. Bids opened July 19th as follows: Bartlett & Mathews, Pasadena, \$33,302.45; Griffith Co., Los Angeles, \$33,350; Match Bros., Elsinore, \$36,217; W. E. Cox & Son, Pasadena, \$38,259.80; Wells & Bressler, Santa Ana, \$41,271. Contract awarded to Bartlett & Mathews.

**PLACER COUNTY**—A reinforced concrete girder bridge across the Truckee River at Tahoe City. Dist. III, Rt. 38, Sec. A. Engr's Est. \$22,672.50. Bids opened June 20th as follows: McDonald and Maggiora, Sausalito, \$28,450; Paul M. White, Santa Monica, \$23,988. Contract awarded to Paul M. White.

**PLACER COUNTY**—Quarrying and depositing crushed stone in windrows between Baxter's and 1 mile east of Shelter House. Dist. III, Rt. 37, Sec. D-E. Engr's Est. \$14,560. Bids opened July 20th as follows: Tieslau Bros., Berkeley, \$14,560; Hemstreet & Bell, Marysville, \$14,230. Contract awarded to Hemstreet & Bell.

**PLACER COUNTY**—Three reinforced concrete girder bridges across the South Fork of the Yuba River. Dist. III, Rt. 37, Sec. F. Engr's Est. \$33,102.50. Bids opened July 11th as follows: M. A. Jenkins, Sacramento, \$41,822.50; H. C. Whitty, Sanger, \$45,200; Paul M. White, Santa Monica, \$48,772.50; Obert Bros., Los Angeles, \$60,463; Coolidge & Scott, Minden, Nev., \$34,293.50. Contract awarded to Coolidge & Scott.

**PLACER COUNTY**—Two overhead crossings over the S. P. R. R. at Bowman. Dist. III, Rt. 37, Sec. A. Engr's Est. \$36,408.75; Bids opened July 11th as follows: Geo. J. Ulrich Const. Co., Modesto, \$41,720; Peter F. Bender, North Sacramento, \$35,805; Butte Construction Co., San Francisco, \$32,251; M. A. Jenkins, Sacramento, \$40,680; H. C. Whitty, Sanger, \$36,600; Fredrickson Bros., Stockton, \$43,220. Contract awarded to Butte Construction Company.

**PLACER and NEVADA COUNTIES**—Between Indian Springs and Soda Springs, 10.6 miles of grading. Dist. III, Rt. 37, Sec. A-F-B. Engr's Est. \$213,046.25. Bids opened July 18th as follows: Robinson-Roberts Co., Los Angeles, \$448,879; Jasper-Stacy Co., San Francisco, \$394,883; C. R. Adams, Mt. Shasta City, \$379,747; The Callahan Const. Co., Los Angeles, \$242,441.50; Ward Engineering Co., San Francisco, \$299,930.75. Contract awarded to Callahan Construction Co.

**PLACER COUNTY**—A reinforced concrete girder overhead crossing over the S. P. R. R. at Weimar—on the Victory Highway. Dist. III, Rt. 37, Sec. B. Engr's Est. \$29,777.50. Bids opened June 20th as follows: M. A. Jenkins, Sacramento, \$25,557.50; Butte Construction Co., San Francisco, \$25,546.05; Oberg Bros., Los Angeles, \$30,330; George J. Ulrich, Modesto, \$34,878.75; P. F. Bender, North Sacramento, \$25,552.50; Dann & Maney, Portland, Ore., \$32,332.50; A. W. Kitchen, San Francisco, \$33,147.10; Coolidge & Scott, Minden, Nev., \$27,324; Paul M. White, Santa Monica, \$32,981. Contract awarded to Butte Construction Co., \$25,546.05.

**SAN DIEGO COUNTY**—7.2 miles to be graded between Viejas Creek and Guatay Creek. Dist. VI, Rt. 12, Sec. D. Engr's Est. \$248,588. Bids opened July 5th as follows: Nelson, Sloan, Otay, \$344,893; Hauser Construction Co., Long Beach, \$237,626; George J. Beck, Los Angeles, \$391,501; C. G. Willis and Sons, Los Angeles, \$253,649; H. G. Fenton, San Diego, \$278,229; Geo. Mitchell, Huntington Park, \$290,304; Watson & Sutton, San Diego, \$357,145; Herbert Nunn and J. T. Logan, Encinitas, Wash., \$291,118; Ross Construction Co., Los Angeles, \$241,113; Nevada Construction Co., Fallon, Nev., \$292,712; Isbell Construction Co., Fresno, \$322,024; C. R. Adams, Oakland, \$274,364; Jahn & Bressi, Los Angeles, \$259,816. Contract awarded to Hauser Construction Co., Long Beach, \$237,626.

**SAN JOAQUIN COUNTY**—Between Cherokee Sta. and Live Oak, 5.1 miles widening of roadbed. Dist. X, Rt. 4, Sec. C. Engr's Est. \$46,484.50. Bids opened July 18th as follows: A. F. Giddings, Sacramento, \$34,738.90; Tieslau Bros., Berkeley, \$37,534; Geo. French, Jr., Stockton, \$38,125; Fredrickson & Watson, Oakland, \$31,912.90; M. J. Bevanda, Stockton, \$32,866; C. W. Wood, Stockton, \$47,771.30; Willard & Biasotti, Stockton, \$44,459.50; Marzel & Staring, Sacramento, \$36,579; D. McDonald, Sacramento, \$31,279.40; Camino Construction Co., Palo Alto, \$41,664.50. Contract awarded to D. McDonald.

**SHASTA COUNTY**—Between Shotgun Creek and Conant, 5.8 miles grading and surfacing crushed gravel or stone. Dist. II, Rt. 3, Sec. D. Engr's Est. \$259,909.60. Bids opened June 6th as follows: Kern and Kibbe, Portland, Ore., \$275,065.95; J. T. Loban, Medford, Ore., \$305,448.20; Mathews Construction Co., Sacramento, \$266,107.20; Ward Engineering Co., San Francisco, \$296,531.65. Contract awarded to Mathews Construction Company.

**SISKIYOU COUNTY**—The Fort Goff Creek Maintenance Yard. Dist. II, Rt. 46, Sec. B. Engr's Est. \$5,062. Contract awarded to J. M. Lemon, Etna, for \$5,430.

**SOLANO COUNTY**—Between Cordelia and Rockville, 2.1 miles of grading and crushed gravel or stone surfacing, oil treated. Dist. X, Rt. 8-7, Secs. A-B. Engr's Est. \$78,113.70. Bids opened June 13th as follows: Larsen Bros., Sonoma, \$62,704.50; J. V. Galbraith, Petaluma, \$80,210.70; J. P. Holland, Inc., San Francisco, \$85,514.50; Kaiser Paving, Oakland, \$79,998.40; Force, Currihan & McLeod, Oakland, \$83,091; J. E. Johnston, Stockton, \$87,312.25; Pacific States Construction, San Francisco, \$88,517.50; W. J. Taylor, Palo Alto, \$78,280.75; Tieslau Bros., Berkeley, \$72,693.50; A. Teichert & Son, Sacramento, \$73,829.75. Contract awarded to Larsen Bros. of Sonoma.

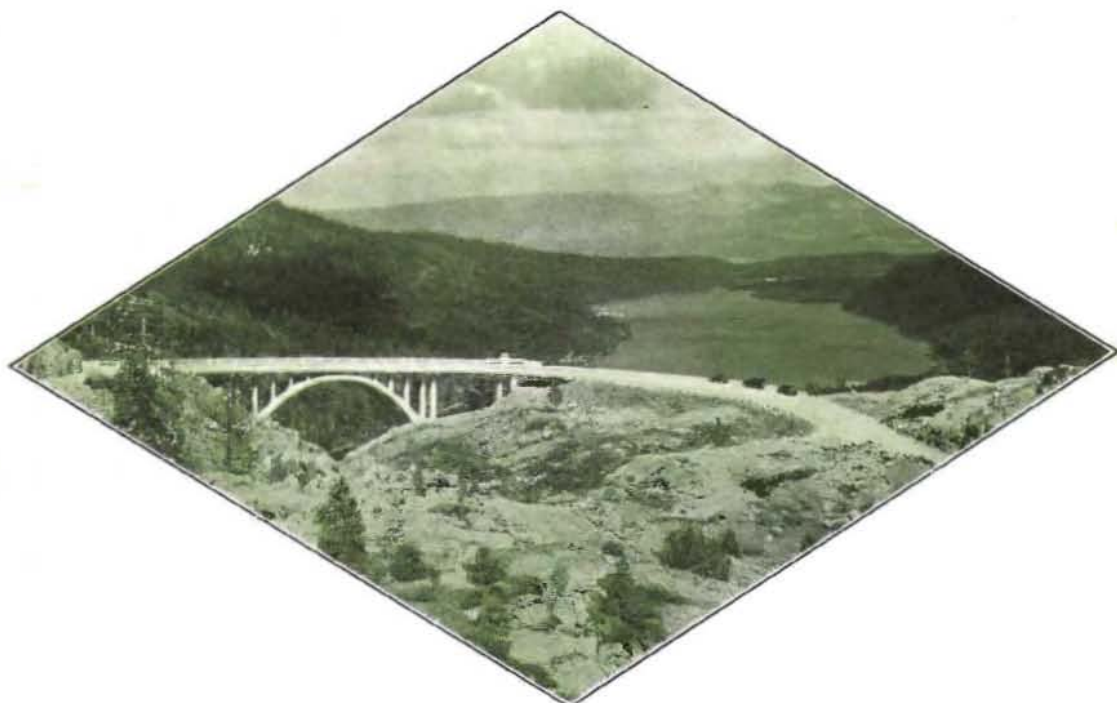
**STANISLAUS COUNTY**—Grading and surfacing 0.04 of a mile and constructing timber trestle approaches at south end of Stanislaus River bridge. Dist. X, Rt. 4, Sec. B. Engr's Est. \$10,785.50. Bids opened June 18th as follows: C. W. Wood, Stockton, \$8,254.25; Lee J. Immel, Berkeley, \$8,855; Pacific Construction Co., \$14,093.80; M. A. Jenkins, Sacramento, \$8,517.30. Contract awarded to C. W. Wood.

**TULARE COUNTY**—Widening existing bridges across Cameron Creek and Packwood Creek and building a new reinforced concrete bridge across Mill Creek. Dist. VI, Rt. 4, Sec. F. Engr's Est. \$10,301.20. Bids opened June 26th as follows: Noble Bros., Visalia, \$11,374; W. H. Cartright, Hanford, \$10,753.75; Oberg Bros., Los Angeles, \$11,252.25; Paul M. White, Santa Monica, \$12,562; H. C. Whitty, Sanger, \$11,440; Guy G. Noble, Tulare, \$9,177.37; R. Hodgson & Son, Porterville, \$11,482.20; C. R. Gurdy, Porterville, \$10,645.30; Earl Bowen, Strathmore, \$9,380.47. Contract awarded to Guy G. Noble.

**VENTURA COUNTY**—11.6 miles to be graded and paved with Portland cement concrete between Jueneque Road and Little Sycamore Creek. Dist. VII, Rt. 60, Sec. A. Engr's Est. \$579,863. Bids opened July 5th as follows: United Concrete Pipe and Const. Co., Los Angeles, \$560,417.50; Thomas M. Morgan, Los Angeles, \$534,652.50; Dillon and Boles, L. A., \$550,442.50; Hanrahan Company, San Francisco, \$539,385; Jahn & Bressi Const. Co., L. A., \$468,324.50; Fredrickson & Watson Const. Co., Oakland, \$518,408.16; George Herz & Co., San Bernardino, \$519,381; Sam Hunter, Santa Barbara, \$526,557.50; Ed. Johnson & Sons, L. A., \$415,772; J. F. Knapp, Stockton, \$490,515. Contract awarded to Jahn & Bressi for \$468,324.50.

**YOLO COUNTY**—Guard rail and wheel guard on Yolo causeway, timber portion. Dist. X, Rt. 6, Sec. A-B. Engr's Est. \$9,830. Bids opened July 9th as follows: Holdener Const. Co., Sacramento, \$10,966.80; Peter F. Bender, North Sacramento, \$9,781.20; M. A. Jenkins, Sacramento, \$10,744.50; B. C. Burnett, Turlock, \$10,793.90. Contract awarded to Peter F. Bender.

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