

# CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



PER  
TE  
24  
.C2  
C2

CULBERT L. OLSON, *Governor of California*

JANUARY · 1939

# CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official Journal of the Division of Highways of the Department of Public Works, State of California

FRANK W. CLARK, Director   C. H. PURCELL, State Highway Engineer   J. W. HOWE, Editor   K. C. ADAMS, Associate Editor

Published for 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.

Address communications to California Highways and Public Works, P. O. Box 1499, Sacramento, California

Vol. 17

JANUARY, 1939

No. 1

## Table of Contents

	Page
Cover Page—Photograph of Governor Culbert L. Olson, Elected Governor of California November 8, 1938—Inaugurated January 2, 1939.	
Highway Funds Unavailable to Adequately Modernize Roads to Meet Increased Traffic Demands in District VIII..... <i>By E. Q. Sullivan, District Engineer</i>	1
Photograph of Frank W. Clark, Newly Appointed Director of Public Works	2
Governor Olson Appoints Frank W. Clark Director of Public Works.....	3
Many Roads in District I Inadequate for Modern Traffic Needs—Illustrated .....	4 and 5
<i>By E. R. Green, District Engineer</i>	
District IX Needs \$19,000,000 to Bring Highways to Modern Standards —Illustrated .....	6
<i>By S. W. Lowden, Acting District Engineer</i>	
Photographs of Poor Roads in Districts VIII and IX.....	6 and 7
New Divided Highway Between Bakersfield and the Grapevine Dedicated..	8
Photographs of Bakersfield-Grapevine Divided Highway.....	9 and 10
How California Protects Gas Tax Funds by Constitutional Act.....	12 and 13
<i>By George T. McCoy, Assistant State Highway Engineer</i>	
Highway Between Redlands and Crystal Springs Realigned.....	14
<i>By A. Everett Smith, Assistant District Highway Engineer</i>	
Illustrations of New Redlands-Crystal Springs Highway.....	15
Bay Bridge Terminal in San Francisco Officially Opened.....	16
State Tests Road Delineation by New Reflectorized Units.....	18
<i>By F. M. Carter, Assistant Maintenance Engineer</i>	
Day and Night Views of Bay Shore Highway Sector Showing Reflectorized Sign Posts and Effects.....	19
Development of Equipment Shortens Job by Five Months.....	20
<i>By Earl E. Sorenson, District Construction Engineer</i>	
Illustrations of Five Types of Improved Equipment Used on Rose Canyon Project .....	20 and 21
Monthly Report—Division of Water Resources.....	22 and 23
Corner Stone of New State Building Laid in Sacramento.....	23
<i>By W. K. Daniels, Assistant State Architect in Charge of Division</i>	
Out of the Mail Bag.....	25
Bay Bridge Traffic Report Shows Increase Over December, 1937.....	26
Highway Bids and Awards for December, 1938.....	27

# Highway Funds Inadequate to Take Care of Increased Transportation Demands Arising in District VIII

By E. Q. SULLIVAN, District Engineer

**S**TATE Highway District VIII comprises the area occupied by San Bernardino County and the populous western half of Riverside County. (The eastern half of Riverside County is included in District XI.) The mileage of State highways in the district is approximately 1340 miles, of which 93 miles are within the limits of incorporated cities. This mileage is approximately 10 per cent of the total of the State Highway System.

Topography of District VIII is such that we have valley, foothill, mountain and desert roads. Climatic conditions vary from the extreme summer heat of the desert to extreme winter cold and snow in the mountain area.

The status of improvement of the roads in the district, exclusive of bridge decks and city streets, is:

33 miles, or 2.7%, unimproved and unoiled earth roads.

700 miles, or 56.1%, temporary oil surfacing and obsolete pavements, inferior as to grade and alignment.

410 miles, or 32.9%, intermediate type surface.

104 miles, or 8.3%, high type pavement.

There are 333 bridges in the district with a total length of 25,300 lineal feet, or 4.8 miles.

There are 58 railroad grade crossings and 14 grade separation structures in the district. Many of the grade crossings on important routes are extremely hazardous and should be eliminated.

Much of the mileage of highways in District VIII consists of roads taken over from the counties. It was the custom of counties for a great many years to construct "dips" in place of bridges and culverts, in view of the light traffic and slow movement of vehicles. This custom was also followed in the early construction of some of the light traffic State highways, though in late years, because of increased volume of traffic and greatly increased speed of traffic, the construction of highways containing "dips" has been discontinued. There are now in District VIII approximately 450 miles of highway where "dips" are the principal provision for water crossing the highways. "Dips" in the original highways served fairly well when the maximum speed permitted by the law was 30 miles per hour, but with the present high speed of motor vehicles, every "dip" is a potential menace and must be eliminated at the earliest possible time.

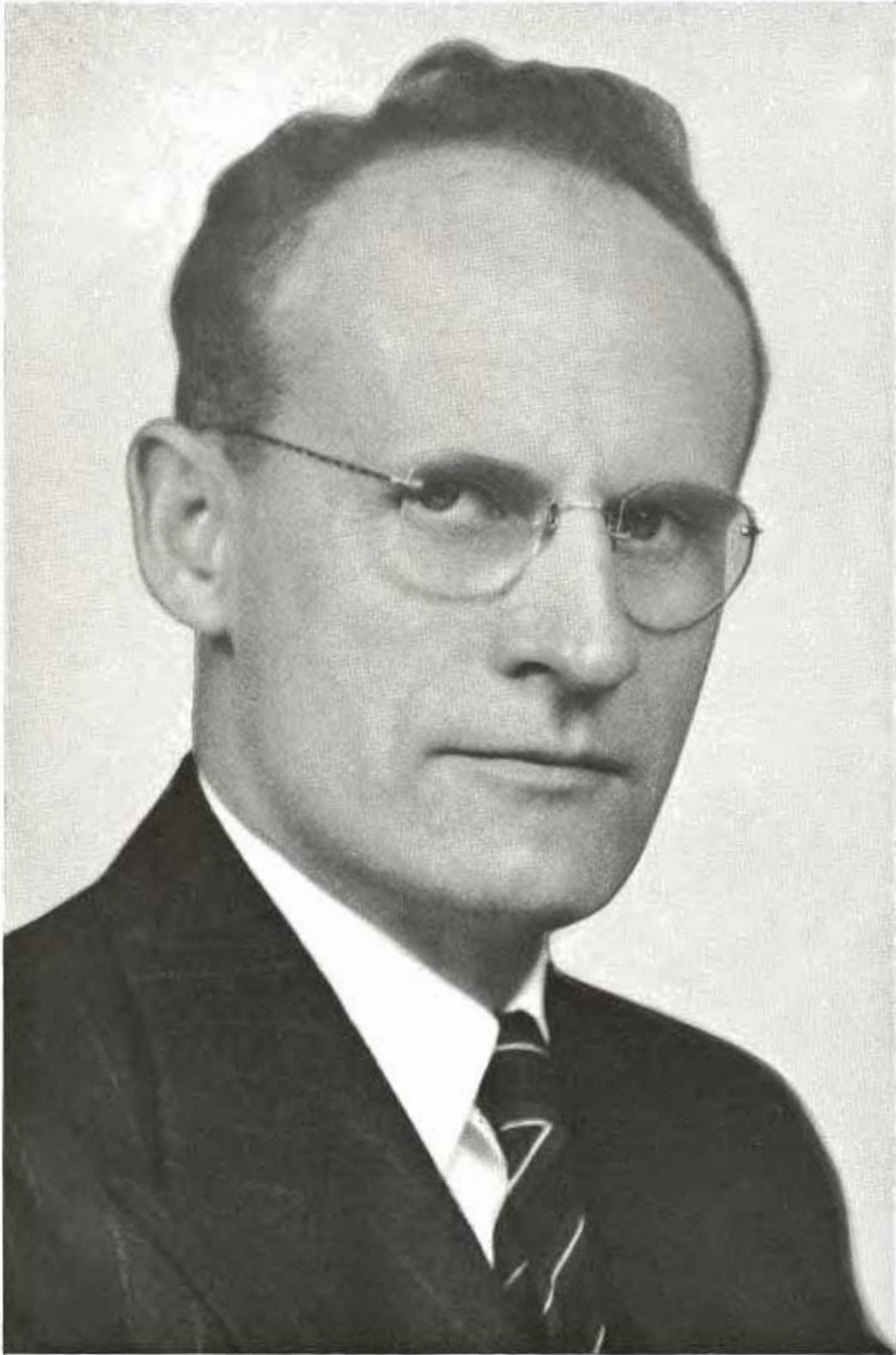
The close proximity of the Los Angeles metropolitan area has started the development of "ribbon cities" along the principal highways entering District VIII from Los Angeles area. This development has made mandatory the early securing of wide rights of way. Ten years ago rights of way were donated by the abutting property owners because

(Continued on page 7)

## Road Building Lags Behind Traffic Rise



Top—Dips on Highland Avenue on Route 190, San Bernardino. Center—Narrow bridge on Base Line Avenue between San Bernardino and Redlands. Bottom—Winding grade near summit leading from Cajon Pass to Lake Arrowhead.



FRANK W. CLARK, Director of Public Works

# Frank W. Clark Takes Office As Director of Public Works

**A**N AUTHORITY on the construction of highways, dams, levees and public buildings and a student of flood control, irrigation and drainage work, Frank W. Clark, for many years a business executive of Los Angeles, this month assumed the duties of Director of the Department of Public Works.

Mr. Clark has relinquished his private business interests to devote his entire attention to State service. Drafted into his new position by Governor Culbert L. Olson, Mr. Clark, long interested in governmental affairs, has accepted public office for the first time. He succeeds Earl Lee Kelly, resigned.

In a formal statement announcing the appointment of his Director of Public Works, Governor Olson said:

#### OFFICE SOUGHT THE MAN

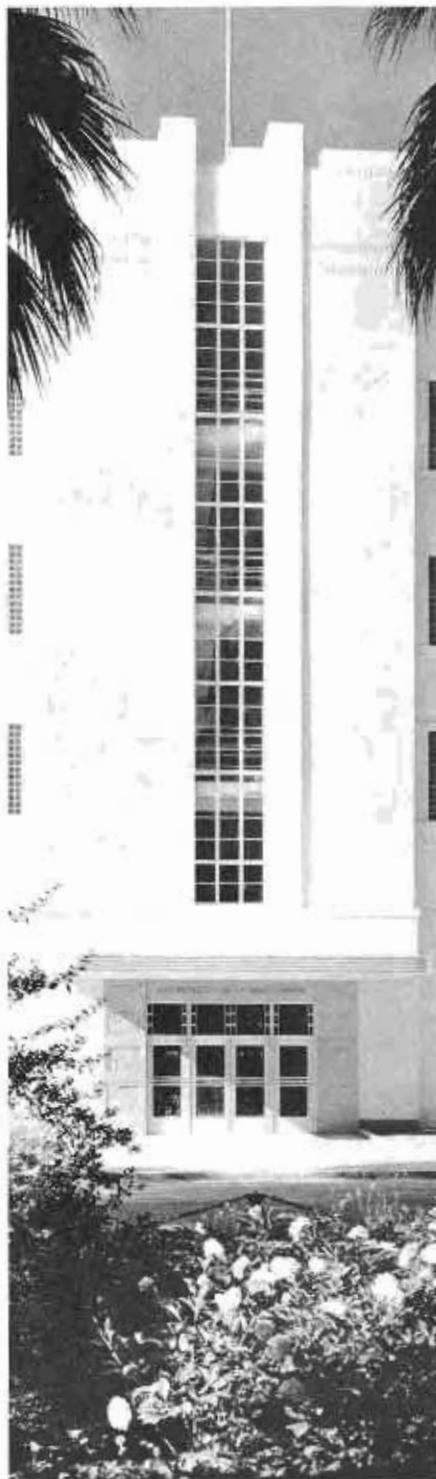
"My selection of Frank W. Clark for the position of Director of Public Works is a case of the office seeking the man. I feel that I am fortunate and that the State is fortunate in securing the service of Mr. Clark.

"I have been personally acquainted with Mr. Clark for about 15 years. He is a man of unquestioned integrity, high ideals and sincerity of purpose; and he has enjoyed that reputation throughout his active life in the field of industry.

"He is 46 years of age; has been a resident of California for 34 years. His education, training and experience especially qualify him for this position.

#### FAMILIAR WITH PROBLEMS

"He has had years of experience in, and is familiar with, all phases of construction work, including highway and road building, dam and levee construction, public buildings and all forms of flood control, irrigation and drainage work; in connection with all of which he has been an eminently successful business executive.



Entrance to Public Works Building in Sacramento

He is familiar with the problems both physical and financial, of all California's irrigation districts now in great need of constructive State services.

"He has never sought public office, but has taken a deep interest in the cause of progressive government; and it is a gratifying circumstance to me that he has always been liberal in his political philosophy, and is an ardent, progressive Democrat.

#### HONOR TO SERVE STATE

"In taking this position, Mr. Clark is disassociating himself from all private business interests and connections. His sole interest will be to give to the State of California the splendid service he is competent to render in our Department of Public Works.

"I do not believe any State appointee ever took office in California with a more thorough knowledge of its duties and with greater ability to perform them than has Mr. Clark for this position."

In accepting the appointment, Mr. Clark said:

"I know our new Governor well. He knows me. We both recognize the magnitude and importance of the office of Director of the Department of Public Works.

"I feel certain that if Governor Olson had not felt confident I would honestly and could efficiently handle the affairs of this important department, he would not have asked me to be its director.

"If I had not believed the manner in which I will fulfill the duties of this office would at all times reflect further credit upon the administration of Governor Olson I would not have accepted the appointment.

"I fully appreciate the honor and am grateful for the privilege of serving the people of California under this truly great man.



Top—Narrow posted bridge on Arcata to Redding highway, 3 miles east of Arcata. About 1800 vehicles use this bridge each day. Center—Sharp, reversing curves on steep grade two miles south of Orick on Redwood Highway. Bottom—Narrow, one-way suspension bridge, 15 miles east of Arcata on Arcata to Redding highway.



## Many Roads in Di

By E. R. GREEN,

**T**HE northwestern portion of the State, widely known as the Redwood Empire, including the counties of Lake, Mendocino, Humboldt, Del Norte, and portions of Siskiyou and Trinity, comprise the territory within State Highway District I.

The entire area is mountainous and quite rugged with consequent high cost per mile in constructing highways adequate for modern traffic needs. For this reason it is an undeniable fact that reconstruction of State highways, both primary and secondary, to modern or even adequate standards has not kept pace with requirements of the motoring public.

District I has the unenviable distinction of having within its borders a disproportionate large percentage of unsealed road surfaces that now remain in the State Highway System. The entire district is subject to extremely heavy rainfall, being well over 100 inches in many portions during the winter of 1937-38 and at one recording station only, that being in Lake County, was the rainfall less than 50 inches. Precipitation in this amount combined with heavy grading makes slides inevitable. The removal of these slides alone places a heavy burden on the already overtaxed finances of the Department as can be readily understood when it is to be noted that the cost of this item in District I amounted to \$599,357 as a result of the wet winter of 1937-38.

Inadequate road surfacing throughout the district and snow removal in many portions further add to maintenance costs, which costs necessarily defer much needed reconstruction of obsolete highways, railroad grade sep-



Top—Sharp curves onto narrow bridge across Long Valley Creek on Redwood Highway between Willits and Laytonville. Center—Scene of many accidents on Redwood Highway one-half mile north of Richardson's Grove. Bottom—Sharp curve 8 miles north of Garberville on Redwood Highway. Summer traffic is 3500 cars per day on this section.

## strict | Inadequate

District Engineer

arations, and a staggering number of entirely inadequate bridges.

The chief industry and products of the Redwood Empire are lumbering, dairy products, fisheries, stock raising, and in the southern portion, fruit and wines, the greater part of which must reach their market by use of the Redwood Highway, U. S. 101. Rail service is not at all dependable during the winter season. The Northwestern Pacific, the only railroad serving this territory, was out of service by reason of slides and washouts from November 9 to November 25, December 10 to December 28, and from February 3 to April 16 during the past winter. During this period the entire area tributary to the northern 200 miles was wholly dependent on this one highway for its transportation system.

Before the completion of the Northwestern Pacific Railroad to Eureka in 1915 and the Redwood Highway in 1918, Humboldt, Del Norte, the western portions of Siskiyou and Trinity counties, and the northern portion of Mendocino County were served by a fleet of coastal steamers, but this service has been discontinued since that date except for a very limited number wholly engaged in the transportation of lumber, and State Highways, principally the Redwood Highway, have assumed the major burden of all transportation.

From the above facts it is convincingly apparent that this arterial highway, comprising 325 miles of the total of 365 miles of primary mileage in the district, must be modernized and brought to adequate standards as fast as available funds will permit; first, because it is indispensa-

(Continued on page 17)



# District IX Needs \$19,000,000

By S. W. LOWDEN, Acting District Engineer

**T**HE area comprising District IX of the Division of Highways extends 330 miles northerly from the Los Angeles County line on the Mojave Desert to the Alpine County line near Topaz Lake. Bordering the westerly district boundary are the crests of the Sierra Nevada Mountain Range containing a number of the highest peaks in the continental United States. The eastern boundary follows the California-Nevada state boundary to a point 25 miles northerly of Calada near the Barstow-Las Vegas Highway.

Encompassed within this gigantic triangle are 18,756 square miles, or 12 per cent of the entire area of the State of California included within the counties of Inyo, Mono and a portion of Kern.

The problem of providing an adequate highway service to this area is of particular interest to the highway engineer. The highways traversing this land of contrast are so diversified as to constitute an entire range from extreme desert conditions to the ruggedness of the High Sierra, and from depressions below sea level to elevations of 10,000 feet.

This diversity of physical characteristics requires a very thorough study in order that the utmost in economy of expenditure consistent with maximum safety and service may be obtained. In portions of the district rain or snow is practically unknown while in the mountainous sections it is not uncommon to encounter snow drifts reaching depths of 25 to 40 feet.

The temperature range has a great influence on the cost of highway operations both from a construction and maintenance standpoint.

Authentic readings indicate that a high of 134 degrees F. has been recorded in Death Valley in the eastern portion of the district while ranges from 120 degrees F. to 125 degrees F. are encountered each season. For the low, the record is at Bridgeport, where a minus 46 degree F. has of recent years been reached, while minus 30 degrees to 35 degrees is of frequent occurrence.

The mileage of the State Highway System within the district is 800 miles, or approximately 6 per cent of the State total that have been brought to the following standards of improvement.

	<i>Miles considered</i>
Unimproved and uncoiled earth roads.....	100
Oiled earth roads inadequate as to width, alignment and grades .....	530
Intermediate type surface with satisfactory width, alignment and grades for present demands but soon requiring restoration of surface and increased safety provisions .....	170
<b>Total .....</b>	<b>800</b>
34 Bridges unsatisfactory as to width and structurally.....	
10 Bridges satisfactory for present service.....	
Drainage Dips requiring reconstruction to satisfactorily serve present traffic demands.....	1.0

The highways of the district render a variety of services, the principal route being a portion of the 3 Flags Highways (U. S. 395), extending from Canada to Mexico. Within California this portion connects the city of Reno with the city of Los Angeles as well as carrying a heavy traffic from the western States of Oregon, Washington, Idaho, Utah, Montana and Wyoming.

(Continued on page 11)

1—Section of Benton Road, Route 40, Mono County. 2—Box Canyon on Westgard Pass, Inyo County, too narrow for safety. 3—This Section of Route 40 near Mono Mills, connects U. S. 6 and Yosemite National Park. 4—Narrow, crooked road through June Lake Village in Mono County.

# Road Funds Inadequate to Care for Traffic Increases

(Continued from page 1)

of the benefit to abutting property by the construction of highways. The development of "ribbon cities" along the highways has made impossible the securing of right of way by donation and the widening of rights of way has become an extremely difficult and costly procedure.

Light rainfall and excellent subgrade conditions for most of the area in District VIII has in the past made possible the use of light bituminous surfaces. With a continued increase of heavier truck loads and greater numbers of trucks to serve the metropolitan area, these light surfaces will have to be replaced with heavier pavements.

Bridge construction in District VIII is not keeping up with requirements. A number of bridge decks and the approaches are obsolete and entirely inadequate to serve traffic properly. Narrow bridges with restricted sight distance are prevalent.

It is estimated that to put the roads and bridges in District VIII in condition to adequately serve present traffic and construct essential grade separations, would require:

720 miles of new construction, totaling \$31,300,000.

217 miles of reconstruction, totaling \$5,800,000.

10,500 lineal feet of bridges, totaling \$2,450,000.

10 grade separation structures, totaling \$800,000.

The grand total required is \$40,350,000.

District VIII is bordered on the west by Los Angeles County. The county line is only thirty-three miles from the Los Angeles City Hall. Three transcontinental highways entering Southern California and terminating in Los Angeles, cross District VIII. There is an ever increasing flow of traffic on these transcontinental highways.

The San Jacinto mountain resorts in Riverside County and the San Bernardino mountain resorts in San Bernardino County are each about two hours' drive from the center of Los Angeles. These mountain resorts have the largest concentration of mountain homes of any similar National Forest area in the United States. This vast pleasure area must be provided with adequate highways.

During the past few years there has been a remarkable recreational development in the desert regions of District VIII. Palm Springs, Twenty-Nine Palms and the North Mojave Desert are becoming more popular each year. These regions are about a three-hour trip from Los Angeles and heavy winter traffic shuttles back and forth between these desert home areas and Los Angeles in ever increasing volume.

Added to this, is the rapidly increasing truck traffic crossing District VIII from the Imperial Valley. There are also increasing numbers of freight trucks hauling manufactured articles from the Los Angeles factories to supply Arizona and Nevada.

It is apparent that sufficient construction funds can not be obtained to provide the needs of the immediate future. The continuously increasing demands of traffic are such that it seems imperative that something must be done to increase construction funds to at least keep pace with the increasing demands.



1—Winding grades and hairpin turns on Carbon Canyon Road, San Bernardino County. 2—Narrow bridge connecting Cajon Pass with San Bernardino Mountain resorts. 3—Winding, narrow dirt road between Camp Seeley and Cedar Springs. 4—Sharp curve and poor sight distance.



View of divided highway on U. S. 99 south of Bakersfield showing new lanes for southbound traffic on left separated from old highway by 26-foot strip. Islands for channelization of traffic mark the Maricopa-Taft intersection.

## New Divided Highway Dedicated

WITH State dignitaries, officials of three southern San Joaquin Valley counties and representative citizens from many sections of California participating, ceremonies celebrating the completion of the nineteen-mile stretch of four-lane divided highway on U. S. 99 between Bakersfield and Grapevine were held at the northern end of the project, eleven miles south of Bakersfield, on December 16, last.

Following a luncheon given by the Kern County Chamber of Commerce, a cavalcade of automobiles filled with celebrants proceeded to the scene of the dedicatory exercises where former Governor Frank F. Merriam officially opened the new highway.

Construction of the four-lane pavement between Bakersfield and Grapevine, divided by a wide tree-planted strip, brings to motorists more safety and driving comfort, and the longest stretch of divided highway in the State. To drive for miles without meeting a vehicle coming from the opposite direction does much to relieve the strain of driving. Particu-

larly is this true at night. On the new highway there will be no headlight glare of approaching vehicles and cars to be overtaken can be seen at much greater distances.

These advantages have been made possible by the construction of a highway with 23 feet of asphaltic concrete pavement parallel to the existing route. Twenty-six feet separates the pavement carrying north bound traffic from the new pavement which is used exclusively for south bound traffic.

Along a large portion of this 26-foot dividing strip are trees planted over twenty years ago, which were brought to maturity in this semi-arid area only after great difficulty and expense. These trees, planted by Kern County shortly after the original State Highway was constructed, are of many varieties including Black Walnut, Olives and Palms.

Planted as a highway improvement project and to furnish shade to motorists wishing to park under their branches, the trees now play an important part on this modern divided

highway. So completely do they serve as a screen between the north bound and south bound traffic that all head light glare is eliminated.

With the divided one-way highways a great saving in time and patience has been accomplished. It is no longer necessary to trail a slow moving truck, waiting for a chance to get out in the lane of approaching traffic, and run ahead of the low speed vehicle.

Nearly 17 per cent of the vehicles using this highway are trucks. Traffic on the route has increased steadily since the original highway was constructed in 1915. In 1918 a traffic count showed 398 vehicles in 16 hours; by 1928 the number of vehicles had increased to 2526.

During the next ten years the traffic more than doubled for the 1938 count recorded 5685 vehicles. What the next ten years will bring we can only guess, but we are sure that the increase will be considerable.

The 19 miles of divided highway is only a link in the great transpor-

(Continued on page 10)



Two views of divided highway on U. S. 99 south of Bakersfield. The upper picture looking south shows the point where the curbed, crushed stone narrow dividing strip ends and wider tree covered separation divides the two lanes. In lower picture the dividing strip is located at center of old highway. Here the State owned wide, tree-bordered right of way that permitted extra traffic lanes to be built.



The new lanes for southbound traffic, at left, just added to the divided highway south of Bakersfield are shown at a point where they are separated at a different level from the old highway on right now reserved for northbound traffic.

tation route, U. S. 99, which connects the Metropolitan Area of Los Angeles and the Port of Los Angeles with the productive San Joaquin and Sacramento Valleys, and the San Francisco Bay region.

The opening of the new improvement was naturally of great interest to the people of Kern and other counties in the San Joaquin Valley and many turned out to attend the ceremony. A chain of artificial wild flowers held by three little girls was stretched across the new highway. The picking of a flower in this chain by former Governor Merriam broke the barrier and officially opened the new highway.

A 100-piece band from Kern County Union High School and Junior College furnished musical selections. Also participating in the ceremony were the Kern County Rangers, led by Captain Grady Cowart.

Alfred Harrell presided over the ceremony. Mr. Merriam and Harry A. Hopkins of Taft, ex-Assistant Director of Public Works, were the principal speakers.

Those present at the celebration included H. R. Judah, chairman, and Philip A. Stanton, of the State Highway Commission; E. E. East, Chief Highway Engineer of the Automobile Club of Southern California; C. E.

McStay, Field Secretary of the Automobile Club; Assemblyman Gordon Garland, representing Tulare and Kings counties; J. G. Brown and C. B. Allenbaugh, Supervisors of Tulare County; Assemblyman Rodney Turner and State Senator J. I. Wagy of Kern County; R. M. Gillis, Construction Engineer, State Division of Highways, Sacramento; S. W. Lowden, Acting District Engineer, State Division of Highways, Bishop; R. S. Badger, District Construction Engineer, Fresno; W. A. Collins, Chairman of the San Joaquin Council, State Chamber of Commerce; Supervisors Roy Woollomes, Stanley Abel, Jay Hinman and George Parish of Kern County; J. R. Benedict, president of the Lindsay Chamber of Commerce, and Walter Dranneck, president of the Visalia Chamber of Commerce.

In addition to the many county officials, representatives from several cities and others attended, including J. J. Philippe, Visalia City Manager; Fred Nighbert, Bakersfield City Manager; L. D. Bachelder, president of the Airline Highway Association; Charles Anger, manager of the Central California Tourist Association; Wesley Walden, commander of Frank S. Reynolds Post, American Legion; Floyd Howe, Secretary of the Coal-

inga Chamber of Commerce, and Herbert Arndt, secretary of the Taft Chamber of Commerce.

Arrangements for the ceremony were made by Emory Gay Hoffman, secretary of the Kern County Chamber of Commerce, and Norman P. Thompson, chairman of the highway committee of the Chamber of Commerce, Bakersfield.

The new highway was built by Griffith Company for \$461,075.09. Don Evans was resident engineer for the Division of Highways.

## Bureau of Public Roads Did Big Job Last Year

Over 15,000 miles of highway were improved during the past fiscal year in the program administered by the Bureau of Public Roads of the U. S. Department of Agriculture, according to the annual report of the bureau. The bureau also supervised the elimination of 711 grade crossings, reconstruction of 144 obsolete grade-crossing structures, and protection of 744 crossings by signs and signals.

The greater portion of the work was done in cooperation with State highway departments and in this way 12,129 miles of highway was improved.

# District IX Needs the Sum of \$19,000,000

(Continued from page 5)

Another important interstate route is U. S. 6, entering California through Montgomery Pass and carrying a rapidly increasing traffic from midwestern and eastern states.

This route is of major military importance in that it is the shortest and most feasible highway between the Naval Arsenal located near Hawthorne, Nevada, and southern California ports and in a case of international disturbance would immediately be subjected to a very heavy and high speed traffic.

The remaining routes serve important recreational areas as well as an extensive mining industry and with the recent agricultural rehabilitation of the Owens Valley, a distinct farm to market need.

The region of the High Sierra of Inyo and Mono counties serves as the recreational playground of many people. An estimate compiled from records of the Forest Service and other agencies indicates that the registered and accounted for visitors for recreation alone to this area exceeds 110,000 persons each summer. To this must be added approximately 60,000 visitors to the Death Valley National Monument each winter. With the improvement of the highways, winter snow sports are developing to such an extent that it is reasonable to expect that within a very few years this traffic demand will reach proportions that will tax the ability of the State to finance the maintenance, in a snow free and travelable condition, of the highways of this district constructed to present standards.

Except for a short distance, the lack of railway facilities within the district places the ever increasing burden of heavy hauling directly upon the highways. The overloading of the light type construction results in a rapid deterioration of the surface on the major routes that is reflected in high maintenance expenditures and will eventually, as funds can be provided, justify the increased cost of a higher type of construction.

Comparable with other sections of the State, an unusual condition exists within the district in that, induced by desert alignment between widely separated stopping points,

## Farm to Market by Truck

In Volume 22, No. 4, of "The Agricultural Situation", issued by the Bureau of Agricultural Economics of the U. S. Department of Agriculture, William C. Crow says, "Large city markets now receive about half their supply of fresh fruits and vegetables by motor truck. A survey in 1936 revealed that nearly 45 per cent of the supply of 40 large cities was transported by motor—New York City, about 40 per cent; Philadelphia, 45; Boston, 33½. The figures ranged up to 72 per cent for Atlanta and 83 for Los Angeles."

maximum speed is common. In order to build a reasonable degree of safety into the highways it will be necessary to reconstruct many miles to new standards.

The problem of snow removal on 200 miles of highway at elevations between 6000 and 9000 feet calls for a rapidly increasing expenditure of funds in order to keep pace with the traffic demands as expressed in the thought of the traveling public, that, the routes should be comparatively snow and ice free and open to travel at all times without interruption. This problem alone requires an expenditure averaging \$400 per mile per year of maintenance funds for highways located in the snow areas together with other increased expenditures required to repair and restore the light type surfacing damaged by traffic under adverse conditions.

Since the snow removal will continue to be an annual obligation, it is obvious that in order to avoid a much greater expense, a surfacing adequate to meet the demands must be provided.

Considering a period of ten years it is estimated that to put the roads and bridges within the district in condition to serve present traffic and with a reasonable allowance to cover

obsolescence and expansion would require:

170 miles on which additional surfacing and minor widening will be necessary.....	\$1,700,000
540 miles construction (light type) and reconstruction of older and obsolete roads....	13,500,000
90 miles construction (heavy type) .....	3,400,000
Bridges, drainage dips and flood protection.....	400,000
Total required.....	\$19,000,000

The construction expenditures in District IX for the period July 1, 1932, to June 30, 1938, total \$3,069,000, the average expenditure being \$511,500 each year. With past allocations as a basis, it is evident that without an increase in available funds, a period of 38 years will be required to bring the highways of the district to a standard suitable to properly serve present demands.

Neither does this estimate contemplate the additions of mileage of highways to the State System or provide for a change of type or standards to meet the development of traffic service.

This problem is one of increasing importance that can only be satisfactorily met by increased allocation of funds that will permit an improvement of the highway system with sufficient rapidity to overcome deterioration of the present system and for expansion to meet increased usage.

Ed (In Chicago for Live Stock Exposition): "Dull here, isn't it?"

George: "Dull! Why, I almost wish I had brought my wife along."

"Lay down, pup; lay down," ordered the man. "Good doggie—lay down, I say."

"You'll have to say, 'Lie down,' mister," declared a small bystander. "That's a Boston terrier."

The frugal Scot was taking his son for a walk, when he said thoughtfully, "Son, have you got on your Sunday boots?"

"Aye, Father," was the reply."

"Then take longer steps."

Farmer—Gosh! You must be brave to come down in a parachute in a hundred-mile gale like this.

Stranger—I didn't come down in a parachute. I went up with a tent.

# California Protects Gas Tax Funds by Constitutional Act

By GEORGE T. McCOY, Assistant State Highway Engineer

**B**Y UNMISTAKABLE mandate of the people of California, gasoline tax funds henceforth will be safe from diversion to other purposes than highway construction and maintenance.

Protection for these moneys was written into the State Constitution by the voters on November 8 when Constitutional Amendment No. 28, requiring that motor vehicle fuel tax funds be used exclusively for public street and highway purposes, was approved by the electorate by the overwhelming vote of 1,505,043 to 766,063.

For many years the motorists of California have zealously guarded their gas tax moneys. At a special election held in 1933 they emphatically voted down two propositions on the ballot proposing to divert gasoline tax moneys. An initiative proposition amending the constitution and designed to prevent diversion was submitted to the voters in 1936 but because of a section requiring that the same tax be imposed upon Diesel motor vehicle fuel as upon gasoline, a confusion of issues involved in the proposition resulted in its defeat.

#### STRONG ANTIDIVERSION FEELING

Constitutional amendments preventing diversion of motor vehicle revenues to nonhighway purposes were approved by voters in three States at the last general election, namely, California, Michigan, and New Hampshire. A similar proposal failed in Alabama by a narrow margin. The New Hampshire proposal won by a five to one vote and the Michigan amendment was carried by more than 200,000. Indicative of the strong antidiversion feeling in California, Los Angeles County alone voted 670,810 to 296,953 for the new constitutional amendment.

Prior to the last election Kansas, Minnesota, Colorado and Missouri had written into their constitutions amend-

ments against diversion of gasoline tax funds. Maine has banned diversion and Nevada and Indiana legislatures have initiated constitutional amendments on the same subject to be submitted to the people.

Undoubtedly there is a very definite trend throughout the country against gasoline tax diversion. According to the Bureau of Public Roads, more than one billion dollars



GEORGE T. McCOY

have been diverted from highway purposes since diversion became a practice.

#### FIRST MOTOR VEHICLE TAX

The first law imposing motor vehicle registration fees was enacted in New York State in 1901. Similar legislation followed in Massachusetts in 1903 and in five other States in 1905. By 1913, every State in the

Union and the District of Columbia was collecting a motor license fee with levees for that year totaling eight million dollars. In early stages, motor vehicle fees were not imposed for revenue purposes but were levied merely to provide facilities for the protection of persons and property such as the registration of vehicles and the prevention of theft. For this reason, funds sufficient to cover only expenses and administrative costs were raised.

As early as 1914, however, 41 States were using motor vehicle registration collections for highway purposes; and by the following year practically 90 per cent of the total revenues so derived was applied to road work. A tendency to make small diversions from registration fees became apparent as early as 1916, but as a rule most States followed the original policy of utilizing the funds for the administration of such registrations, policing and the prevention of theft. With the increase of collections, the surplus was generally used for highway construction and maintenance.

#### OREGON STARTS GAS TAX

Oregon initiated the first gasoline tax in 1919 and was followed by North Dakota, New Mexico, and Colorado. These initial statutes except in North Dakota generally provided that the collections must be used for highway purposes. This practice was rather consistently followed for a number of years. Records indicate that it was the general practice of most States until comparatively recent years to refrain from the application of motor vehicle fees and gasoline taxes to other than highway purposes. During the last seven years, however, diminishing State revenues encouraged legislators to resort to motor vehicle taxes as a fruitful source of funds for all manner of expenditures

unrelated to constructing highways. The federal government was compelled to register its opposition to diversion of motor vehicle funds and the Hayden-Cartwright Act of 1934 was the result.

Section 12 of the Hayden-Cartwright Act provides that States diverting highway funds shall be penalized not to exceed one-third of the federal aid allotments for highways. Several eastern States have felt the sting of the Hayden-Cartwright Act.

#### STATES PENALIZED

Diversion in Massachusetts caused the government to withhold \$472,862 of the federal aid apportionment of \$3,171,423 for the fiscal year ending June 30, 1938. Under similar circumstances \$250,000 was deducted from the apportionment to New Jersey for the fiscal year 1937. Maryland, Pennsylvania and Georgia were penalized. There is a strong sentiment in congress for increasing the penalty imposed for diversion to two-thirds of the apportionments or denying federal aid altogether to States that persist in the practice of diverting their own gasoline and other motor vehicle tax revenues to non-highway purposes.

The Hayden-Cartwright Act is an unmistakable warning to legislatures to turn a deaf ear to proposals for diversion. In California, the people have taken the matter into their own hands and now with constitutional safeguards for gasoline taxes, there is no need to fear the imposition of federal penalties even though some future legislatures might be inclined to find a way around the constitution to divert highway funds.

#### CALIFORNIA'S NEW AMENDMENT

California's new amendment adds an article, numbered 28, to the State Constitution relating to the purposes for which motor vehicle fees and motor vehicle fuel taxes can be expended. The article must be considered in its entirety.

**Section 1.** This section relates only to motor vehicle fuel taxes now or hereafter imposed. It provides that the revenues from such fuel taxes, over and above the cost of collection and making any refunds authorized by law, shall be used first for highway purposes. It permits, however, the use of not more than the revenue from one-fifth of one cent per gallon tax to be used in aid of special assessments where the dis-

tricts for which the assessments are levied were initiated prior to January 1, 1933.

This latter provision merely continues in effect the provisions of the law in effect at the time the constitutional amendment was adopted.

#### TAX DISTRIBUTION

The constitutional amendment does not interfere in any way with the power of the legislature to distribute the revenues from motor vehicle fuel taxation to various governmental agencies. The present allocation is that the counties receive the revenue from one cent per gallon gasoline tax while the State receives the revenue from two cents per gallon gasoline tax. From the State's portion, however, the revenue from one-half cent must be spent within city limits. The revenue from one-quarter cent, one-half of this latter amount, must be spent on State highways within cities, while the revenue from the other one-quarter cent may be spent on city streets outside of the State highway system. The constitutional amendment does not in any way limit the power of the legislature to alter this present allocation, that is, the legislature may give the counties more than one cent or restrict them to less than one cent if it so desires, and likewise may change city allocations.

#### LIMITS USE OF FUND

In 1933, legislation was enacted permitting the use of twenty per cent of the counties' share of the gasoline taxes to be used to aid special assessment districts, and the money in many counties has been so used since that time. The provision in the constitutional amendment merely permits that use to continue but it limits the special assessments to be aided to those in existence on January 1, 1933. If the aid to special assessment districts could be considered a diversion, the diversion occurred by the 1933 legislation and the constitutional amendment prohibits any further use for this purpose. As soon as the bonds for which the special assessments were levied are paid off, there will be no further use of motor vehicle fuel revenue for this purpose.

#### REGISTRATION FEES

**Section 2.** This section deals with motor vehicle registration fees and any future taxes that may be levied upon motor vehicles.

This money is first to be used to carry out the powers and duties im-

posed on the Motor Vehicle Department, that is, registration and enforcement. It is also to be available for highway purposes to the same extent as the motor vehicle fuel revenues referred to in section 1.

As is true with respect to the motor vehicle fuel revenues, the power of the legislature to divide this money between the counties and the State is left undisturbed. Under the existing set up, a little over a third of the money is available for the support of the Motor Vehicle Department and the remainder is divided equally between the State and counties.

Ever since 1927 the counties have been authorized to use all or any portion of the funds received from this source to pay off general county bonds which have been issued for highway purposes. For example, Alameda County many years ago pledged its motor vehicle revenues to pay off the bonds issued for the Broadway Low Level Tunnel. The amendment merely permits this to continue, but provides that the money may not be used to pay off any bonds which were issued after January 1, 1935.

#### LEGAL BORROWING

By the 1933 legislation authorizing the revenue from twenty per cent of one cent per gallon gasoline tax to be used for special assessment relief, the counties were permitted to use all of their motor vehicle fee money for this purpose. The constitutional amendment permits this to continue except that it can not be used for any special assessment relief except where the special assessment district was initiated prior to January 1, 1933.

**Section 3.** This merely affirms the power of the legislature to provide for the expenditure of the money by the State or by the counties or by the cities of the State. It also permits the temporary loaning to the general fund of the revenues so raised but provides that the loans must be repaid. This is done for the reason that section 444 of the Political Code now authorizes such borrowing and the constitutional amendment merely continues the effectiveness of that section.

#### REVENUES PROTECTED

**Section 4.** This is designed to protect all of the existing revenues to the State general fund which might possibly be affected by sections 1 and 2. The whole purpose of the consti-

(Continued on page 24)

# Highway Between Redlands and Crystal Springs Realigned

By A. EVERETT SMITH, Assistant Highway Engineer

**T**HE construction of a portion of State Highway on Route 26, between Crystal Springs and Redlands in San Bernardino County was completed on November 1, 1938.

The roadbed was constructed on new alignment, to modern standards, which eliminated numerous sharp, horizontal and vertical curves in the old road that were particularly hazardous to traffic.

On the old road the element of hazard was amplified due to the mixed nature of the traffic which consists of fast passenger cars and nu-

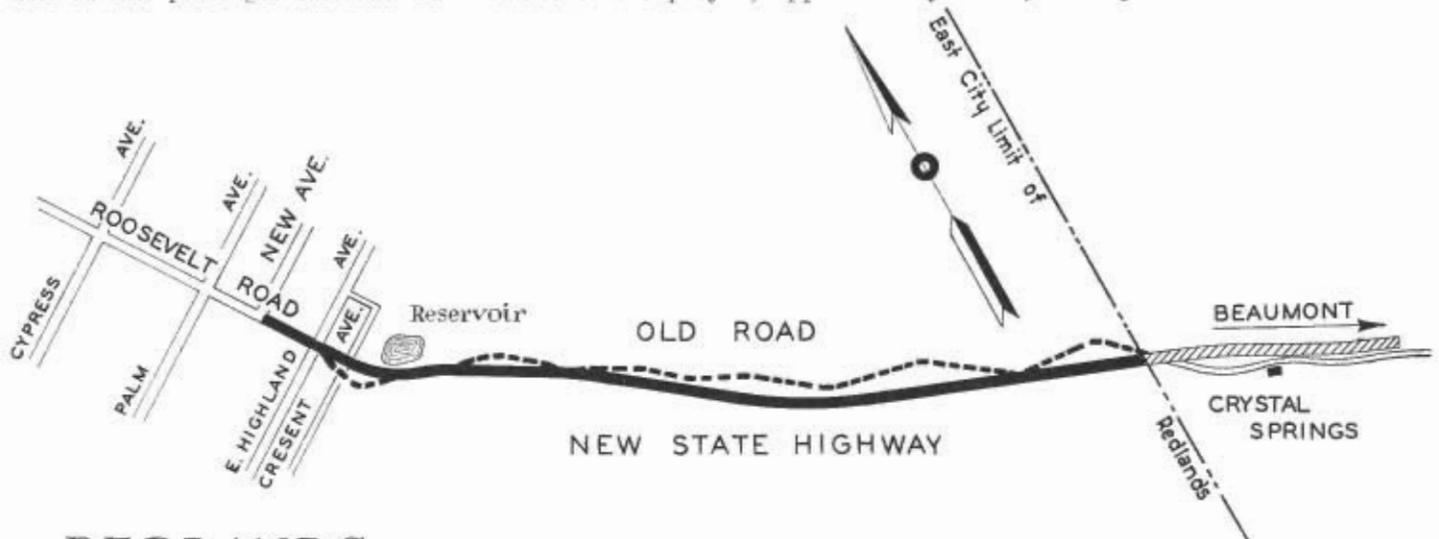
merous trucks ranging up to maximum legal weight and size. This mixed traffic travels at varying rates of speed, due to the limited tangent distance between the sharp curves. The faster cars had little opportunity to pass the heavier vehicles while traveling at slow speeds in a lower gear.

consists of a 22-foot width of Portland cement concrete pavement bordered by wide shoulders, to which a road-mix surface treatment was applied. In connection with finishing the Portland cement concrete pavement, the new finishing machine was used. Except for the change in finishing procedure due to facilitation of the work by this machine, other phases of construction activity were normal.

To construct the embankment on the westerly one and three-quarters miles of the project, approximately

approximately 4400 cubic yards of Class "B" Portland cement concrete was used in building two lanes of pavement, each eleven feet in width and about one and eight-tenths miles in length. The road-mix surface treated shoulders have a minimum width of eight feet on each side of the pavement.

The project beginning at New Avenue extends easterly through Reservoir Canyon and continues on up Crystal Springs Canyon to Crystal Springs. This stretch of highway is the point where the westbound



## REDLANDS

Sketch map showing realignment of State Highway 26 on the Redlands-Beaumont Route.

merous trucks ranging up to maximum legal weight and size. This mixed traffic travels at varying rates of speed, due to the limited tangent distance between the sharp curves. The faster cars had little opportunity to pass the heavier vehicles while traveling at slow speeds in a lower gear.

### TRAFFIC NOT INTERRUPTED

During construction, traffic was carried around the work on the old road and on detours constructed for this purpose.

The newly constructed highway

five million station yards of overhaul were involved. For this work, four-cubic-yard dump trucks were used and were loaded by a two-yard power shovel. The excavated material was taken from the easterly portion of the project in such manner as to form a roadbed to a rough grade section, that may be used as a future alignment correction in the Crystal Springs Canyon.

Adequate drainage was provided for by placing corrugated metal pipes and reinforced concrete box culverts.

From the beginning of the project to the east city limits of Redlands,

traveler leaves the desert roads behind and drives down Crystal Springs Canyon to come upon delightful orange groves, in strange contrast to the arid lands of the desert area through which he has passed.

Bids for the project, which is a link in the Los Angeles to Imperial Valley highway were opened on April 21, 1938. The contractor was the Claude Fisher Company, Limited.

Mrs. Black: "Do you know what happens to little boys who tell lies?"

Herbie: "Yes, Mother. They get into the show for ten cents, and travel for half fare."



View of a section of the improved alignment on State Route 26 through Reservoir Canyon where the highway enters the orange grove area at the eastern entrance to the City of Redlands. The realignment eliminates steep and combined vertical and horizontal curves that presented dangerous conditions for traffic on the old highway. Part of the old routing may be seen at left.



Another view of a part of the new State Highway alignment through the valley below Crystal Springs in Reservoir Canyon on the East approach to the City of Redlands. On the old traveled road, seen at the right of the new highway, numerous sharp, horizontal curves made dangerous driving conditions for the heavy traffic that this route carries.



Combined aerial photo and artist's drawing of Bay Bridge and Terminal. Arrow indicates Terminal Building.

## Bay Bridge Terminal Officially Opened

**A**S THIS ISSUE of the magazine goes to press, Governor Culbert L. Olson is scheduled to officially dedicate the San Francisco-Oakland Bay Bridge terminal, initiating train operations on the monumental structure spanning San Francisco Bay.

One of the most imposing buildings in San Francisco, the Bridge Railway terminal is on Mission street between First and Fremont. Faced with California granite, it is of reinforced concrete construction, modern in line and so designed as to reduce walking to a minimum. The distance from track level to mezzanine (street-level) is approximately 10 feet; from mezzanine to ground floor another 10 feet, making a total distance of 20 feet from track to street. Streetcars rise from ground level to mezza-

nine on a ramp which provides for three tracks.

There is a total of 14 stairs and 11 ramps within the structure, allowing for a wide distribution of passengers, within, while 15 street entrances and exits into and from the terminal tend to eliminate congestion without. These give access to Beale, Fremont, First, Mission, Natoma, and Minna near Second street.

**Approximately 60,000 persons, it is conservatively estimated, will pass through the Terminal daily.**

Due to the convenience of the Terminal location, 50 per cent of these will be within walking distance of their destinations. This is comparable to 25 per cent now within walking distance from the Ferry Building terminus.

Installation of all signal equipment has been completed. Interurban Elec-

tric trains (S. P.) have completed schooling their engineers on nightly runs across the bridge from the easterly end to the Center Anchorage in the West Bay crossing.

Inspection buildings in the East Bay yard are well under way, with major steel work completed, except for the Key System structure.

The Bridge Railway's own telephone system is installed. The system will involve in all 41 telephones, including phones at five crossovers on the bridge proper, the three substations, and four tie stations.

The Bridge Railway was constructed by the State Department of Public Works under the direction of Chief Engineer C. H. Purcell.

An illustrated article showing interior views of the capacious new terminal building will appear in a later issue of this magazine together with details of the dedication ceremonies.

# Many Roads in District I Inadequate

(Continued from page 5)

ble to the entire northwestern portion of the State and, secondly, its development is of major importance to the State as a whole in that it is an important interstate road that has no rival in scenic attraction and is the magnet that draws many thousands of tourists to California each season to view the magnificent groves of Sequoias through which it is constructed. Likewise, it is enjoyed by many State residents living outside the limits of the Redwood Empire during their vacation periods.

Before the addition of approximately 6600 miles to the State Highway System in 1933 the reconstruction of this highway to an adequate standard was planned to be an accomplished fact within a reasonable period.

Secondary State highways within the district make up most of Lake County's road system. In Mendocino County State Highway Routes 56 and 48 are all important to a 100-mile coastal section. While in the northern area, State Routes 35, 20, 46 and 84 make up three laterals connecting U. S. 101 with U. S. 99 and serve a sparsely settled area of considerable size.

In the following estimates of cost to bring these secondary roads to an adequate standard consideration was given both to the rugged nature of the terrain traversed and their relative importance to the State Highway System, neither of which justified their being constructed to the standards that would be considered adequate in more populous and less rugged portions of the State. But regardless of alignment, all State highways should be constructed with passable widths and should have adequate surfacing, and most of all should have structures capable of supporting legal loadings.

At this time there are 53 posted bridges in the district, 44 of them being on secondary highways. The cost of their replacement with adequate structures would require immediate expenditures of \$5,055,000. In all there are 931 miles of State highways in District I, 365 miles being primary and 566 miles secondary, with a further classification as to type of surfacing as follows:

## "Safe Travel on the Highways is a Joint Enterprise"

Have roadbuilders and traffic engineers tended to overstress the possibility of accident reduction through the construction and reconstruction of roads to modern standards of design? We frequently read that the application of all the engineering and traffic knowledge we possess to the redesign of our highway system would eliminate an astonishingly large percentage of highway accidents. Should we not reflect that an equally astonishing result might be obtained if all drivers could be made to apply the common sense now exhibited by, let us say, upwards of 90 per cent of those using the highways?

Pursuit of the praiseworthy ideal of building the best and safest highways possible should not lead to the transfer to the highway engineer of the entire responsibility, or an overwhelmingly large share of it, for the safe conduct of traffic over the roads. The obligation is a joint one. For his part, the engineer is forced to think constantly of the cost of modern highway improvements. He must place warnings where he can not rebuild.

The driver's sense of responsibility must keep up with the engineer's. J. W. Vickrey, safety engineer of the California Division of Highways, recently put it this way:

"The engineer will make frank recognition of his responsibility to so design, construct and maintain the highways that they will to the most reasonable degree require and induce safe action on the part of the driver.

"The driver at the same time must never be permitted to forget that the first and main responsibility lies with him. So long as he demands the right to drive a machine that will respond to his control, no amount of engineering on the part of someone else will ever provide him a guarantee of safety."—*Editorial in Better Roads Magazine.*

	Unimproved and unsealed earth roads		Oiled earth inferior as to grade, width, alignment, and drainage		Graveled roads with light oil surfaces	
	Mi.	%	Mi.	%	Mi.	%
Primary	154.67	27.3	118.98	21.0	157.80	43.26
Secondary	154.67	27.3	118.98	21.0	216.08	38.2
Total	154.67	16.6	118.98	12.8	373.88	40.1

	Intermediate types of surfacing		High type pavement in poor condition		High type pavement in good condition	
	Mi.	%	Mi.	%	Mi.	%
Primary	159.77	43.8	15.38	4.22	26.28	7.2
Secondary	61.75	10.9	1.55	0.3	7.05	1.2
Total	221.52	23.8	16.93	1.8	33.33	3.6

	Bridges		Miles
	Mi.	%	
Primary	5.53	1.52	364.76
Secondary	6.29	1.1	566.37
Total	11.82	1.3	931.13

For the reason that the relative importance of the primary highway system within the district would dictate that its needs be given first consideration in the matter of construction to adequate standards, the estimated cost of reconstruction of the two systems are separated in the following tabulation:

	Mi. of rd. inadequate for present traffic	Mi. of rd. now adequate but will require reconstruction within 20 year period	Mi. of rd. adequate for future	Est. cost to reconstruct roads now adequate but inadequate for traffic in 20 year period (mostly surfacing)	Total est. cost to reconstruct for 20 year period
Primary	159.64	192.09	13.02	\$14,903,000	\$22,458,000
Secondary	427.10	128.17	11.10	15,667,000	17,681,000
Total	586.74	320.26	24.12	\$30,570,000	\$40,139,000
% in miles	63	34.5	2.5		

## Sixteen States Share Work on Central Valley Project

With heavy construction just beginning, one-third of the States of the United States are represented in construction contracts awarded to date on the Central Valley Project.

Thirty contracting firms from sixteen states have shared the work so far started or already completed, it is announced by Walker R. Young, Supervising Engineer for the United States Bureau of Reclamation. Several additional States are represented in separate contracts for materials and supplies required for the construction.

Tourist: "How's business here-about?"  
Native: "It's so quiet you can hear the notes at the bank a block away drawing interest."

# STATE TESTS ROAD DELINEATION BY NEW REFLECTORIZED UNITS

By F. M. CARTER, Assistant Maintenance Engineer

THE Division of Highways is testing reflector units along both sides of State Highway 68, U. S. 101 Bypass, Bay Shore Highway from the South San Francisco subway to Broadway, Burlingame.

Each reflector unit consists of three discs  $1\frac{1}{8}$  inches in diameter, placed one above the other in a vertical position in an enameled frame  $7\frac{1}{2}$  inches high and  $2\frac{1}{2}$  inches wide. These units are placed on both sides of the standard sight posts on both sides of the highway at a height of approximately 40 inches above the pavement. The sight posts are placed 100 feet apart on tangents, 50 feet apart on curves, and 10 feet from the edge of the pavement.

This section of State Highway was selected for the test because the sight posts were already in place. The original reflector discs as placed on the Bay Shore are made of "Lucite" a synthetic resin. The first installation of such units was made on state highways in Michigan. Approximately sixty-five miles of the main highway between Detroit and Lansing was outlined by this reflector system. Since this Michigan installation several manufacturers have developed reflecting units for the same purpose.

## AID TO DRIVER

The reflector unit system is actuated by the headlight of the approaching vehicle and is designed primarily to indicate to the driver the alignment of the highway and especially designate the far edge of the area available to him. The purpose of such designation is to encourage the motorist to drive nearer the right-hand edge of his lane and farther from the center line or the right line of the lane adjacent to the center of the traveled way on a four-lane highway.

In perhaps a somewhat lesser degree of return indication, the Division of Highways has for many years used white painted sight posts to delineate the edge of available roadway along embankments, around curves and at

the approach to bridges and similar locations where the roadway narrows. These sight posts have proved very beneficial to the motorist.

## NEW REFLECTORS

A similar assembly of three three-inch red reflecting elements has been standard for several years as clearance markers at points where the roadway is restricted by culverts, trees, or bridges. Where such red clearance units are used, traffic always passes to the left of the marker.

The test installation on the Bay Shore, however, increases the return indication, and with reflecting units positioned on each side of the posts on both sides of the highway, they advise as to the width of the traversable area given to the motorist.

By the aid of the return reflection from these units, the sight of the

driver is not held to the lane line on his left and the glare of approaching headlights is lessened. The momentary darkness caused when an approaching car passes is minimized by the knowledge obtained, through these reflector units, of location within the lane of the nearness to the outside edge of the traveled way.

## ADVANTAGES OF SYSTEM

The systematic installation of the reflector units over a stretch of highway is planned so that should any unit be invisible to the driver, notification is given that some object occupies the location at which the reflector unit is obscured.

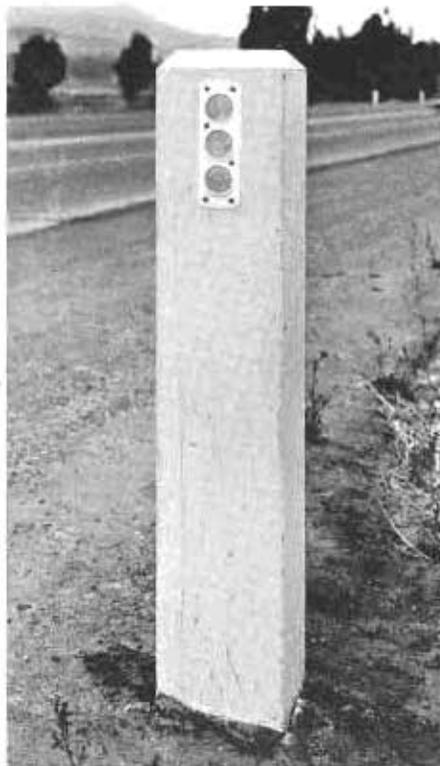
The proponents of the system of reflector units make many claims for their advantages and use. Some of these are:

- (a) To effectively outline or delineate the highway.
- (b) Afford visual indication of pedestrians or parked vehicles.
- (c) Indicates changes in direction of the roadway ahead such as at turns and over vertical curves. These are disclosed and the nature and degree unfolds far enough ahead to permit proper timing and compensating actions by the driver.

The installation of this system on the Bay Shore Highway has just been completed and while sufficient time has not elapsed to obtain reactions from the motorists, it is apparent from our tests that the reaction and benefits obtained on this four-lane highway are much less than should be obtained from such a system on a two-lane roadway.

The benefit of return reflection is also reduced somewhat, because of the city lights which are visible to the driver on this section of highway.

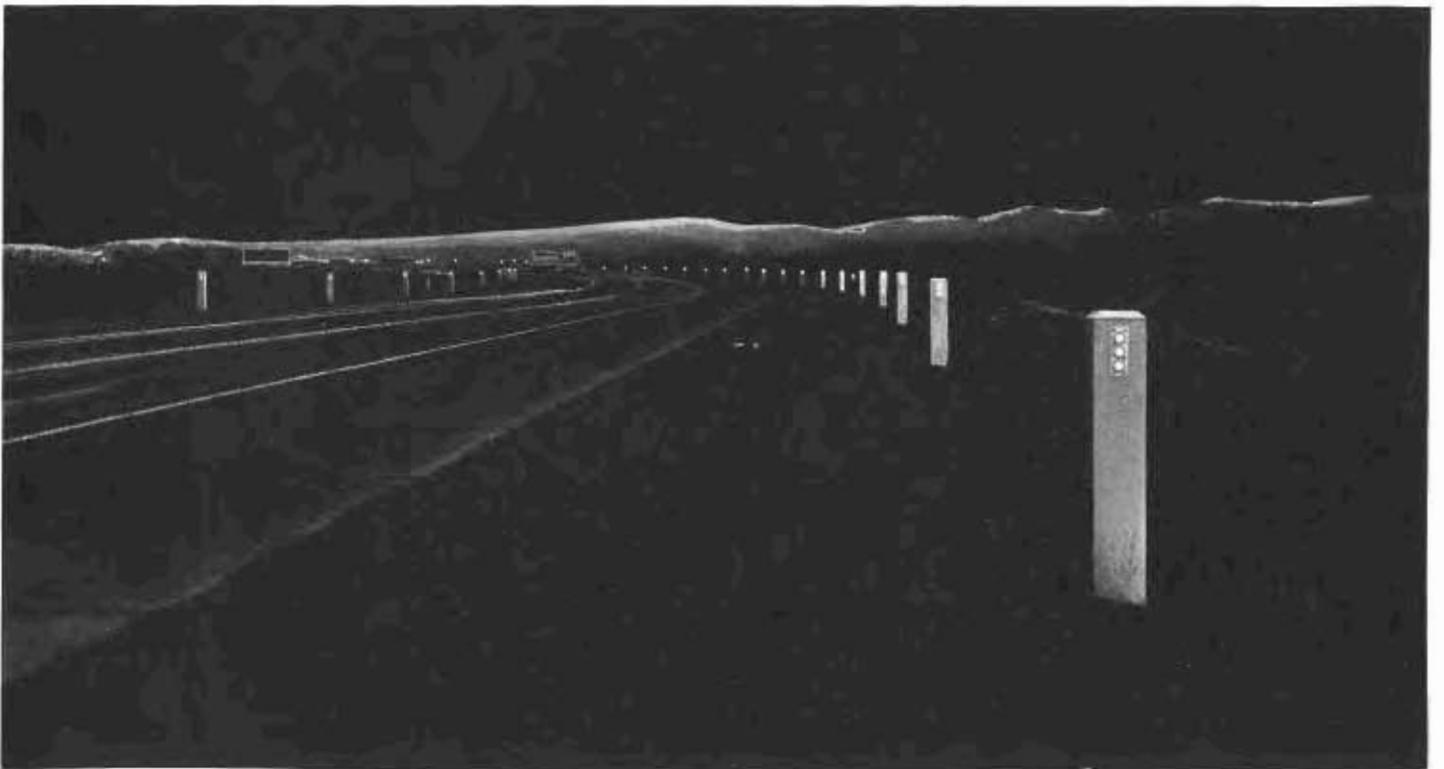
The use of reflector units placed similarly on the outside of sharp curves should prove a distinct benefit to the motorist.



Reflectorized Sight Post now being tested.



View of section of Bay Shore Highway between South San Francisco and Burlingame bordered by reflectorized sight posts being used in an experimental test of night delineation of roadsides. Each post bears three reflector units on two sides that are actuated by headlights of approaching cars.



This view shows how the reflectorized posts outline both edges of the highway at night and plainly give warning of a curve ahead. It is claimed that should any unit be invisible to the driver it gives notification to the driver that a pedestrian or other object occupies the location at which the reflector unit is obscured.

# Development of Equipment Shortens Job by Five Months

By EARL E. SORENSON, District Construction Engineer

**D**UE TO the inventive genius of the contractor on the project in developing new equipment, the widening and modernization of the Rose Canyon gateway to the City of San Diego, a \$380,000 job completed last November, was finished five months ahead of schedule.

More than nine miles of Rose Canyon Highway from Barnett Avenue to Miramar Road, originally improved in 1929 and developed into a three-lane thoroughfare, had to be widened to four lanes to take care of rapidly increasing traffic needs.

In order to assure adequate support for the new pavement on the widened sections placed over old fill areas, it was necessary to recompact the old embankments. This was done by shifting the material and rebuilding the fills in thin lifts with adequate compaction.

Several sections of the old 30-foot pavement through Rose Canyon had settled, due to slippage and inadequate consolidation of the fills. The existing pavement at these locations was removed and water-logged and unsuitable material taken out to an



Drop-hammer operated from truck crane which compacted subgrade to depth 4 to 5 feet.

approximate depth of 2 feet.

In order to compact the fill below this point, considerable experimenting was done with a drop-hammer, operated from a truck crane and it was found that compaction of 88 per

cent could be obtained to a depth of from four to five feet, assuring the necessary support of the new pavement.

#### LATEST IMPROVEMENTS USED

The asphaltic concrete pavement was placed in conformity to the latest specifications, including the use at the plant, of automatic scales with electrically controlled air valves and pistons for operating the gates on the aggregate bins. On the street the latest improvements in spreading devices and raking machines were employed. A three-axle roller was used with excellent results on the "break-down" immediately behind the raking machine.

Due credit must be given the contractor, D. H. Ryan, for development of new equipment and methods which resulted in better and more economical work. Mr. Ryan is responsible for the developing of an outrigger cutting template placed on a standard bulldozer unit and used to round slopes on the smaller cuts.

The widening job included the resloping of many old cuts which had



"Curry-comb" or spike-tooth slope grader on 75-foot boom attached to shovel.

At top—An outrigger cutting template placed on a standard bulldozer unit used to round slopes on the smaller cuts.

Center—Set of steel forms in sections with interlocking devices and braces which permitted contractor to remove and reset up to 200 feet of double curb per hour on center dividing strip.

At bottom—A traveling asphalt raker.

washed and weathered to an unsightly appearance and which were high enough to present a serious problem. To correct this condition, the contractor developed a method of sloping, using a device similar to a spike tooth harrow, but much heavier, and hauled back and forth on the face of the cut and over the rounded tops by cable, using a shovel equipped with a 75-foot boom. This device was used both with and without guides and with remarkably satisfactory results and surprising economy. The workmen have "dubbed" this device with the very appropriate name of "curry-comb sloper."

#### DESIGNED CURB FORMS

Due to the small amount of concrete per linear foot used in the dividing curbs, which were doweled to the existing pavement, it was necessary to move and reset the curb forms very rapidly in order to avoid any delay to the equipment. To provide for this the contractor designed and constructed a very ingenious set of steel forms, in sections, with interlocking devices and bracing which permitted him to remove and reset up to 200 feet of double curb per hour.

For mixing concrete, a one-cubic-yard traveling paver was used, dragging platforms from which the mixed concrete was shoveled into the forms and also mounting or towing the driving units for both electric and air vibrators.

An RD-8 caterpillar tractor mounting a bulldozer to which was welded a properly shaped cutting template, which rode the side forms, was also developed to cut and shape all widths of subgrade from ten to twenty feet. For speed and economy on hard and difficult subgrade this device was very satisfactory, and appears to have great possibilities.

"Shall we have a friendly game of cards?"

"No, let's play bridge."—*Troy (N. Y.) Times.*





**A** FEW more applications for allotments from money appropriated to the Emergency Fund by Chapter 11, Statutes of 1938, Extra Session, for the restoration of property, levees, flood control works, county roads and bridges, damaged by the floods of the 1937-38 winter season throughout the State, were received by the Division of Water Resources during the month. Investigations of work requested in these and other applications and the preparation of reports thereon have been continued. More than 240 reports and recommendations have been prepared by the Division of Water Resources and State Reclamation Board and submitted to the Director of Finance, pursuant to his instructions. No further allocations were made by ex-Governor Merriam for flood damage repair work during the month and the allocations for this work to date total \$4,163,200. The Division of Water Resources is performing some of the work for which these allocations were made, and the remainder is being done by the applicants under contracts entered into with the Department of Public Works. There are now 127 such contracts in force covering work which will cost \$3,321,200.

Work was continued on the checking of plans and specifications for all work being done under contracts, and the supervision and inspection of such work by representatives of the Division of Water Resources.

#### CALIFORNIA COOPERATIVE SNOW SURVEYS

Final details regarding procedure and schedules for this winter's snow surveys have been worked out and arranged for all cooperating agencies. Facilitating details in the field, such as stocking all mountain shelter cabins with food, fuel, bedding, and equipment have been taken care of.

Another new snow course was laid out in the American River watershed, just above

Camp Sacramento on the Placerville-Lake Tahoe highway. Measurements at this new course will be made by rangers of the Eldorado National Forest. With this addition, the number of snow courses to be measured this winter totals 191.

In the upper watershed of the Rubicon River, trail markers have been placed along four miles of trail through difficult country, which will be of material aid to the snow surveyors.

In the office, work has continued on bringing back records up to date. Monthly precipitation records for the period since last July are being tabulated and where runoff records are now available the forecasting curves are being brought up to date. Some research work is also being done with the aim of improving our forecasting procedure.

#### CENTRAL VALLEY PROJECT

Engineering studies in connection with the Central Valley Project were continued. These studies included analyses of field data previously obtained through comprehensive hydrographic, hydrologic and topographic surveys, for the preparation of a report to be used in connection with negotiations for the acquisition of water rights of the lands bordering the San Joaquin River, which are now being served by that stream. Studies also were continued on matters affecting the disposal of water and power made available by the project, including analyses of present ground water conditions and requirements of certain areas for additional supplies and investigations, and the preparation of reports on districts being formed for the purpose of purchasing water from the project. Negotiations were continued with public utility companies for the relocations of power and communication facilities for the complete project and for temporary relocations necessitated by construction activities. Work was nearly completed on the preparation of a report on the acquisition of, and plan of exchange for, water rights of certain owners along the San Joaquin River proposed to be acquired for the use of the Central Valley Project.

#### SPECIAL INVESTIGATIONS

##### Cache Creek Investigations

An engineering investigation was continued for the preparation of a report on a preliminary coordinated plan of flood control for the Clear Lake and Cache Creek drainage areas in Lake and Yolo counties.

##### Cooperative Flood Control, U. S. Departments of War and Agriculture

The Division of Water Resources has continued studies in cooperation with the U. S. Departments of Agriculture and War for the formulation of a coordinated state-wide plan of flood control for the State of California.

##### Cooperative Survey by U. S. Departments of War and Interior

A comprehensive survey being conducted jointly by the State of California, U. S. War Department and U. S. Department of the Interior, covering the compilation and analyses of flood data on the record-breaking floods of the 1937-38 season, was continued.

##### Henshaw Reservoir Yield Study

A study of the safe yield of water for irrigation from the Henshaw Reservoir in San Diego County, made at the request of the Vista Irrigation District with funds furnished by it, was completed and preliminary report prepared.

##### Conn Valley Reservoir Project

Work was continued during the month by the Division of Water Resources on the preparation of plans and specifications for the construction of the Conn Valley Dam and Reservoir in Napa County. Surveys of the reservoir site and dam and spillway locations were continued by the Division of Water Resources, and surveys for the relocation of the state highway through the reservoir site were continued by the Division of Highways under a service agreement with the Division of Water Resources. An appraisal was made of the lands in the reservoir site by a board appointed for this purpose, and a report was rendered by it to the State Engineer.

#### IRRIGATION DISTRICTS

Fallbrook Irrigation District was formally dissolved on November 26, 1938, by a decree of the superior court in session at San Diego. The district was organized in 1925 and endeavored without success for a number of years to secure a water supply from Santa Margarita and San Luis Rey rivers. All of the assets of the irrigation district have been acquired by the Fallbrook Public Utility District under which organization the landowners in the area will carry on their efforts to obtain additional water. At an election held December 14, the voters authorized a bond issue of \$150,000 to finance a water development program. A pumping plant and pipe line will be built to supply water from wells on an 80-acre tract

recently acquired in the San Luis Rey Valley.

West Side Irrigation District voted at a recent election to refinance its outstanding bonded indebtedness by entering into a contract with the Reconstruction Finance Corporation for a loan of \$286,500. This will permit the payment of about 50 cents on the dollar to bondholders, 90 per cent of whom have accepted the plan of debt compromise. A petition for confirmation of the plan was filed in the United States district court at Sacramento on December 13, 1938.

#### SUPERVISION OF DAMS

With the runoff season upon us the repairs on many of the dams in the State are nearing completion.

The Los Angeles County Flood Control District is completing many repairs and alterations to the outlet works on their major structures so that excessive flood-carried debris will not interfere with the efficient operation of their flood control works.

During the month of December, applications were received for the approval of the following dams: Lemoore Diversion Dam, in Kings County; Peconom Dam in Lassen County; Gold Lake Dam in Plumas County. Applications were approved for the construction of Palos Verdes Dam in Los Angeles County and Newton Dam in Napa County. The application for the enlargement of the Bevanda Dam in Calaveras County was approved. Applications for the repair of the Live Oak Dam in Los Angeles County, Roberts Dam in Modoc County and of the McMahon Gulch Dam in San Mateo County were received.

#### WATER RIGHTS

Receipt and action upon applications to appropriate water during the month of November were as follows: Twenty-one applications were received; 11 applications were denied; 17 applications were approved; 10 permits were revoked, and 15 licenses were issued.

Inspection reports are in process of preparation upon the 228 projects which were inspected during the past field season and an analysis is being made of the 1,316 reports filed by permittees and licensees since October 1.

#### TOPOGRAPHIC MAPPING

Advance sheets of the Blairsden and Rogers Lake quadrangles are now available. They are published on a scale of 1:48,000 with contour intervals of 50 feet and 25 feet, respectively. The Blairsden quadrangle covers an area in Plumas County embracing the NE $\frac{1}{4}$  of what has been known as the Downieville quadrangle. The Rogers Lake quadrangle covers an area in Kern and Los Angeles counties embraced within the NW $\frac{1}{4}$  of what has heretofore been designated as the Kramer quadrangle, a map of which has not as yet been published.

Final maps of the Lakeport quadrangle have recently been published and this sheet is of special interest because the field work was done in part by aerial methods and this

marks the first sheet published under the cooperative agreement with the United States Geological Survey in which topography was thus mapped. This sheet is published on a scale of 1:62,500 with a contour interval of 50 feet.

#### SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

During the past month the activities have been confined wholly to the routine office work necessary before starting the actual computations of diversions, stream flow and return water in the Sacramento and San Joaquin valleys during the 1938 irrigation season.

The sampling of water in the delta for salinity is being carried on at a number of stations sufficient to record the recession of the salinity.

#### RELIEF LABOR WORK

The State Relief Administration has abandoned Camp No. 7 at Waybur in Sutter County so that the 100 men formerly employed by the Division are no longer available.

The clearing work in the Feather River overflow channel and the Butte Slough By-pass has continued with an average of 146 men assigned, which is equivalent to the continuous labor of 73 men. At this time the entire crew is clearing in the Butte Slough By-pass.

Under a project sponsored by this Department, there are 98 men assigned, equivalent to 50 men full time, to clearing the channels of Little Chico Creek, Big Chico Creek and Edgar Slough in the vicinity of Chico, and the incidental cost of this work is being paid by Butte County. Plans are now being made to extend this work to Butte Creek, and this office is obtaining the necessary rights of way.

Under the same Department sponsored project, 80 men have been assigned to clearing on the river banks and levees in Reclamation Districts 535 and 673 in Sacramento County. Similar work will be started within the next day or two in Lisbon Reclamation District No. 307 in Yolo County.

At this time there are assigned to work under charge of this Division a total of 324 men from which a continuous working crew of 160 men is available.

#### EMERGENCY LEVEE REPAIRS

The work of completing the flood damage repairs in Glenn, Butte, Shasta and Tehama counties has been completed and the final report thereon is now in preparation. The last work was on Stony Creek in Glenn County.

Judge: "What's the charge against this man, officer?"

Officer: "Bigotry, yer honor. He's got three wives."

Judge: "I'm surprised at your ignorance, officer. That's trigonometry, not bigotry."

## Cornerstone of New State Building in Sacramento is Laid

By W. K. DANIELS, Assistant State  
Architect in Charge of Division

LAYING of the cornerstone of the new Professional and Vocational Standards Building at Eleventh and N streets in Sacramento was celebrated by State and county officials on December 29.

The plan of the structure which is being built under supervision of the Department of Public Works is in the form of a block Figure "8" with dimensions of 307 feet by 146 feet. The main entrance is on N street and minor entrances on Tenth and Eleventh. The two light courts are 54 feet by 63 feet and extend through the five stories.

The building is of reinforced concrete construction including its skeleton frame designed to resist lateral force. It will be highly fire and earthquake resistive.

Architecturally and in its equipment and finishes it will conform to the quality set by the neighboring buildings for the Departments of Public Works and Motor Vehicles. An exterior of exposed concrete poured in ply wood forms and finished with cement bonding paint will provide large window openings for these work shops.

In all working areas acoustical plaster ceilings will aid sound control; modern artificial illumination and Venetian blinds will furnish lighting control, and air conditioning is designed to control both temperature and humidity throughout the year.

The gross area is 242,136 square feet including a full basement.

The new building will be occupied by the Board of Equalization, Veterans' Welfare Board, Department of Professional and Vocational Standards, Franchise Tax Department, Division of Lands and Division of Real Estate.

A small assembly room on the first floor will seat 108 in fixed seats. An area 35 feet by 70 feet on the sixth floor will seat 350 in seats not fixed or accommodate approximately 120 seated as for an examination.

Three and one-half inches of insulation will be provided in the fifth floor ceiling under the roof and a

(Continued on page 38)

# California Protects Gas Tax Funds by Constitutional Act

(Continued from page 13)

tutional amendment was to provide that the existing revenues which were devoted to highway purposes would continue to be so devoted and that any new motor vehicle fuel or motor vehicle taxes levied would be used for such purposes. As to existing taxes which were not used for such purposes, the purpose of the amendment was to permit the continuance of the present uses of the money raised by them.

Section 4 first provides that the constitutional amendment shall not apply to the taxes raised by Chapter 339, Statutes of 1933. This chapter is commonly known as the three per cent truck tax act. A tax of three per cent of the gross receipts is imposed upon all operators of motor vehicles for hire except where they operate entirely within a city. The revenue from this act since its enactment in 1933 has gone into the general fund of the State. This constitutional amendment will permit the continuance of such payment into the general fund.

## BOND PAYMENTS

There has been some confusion as to an amendment made to this act in 1935. The 1933 act as enacted provided that of the revenue paid into the general fund of the State there should be set apart a sufficient amount to pay off the various State highway bonds that had been issued. This "ear marking" of the revenue really meant nothing because the State highway bonds were obligations of the general fund anyway, and it made no difference what actual revenue that went into the general fund was used to pay off these bonds. The purpose of the provision in the 1933 act was to prevent agitation to pay these bonds out of the State highway fund as there was considerable sentiment in favor of doing that at that time.

In 1935 the "ear marking" was taken out of the three per cent truck tax act and the revenues were paid directly into the general fund. The reason this was done was that the so-called "in lieu tax," Chapter 362, Statutes of 1935, was enacted and the revenue from that act was payable into the general fund. That act included an "ear marking" for State

## Trend Against Gas Tax Diversion Steadily Growing

Three States—California, Michigan and New Hampshire—adopted constitutional amendments at the last general elections prohibiting diversion of gasoline tax funds and motor vehicle revenues to nonhighway purposes.

The California proposal carried by a two to one vote. The Michigan amendment succeeded by a majority of approximately 200,000 votes. The vote in New Hampshire was five to one against diversion.

Colorado, Kansas, Minnesota and Missouri had previously adopted anti-diversion amendments.

According to the U. S. Bureau of Public Roads, more than one billion dollars have been diverted from highway construction since diversion became a practice in many States.

The trend against diversion of gasoline tax funds is widespread and other States are expected to follow the lead of the seven which already have adopted constitutional amendments prohibiting misuse of highway moneys.

highway bonds, but the revenues from the act far exceeded the costs of the principal and interest on the State highway bonds so there was no purpose in having the three per cent truck tax revenue also "ear marked" for the highway bonds.

## IN LIEU TAX

The so-called "in lieu tax," Chapter 362, Statutes of 1935, provides for the return of certain percentages of the net revenue to the various counties and cities of the State while the remainder is paid into the State general fund. Some authorities on taxation have shown an inclination to regard this tax as a diversion of highway funds. This would seem entirely

unwarranted under the circumstances. Prior to the adoption of the "in lieu tax" in 1935, all motor vehicles were subject to the general personal property taxes levied on an ad valorem basis by counties and cities. The revenue from the general property taxes, of course, went into the general funds of the counties and cities and was not at all devoted to highway purposes. Although the State did not levy an ad valorem tax, it was authorized to do so prior to 1935 if necessary to provide sufficient State revenue. Had it done so, motor vehicles would have been included along with all other personal property and the revenue would have been paid into the State general fund.

## COUNTIES PAID BACK

When the "in lieu tax" was adopted, local governmental agencies were thereafter prohibited from levying personal property taxes on motor vehicles. The act itself provides for paying back to the counties and cities a certain share of the receipts of the "in lieu tax." It has been said that the local governmental agencies receive almost as much revenue now as they did previously due to the fact that no motor vehicles are able to escape taxation as they were previously, and due to the fact of decreased cost of collection. The net result is that the State has become the collecting agent only for the personal property taxes on motor vehicles. In no sense can it be considered a new tax nor can it be said to constitute a diversion.

Section 4 also specifically provides that taxes collected under the sales tax or use tax are not affected and that these may continue to go into the general fund. This was done because of the fear of some people that sales taxes imposed on the sale of an automobile would be covered by the constitutional amendment. This was not the intention and is clearly so stated in section 4.

Section 4 also provides that the Unemployment Relief Bond Act of 1933 shall not be affected.

The Unemployment Relief Bond Act of 1933 provided for the sale of twenty million dollars of State bonds

(Continued on page 28)



### Italy Interested

Instituto Sperimentale Stradale  
Della Consociazione Turistica Italiana  
E Del Reale Automobile Club D'Italia

Milano, 19 November, 1938.

Spett. le Rivista,  
California Highways and Public Works,  
P. O. Box 1499,  
Sacramento, California.

We propose to institute a systematic exchange between your California Highways and Public Works, which is always at our disposal for interesting reference, and our review "The Highways," the organ of our institute, and which we will send you complimentary.

Would you be willing to consider exchange with our publication, the oldest Italian publication specializing in all technical, experimental, legislative, economic and administrative problems regarding the highways?

We trust and anticipate your approval of the exchange of reviews. We send you our regards.

Il Direttore,

CESARE BIFFI.

### College Student Aided

Associated General Contractors of America  
Southern California Chapter  
801 Washington Building  
Los Angeles, California

December 30, 1938.

Mr. John W. Howe, Editor,  
California Highways and Public Works,  
Sacramento, California.

Dear Mr. Howe:

I have a nephew who is graduating as a civil engineer in June and who is specializing in highway engineering and last evening while visiting at my home he had an opportunity to look through my file of "California Highways and Public Works" which interested him very much.

He expressed the opinion that a careful study of your magazine would probably be just as useful as some of the courses which he is taking in college so at his request I wish to ask if it is possible for you to put his name on your mailing list to receive the magazine monthly for a little while at least.

I don't like to impose upon your good nature, but I am also anxious to secure a complete file of your 1938 issues and

if it is possible for you to send me one copy of each monthly issued during 1938 I will be very grateful to you.

In closing I want to say that I read your magazine with more interest than any of the publications which come to my office and I want to congratulate you on the fine standards which you have maintained.

Best wishes for a Happy and Prosperous 1939, I remain

Sincerely yours,

(Signed) F. J. CONNOLLY,  
Manager.

### Praise From Oakland

5714 Broadway,  
Oakland, California,  
December 26, 1938.

California Highways and Public Works,  
P. O. Box 1499,  
Sacramento, California.

Gentlemen:

I have read several issues of your "California Highways and Public Works" magazine and would like very much to be placed on your mailing list to receive it regularly.

The articles interest me in that they show the trends and latest developments in highway and street work all over California. This, I think, may, in a way, help me in my work as construction superintendent in the City of Oakland street department.

Very truly yours,

(Signed) W. H. TAMM.

### An Appreciation

Hollywood, California,  
December 5, 1938.

Mr. S. W. Lowden,  
Division of Highways,  
Bishop, California.

Dear Mr. Lowden:

About a week ago, traveling from Death Valley to Hollywood, my car broke down at about the end of what, I believe, is your division. I had the good fortune to stop behind a State truck manned by M. M. Warner and Sam Gordon. Despite the fact that they were at the end of their run and in a hurry, they plugged the leaks in my radiator and towed me to the top of a hill where I could get a run down into a service station. As it turned out, they saved me hours of delay

and a great deal of discomfort—and a lot of mental anguish.

I tried to get them to accept something for their kindness, but they refused; and I literally had to pry their names and yours out of them.

The purpose of this letter is to express my gratitude in what is apparently the only way I can do it. You now have one more loud and enthusiastic booster for the State highway service and one more admirer of the men in it.

Incidentally, if Mr. Warner or Mr. Gordon should be in Hollywood some time and want to see Paramount Studio, I could arrange it. They can call me there. And if you could tell them I really remembered and wrote, I'd appreciate it.

Best wishes to District IX.

Gratefully,

ROBERT CARSON (SS),  
8281 Norton, W. Hollywood, Calif.

P. S.—The next time my wife and I pass a State highway truck, we're going to wave to 'em.

### Minnesota University Writes

University of Minnesota Library  
Minneapolis, Minnesota

Dec. 29, 1938.

We are desirous of securing a copy of the report as listed below, "California Highways and Public Works," if available, free of charge.

If the name of our library is not now on your permanent mailing list, is it possible for us to be included?

Very truly yours,

RAYMOND H. SHOVE,  
Head of Order Department.

### Aid to City Engineer

City of Fullerton, California  
City Hall, 123 West Wilshire Avenue.  
November 23, 1938

Editor Highway Bulletin,  
Sacramento, Calif.

Dear Sir:

I would appreciate your sending me the Highway Bulletin magazine as I have read same and found it contains many interesting and educational articles.

Yours very truly,

(Signed) H. A. HILTSCHER,  
City Engineer.

## National System of Parkways and Freeways Coming

**D**EVELOPMENT of parkways and freeways into a national system is foreseen by the *National Park Service*. Its sixty-page illustrated Year Book makes this statement:

"With the tremendous increase in motor traffic over-crowding the highways, the parkway has offered an avenue of escape free of commercial vehicles and cluttered roadsides. Today, in certain sections of the country, parkways function as important arteries of travel for pleasure vehicles. They provide safe, fast routes through metropolitan districts and between important recreational centers. Tomorrow, parkways and freeways or limited motorways, will form a national system for motor transportation."

The National Park Service expresses the opinion that, "In all levels of planning, national, regional, state, county and city, parkways should be carefully studied because of their direct relation to the problems of transportation, recreation, conservation and natural resources, land use, and zoning." State and regional planning agencies are said to be now emphasizing the importance of parkways.

The difference between a parkway and a highway is explained by the National Resources Committee as follows: "An elongated park with a road running through it, in counter distinction to a highway, possessing a board right-of-way. In the case of the parkway, access is wholly under control of the administrative agency; in the case of the highway, abutting property owners possess definite rights of access."

Another authority defines a freeway, or limited motorway, as a strip of public land devoted to movement over which the abutting property owner has no right of access.

The National Park Service says that, "Except for the Mount Vernon Memorial Parkway, and the national parkway projects, Blue Ridge, Natchez Trace, and Colonial, actual parkway construction has so far been generally limited to metropolitan regions.

## Bay Bridge Traffic Report Shows Increase Over December, 1937

**A** TOTAL OF 8,621,196 vehicles crossed the San Francisco-Oakland Bay Bridge during 1938, it was revealed in a December traffic report filed by State Highway Engineer C. H. Purcell with Director of Public Works Frank W. Clark. This compares with the total of 9,104,765 vehicles for the year 1937. The drop from last year's total was attributed to low-rate automobile ferry competition. However, last month's traffic figures showed an increase over any previous month since the ferries lowered their rates in August, 1937, the report said.

A total of 783,846 vehicles crossed the span during December, averaging 25,285 cars per day, and bringing revenues amounting to \$410,227.41. During the three-day Christmas holidays 102,565 vehicles crossed the Bay Bridge.

December traffic a year ago totaled 721,048 vehicles. A general increase in the various classifications of traffic was indicated in the December 1938 figures over those for the same period of 1937. The number of trucks to cross the bridge in December, 1938, was 40,264 as compared to 25,316 for December, 1937. Truck trailers also increased with 1607 for last month and 954 for December, 1937. Freight pounds for last month numbered 114,999,050 as compared to 59,597,004 for the same period in the previous year.

Total freight pounds for 1938 is 1,076,601,801. Other 1938 totals are: Motorcycles, 28,944; buses, 144,549; trucks, 402,340; truck trailers, 17,162.

Total number of vehicles to cross the bridge since its opening on November 12, 1936, is 19,061,189.

Comparative figures follow:

	Total December	Total November	Total since opening
Auto Trailers -----	683	859	30,463
Passenger Autos -----	709,223	708,587	17,677,209
Motorcycles -----	1,715	22,461	65,249
Tricars -----	1,164	1,210	21,650
Buses -----	13,616	13,239	247,634
Trucks -----	40,264	39,760	720,320
Truck Trailers -----	1,607	1,743	39,579
Toll Vehicles -----	768,272	767,859	18,802,104
Auto Passes -----	14,533	13,767	232,528
Truck Passes -----	1,041	1,626	26,557
Total Vehicles -----	783,846	783,252	19,061,189
Extra Passengers -----	247,439	238,999	4,748,635
Freight Pounds -----	114,999,050	115,921,750	1,822,259,126

## Pounding Seas Damage Roads

Considerable damage was done to highways in Mendocino County by high seas of January 5. District Highway Engineer E. R. Green reported to the Central Office in Sacramento.

About 1500 cubic yards of new fill at Seaside Creek were washed out. A pile abutment about 320 feet long at Caspar Creek was undermined by ocean waves, the damage amounting to \$2,000.

A concrete pile on Salmon Creek Bridge and some piling on Big River Bridge were damaged by drift.

Del Norte County also suffered from pounding seas. The highway out of Wilson Creek was damaged considerably. The highway south of Crescent City was covered with water and drift for about three miles and traffic was taken through under control.

In Crescent City, water covered Front street and went as far as Second street.

All highways were kept open, Mr. Green reported.

"I started out on the theory that the world had an opening for me."

"And you found it?"

"Well, rather. I'm in the hole now."

## Highway Bids and Awards for the Month of December, 1938

**FRESNO COUNTY**—Across San Joaquin River Overflow, about 8 miles east of Mendota, five bridges to be repaired. District VI, Route 41, Section P. A. Soda and Son, Oakland, \$14,999; A. A. Tieslau, Berkeley, \$12,584; E. G. Perham, Los Angeles, \$14,741. Contract awarded to F. Fredenburg, San Francisco, \$11,084.

**KERN COUNTY**—Overhead crossing over tracks of A. T. & S. F. Ry. at Oak Street in Bakersfield, consisting of one 88-foot, one 80-foot, one 68-foot, and seventeen 45-foot steel girder spans with reinforced concrete deck supported on concrete bents on treated timber piles and approximately 0.44 mile of roadway to be paved with Portland cement concrete and plant-mixed surfacing. District VI, Route 141, Section Bkd., Union Paving Co., San Francisco, \$183,431; Griffith Co., Los Angeles, \$179,670; Earl W. Heple, San Jose, \$179,505; Heafey-Moore Co., Fredrickson & Watson Construction Co., Oakland, \$188,268; J. F. Knapp, Oakland, \$189,890; White & Wilberg, Santa Monica, \$189,969; Gibbons & Reed Co., Burbank, \$193,285; Vinson & Pringle, Phoenix, Arizona, \$195,642; Oscar Oberg, Los Angeles, \$197,935; M. B. McGowan, Inc., San Francisco, \$209,528; J. H. Pomeroy & Co., Inc., San Francisco, \$211,016. Contract awarded to United Concrete Pipe Corporation, Los Angeles, \$178,460.70.

**LASSEN COUNTY**—Between 3 miles south of Standish and Wendel, about 0.6 mile to be graded and surfaced with gravel and penetration oil treatment applied. District II, Feeder road. A. A. Tieslau, Berkeley, \$12,185. Contract awarded to Harms Bros., Sacramento, \$9,929.50.

**LOS ANGELES COUNTY**—Fremont Avenue, between First Street and Diamond Street, North Street, between Fremont Avenue and North Figueroa Street, and North Figueroa Street, between Diamond Street and Temple Street, a portion of State highway is to be constructed and sanitary sewers to be installed. District VII, Route 165, Section L.A. Griffith Company, Los Angeles, \$18,745. Contract awarded to C. G. Willis & Sons, Inc., and Chas G. Willis, Los Angeles, \$13,363.

**LOS ANGELES COUNTY**—Between Lomita Boulevard and Wilmington-San Pedro Road, about 1.9 miles to be graded and surfaced with asphalt concrete, Portland cement concrete and plant-mixed surfacing. District VII, Route 165, Section L.A. United Concrete Pipe Corp., Los Angeles, \$86,462; J. E. Haddock, Ltd., Pasadena, \$91,751; L. A. Paving Co., Los Angeles, \$97,778; Oswald Bros., Los Angeles, \$107,923; C. O. Sparks and Mundo Engineering Co., Los Angeles, \$114,826. Contract awarded to Griffith Co., Los Angeles, \$85,584.50.

**ORANGE COUNTY**—Between Santiago Boulevard and Santa Ana Canyon Road, about 0.7 mile to be graded and paved with Portland cement concrete. District VII, Route 43, Section B. Match Bros., Elsinore, \$44,912; Griffith Co., Los Angeles, \$46,049; J. E. Haddock, Ltd., Pasadena, \$47,468; Vido Kovacevich, South Gate, \$48,153; C. O. Sparks & Mundo Engineering Co., Los Angeles, \$48,193; V. R. Dennis Construction Co., San Diego, \$49,466; Daley Corp., San Diego, \$51,928; Sully Miller Contracting Co., Long Beach, \$52,918; Claude Fisher Co., Ltd., Los Angeles, \$52,940; C. R. Butterfield & Kennedy Co., San Pedro, \$53,226; Johnston & Perscallo, Los

### Three Zones for Development of Highway Landscape

There are certain fundamental requirements in the finished highway product of today that have not always been included, says W. H. Simonson of U. S. Bureau of Roads. The need for conserving topsoil is increasingly recognized. Topsoiling, seeding and sodding are being integrated with regular construction. Native vegetation is favored for roadside plantings. There is increasing interest also in the control of lands adjacent to the highway through the use of building setback lines, regulation of access, grading and seeding easements and so forth.

In highway landscape development, these distinct zones are now recognized: (1) roadbed, (2) roadside and (3) adjacent lands. In planning for tomorrow's highways we must have sufficient right-of-way to provide surfaces to meet the needs of present and future traffic. The roadside must be wide enough to accommodate the ultimate development through reasonable border control, including private lands fronting on highways.

We can not reach the ultimate development in highways with respect to either character of surface or roadside development in the immediate future, because of lack of funds. But the widths of right-of-way obtained now will definitely control the ultimate development. — *Better Roads.*

Angeles, \$55,249; S. Edmundson & Sons, Los Angeles, \$56,593. Contract awarded to United Concrete Pipe Corp., Los Angeles, \$44,800.80.

**ORANGE COUNTY**—Over A. T. & S. F. R. R., about 0.5 mile north of Galivan, an overhead crossing to be repaired. District VII, Route 2, Section B. R. M. Price,

Huntington Park, \$12,538; Edward Green, Los Angeles, \$12,822; H. H. Peterson, San Diego, \$13,913; The Contracting Engineers Co., Los Angeles, \$13,946; V. R. Dennis Construction Co., San Diego, \$14,445; A. L. Gabrielson, Arlington, \$16,999; J. E. Haddock, Ltd., Pasadena, \$18,549. Contract awarded to Franzini and Fredenburg, San Rafael, \$12,415.50.

**ORANGE COUNTY**—At Brea Canyon, about 5 miles northeast of Fullerton, reinforced concrete channel protection to be constructed. District VII, Route 19, Section A. Oberg Bros., Los Angeles, \$13,995; R. M. Price, Huntington Park, \$14,405; Edward Green, Los Angeles, \$14,710; Raymond H. Liggett, Lynwood, \$16,340; J. E. Haddock, Ltd., Pasadena, \$16,550; Byerts & Dunn, Los Angeles, \$18,910; Contracting Engineers Co., Los Angeles, \$22,830. Contract awarded to Vido Kovacevich, South Gate, \$13,565.

**RIVERSIDE COUNTY**—Near Norco, construction of a reinforced concrete girder bridge across Santa Ana River and 0.3 mile of roadway to be graded and surfaced with plant-mixed surfacing. District VIII, Route 193, Section A. White and Wilberg, Santa Monica, \$104,861; C. O. Sparks and Mundo Engineering Co., Los Angeles, \$107,105; Byerts & Dunn, Los Angeles, \$107,312; J. S. Metzger & Son, Los Angeles, \$117,998; John Strona, Pomona, \$119,392; The Contracting Engineers Co., Los Angeles, \$122,666; Oscar Oberg, Los Angeles, \$123,761; R. E. Campbell, Los Angeles, \$125,284; United Concrete Pipe Co., Los Angeles, \$126,186; Baruch Corp., Los Angeles, \$128,203; J. E. Haddock, Ltd., Pasadena, \$135,331. Contract awarded to Vinson and Pringle, Phoenix, Arizona, \$88,154.70.

**SAN BERNARDINO COUNTY**—About two miles east of Ontario across Cucamonga Wash, a reinforced concrete slab bridge consisting of two 24-foot spans, two 22-foot spans and two 6-foot cantilever spans on concrete piles and approximately 0.13 mile of approaches to be graded and 0.06 mile Portland cement concrete pavement to be constructed. District VIII, Route 26, Section D. H. H. Peterson, San Diego, \$24,947; Oberg Bros., Los Angeles, \$26,569; R. M. Price, Huntington Park, \$27,995; Dimmitt & Taylor, Los Angeles, \$28,167; White and Wilberg, Santa Monica, \$29,145; The Contracting Engineers Company, Los Angeles, \$31,350; Vinson and Pringle, Phoenix, Arizona, \$33,097; Byerts & Dunn, Los Angeles, \$31,825. Contract awarded to Gibbons & Reed Co., Burbank, \$24,714.19.

**STANISLAUS COUNTY**—About 0.4 mile south of Turlock, a steel beam overhead structure with concrete deck across the tracks of Southern Pacific Railroad, to be constructed and about 0.3 mile to be graded and paved with Portland cement concrete and asphalt concrete. District X, Route 4, Section A. J. F. Knapp, Oakland, \$309,799; United Concrete Pipe Corp., Los Angeles, \$312,890; Earl W. Heple, San Jose, \$295,399; Frederickson and Westbrook, Sacramento, \$297,810; Heafey-Moore Co. & Fredrickson and Watson Construction Co., Oakland, \$295,497; P. J. Walker Co., San Francisco, \$338,985; Eaton and Smith, San Francisco, \$319,455; C. W. Caletti & Co., San Rafael, \$343,905. Contract awarded to Union Paving Co., San Francisco, \$242,044.

**TULARE COUNTY**—Between Exeter and Venida Substation, about 2.7 miles to

(Continued on page 38)

# California Protects Gas Tax Funds by Constitutional Act

(Continued from page 24)

—obligations of the State general fund. The proceeds were to be loaned to the counties for unemployment relief purposes. The act provided that the counties borrowing the money could make arrangements for the repayment of this money in any way they saw fit at the time of borrowing, but that if no such arrangements were made, then the annual installments due from the counties to the State would be deducted from their apportionment of gasoline taxes and would be paid into the general fund. Only one or two counties made any arrangements for the repayment of the money borrowed at the time the borrowing was made, and consequently most of the counties are repaying what they borrowed by having the annual installments deducted from their apportionments of gasoline taxes. The bonds under this act run for only ten years so that by 1943 or 1944 these bonds will be entirely paid off.

The use of the revenue from the in lieu tax, which now goes to the general fund, is also undisturbed by the constitutional amendment except that as long as the tax is imposed enough of the revenue must be "ear marked" to pay off the State highway bonds above referred to.

It is also provided that if the in lieu tax is repealed, the legislature may provide for the payment of the State highway bonds from either the gasoline tax or the motor vehicle fees or any new taxes on motor vehicles that might be imposed—providing such payment out of present highway revenues will not cause the loss of federal funds to the State. There is certain federal legislation now, known as the Hayden-Cartwright Act, which it is believed would cause the loss of federal aid if present revenues were used to pay off these bonds.

The last provision in the amendment attempts to retain the status quo in so far as section 15 of Article XIII of the Constitution is concerned. That section relates to the public school system and for many years has contained a provision which says that the school system shall have the first call on all State revenues. This constitutional amendment states that it does not impliedly repeal that provi-

## An Appreciation

The State College  
of Washington  
Pullman, Washington

College of  
Mechanic Arts and Engineering  
Department of  
Civil Engineering

January 2, 1939

California Highways and  
Public Works,  
Sacramento, California.

Dear Sirs:

For a good many years I have had the privilege of receiving copies of "California Highways and Public Works" and have found this magazine the most interesting and valuable one of its class; I have also found it very useful in my work of teaching highway engineering at the State College of Washington.

This magazine is especially valuable in its frequent illustrations of modern practice in highway location, design and construction, its demonstrations of research applied to highway engineering, and the frequent demonstrations of the economic value of high cost highway locations. Motorists, as well as highway engineering students, need the facts as to the large values resulting from widening and straightening highways, and the engineers of the highway department are to be congratulated on the convincing manner in which they present these values in the pages of your magazine.

I hope you will be able to continue sending me this magazine, as I would feel lost without its frequent message of good highway engineering.

Very truly yours,  
H. E. PHELPS,

Howard E. Phelps, Professor  
Highway Engineering.

sion but that if any moneys are used for the support of the schools, they must be returned to the highway funds.

There has always been some doubt as to the effectiveness of the provision in section 15 of Article XIII of the Constitution inasmuch as it provides no method of determining how much money shall be taken from each special fund in the treasury. Due to that fact, it may be entirely ineffective. The effect of this constitutional amendment is to leave whatever uncertainty there is, still existing.

From the above it is apparent that the only reason for the length of the constitutional amendment is that certain diversions or "near-diversions" have occurred in the past and that the amendment attempts to preserve the status quo as to those but to prohibit any additional or future diversions of any kind.

*The foregoing article was prepared by Mr. George T. McCoy for the Western Construction News and California Highways and Public Works.*

## CORNERSTONE OF NEW STATE BUILDING IS LAID

(Continued from page 23)

spray coating of aluminum paint in the roofing will counteract solar radiation.

A garage in the basement will house eighteen State cars.

It is estimated that the building will be completed by October, 1939.

The cost of construction, \$1,500,000, including the land, will be defrayed by rentals paid by State agencies occupying the structure.

The Campbell Construction Company is the contractor.

## BIDS AND AWARDS

(Continued from page 27)

be graded and surfaced with plant-mixed surfacing. District VI, Route 129, Section Exr., D. Union Paving Co., San Francisco, \$64,332; Oilfields Trucking Company, Bakersfield, \$62,568; Larsen Bros. and Harms Bros., Sacramento, \$63,818; Pacific States Construction Co., San Francisco, \$67,686; Griffith Company, Los Angeles, \$69,617; Hemstreet and Bell, Marysville, \$70,692; Independent Construction Co., Ltd., Oakland, \$76,108. Contract awarded to Piazza and Huntley, San Jose, \$59,234.15.

STATE OF CALIFORNIA  
**Department of Public Works**

Headquarters: Public Works Building, Twelfth and N Streets, Sacramento

CULBERT L. OLSON.....Governor      FRANK W. CLARK.....Director  
EDWARD J. NERON.....Deputy Director

**CALIFORNIA HIGHWAY COMMISSION**

H. R. JUDAH, Chairman, Santa Cruz  
PHILIP A. STANTON, Anaheim  
PAUL G. JASPER, Fortuna  
WILLIAM T. HART, Carlsbad  
ROBERT S. REDINGTON, Los Angeles

**DIVISION OF HIGHWAYS**

C. H. PURCELL, State Highway Engineer  
G. T. McCOY, Assistant State Highway Engineer  
J. G. STANDLEY, Principal Assistant Engineer  
R. H. WILSON, Office Engineer  
T. E. STANTON, Materials and Research Engineer  
FRED J. GRUMM, Engineer of Surveys and Plans  
R. M. GILLIS, Construction Engineer  
T. H. DENNIS, Maintenance Engineer  
F. W. PANHORST, Bridge Engineer  
L. V. CAMPBELL, Engineer of City and Cooperative Projects  
R. H. STALNAKER, Equipment Engineer  
J. W. VICKREY, Safety Engineer  
E. R. HIGGINS, Comptroller

**DISTRICT ENGINEERS**

E. R. GREEN, District I, Eureka  
F. W. HASELWOOD, District II, Redding  
CHARLES H. WHITMORE, District III, Marysville  
JNO. H. SKEGGS, District IV, San Francisco  
L. H. GIBSON, District V, San Luis Obispo  
E. T. SCOTT, District VI, Fresno  
S. V. CORTELYOU, District VII, Los Angeles  
E. Q. SULLIVAN, District VIII, San Bernardino  
S. W. LOWDEN (Acting), District IX, Bishop  
R. E. PIERCE, District X, Stockton  
E. E. WALLACE, District XI, San Diego

**SAN FRANCISCO-OAKLAND BAY BRIDGE**

C. E. ANDREW, Bridge Engineer

**DIVISION OF WATER RESOURCES**

EDWARD HYATT, State Engineer, Chief of Division  
GEORGE T. GUNSTON, Administrative Assistant  
HAROLD CONKLING, Deputy in Charge Water Rights  
A. D. EDMONSTON, Deputy in Charge Water Resources Investigation  
R. L. JONES, Deputy in Charge Flood Control and Reclamation  
GEORGE W. HAWLEY, Deputy in Charge Dams  
SPENCER BURROUGHS, Attorney  
EVERETT N. BRYAN, Hydraulic Engineer Water Rights  
GORDON ZANDER, Adjudication, Water Distribution

**DIVISION OF ARCHITECTURE**

W. K. DANIELS, Assistant State Architect, in Charge of Division  
P. T. POAGE, Assistant State Architect

**HEADQUARTERS**

H. W. DeHAVEN, Supervising Architectural Draftsman  
C. H. KROMER, Principal Structural Engineer  
CARLETON PIERSON, Supervising Specification Writer  
J. W. DUTTON, Principal Engineer, General Construction  
W. H. ROCKINGHAM, Principal Mechanical and Electrical Engineer  
C. E. BERG, Supervising Estimator of Building Construction

**DIVISION OF CONTRACTS AND RIGHTS OF WAY**

C. C. CARLETON, Chief  
FRANK B. DURKEE, Attorney  
C. R. MONTGOMERY, Attorney  
ROBERT E. REED, Attorney

**DIVISION OF PORTS**

Port of Eureka—E. S. MACKINS, Surveyor

Return postage guaranteed.  
 PM: If addressee has moved  
 notify sender on  
**Form 3547**  
 Division of Highways  
 P. O. Box 1499  
 Sacramento, California

Occidental College Library,  
 Los Angeles,  
 Calif.

SEC. 562, P. L. & R.  
 U. S. POSTAGE

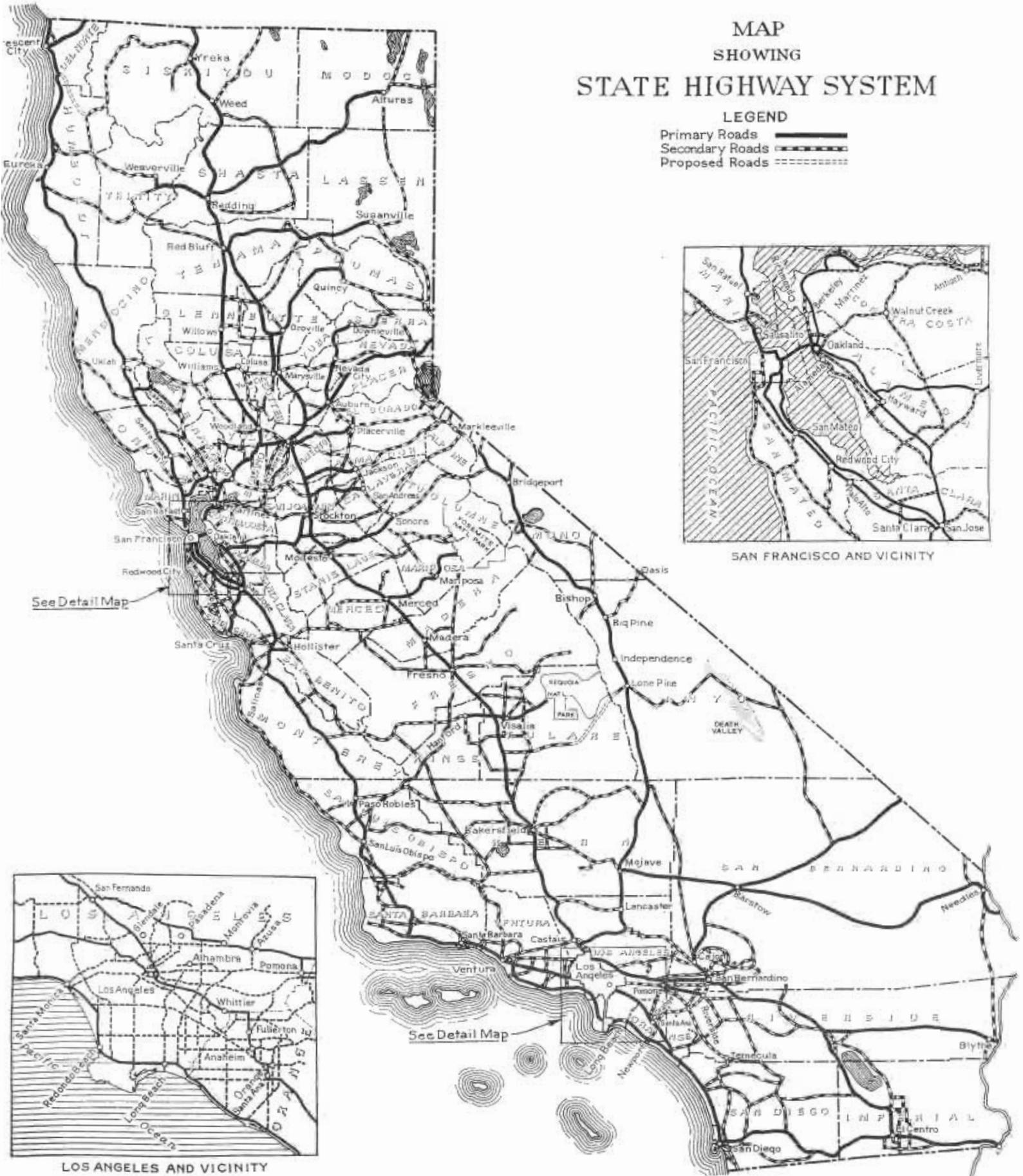
**PAID**

Sacramento, Cal.  
 Permit No. 152

**MAP  
 SHOWING  
 STATE HIGHWAY SYSTEM**

**LEGEND**

- Primary Roads
- Secondary Roads
- Proposed Roads



SAN FRANCISCO AND VICINITY

LOS ANGELES AND VICINITY