

CALIFORNIA

HIGHWAYS AND PUBLIC WORKS

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*View from Donner Summit on State Highway No. 17 (U. S. No. 40)
Showing Donner Lake with Sierra Mountains in background.*

JUNE
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

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Governor Olson Accomplishes a Reduction in Toll Rates on the San Francisco-Oakland Bridge

UPON the initiation by and under the leadership of Governor Culbert Olson, a transaction has been completed with the Reconstruction Finance Corporation and a syndicate of underwriters which has reduced the indebtedness of the San Francisco-Oakland Bay Bridge and the rate of interest on that indebtedness, and certain of the annual payments thereon, thus making it possible for a reduction of the tolls on the San Francisco-Oakland Bay Bridge from fifty cents to forty cents, and a reduction of 20 per cent of the commutation rates

About the fifteenth of May Governor Olson telephoned Jesse Jones, Chairman of the Reconstruction Finance Corporation, and advised him that he was sending Frank W. Clark, State Director of Public Works, and Messrs. Herbert W. Erskine and Edward P. Murphy, attorneys for the California Toll Bridge Authority, to Washington immediately for the purpose of discussing arrangements which would lead to a prompt reduction of the tolls on the San Francisco-Oakland Bay Bridge.

On May 18th Mr. Clark, accompanied by Mr. Erskine and Mr. Murphy, embarked for Washington by airplane, and arrived there May 19th. Negotiations then occurred between them and Mr. Jones and other officials of the Reconstruction Finance Corporation and attorneys and officials of the underwriters. Finally the following arrangement was worked out by Mr. Clark and these attorneys with the other groups, and Mr. Clark then returned to San Francisco, leaving the details and the contracts to be completed by the attorneys. The net results of these negotiations were the following:

1. Reduction of the rate of interest on the \$40,000,000 San Francisco-Oakland Toll Bridge Sinking Fund Revenue bonds from 4½ per cent to 4 per cent, thus saving the

New Toll Rates

The reduced toll rates on the San Francisco-Oakland Bay Bridge adopted by the California Toll Bridge Authority are as follows:

Automobile with 4 passengers and driver, 40¢ reduced from 50¢

Present \$17 commute books reduced to \$14.00.

Present \$14 commute books reduced to \$11.80

Reduction in the toll to Treasure Island will make the rate 40 cents for round trip from either end of the bridge.

Reduced rates on commute books will also apply to round trip to Treasure Island.

Toll Bridge Authority \$100,000 per annum in interest charges;

2. Allowance to the Toll Bridge Authority of \$1,065,000 as its share of the profit derived by the Reconstruction Finance Corporation from the sale of the bonds to the underwriters;

3. Use of said profit plus \$500,000 in the hands of the Authority, which was not needed for construction purposes, to redeem \$1,500,000 of said revenue bonds at a premium of 2½ per cent rather than the premium of 6 per cent provided for in the bonds, thus again saving the Authority \$52,000 in the redemption cost of the bonds and reducing the Toll Bridge indebtedness to \$71,000,000, thereby saving the interest on the \$1,500,000 of bonds so redeemed, which is \$60,000 per annum.

The application of this \$1,500,000 to the payment and redemption of certain of the bonds outstanding reduced the yearly payments for the

next several years, so as to decrease the bond service requirements to a point which made it possible to reduce the rates of tolls and still comply with the bond service requirements.

It is confidently expected by the Governor and Mr. Clark and the counsel for the Authority that this reduction in bond service requirements will make it possible before the end of the year 1939 to reduce the bridge toll to thirty-five cents.

It is expected that the reduction to forty cents and the later reduction to thirty-five cents will make it impossible for the vehicular ferries to continue their present competition with the bridge. The existence of this competition has been the leading factor in preventing toll reductions.

As soon as this factor is eliminated it is confidently hoped that the tolls may again be reduced even as low as twenty-five cents.

After Mr. Clark's return to California, Mr. Erskine and Mr. Murphy, counsel for the Authority, then proceeded to New York, where the complicated agreements and documents setting forth the transaction were drawn by them in collaboration with the attorneys for the underwriters and the Reconstruction Finance Corporation. These were completed on Friday, June 2d, and Messrs. Erskine and Murphy immediately left New York by plane and arrived in San Francisco Saturday, June 3d. The members of the Toll Bridge Authority met on Monday morning, and passed the necessary resolutions to make the transactions effective. The papers were then airtailed to Washington and were executed there by the Reconstruction Finance Corporation and by the underwriters and the transaction thus was successfully concluded.

As this magazine went to press it was expected the toll rate of forty cents per vehicle would go into full



California Toll Bridge Authority that adopted reduced rates on San Francisco-Oakland Bay Bridge. Left to right, seated, Lawrence Barrett, Chairman California State Highway Commission; Director of Public Works Frank W. Clark, Secretary, Toll Bridge Authority; Governor Culbert L. Olson, Chairman of the Board; Lieutenant Governor Ellis E. Patterson; Phil S. Gibson, Director of Finance. Standing, left to right, Charles H. Purcell, State Highway Engineer; Edward P. Murphy, Attorney for the Board; Hubert W. Erskine, Attorney for the Board; C. C. Carleton, Chief of the Division of Contracts and Rights of Way, Department of Public Works.

effect on or about the fifteenth of June.

It is interesting to note that in November of last year it was announced that it would be approximately three years before there could be any reduction in the tolls. Governor Olson, Mr. Clark, and the attorneys, Mr. Erskine and Mr. Murphy, are accordingly being congratulated upon this splendid achievement due entirely to the initiative and efforts of Governor Olson aided by the cooperation of Director Clark, and the attorneys for the Authority.

The people of the State of California, particularly those residing in the Bay area feel elated and are expressing their appreciation to the administration for the results so quickly and so efficiently obtained.

Following the action by the Toll Bridge Authority, Chairman Jesse H.

Jones of the Reconstruction Finance Corporation announced the sale on June 7 of \$71,000,000 of San Francisco-Oakland Bay Bridge bonds to a group of New York bankers. The bonds, known as 4 per cent revenue bonds, were sold at a price of 104 per cent of the face value plus accrued interest which, Jones said, represented a premium to the Reconstruction Finance Corporation of \$2,840,000.

Another purchaser of the bonds was L. J. Mattox, State Industrial Accident Commissioner, who announced that the commission voted to invest \$5,000,000 of the Workmen's Compensation Fund which now totals about \$17,000,000.

During the month of May, a total of 847,925 vehicles crossed the bridge, according to a traffic report submitted by Director Frank W. Clark to Gov-

ernor Olson. This figure represents an increase of approximately 120,000 vehicles over the same period a year ago and brings the total number of vehicles to travel over the span since its opening November 12, 1936, to 23,081,127.

During the month a daily average of 27,352 vehicles used the bridge, which includes an increase over April of approximately 3,000 trucks. The total number of trucks using the

(Continued on page 5)

An aerial photo of San Francisco-Oakland Bay Bridge on the adjoining page shows the full 8 1/2 mile-length of the great structure, on which the toll for automobile with driver and four passengers has been reduced to forty cents. In the foreground may be seen the San Francisco end at Fifth Street Plaza and the bridge train terminal. At Yerba Buena Island in the middle ground a highway lateral and viaduct extends to Treasure Island shown at extreme left.



Work on Presidio Approach to Golden Gate Bridge Speeds Up

By T. E. FERNEAU, Resident Engineer

EARLY in 1935 negotiations were started to obtain a permit for constructing an approach to the Golden Gate Bridge through the Presidio of San Francisco. The Golden Gate Bridge and Highway District and the city of San Francisco conducted these early negotiations, while the Division of Highways took no active part. Early in 1937 it was agreed that the work should be done by the Division of Highways and negotiations with the military authorities were assumed by the Division. The greater portion of the negotiations were carried on personally by Col. Jno. H. Skeggs, District Engineer of District IV.

Many major and minor difficulties had to be met and dealt with before the U. S. Army authorities issued a permit on July 27, 1938, allowing construction of the highway within the Presidio.

The new approach is to extend from the intersection of Lake Street

and Park-Presidio Boulevard on the south side of the Presidio to the Marina approach to the Golden Gate Bridge. The length of the main approach is 1.44 miles, but with the addition of two off ramps and two on ramps at the bridge connection the length will total 2.10 miles. Of this length 2.03 miles are located within the Presidio boundaries.

APPROACH IS FREEWAY

A requirement of the Army permit is that the approach be a freeway through the Presidio with no access except at the termini.

In two instances where Presidio roads cross the new alignment, relocations of the roads are to be made passing under the new viaducts. Right of way is limited to toe of slope in cuts, top of embankment in fill, exterior faces of retaining walls and outer railing of viaducts. However, the Division of Highways is required to plant and permanently

maintain all slopes outside the actual right of way lines. Title to ground underneath all viaducts and over a section of road in tunnel remains with the Army.

Distribution and segregation of traffic from the new highway to and from the Marina approach to the Golden Gate Bridge is to be handled by two on, and two off ramps, all of two-lane roadways. These distribution roads permit vehicles coming from any direction to turn towards their ultimate destination without crossing another traffic stream. No pedestrian facilities will be provided, although it is necessary to construct two pedestrian underpasses for relocations of the sidewalk on the existing Marina approach to the Golden Gate Bridge.

COST IS \$1,500,000

Financing is provided from gas tax funds and a PWA grant of \$800,000 accepted by the State on August 19, 1938.

General view of main Funston Avenue approach to Golden Gate bridge through Presidio looking south from intersection of all traffic distribution ramps.





Erecting steel form jumbo preparatory to pouring arch for tunnel under Presidio golf course and Washington Boulevard.

The cost of the entire project was originally estimated at \$1,789,100. Savings of nearly \$330,000 have been made in bids on four contracts to date, and it now appears that the completed project will cost less than \$1,500,000.

The various phases of construction have been divided into units as follows:

Type of work	Contractor	Per cent complete May 27, 1939	Estimated completion Date
Grading and 1300 ft. of tunnel	Macco Construction Co.	31	Dec., 1939
Three viaducts totaling 1288 ft.	Union Paving Co. "A," "B" and "C"	20	Dec., 1939
Highway underpass-- 2 pedestrian underpasses	M. J. Lynch "D," "G" and "H" and Viad. "E"	0	Dec., 1939
238 ft. viaduct	Union Paving Co. Viad. "F"	6	Nov., 1939
Paving entire project	Not under contract	0	Feb., 1940
Land-scaping	Not under contract	0	Mar., 1940

1300-FOOT TUNNEL

A unique feature of the work is a 1300-foot 4-lane tunnel being constructed by the open cut and backfill method. The material taken from the tunnel cut was used to overload a section of fill on marshy ground skirt-

ing the edge of Mountain Lake. The fill was built up nearly twenty feet above grade, resulting in displacement of the marsh mud until the highway fill now rests on firm foundation. The material thus stock piled as overload will later be used to back-

Governor Olson Accomplishes a Reduction in Toll Rates on San Francisco-Oakland Bridge

(Continued from page 2)

bridge in May was 47,352 continuing the definite trend of increased truck travel noticeable during the past year. May also showed an increase over the previous month in the amount of freight transported over the bridge with 59,345 tons as against 54,830 tons for April.

Revenues for the month of May amount to \$439,738.42. The report also revealed that a total of 153,424 vehicles traveled to Treasure Island via the bridge. Traffic from San Francisco to the island totaled 80,606 and from the east bay 72,818. May traffic totals and comparative figures are as follows:

	April, 1939	May, 1939	Total, 1939	Total since opening
Passenger Autos and Auto Trailers.....	767,327	761,650	3,608,572	21,316,244
Motorcycles and Tricars.....	3,467	3,759	15,906	102,805
Buses.....	8,270	8,929	40,872	288,506
Trucks and Truck Trailers.....	44,790	47,352	299,763	989,662
Toll vehicles.....	823,854	821,690	3,895,113	22,697,217
Passes.....	25,463	26,235	124,825	383,910
Total vehicles.....	849,317	847,925	4,019,938	23,081,127
Extra passengers.....	296,604	317,347	1,312,671	6,061,306
Freight tons.....	54,830	59,345	303,823	1,214,953



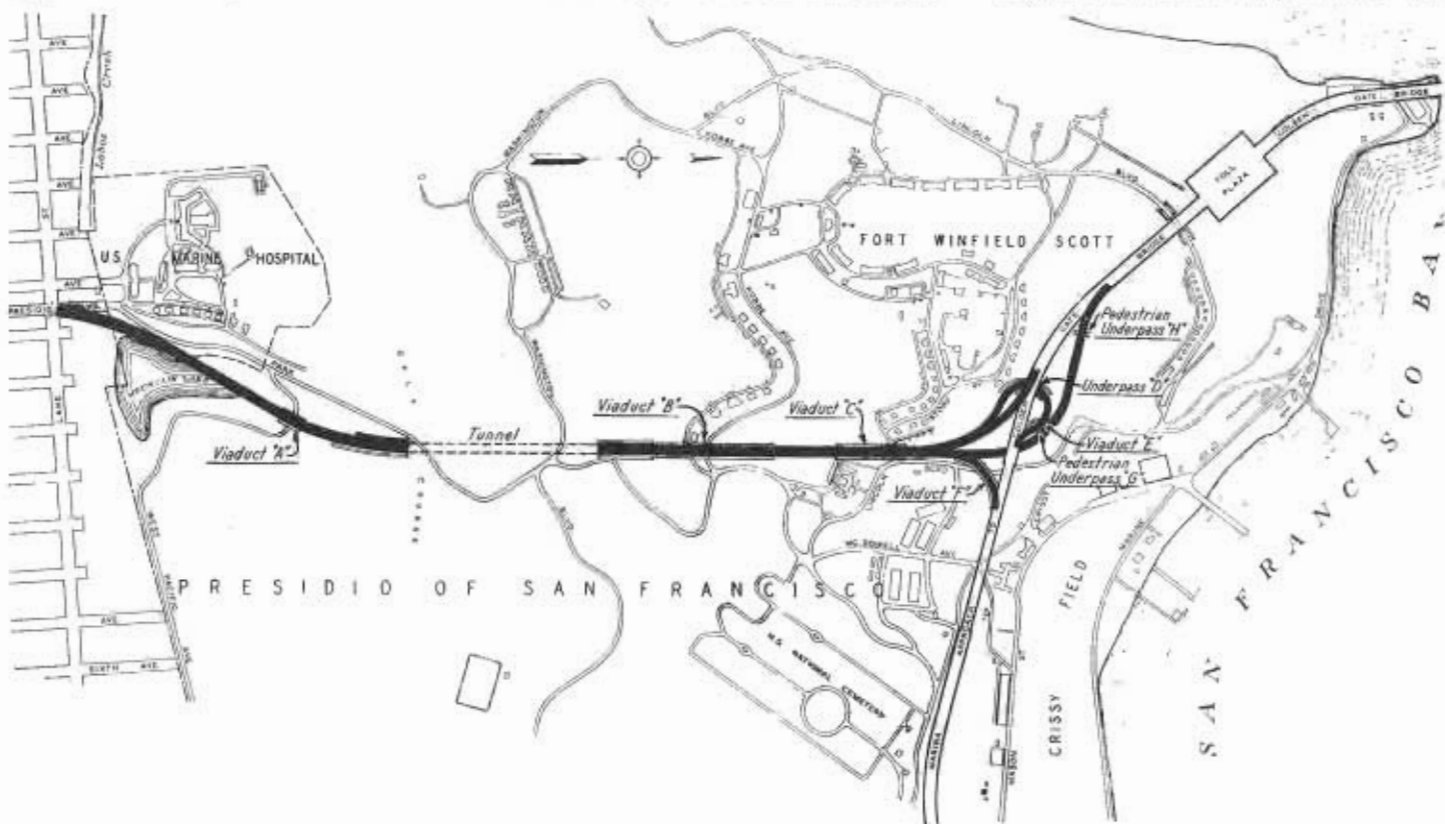
Pouring tunnel sidewall blocks. The tunnel, 1300 feet long, is being constructed by open cut and backfill method.

fill the tunnel and tunnel retaining walls.

The length of this tunnel, 1300 feet, approaches the practical limit of

length without requiring forced ventilation equipment. The odorless but noxious carbon monoxide gas from automobile exhaust can not be per-

mitted to exceed concentrations of 4 parts in 10,000 for any extended period of time. It is very doubtful if gases would ever be present in this



tunnel in dangerous concentrations, but ventilation is provided by a 24-foot by 24-foot shaft to the surface about midway of the length. If ever found necessary, exhaust fans will be placed in this shaft to provide forced ventilation by drawing fresh air in at both portals and exhausting it up the shaft.

NO DRAINAGE FROM HIGHWAY

Another unusual feature of the project is that no drainage from the highway can be permitted to flow onto the Presidio grounds or into any of the existing Presidio facilities.

This limitation necessitates construction of a master drain system which carries all drainage water to Mountain Lake at the south end of the project and to the San Francisco Bay at the north end. Across the various viaducts the drainage is carried in special pipes suspended beneath the deck.

Viaducts are of reinforced concrete construction. All are designed as rigid frame continuous girder types.

The roadway from the beginning of the project at Lake Street to the first viaduct, a distance of 1500 feet will have two 24-foot lanes separated by a center parting strip 6 feet wide. From there to the traffic distribution roadways the roadway, including viaducts, will have two 22-foot lanes separated by a center parting strip

A Good Samaritan

May 13th, 1939

Mt. Hermon,
California

The Division of Highways
Sacramento, California

My Dear Sirs:

Just a kindly word of commendation for the foreman of your San Lucas division who today found two elderly people in trouble with their car and unable to adjust themselves. He corrected the trouble and soon had them on their way, and flatly refused any compensation for the splendid help rendered. Therefore we desire again to thank a man whose name we do not have. Also the higher ups who select such men to service.

Sincerely yours,
MR. and MRS. A. R. TAYLOR
Mt. Hermon

18 inches wide. Except through the tunnel and across viaducts, shoulders 9 feet 6 inches wide will be provided.

The traffic distribution roadways including structures will have a road-

way width of 24 feet between curbs.

An interesting feature of the work is caring for golf course facilities near the tunnel cut. Two tees and one green were moved to temporary locations away from the work and a foot bridge for the golfers was constructed over the tunnel cut. These facilities must be returned to their original location after the tunnel backfill is completed.

Progress on the work has been good. Grading work is nearly completed. Foundation work for all viaducts is nearly completed and superstructure construction is in progress. At the tunnel, footings and sidewalks are completed and pouring of the concrete tunnel arch is scheduled to start immediately. The arch will be poured by using steel form jumbos, traveling on rails. These form jumbos are now being erected in preparation for the first arch pour.

At present, about 275 men are regularly employed at the site of the work and it is expected this force will be increased as additional units of work are placed under contract.

Approximate quantities of major items and materials which will be used for the entire project are:

Roadway Excavation	310,000 cu. yds.
Concrete	40,000 cu. yds.
Reinforcing Steel	2,500 tons
Crusher Run Base	10,000 tons
Drainage Pipes	21,000 lineal feet

Pouring last section of the deck of Viaduct "A" which carries the approach highway over West Pacific arterial in the Presidio.



Nojoqui Canyon Abolishes

By L. H. GIBSON

THE combined highway and bridge project between Gaviota Pass and the Santa Ynez River in Santa Barbara County, recently completed, adds another link of modernized highway to the Coast Route between San Francisco and Los Angeles.

The new road replaces an old pavement that contained many dangerous combinations of sharp curvature and blind vertical curves, and retains the sylvan charm afforded by the groves of beautiful live oak trees. Nineteen curves have been eliminated.

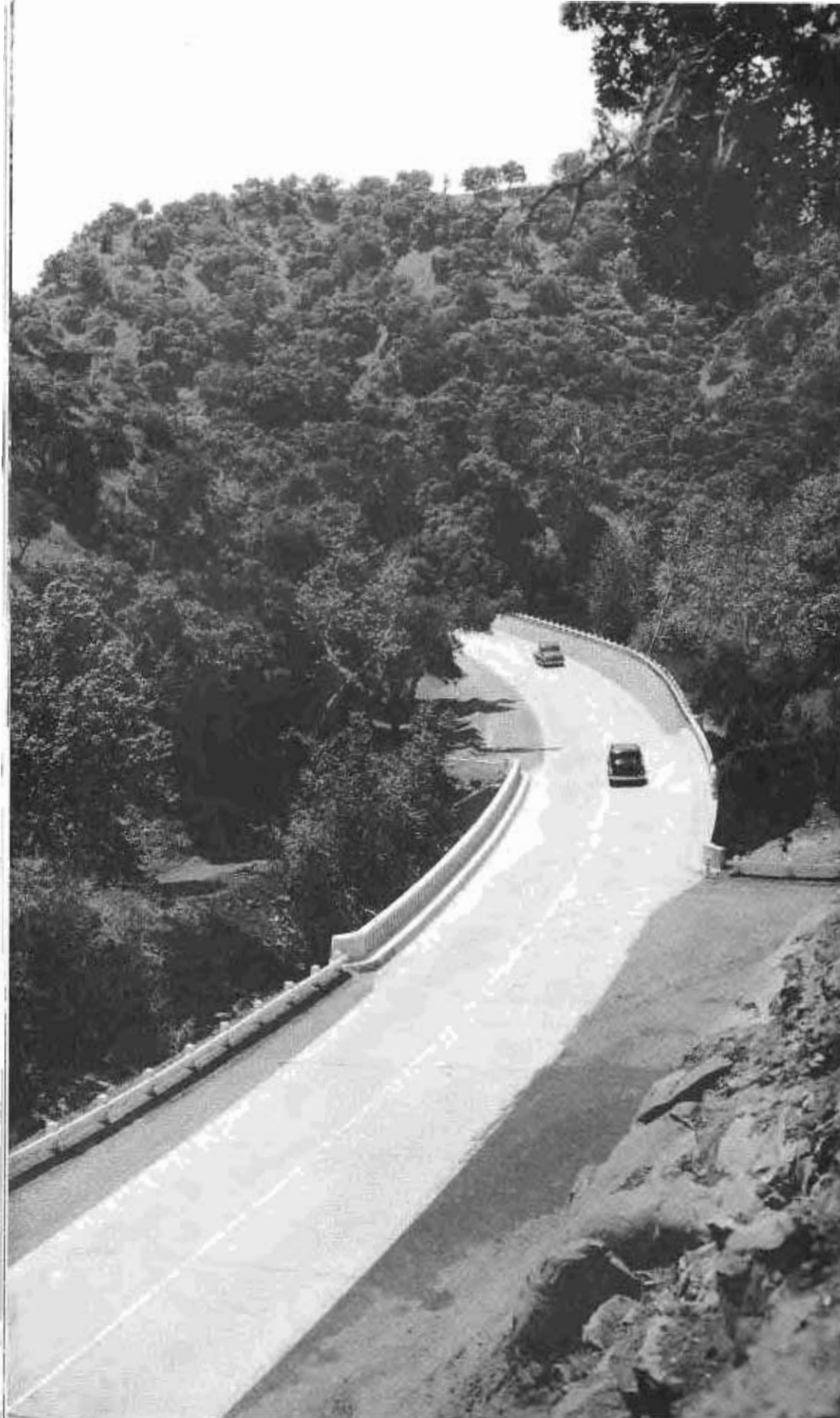
Contract for constructing the project was awarded to C. O. Sparks and Mundo Engineering Corporation on April 25, 1938. The major items of work involved grading a 36-foot roadbed, placing a blanket of selected imported borrow river gravel thereon, constructing a 22-foot width of Portland cement concrete pavement and constructing four reinforced concrete bridges, each approximately 120 feet long.

ROCK CUTS BLASTED

Contract work got under way early in May, 1938. After clearing had sufficiently progressed, the contractor started grading operations, using bulldozers for pioneering and three 13-cubic yard carryall outfits for moving.

Two rock cuts proved too difficult for rooters and carryalls; it was necessary to loosen up the material with approximately 0.4 pound of powder per cubic yard and then move it by 1-cubic yard shovel and trucks. Very few slides of any consequence occurred on the job.

Construction of the four bridges began very early in the contract. Each of the bridges, identical in type and almost identical in length, are rigid frame type, 26 feet clear width; central span is 46 feet with cantilevered span 9 feet long at each end; each cantilever supports a suspended span 26 feet long; the other end of each suspended span is



Realignment and modernization of the highway through Nojoqui Canyon involved the construction of several rock cuts and four bridges. Note how the bridge over Nojoqui Creek in the above picture conforms perfectly to the width and curvature of the roadway.

n Realignment 19 Curves

N, District Engineer

supported on a steel bearing plate mounted on an abutment. Overall length of the bridges varies from 120 feet to 121 feet 5 inches depending on whether built on tangent or curve.

UNSTABLE SOIL CONDITIONS

The contractor early experienced difficulty in the bridge construction. Upon excavating for foundations, unexpected unstable conditions were encountered, which required the lowering of footings from 4 to 8 feet. Considerable delay was caused by this unlooked for condition.

Forms for bridge work were largely constructed of 3-ply plywood, backed by 1 by 6-inch and 2 by 4-inch struts and wales. The better-than-average form work aided in obtaining a very good finish on the structures.

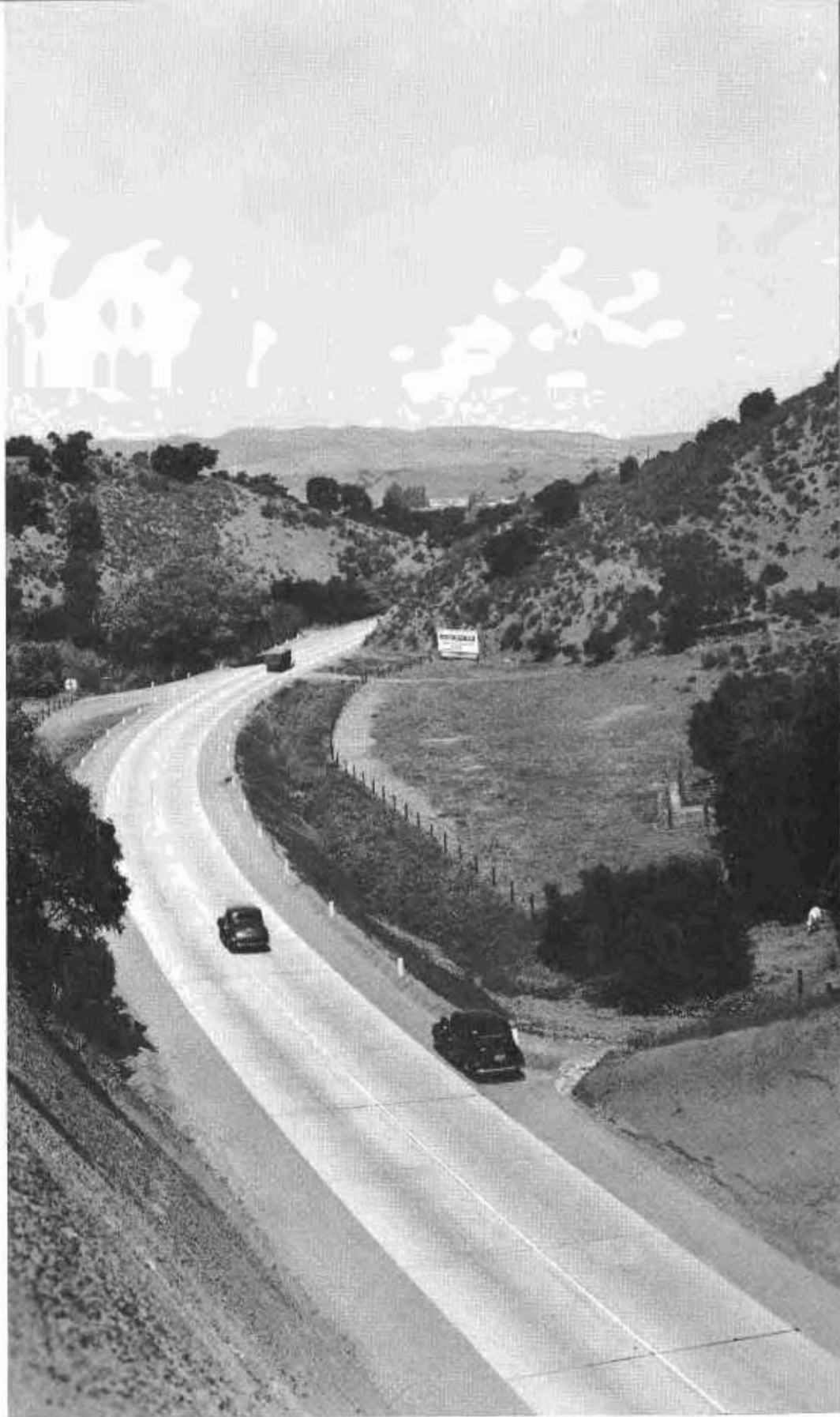
Bearing values of soils encountered in the cuts were generally so low that it was necessary to place better material as a sub-base for the pavement. A river gravel of suitable quality obtained from the bed of the Santa Ynez River about 500 feet right of Station 263, was spread on the prepared subgrade to a maximum depth of 0.70 foot below pavement; shoulders were blanketed with 0.75-foot thickness.

MEMBRANE SEAL PLACED

As a precaution against reducing the bearing value of the river gravel subbase by absorption of capillary water from below, an impervious membrane seal, consisting of Grade "E" asphalt was spread on the subgrade at the rate of 0.7 gallons per square yard.

After unsatisfactory preliminary trials to eliminate oversize in the pit run imported borrow by screening through a sloping grizzly set on the truck body, the contractor brought in a crushing and screening plant of 100 tons per hour capacity.

(Continued on page 26)



A section of the new State highway through Nojoqui Canyon which eliminates 19 curves between Gaviota Pass and Santa Ynez River in Santa Barbara County. Part of the narrow, tortuous old route is seen crossing the new highway in the middle ground.



Completed section of Arroyo Seco Parkway beginning at Glenarm Street in Pasadena. Designed as a "freeway" it has six lanes divided by a raised separation strip and no stop lights or intersections in its nine-mile length between Pasadena and Los Angeles.

Arroyo Seco 6-Lane Freeway

By S. V. CORTELYOU, District Engineer

WITH four contracts completed and three contracts now under way, the Arroyo Seco Parkway, which is to connect downtown Los Angeles with Pasadena and other points to the north and east, is well on its way toward realization. The distance from the business district of Pasadena to downtown Los Angeles via this new route will be nine miles, about six miles of which will be new construction by the State.

Designed as a "Freeway," this highway will enable traffic to pass from the Figueroa Street tunnels in Los Angeles to Broadway and Glenarm Street in Pasadena without encountering a single stop light, intersecting street or railroad grade crossing.

Three wide traffic lanes will be provided for traffic in each direction, separated in the center by a raised dividing strip which will make it impossible to make left turns across traffic or to meet opposing traffic "head on."

Access to the "Parkway" will be had at intervals by means of modified "clover leaf" intersections on which only right hand turns from the "Parkway" may be made. Each of these intersections is being carefully designed to conform to its particular topographic features and traffic requirements.

SERVICE ROADS PROVIDED

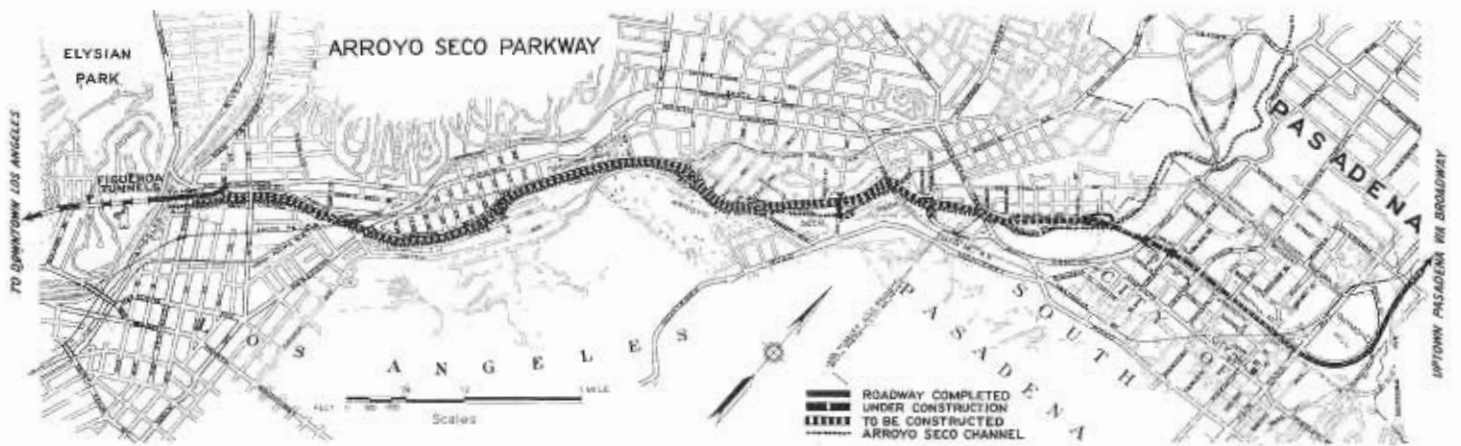
Adjoining privately owned property will not have direct access to the "Parkway" but will front on service roads paralleling the highway. These service roads will connect with the "Parkway" at suitable intervals by means of one way ramps.

Accelerating and decelerating lanes will be provided at each of these ramps to permit entering traffic to "speed up" to the legal speed of traffic on the "Parkway" before entering one of the main traffic lanes and to permit traffic leaving the "Parkway" to "slow down" on an additional traffic lane before turning off of the main highway. These

safety provisions are in accordance with accepted "Freeway" design and will result in a minimum of interference with "Parkway" traffic.

The "Parkway" between Hough Street and Avenue 26 in Los Angeles, will follow the northwesterly side of the Arroyo Seco Channel, being depressed to permit all intersecting streets and railroads to cross on overhead bridges. Near Hough Street, in Los Angeles, the alignment enters the city of South Pasadena, crossing the Arroyo Seco Channel on a bridge which is now under construction.

Thence the "Parkway" runs easterly along Sterling Place and Grevelia Street on a depressed grade which will be about 20 feet below natural ground elevation from Arroyo Drive to Fair Oaks Avenue. Just easterly of Fair Oaks Avenue the grade ascends to approximate ground level curving northerly around Raymond Hill and entering the city of Pasadena on Broadway. Actual construction work by the State ends at the intersection of Glenarm Street and



Broadway in Pasadena, from which point connection is made with the business district of Pasadena via Broadway, which is already a wide, improved street.

The Arroyo Seco Parkway in Los Angeles from Avenue 22 to Hough Street near the south city limit of South Pasadena is located for the greater part of the distance adjoining and parallel to the Arroyo Seco Channel, which is paved and walled for the entire distance. The grade of the highway can thus be established at critical points somewhat lower than

the banks of the channel to permit crossings of intersecting streets and railroads to be made on overhead bridges at a minimum of expense.

Comparatively little damage to adjoining property results from this location which follows through city of Los Angeles park lands for a considerable portion of the distance. On the contrary, a large number of citizens will drive every day through beautified park areas and the city thus secure a maximum beneficial use of the long narrow park.

An interesting side light in the con-

struction of the "Parkway" is the recent utilization for the construction of highway embankments of more than 170,000 cubic yards of material excavated from the bed of the Los Angeles River near Dayton Avenue. This was material excavated by the U. S. Engineering Department in connection with their channel lining project on Los Angeles River.

This arrangement for securing excavated material was mutually beneficial to the U. S. E. D. and the State since it provided a location readily accessible for the disposal of surplus



Bridge across Arroyo Seco Parkway on Orange Grove Avenue, Pasadena, is shown under construction flanked by off and on ramps.



Constructing and compacting fill for Arroyo Seco Parkway which closely parallels the concrete lined arroyo channel throughout this section.

material from the river bottom and at the same time has enabled the State to have constructed a considerable portion of the highway embankments between Avenue 22 and Pasadena Avenue at only the comparatively small cost of spreading and compacting the material.

The design and construction of this "Freeway" is a matter which is receiving the closest cooperation between the State, the cities of Los Angeles, South Pasadena and Pasadena, the various railroads involved, and Federal agencies. Only by such cooperation could the many intricate steps necessary for such a project be properly coordinated.

Plans for the "Parkway" include construction or partial reconstruction of sixteen street and railroad bridges crossing over the highway. These are at Avenue 26, Pasadena Avenue (in Los Angeles), Santa Fe and U.P.R.R. bridge near Pasadena Avenue, Avenue 43, Avenue 52, Hermon Avenue, Avenue 60, Marmion Way, all of which are in the city of Los Angeles, and Arroyo Drive, Grand Avenue, Orange Grove Avenue, Prospect Avenue, Meridian Avenue, Fremont Avenue, the U. P. and Santa Fe Bridge near Fremont Avenue and Fair Oaks Avenue which are in the city of South Pasadena.

The Santa Fe R. R. and Pasadena Avenue and Union Pacific R. R. crossings near the city limit of South Pasadena were already in place, the "Parkway" passing under these two structures. A bridge near the South Pasadena city limit will carry the "Parkway" across the Arroyo Seco Channel. In addition to the above listed bridges a viaduct has been constructed from the northerly end of the Figueroa tunnels across Los Angeles River, the S. P. R. R. and San Fernando Road over which "Parkway" traffic will be carried to connect with downtown Los Angeles via Figueroa Street.

At present the only section of the route open to traffic is from Glenarm Street in Pasadena to Fair Oaks Avenue in South Pasadena, a distance of 0.76 mile, which was completed January 4, 1939, at a cost of \$120,000.

The viaduct over Los Angeles River and adjacent railroads and streets was completed in 1937 at a cost of \$680,000. The Arroyo Drive and Grand Avenue bridges were constructed during 1938 under one contract at a total cost of \$111,000. The Avenue 60 bridge was completed March 3, 1939, at a cost of \$59,000. The 0.75 mile highway section from Hough Street in Los Angeles to Meri-

dian Street in South Pasadena including the Prospect Avenue and Orange Grove Avenue bridges, is under contract and will be completed late next fall. This section is estimated to cost \$177,000. Included also within these limits is the bridge crossing the Arroyo Seco Channel which will cost \$141,000. Bids for the Avenue 43 bridge were taken May 18, 1939, the low bid being about \$43,000.

WPA AND CITY COOPERATE

The next section which will be let to contract is from Avenue 50 to Avenue 58 including the Avenue 52 and Hermon Avenue bridges and grade separations. This will be followed by contracts for the Fremont Avenue Bridge and the highway section from Avenue 58 to Arroyo Drive.

In the meantime, the WPA project by the city of Los Angeles for lining the Arroyo Seco Channel and constructing storm drains, which must necessarily precede a considerable portion of the highway work, is being carried on. Plans for other bridges and highway sections of this route are being prepared and contracts will be let as soon as progress on the storm drains and Arroyo Seco Channel lining will permit.

Contracts completed or now in progress represent an outlay by the

State of \$1,331,000. The total estimated cost of the Arroyo Seco Parkway proper which includes highway and bridge work is \$3,745,000. This would indicate that approximately 36 per cent of the work has either been completed or let to contract. In addition to this the State will pay its proportionate share of the cost of materials for storm drains and lining the Arroyo Seco Channel.

EXTENSIVE LANDSCAPING

An outstanding example of the splendid cooperation which the park departments of the cities of Los Angeles, Pasadena and South Pasadena have given the Division of Highways is the landscaping of the recently completed highway section between Glenarm Street in Pasadena, and Fair Oaks Avenue in South Pasadena. Landscaping of this section has been planned by the park departments of the cities of Pasadena and South Pasadena in cooperation with the State highway landscape engineer and suitable plants and shrubs are being planted

by these departments from stock propagated in their own nurseries at no cost to the State.

It is too early to accurately predict the date when the "Parkway" will be opened to traffic for its full length. This will depend on a number of factors, the principal one of which is the completion of lining of the Arroyo Seco Channel between Avenue 36 and Avenue 22, which must be completed before this portion of the "Parkway" can be let to contract. From present indications, it is reasonable to expect the entire project will be completed toward the latter part of next biennium which ends June 30, 1941.

Supplementing the Arroyo Seco Parkway proper is the construction by the city of Los Angeles of Figueroa Street from the Figueroa Tunnels southerly to Sunset Boulevard including the College Street grade separation to facilitate the flow of traffic from the "Parkway" to the business district of Los Angeles.

Just southerly of Sunset Boulevard, Figueroa Street will pass under Temple Street on a grade separation now being constructed by the State. From the southerly limit of this contract at Diamond Street, preliminary plans are under consideration for improving Figueroa Street as far south as Second Street which will include a grade separation at First Street, this construction to be done by the State.

All of these improvements will form a comprehensive project for carrying traffic quickly and safely between downtown Los Angeles and the business district of Pasadena and intermediate communities. It is anticipated that the average driving time between the two cities will be reduced one half, which estimate is not based on excessive speeds but rather on the continuous flow of traffic without the interruptions of intersecting streets and railroads.

"Have you seen the new play I wrote about the couple who were always quarreling?"

"No, but I heard you and your wife rehearsing it."



Newly completed bridge on the Arroyo Seco Parkway at Grand Avenue. Sixteen street and railroad bridges will cross the parkway.



State Highway Route 5 through Oakland, Alameda County, widened and modernized with gas tax funds apportioned to city.

Cities Get \$15,606,223 of Gas Tax in Biennium Ending June 30, 1939

By L. V. CAMPBELL, Engineer of City and Cooperative Projects

DISTRIBUTION by the Department of Public Works through the Division of Highways of the April, 1939 quarterly apportionment of gas tax funds in the sum of \$1,856,936.20, for expenditure within incorporated limits of municipalities brings the total amount of these funds received by 285 California cities for expenditure upon State highways and streets of major importance to \$15,606,223.20 for the biennial period ending June 30 of this year.

The total apportionment combines $\frac{1}{4}$ cent of the gas tax or \$7,803,111.60 allocated under laws enacted by the Legislature in 1933 for expenditure upon designated State highway routes within incorporated cities, with an equal amount, or an additional $\frac{1}{4}$ cent, subsequently allocated by the Legislature in 1935 for expenditure upon streets of major importance other than State highways. In those cities where there are no State highways, the total amount may be expended upon streets of major importance.

The above amount includes \$224.92 apportioned to the city of Hornitos which, although an incorporated city,

does not have any functioning city officials and is therefore unable to comply with the requirements of the Streets and Highways Code for the expenditure of its share of the gas tax.

The apportionment is made to the various cities upon a population basis. The population is that determined by the Federal census of 1930, which is increased by multiplying by three the number of registered electors residing in any unincorporated territory annexed to a city subsequent to the 1930 Federal census. Likewise, the population of any city incorporated since the 1930 census is determined by multiplying the number of registered electors residing therein by three.

Cities incorporated during the past two years, or since April 1, 1937, are: Palm Springs, Pismo Beach, Shafter, and Tulalake.

Direct payment of the money to the cities by the Division of Highways is made in quarterly apportionments, upon the warrant of budgets of proposed expenditures submitted by the cities annually to the Department for approval.

The law is quite explicit on the latter point and operates to restrain the Department from paying money to a city until a budget has been submitted and approved.

An important qualification of such budgets is the expenditure upon streets commanding prominence as major traffic arterials. This condition precludes indiscriminate expenditures upon streets which are restrictive of general traffic service. Other conditions of the law require the proposals to be sound both economically and in engineering judgment, with a full appreciation of traffic demands, under penalty of disapproval by the Department.

Under section 203 of the code which provides the allocation for State highways, the Division of Highways is obliged to assure the expenditure of funds apportioned under this section for the fullest benefit of State highway routes, with the further discretionary privilege of delegating the obligation to cities competently equipped to conduct such expenditures.

The apportionment to cities by State highway districts is as follows:

Gas Tax Apportionments to Cities for Expenditure Upon Streets of Major Importance and State Highways Within Municipalities During Biennium

District I

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Del Norte County			
Crescent City	\$1,559.21	\$1,560.93	\$3,120.14
Humboldt County			
Arcata	\$1,549.25	\$1,550.94	\$3,100.19
Blue Lake	503.11	503.67	1,006.78
Eureka	14,279.53	14,295.16	28,574.69
Ferndale	805.90	806.78	1,612.68
Fortuna	1,123.18	1,124.41	2,247.59
Trinidad	97.01	97.09	194.10
Totals	\$18,357.98	\$18,378.05	\$36,736.03
Lake County			
Lakeport	\$1,194.80	\$1,196.10	\$2,390.90
Mendocino County			
Fort Bragg	\$2,739.51	\$2,742.50	\$5,482.01
Point Arena	349.02	349.39	698.41
Ukiah	2,831.97	2,835.07	5,667.04
Willits	1,290.89	1,292.30	2,583.19
Totals	\$7,211.39	\$7,219.26	\$14,430.65
Totals District I	\$28,323.38	\$28,354.34	\$56,677.72

District II

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Lassen County			
Susanville	\$1,231.06	\$1,232.40	\$2,463.46
Modoc County			
Alturas	\$2,119.45	\$2,121.77	\$4,241.22
Plumas County			
Shasta County			
Redding	\$3,796.51	\$3,800.67	\$7,597.18
Siskiyou County			
Dorris	\$690.77	\$691.52	\$1,382.29
Dunsmuir	2,366.01	2,368.61	4,734.62
Etna	343.57	343.95	687.52
Fort Jones	273.78	274.07	547.85
Montague	459.61	460.11	919.72
Mt. Shasta	938.93	964.69	1,903.62
Tulelake	271.96	272.25	544.21
Yreka	1,995.25	1,997.43	3,992.68
Totals	\$7,339.88	\$7,372.63	\$14,712.51
Tehama County			
Corning	\$1,248.28	\$1,249.64	\$2,497.92
Red Bluff	3,188.24	3,191.73	6,379.97
Tehama	172.24	172.43	344.67
Totals	\$4,608.76	\$4,613.80	\$9,222.56
Trinity County			
Totals District II	\$19,095.66	\$19,141.27	\$38,236.93

District III

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Butte County			
Biggs	\$419.72	\$420.18	\$839.90
Chico	7,216.81	7,224.72	14,441.53
Gridley	1,759.57	1,761.48	3,521.05
Oroville	3,352.33	3,355.98	6,708.31
Totals	\$12,748.43	\$12,762.36	\$25,510.79
Colusa County			
Colusa	\$1,918.21	\$1,920.29	\$3,838.50
Williams	787.76	788.63	1,576.39
Totals	\$2,705.97	\$2,708.92	\$5,414.89
El Dorado County			
Placerville	\$2,145.74	\$2,148.09	\$4,293.83
Glenn County			
Orland	\$1,083.30	\$1,084.48	\$2,167.78
Willows	1,834.79	1,836.81	3,671.60
Totals	\$2,918.09	\$2,921.29	\$5,839.38
Nevada County			
Grass Valley	\$3,460.19	\$3,463.99	\$6,924.18
Nevada City	1,542.00	1,543.67	3,085.67
Totals	\$5,002.19	\$5,007.66	\$10,009.85
Placer County			
Auburn	\$2,412.27	\$2,414.90	\$4,827.17
Colfax	826.75	827.65	1,654.40
Lincoln	1,898.26	1,900.34	3,798.60
Rocklin	656.31	657.03	1,313.34
Roseville	5,824.39	5,830.77	11,655.16
Totals	\$11,617.98	\$11,630.69	\$23,248.67
Sacramento County			
North Sacramento	\$1,900.98	\$2,022.70	\$3,923.68
Sacramento	84,986.46	85,079.35	170,065.81
Totals	\$86,887.44	\$87,102.05	\$173,989.49
Sierra County			
Loyalton	\$758.76	\$759.58	\$1,518.34
Sutter County			
Yuba City	\$3,268.01	\$3,271.59	\$6,539.60
Yolo County			
Davis	\$1,126.81	\$1,128.03	\$2,254.84
Winters	812.25	813.13	1,625.38
Woodland	5,052.46	5,062.12	10,114.58
Totals	\$6,991.52	\$7,003.28	\$13,994.80
Yuba County			
Marysville	\$5,224.28	\$5,229.99	\$10,454.27
Wheatland	434.23	434.70	868.93
Totals	\$5,658.51	\$5,664.69	\$11,323.20
Totals District III	\$140,702.64	\$140,980.20	\$281,682.84

Gas Tax Apportionments to Cities

District IV

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Alameda County			
Alameda	\$31,758.20	\$31,792.92	\$63,551.12
Albany	7,768.00	7,776.47	15,544.47
Berkeley	74,433.63	74,515.00	148,948.63
Emeryville	2,117.64	2,119.95	4,237.59
Hayward	5,013.07	5,018.54	10,031.61
Livermore	2,827.43	2,830.53	5,657.96
Oakland	257,509.42	257,790.92	515,300.34
Piedmont	8,460.57	8,469.83	16,930.40
Pleasanton	1,121.37	1,122.59	2,243.96
San Leandro	10,384.21	10,395.57	20,779.78
Totals	\$401,393.54	\$401,832.32	\$803,225.86
Contra Costa County			
Antioch	\$4,086.60	\$4,396.51	\$8,483.11
Concord	1,019.84	1,020.96	2,040.80
El Cerrito	3,508.24	3,512.07	7,020.31
Hercules	355.36	355.74	711.10
Martinez	6,670.85	7,192.02	13,862.87
Pinole	707.99	708.77	1,416.76
Pittsburg	8,711.67	8,721.21	17,432.88
Richmond	18,301.78	18,321.79	36,623.57
Walnut Creek	919.21	920.22	1,839.43
Totals	\$44,281.54	\$45,149.29	\$89,430.83
Marin County			
Belvedere	\$453.27	\$453.75	\$907.02
Corte Madera	930.99	932.02	1,863.01
Fairfax	2,651.57	2,654.48	5,306.05
Larkspur	1,125.00	1,126.22	2,251.22
Mill Valley	3,774.76	3,778.88	7,553.64
Ross	1,228.34	1,229.68	2,458.02
San Anselmo	4,215.33	4,219.95	8,435.28
San Rafael	7,272.12	7,280.07	14,552.19
Sausalito	3,324.21	3,327.85	6,652.06
Totals	\$24,975.59	\$25,002.90	\$49,978.49
Napa County			
Calistoga	\$906.51	\$907.52	\$1,814.03
Napa	5,835.28	5,841.66	11,676.94
St. Helena	1,434.13	1,435.69	2,869.82
Totals	\$8,175.92	\$8,184.87	\$16,360.79
San Francisco County			
San Francisco	\$575,092.25	\$575,720.91	\$1,150,813.16
San Mateo County			
Atherton	\$1,200.23	\$1,201.54	\$2,401.77
Bay Shore	1,041.60	1,042.73	2,084.33
Belmont	905.61	906.61	1,812.22
Burlingame	12,029.54	12,042.69	24,072.23
Daly City	7,646.51	7,654.88	15,301.39
Hillsborough	1,714.24	1,716.10	3,430.34
Lawndale	334.50	334.88	669.38
Menlo Park	2,043.32	2,045.53	4,088.85
Redwood City	8,124.25	8,133.13	16,257.38
San Bruno	3,272.54	3,276.13	6,548.67
San Carlos	1,026.18	1,027.31	2,053.49
San Mateo	12,198.17	12,211.50	24,409.67
South San Francisco	5,614.09	5,620.23	11,234.32
Totals	\$57,150.78	\$57,213.26	\$114,364.04

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Santa Clara County			
Alviso	\$345.37	\$345.75	\$691.12
Gilroy	3,174.63	3,178.12	6,352.75
Los Gatos	2,871.87	2,874.99	5,746.86
Morgan Hill	823.12	824.03	1,647.15
Mountain View	2,998.78	3,002.06	6,000.84
Palo Alto	12,541.73	12,558.68	25,100.41
San Jose	56,224.33	56,285.79	112,510.12
Santa Clara	5,712.91	5,719.15	11,432.06
Sunnyvale	2,804.79	2,807.84	5,612.63
Totals	\$87,497.53	\$87,596.41	\$175,093.94
Santa Cruz County			
Santa Cruz	\$13,049.40	\$13,063.66	\$26,113.06
Watsonville	7,833.26	7,841.81	15,675.07
Totals	\$20,882.66	\$20,905.47	\$41,788.13
Sonoma County			
Cloverdale	\$688.05	\$688.80	\$1,376.85
Healdsburg	2,081.36	2,083.64	4,165.00
Petaluma	7,474.28	7,482.44	14,956.72
Santa Rosa	9,641.78	9,709.34	19,351.12
Sebastopol	1,597.30	1,599.04	3,196.34
Sonoma	889.39	889.37	1,778.76
Totals	\$22,371.16	\$22,452.63	\$44,823.79
Totals District IV	\$1,241,820.97	\$1,244,058.06	\$2,485,879.03

District V

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Monterey County			
Carmel	\$2,048.73	\$2,050.99	\$4,099.72
King City	1,344.38	1,345.85	2,690.23
Monterey	8,286.52	8,295.57	16,582.09
Pacific Grove	5,038.45	5,043.95	10,082.40
Salinas	9,485.84	9,496.21	18,982.05
Soledad	538.49	539.06	1,077.55
Totals	\$26,742.41	\$26,771.63	\$53,514.04
San Benito County			
Hollister	\$3,405.80	\$3,409.53	\$6,815.33
San Juan	699.84	700.61	1,400.45
Totals	\$4,105.64	\$4,110.14	\$8,215.78
San Luis Obispo County			
Arroyo Grande	\$808.60	\$809.50	\$1,618.10
Paso Robles	2,332.48	2,335.04	4,667.52
Pismo Beach	0.00	338.87	338.87
San Luis Obispo	7,502.38	7,510.58	15,012.96
Totals	\$10,643.46	\$10,993.99	\$21,637.45
Santa Barbara County			
Lompoc	\$2,579.06	\$2,581.87	\$5,160.93
Santa Barbara	30,470.93	30,504.24	60,975.17
Santa Maria	6,397.33	6,404.32	12,801.65
Totals	\$39,447.32	\$39,490.43	\$78,937.75
Totals District V	\$80,938.83	\$81,366.19	\$162,305.02

District VI

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Fresno County			
Coalinga	\$2,584.51	\$2,587.33	\$5,171.84
Clovis	1,192.98	1,194.28	2,387.26
Firebaugh	458.70	459.20	917.90
Fowler	1,061.55	1,062.70	2,124.25
Fresno	47,933.27	48,406.95	96,340.22
Kingsburg	1,198.43	1,199.73	2,398.16
Parlier	511.28	511.83	1,023.11
Reedley	2,346.99	2,349.56	4,696.55
Sanger	2,689.64	2,692.59	5,382.23
San Joaquin	147.76	147.93	295.69
Selma	2,762.16	2,765.19	5,527.35
Totals	\$62,887.27	\$63,377.29	\$126,264.56
Kern County			
Bakersfield	\$23,583.17	\$23,608.96	\$47,192.13
Delano	2,385.97	2,388.57	4,774.54
Maricopa	970.89	971.95	1,942.84
Shafter	266.96	1,146.18	1,413.14
Taft	3,120.26	3,123.66	6,243.92
Tehachapi	667.19	667.94	1,335.13
Totals	\$30,994.44	\$31,907.26	\$62,901.70
Kings County			
Corcoran	\$1,602.74	\$1,604.49	\$3,207.23
Hanford	6,371.04	6,378.00	12,749.04
Lemoore	1,268.22	1,269.61	2,537.83
Totals	\$9,242.00	\$9,252.10	\$18,494.10
Madera County			
Chowchilla	\$767.82	\$768.67	\$1,536.49
Madera	4,228.92	4,233.55	8,462.47
Totals	\$4,996.74	\$5,002.22	\$9,998.96
Tulare County			
Dinuba	\$2,690.56	\$2,693.51	\$5,384.07
Exeter	2,434.02	2,436.67	4,870.69
Lindsay	3,515.49	3,519.34	7,034.83
Porterville	4,807.29	4,812.53	9,619.82
Tulare	5,626.77	5,632.93	11,259.70
Visalia	6,584.08	6,591.27	13,175.35
Totals	\$25,658.21	\$25,686.25	\$51,344.46
Totals District VI	\$133,778.66	\$135,225.12	\$269,003.78

District VII

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Los Angeles County			
Alhambra	\$26,717.03	\$26,746.23	\$53,463.26
Arcadia	4,728.41	4,733.60	9,462.01
Avalon	1,719.67	1,721.54	3,441.21
Azusa	4,358.56	4,363.32	8,721.88
Bell	7,147.02	7,154.84	14,301.86
Beverly Hills	15,799.78	15,817.05	31,616.83
Burbank	15,104.47	15,120.98	30,225.45
Claremont	2,464.84	2,467.53	4,932.37
Compton	11,346.03	11,358.43	22,704.46
Covina	2,514.69	2,522.87	5,037.56
Culver City	5,139.08	5,144.69	10,283.77
El Monte	3,153.79	3,157.23	6,311.02
El Segundo	3,175.54	3,179.02	6,354.56
Gardena	6,385.54	6,392.52	12,778.06
Glendale	56,871.57	56,933.74	113,805.31
Glendora	2,502.91	2,505.65	5,008.56
Hawthorne	5,979.42	5,985.95	11,965.37
Hermosa Beach	4,347.68	4,352.44	8,700.12

STREETS OF MAJOR IMPORTANCE Section 194

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Los Angeles County—Continued			
Huntington Park	\$22,292.29	\$22,316.65	\$44,608.94
Inglewood	19,418.61	19,439.85	38,858.46
La Verne	2,592.65	2,595.50	5,188.15
Long Beach	129,231.99	129,394.13	258,626.12
Los Angeles	1,124,608.81	1,125,838.17	2,250,446.98
Lynwood	6,638.45	6,645.72	13,284.17
Manhattan Beach	1,714.24	1,716.10	3,430.34
Maywood	6,158.91	6,165.65	12,324.56
Monrovia	9,872.03	9,882.82	19,754.85
Montebello	4,984.06	4,989.51	9,973.57
Monterey Park	5,807.19	5,813.52	11,620.71
Pasadena	69,223.85	69,299.52	138,523.37
Pomona	18,859.29	18,879.91	37,739.20
Redondo Beach	8,473.27	8,482.53	16,955.80
San Fernando	6,859.65	6,867.15	13,726.80
San Gabriel	6,616.70	6,623.94	13,240.64
San Marino	3,381.32	3,385.02	6,766.34
Santa Monica	33,673.68	33,710.48	67,384.16
Sierra Madre	3,218.16	3,221.66	6,439.82
Signal Hill	2,657.93	2,660.84	5,318.77
South Gate	17,796.85	17,816.29	35,613.14
South Pasadena	12,446.55	12,460.16	24,906.71
Torrance	8,008.20	8,016.97	16,025.17
Vernon	1,150.38	1,151.64	2,302.02
West Covina	868.11	904.81	1,772.92
Whittier	13,458.23	13,472.93	26,931.16
Totals	\$1,719,467.43	\$1,721,409.10	\$3,440,876.53
Orange County			
Anaheim	\$9,983.53	\$9,994.44	\$19,977.97
Brea	2,207.38	2,209.79	4,417.17
Fullerton	9,844.84	9,855.59	19,700.43
Huntington Beach	3,345.08	3,348.73	6,693.81
Laguna Beach	1,795.82	1,797.79	3,593.61
La Habra	2,060.53	2,062.77	4,123.30
Newport Beach	1,997.06	1,999.25	3,996.31
Orange	7,312.01	7,320.00	14,632.01
Placentia	1,455.87	1,457.47	2,913.34
San Clemente	604.65	605.32	1,209.97
Santa Ana	27,487.56	27,517.61	55,005.17
Seal Beach	1,047.94	1,049.09	2,097.03
Tustin	839.43	840.36	1,679.79
Totals	\$69,981.70	\$70,058.21	\$140,039.91
Ventura County			
Fillmore	\$2,622.56	\$2,625.43	\$5,247.99
Ojai	1,330.77	1,332.24	2,663.01
Oxnard	5,697.49	5,703.72	11,401.21
Santa Paula	6,755.41	6,762.78	13,518.19
Ventura	10,518.39	10,529.88	21,048.27
Totals	\$26,924.62	\$26,954.05	\$53,878.67
Totals District VII	\$1,816,373.75	\$1,818,421.36	\$3,634,795.11

District VIII

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Riverside County			
Banning	\$2,508.35	\$2,511.08	\$5,019.43
Beaumont	1,207.49	1,208.80	2,416.29
Corona	6,361.97	6,368.92	12,730.89
Elsinore	1,223.80	1,225.15	2,448.95
Hemet	2,026.07	2,028.30	4,054.37
Palm Springs	0.00	2,316.89	2,316.89
Perris	691.68	692.43	1,384.11
Riverside	26,920.09	26,949.51	53,869.60
San Jacinto	1,220.18	1,221.52	2,441.70
Totals	\$42,159.63	\$44,522.60	\$86,682.23

(Continued on page 28)

"Movie" Camera Records Traffic Violations Through the Windshield

By A. I. Rivett, Assistant Safety Engineer



Riding double stripe over crest of hill.



Passing four cars in face of oncoming traffic.



Passing truck to right on a curve.

"Oh, wad some power the giftie gi'e us

To see oursel's as ithers see us!"

Robert Burns

THE average motorist does not intend to be a lawbreaker. Nor, frequently, does he realize that he is, as he rolls merrily along, using what he deems to be due caution.

Cold, bare facts, however, indicate that improper turning and passing, violating the right of way, following too closely, excessive speed and loss of control were among the major causes of accidents during the past year.

Such accidents are the direct result of carelessness, chance-taking, absent-mindedness, recklessness—a failure on the part of the motorist to actually use due caution.

The problem of bringing a realization of these facts to the motorist is not one of engineering nor of enforcement, but one of individualized personal education. Engineering and enforcement agencies, however, are definitely responsible for the furtherance of traffic education.

The Safety Department of the Division of Highways in its study of traffic conditions and the presentation

of its findings to the public throughout California is making use of the motion picture camera. A modern philosopher has said, "One picture is worth one thousand words." In traffic education, if the picture be unposed, an actual photograph of a supposedly normal and average motorist or pedestrian, depicting his misconduct, it is worth two thousand words.

The Safety Department of the Division of Highways is using a 16 mm movie camera inconspicuously mounted behind the windshield of an automobile. Actions of motorists or pedestrians on the highway ahead are quickly and easily recorded by the pressure of a button.

Immediately there becomes available a visual and sometimes unpleasant story for presentation to public groups. A story which paints in permanent black and white the failure of someone to observe traffic stop-signs or signals and warning signs; the failure to practice highway courtesies, to give correct hand signals; the failure to reduce speed at dangerous points, to keep in the proper traffic lane and many other traffic infractions.

Here is a lasting record of chance-

taking and reckless driving—attempts to pass on a blind curve at the crest of grade, passing over double stripes, driving to the right of slower moving vehicles, cutting in, and passing with insufficient room.

And, in the pictured story can be found samples of absentmindedness—turning without signaling, stepping out of the left side of the car without looking back, parking too close to the pavement while making repairs, turning from watching the road ahead to talk or to observe the side scenery.

A looking-glass is a most harsh personal critic—a motion picture film of actual highway misconduct likewise reflects forcible criticisms.

It should be noted that these pictures are being taken for educational information and engineering study, and not for enforcement purposes. It is believed that the motorist, often unaware that he is breaking a safe driving habit, will appreciate being reminded of his violations that he might voluntarily correct his driving errors and cooperate with other drivers to make the highway safe for motorists and pedestrians.

Traffic engineers have long known that traffic problems can be reduced or improved by three methods, dif-

ferent but associated. First, the engineering approach, making changes in the physical condition so as to make more easy, correct, safe and expeditious practices. Second, enforcement policies wherein the individual's behavior is kept in right channels by direct social pressure and compulsion. Third, an educational conviction, changing the individual's attitude by precept and instruction so as to make safe practices common and instinctive.

It is quite evident that the first method of approach, engineering, the most effective and permanent, is the most costly. Enforcement, though always necessary, is primarily directed to the noneconformist and the wilful misbehaviorist. Education, while the most ethical and desirable, and perhaps the most indirect for some individuals and classes, can be the most effective means of creating good traffic conduct if the "whys" and "wherefores" are understood.

It is not fear of the law, the dire consequences of breaking the rule of the road, which keeps us from breaking traffic regulations, though this point often has been stressed. The important thing is not that we should fear the law but that we should recognize the value and importance of the rule and appreciate its functions. Action pictures of road conduct quickly bring personal conviction. Traffic education pays.

The Safety Department of the Division of Highways in its study of highway traffic places an equal value

Are You a Hypocrite?

The average motorist is an unconscious hypocrite. That's a strong characterization—but a little impersonal analysis will substantiate it.

How often have you roundly criticized some driver for an offense which you commit periodically yourself? How often have you taken comfort in the thought that accidents are caused by some reckless breed of motorists with whom you have nothing in common, thus dodging the fact that only pure fool's luck has saved you from a crash on a dozen occasions?

Who, for example, doesn't sometimes pass a car when the stretch of empty road that can be seen is too short for safety? Who doesn't occasionally succumb to the lure of excessive speed—even though he has little or nothing to do when his destination is reached?

We'll go a good way toward reducing accidents when the average driver begins asking himself such questions and returning honest answers. Accident prevention, so far as it concerns the human element, is a personal, individual matter—and each individual has to really want to drive safely at all times before he can analyze his driving errors and correct them.—Woodland Democrat, Woodland, California.

upon traffic pictures as a means of engineering study. Motion pictures definitely record driver-action in relation to engineering facilities provided in the highways—the respect for

stripes, lanes, guard-rails, curve construction, signs and signals.

Similar data to that obtained by aerial motion pictures (described in the May, 1939, issue of CALIFORNIA HIGHWAYS AND PUBLIC WORKS) is obtained by behind-the-windshield pictures. Using an automobile-mounted movie camera, the United States Bureau of Public Roads has made an extensive study of traffic habits of motorists. Much of strictly engineering value is obtained from movie records of traffic observed.

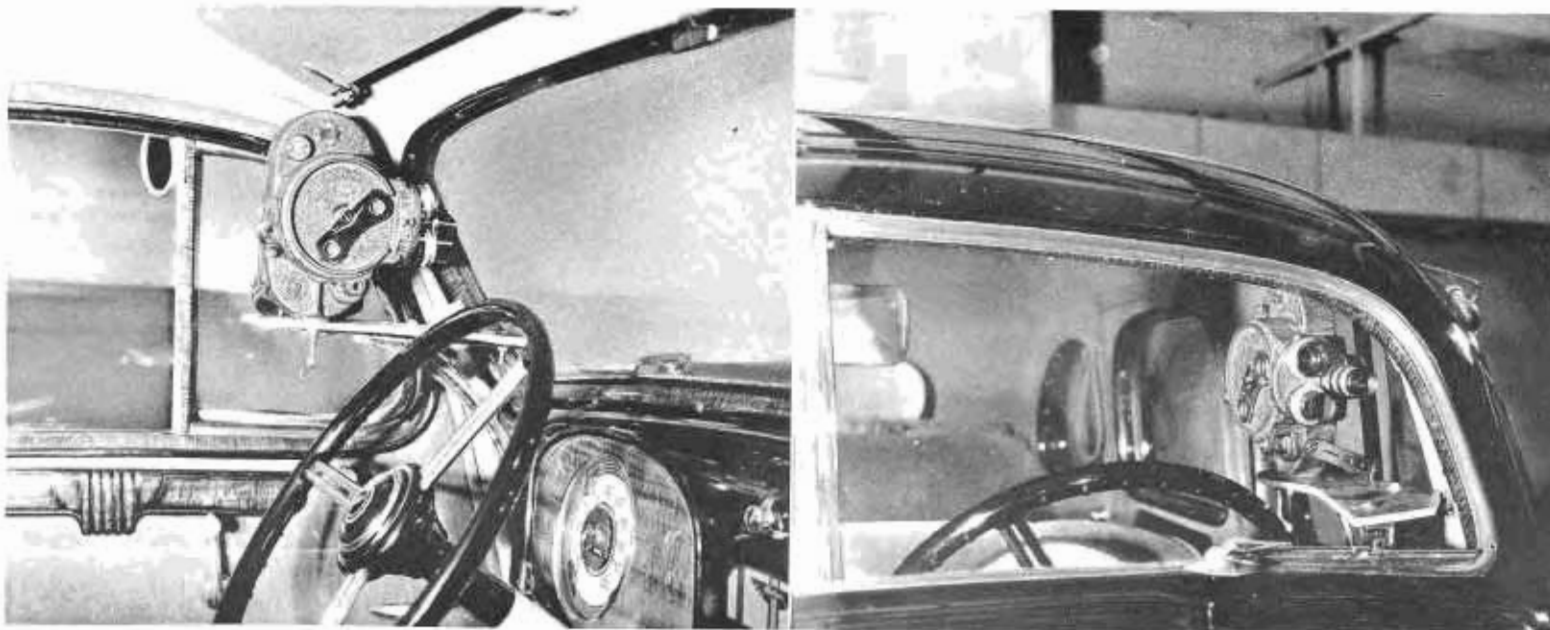
The great educational value of presenting unposed pictures of driver-habits has been overlooked in the past. Positive and constructive value is being obtained from the presentation of the visual story to the public of the public's driving-habits. Every picture tells a story.

CITIES WIN SAFETY LAURELS

Six California cities won citations from the California Safety Council for their accomplishment in traffic accident prevention, at its annual awards luncheon in Los Angeles. They are: Los Angeles, Berkeley, Ventura, Piedmont, Redding, Ross.

The William May Garland Safety Trophy for the most outstanding traffic record in decreasing fatalities was presented to San Francisco, which scored a 24 per cent decrease in fatal accidents during 1938, according to Dr. Floyd Ruch, U. S. C. psychologist, who tabulated returns.

Honorable mention for "conspicuous achievement in accomplishing substantial traffic accident reduction during the year 1938" went to San Diego, Alameda, El Centro, Chico, and Morgan Hill. The latter were runner-ups for first place in their population classifications.



"Movie" camera operated by push button is set within easy reach of driver and is inconspicuous to approaching traffic.

Divided 4-Lane Highway Underpass Replaces Old Bottleneck Near Redding

By E. J. BASSETT, District Office Engineer

AN EXCELLENT example of the advancement in highway construction standards and safety design in a sixteen-year period is the recently completed grade separation project on State Highway 3 (U. S. 99) approximately one mile south of the city of Redding, where a narrow old subway beneath the Southern Pacific railroad tracks has been replaced by a modern four-lane divided highway underpass and approaches.

The old subway, built in 1923, had only a 15-foot roadway width, a restricted sight distance due to poor alignment, and an unenviable record of traffic accidents. Besides being a restrictive bottleneck through which traffic was forced to pass, the flooding of the subway during heavy storms presented additional hazards.

The new subway has 4160 feet of concrete-paved, four-lane approaches, with an 8-foot separation strip, partly a raised landscaped section protected with a curb. Each roadway is composed of two lanes, the inner one twelve feet wide and the outer one eleven feet in width.

For approximately 1500 feet adjacent to the subway structure the roadway is provided with a curb and a sidewalk 3.5 feet wide, while the remainder of the project has borders of asphaltic surfacing 3.5 feet wide and .21 of a foot thick.

The overhead railroad structure is a two-span, single-track, steel plate girder bridge.

The project involved the construction of a detour and temporary grade crossing of the railway, two county road approaches, the erection of a shoo-fly track and trestle for handling railroad traffic during removal and replacement of the old subway structure, the rearrangement of five gas and oil depots and spur track facilities and an elaborate system of drains and subdrains feeding into a 24-inch gravity outfall to prevent future flooding of the subway.

The necessary treatment of the subgrade consisted of the removal of deposits of black clay, in many in-

stances several feet below grade, and its replacement with stable material and the placing of imported subgrade material 0.5 of a foot thick over the entire width of roadway.

While the quantities of materials involved in the construction of this new and important grade separation were not unusual for a structure of this type, the following brief summary of the major quantities provides a conception of the size of the project.

The contract was awarded on the basis of unclassified roadway excavation and involved the movement of some 52,300 cubic yards of material. Removal of the black clay, which was not satisfactory for subgrade, necessitated the placing of more than 12,000 cubic yards of imported material to insure the desired stability.

Excavation for the structure required the moving of 6,600 cubic yards of earth.

The Portland cement concrete pavement placed through the subway and on the approaches involved preparation of 14,350 square yards of subgrade on which the 2,863 cubic yards of concrete was placed. The structure itself required 1,469 cubic yards of concrete and an additional 486 cubic yards was used for curbs and sidewalks.

Approximately 160,000 pounds of reinforcing steel was placed in the concrete of the structure and the pavement. The structural steel, cast steel, and wrought iron plate used in the girder construction which carries the railroad tracks over the highway amounted to more than 448,000 pounds.

Construction of drainage facilities necessitated the placing of 2,312 linear feet of 18-inch and 24-inch reinforced concrete pipe, 362 linear feet of various sizes of corrugated



Old subway on U. S. 99 near Redding built in 1923 had 15-foot curved roadway.



Two views of recently completed modern, 4-lane subway with 8-foot division strip on U. S. 99 near Redding.

metal pipe and 2,987 linear feet of perforated metal pipe subdrains.

The completion of the project was timely in view of the rapid increase in the volume of traffic in this area occasioned by the heavy construction program of the U. S. Bureau of Reclamation involving not only Shasta Dam itself but 30 miles of new railroad and 16 miles of highway.

Traffic counts indicate that the increase approximated 58 per cent be-

tween July, 1937, and October, 1938, with the peak of the heavy traffic yet to come. The project was financed from federal grade separation funds and State highway funds. The anticipated reimbursement by the federal government, including preliminary and construction engineering and construction costs to the railroad in which the State participated, total \$219,727. Additional engineering, construction and costs of furnished material to be

borne by the State amounts to \$10,600, making a grand total cost of \$230,327.

The project was constructed by N. M. Ball and Sons under a single contract and was under the direction of P. R. Watson, Resident Engineer of the Bridge Department of the Division of Highways. The grading and paving was supervised by M. Fredericksen, Resident Engineer for District II of Division of Highways.



Bombs Do Explode If Hit by Bullets

As a result of over zealousness on the part of a Plumas County constable in what he believed to be the performance of his duty, the Division of Water Resources is minus one recorder used to determine the height of water and stream flow on the Middle Fork of the Feather River.

This particular recorder was installed on a float wedged against a concrete pier of a Western Pacific Railway bridge. A passing trout fisherman, hearing the clock which registers stream flow, thought it was a bomb and excitedly telephoned the constable, who rushed to the scene with a high powered rifle and blasted the recorder to bits with sixteen bullets.

What puzzles Division of Water Resources officials is why the constable didn't pause to consider that if the recorder was an infernal machine set to go off by a time clock it would explode more readily if steel-jacketed bullets were fired into it.

From Reader in Alaska

Territorial Department of Health
Juneau, Alaska

Editor, California Highways and
Public Works,
Sacramento, California.

Dear Sir:

This is to notify you as to my recent change of address from eastern Washington in order to facilitate receipt of California Highways and Public Works.

I have been an ardent reader of the magazine for several years and look forward to each issue. Inasmuch as I was at one time a member of the Division, under E. E. Wallace in District XI, the many problems discussed and their solutions are of personal interest. Each clear pictorial evidence of a reduced grade, a new underpass, or a reduction of curves presented in your publication demonstrates to me the elimination of a familiar highway hazard. In short, the magazine is great and I sincerely appreciate receiving it.

May I extend my wishes for the continued success of California Highways and Public Works and of the men and women it represents.

Yours very truly,
KAARLO W. NASI,

Territorial Public Health Engineer.

New Lompoc Bridge Over Santa Ynez River Opened

WITH representatives of the Division of Highways, officials from three counties and civic leaders participating, the city of Lompoc on May 1 staged a celebration to dedicate the new Robinson crossing bridge over the Santa Ynez River.

The new structure replaces an old iron and wooden bridge erected 54 years ago and eliminates a hazardous horseshoe curve on the Lompoc-Buellton highway. It is 447 feet in length and consists of five 80-foot spans, with two 21-foot spans at either end. Long, straight approaches do away with sharp curves that have slowed up traffic materially in the past. Its design has some novel features providing additional rigidity for the structure and economy in foundation construction.

The three-quarters of a mile of new approaches which were constructed to give access to the new bridge present a marked contrast to those which led to the former structure. The old approaches containing eleven curves with radii as short as 150 feet and sight distances as low as 500 feet have been replaced by approaches having only two curves, one of 1500 feet radius and the other of 10,000 feet and affording unlimited sight distance.

Robinson bridge was officially opened by F. W. Panhorst, Bridge Engineer of the Division of Highways, under whose supervision the structure was built.

In his dedicatory address, Mr. Panhorst called attention to the serious bridge problems confronting the Division of Highways. He said there are 12,000 bridges on California highways and that 320 of them are incapable of bearing legal loads and should be immediately replaced. He declared that it would require \$70,000,000 for bridge construction imperatively needed and that \$100,000,000 would have to be expended to bring the highways of the State up to standards which would enable them to carry present day traffic, which totals twenty-two billion vehicle miles per year or fifty-five million vehicle miles a day.

In the same vein, District Highway Engineer Lester H. Gibson of San Luis Obispo declared that funds now available for highway construction and maintenance are entirely inadequate.

Following the dedicatory ceremonies, visiting officials and guests of the Lompoc Chamber of Commerce, which arranged the celebration, were taken on a sightseeing tour which included the ancient Mission La Purisima. Later a barbecue was held in the Veterans Memorial Building in Lompoc with President M. V. Duncan of the chamber of commerce presiding.

Speakers at the dedication included Supervisor Ronald M. Adam, County Surveyor Owen O'Neill, who has constructed 153 bridges in Santa Barbara County during his twenty-five years tenure of office; W. T. Hobbs, chairman of the reception committee; C. L. Preisker of Santa Maria, chairman of the board of supervisors, and Alexander McLean, pioneer resident, who gave a history of the old bridge.

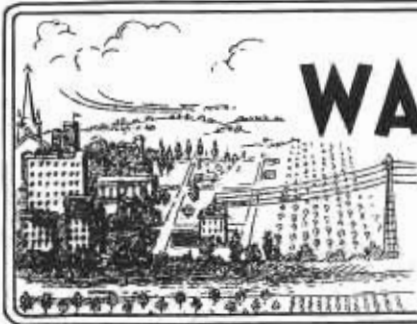
Highway Exhibit Arouses Interest

Cuts made from photographs of the diorama on exhibition by the Division of Highways on Treasure Island, which graphically depicts the highways of Yesterday, Today and Tomorrow, and which appeared in the April issue of CALIFORNIA HIGHWAYS AND PUBLIC WORKS, have attracted widespread attention.

Editors of various publications have asked to borrow the cuts for reproduction. The Tennessee Road Builder, published in Nashville, Tennessee; the South Dakota Hiway Magazine, published in Sioux Falls, South Dakota, and The California Highway Patrolman, the Architect and Engineer and Sunset Magazine, published in San Francisco, are among publications which have requested the loan of either the cuts or photographs. Newspapers throughout the State have been equally interested.



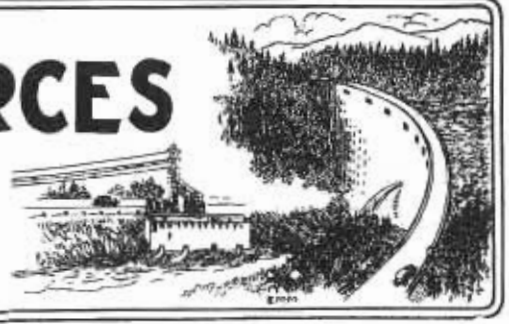
At top, profile view of new Santa Ynez River bridge near Lompoc on State Highway 149 in Santa Barbara County which was officially dedicated May 1. Below at left, new approach road that eliminates numerous sharp curves. At right, old steel and wood bridge built 54 years ago.



DIVISION OF WATER RESOURCES

OFFICIAL REPORT
FOR THE MONTH OF
MAY, 1939

EDWARD HYATT, State Engineer



ENGINEERING studies for negotiations in connection with the acquisition of water rights and rights of way for the Central Valley Project have been continued during the month. Under an agreement between the Water Project Authority of the State of California and the United States of America, the Division of Water Resources, representing the Authority, is to continue field work in addition to that previously performed by the Division, the compilation of data previously obtained and the preparation of reports containing these data, and negotiations with public utility companies for power and communication line relocations.

Under this agreement, the activities during the month included field surveys for the preparation of topographic maps of lands adjacent to the San Joaquin River between Friant and Gravelly Ford and the preparation of reports on the acquisition of and plan of exchange for waters of the San Joaquin River. The work has also included the preparation of folios of maps showing character of water rights and sources of water supply for lands, soil and land classifications, and the rating of soils.

In addition to the work being performed under the contract with the United States, studies are proceeding with regard to the disposal and distribution of power which will be available from the Shasta power plant of the project, including the programming of additional facilities to provide for the absorption thereof in the market of northern and central California. In this connection, the Division of Water Resources prepared a brief on behalf of the Water Project Authority which was transmitted to the Federal Power Commission, requesting the commission to deny the application of the Pacific Gas & Electric Company for a preliminary permit

for hydro-electric power plants on the north fork of the Feather River.

IRRIGATION DISTRICTS

Clearwater-Hynes and Gibson Park County water districts submitted applications for approval of consolidation procedure. An investigation and report on the proposal will be made with recommendations as to equitable apportionment of the present outstanding indebtedness to lands of the respective districts.

Richvale Irrigation District plans for acquiring additional water rights and facilities from the Sutter Butte Canal Company were advanced during the month by the voting of a new bond issue in the amount of \$160,000. The project was favorably reported on by the State Engineer and approved by the Districts Securities and State Railroad Commissions.

Corcoran Irrigation District's refinancing plan was declared just and equitable to all creditors in a decision of the U. S. District Court at Fresno. The district has an outstanding bonded indebtedness of \$733,000 which is being refinanced at the rate of 75 cents on the dollar through a loan from the Reconstruction Finance Corporation.

DISTRICTS SECURITIES COMMISSION

At a regular meeting of the California Districts Securities Commission in San Francisco on May 12, 1939, Banta-Carbena Irrigation District petition was granted for approval of an expenditure of \$12,307.84 from district funds for the purchase and installation of electrical equipment on the pumping system.

West Side Irrigation District requested approval of a refunding bond issue in the amount of \$286,500 for certification by the State Controller. Refunding bonds were issued to take up outstanding bonds of \$510,500 and warrants in the sum of \$56,331 on the basis of approximately 50 cents on the dollar. The owners of more than 90 per cent of the bonds and warrants agreed to accept the offer, and the U. S. District Court confirmed the plan. The request was granted.

Richvale Irrigation District's application was granted for approval of a bond issue of \$160,000 for repayment of a loan from the Reconstruction Finance Corporation. Proceeds will be used to purchase a share of the water rights and irrigation facilities of the Sutter Butte Canal Company and for certain rehabilitation work.

Alpough Irrigation District was granted validation of a refunding issue of \$54,000 for certification by the State Controller. The bonds are to cover the balance of \$54,520 due on Reconstruction Finance Corporation loan.

SUPERVISION OF DAMS

Application was filed for approval of plans and specifications for construction of Middle Fork Dam in Calaveras County, owned by the Calaveras Public Utility District.

Applications were filed and approved for alteration of Stanislaus Forebay Dam and repair of Sand Bar Dam in Tuolumne County, both owned by the Pacific Gas and Electric Company.

Application was filed for approval of plans for alteration of the Hog Flat Dam in Lassen County, owned by the Lassen Irrigation Company.

WATER RIGHTS

Supervision of Appropriation of Water

Thirty-one applications to appropriate water were received during April; 15 were denied, none was approved and rights were confirmed for the issuance of 3 licenses.

Projects were inspected during the month in Inyo, Kern, San Bernardino, Los Angeles, Ventura, Santa Barbara and San Luis Obispo counties, preparatory to the issuance of licenses confirming the rights under permits heretofore issued.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

The field work is now going forward on the regular summer schedule and all points of diversion and return flows are being visited and discharge measurements made. The stream flow into the delta on the Sacramento River and at Vernalis on the San Joaquin River was decreasing at a rapid rate and was comparable to the 1934 flow until May 20th, when the effect of a rather short and heavy storm was shown in rising river levels. The downward trend of the flow of the San Joaquin at Vernalis was checked, but the flow of the Sacramento River at Sacramento increased about 7000 cubic feet per second, the flow on May 20th being about 5000 cubic feet per second and on May 25th, 12,000 cubic feet per second.

The storm did considerable damage to ripening crops, but was of help to the rice and beet men. At the outset of the season

(Continued on page 25)

Highway Bids and Awards for the Month of May, '39

SAN BERNARDINO COUNTY—A reinforced concrete slab bridge across Cucamonga Wash to be extended with two 30-foot spans. District VIII, Route 9, Section A. Matich Bros., Elsinore, \$13,310; Carl Hallin, Los Angeles, \$13,485; G. E. Keras, Long Beach, \$13,852; Valley Construction Co., San Jose, \$13,997; Gibbons & Reed, Burbank, \$14,733; Oberg Bros., Los Angeles, \$14,872; R. M. Price, Huntington Park, \$14,881; C. R. Butterfield-Kennedy Co., San Pedro, \$15,000; Anderson & France, Visalia, \$15,050; Byerts & Dun, Los Angeles, \$15,165; Franklin B. Gridley, Pasadena, \$15,179; H. A. Teget, Ontario, \$15,662; The Contracting Engineers Co., Los Angeles, \$15,664; V. L. & W. B. Jacobson, Los Angeles, \$15,988; W. H. McCune, Monrovia, \$15,996; J. S. Metzger & Son, Los Angeles, \$16,885; C. O. Sparks & Mundo Engineering Co., Los Angeles, \$17,815. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$12,621.50.

YOLO COUNTY—At Knights Landing, a reinforced concrete slab bridge on steel pile bents to be constructed and about 0.18 mile of roadway to be graded and roadmix surface treatment applied. District III, Route 88, Section A. E. T. Lesure, Oakland, \$29,751; L. C. Seidel, Oakland, \$29,784; E. E. Smith, Eureka, \$29,829; A. A. Tieslau, Berkeley, \$31,859; P. F. Bender, North Sacramento, \$32,140; J. S. Metzger & Son, Los Angeles, \$33,992; Lindgren & Swinerton, Inc., Sacramento, \$34,362; Albert H. Siemer and John Carcano, San Anselmo, \$35,815; Holdener Construction Co., Sacramento, \$31,655. Contract awarded to R. G. Clifford, San Francisco, \$28,619.50.

TULARE COUNTY—A reinforced concrete bridge across Kings River about 2 miles south of Kingsburg to be constructed. District VI, Route 4, Section E. Heafey-Moore Co. & Frederickson & Watson Construction Co., Oakland, \$114,413; United Concrete Pipe Corp., Los Angeles, \$114,416; Earl W. Heple, San Jose, \$119,069; R. G. Clifford, San Francisco, \$121,058; Sordal and Bishop, Long Beach, \$122,823; Paul J. Tyler, Oroville, \$124,380; D. W. Nicholson, Oakland, \$125,274; A. Teichert & Son, Inc., Sacramento, \$126,716; J. S. Metzger & Son, Los Angeles, \$128,721; Trewitt-Shields & Fisher, Fresno, \$129,272; Union Paving Co., San Francisco, \$131,407; C. W. Caletti & Co., San Rafael, \$131,820; Macco Construction Co., Clearwater, \$136,221; M. B. McGowan, Inc., San Francisco, \$139,019; J. E. Haddock, Ltd., Pasadena, \$156,644. Contract awarded to A. Soda and Son, Oakland, \$109,168.84.

SANTA CRUZ AND SANTA CLARA COUNTIES—Between Woodwardia and Hall's bridge, about 2.9 miles to be graded and surfaced with crusher run base and armor coat. District IV, Feeder road. N. M. Ball Sons, Berkeley, \$64,919; Jack Casson, Hayward, \$66,093; Heafey-Moore Co., Fredrickson & Watson Construction Co., Oakland, \$68,487; M. J. Ruddy, Modesto, \$74,781; Mountain Construction Co., Sacramento, \$73,261; J. L. Conner and Sons, Ukiah, \$72,613; Valley Construction Co., San Jose, \$76,443; Fredericksen & Westbrook, Sacramento, \$69,860; Piazza & Huntley, San Jose, \$80,259; L. C. Karstedt, Watsonville, \$87,810; H. Earl Parker, Marysville, \$71,969; Macco Construction Co., Clearwater, \$71,190. Contract awarded to Eaton & Smith, San Francisco, \$62,273.70.

YUBA COUNTY—Between 1.5 miles southwest of Clipper Mills and Challenge, about 4.8 miles to be graded and surfaced

Division of Water Resources Report

(Continued from page 24)

indications were that the rice acreage planted this year would closely approximate that of 1938, but due to the dry spring a large amount of land which had been sown to grain was ploughed and rice planted instead.

COOPERATIVE SNOW SURVEYS

The results of the May 1st snow surveys (the final one scheduled for issue this season) released May 10th, necessitated revision of the stream-flow estimates made a month previous.

The reductions in run-off are greater in the north where there was a more severe deficiency in April precipitation. The overall reduction in the April-July run-off forecasts amounts to 17 per cent of the figures published in April, which reduces the overall expectancy of the run-off during the four months' snow melting period from 48 per cent of normal—as published in April—to 40 per cent of normal.

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento River Flood Control Project

Minor repairs to the flood control works have been carried on during this period. No storms or floods have occurred this season, eliminating the necessity for the usual spring repairs. The new truck and storage shed at the Sutter maintenance yard is nearing completion, with the installation of sliding doors.

The flowage area of the Knights Landing Ridge Drainage Cut is being cleared with the aid of WPA labor, an average of 30 men having been engaged in this work during the period.

Sacramento Flood Control Project Construction

The Reclamation Board has requested the division to construct one bridge and three concrete crossings on Dry Creek in Yuba

with untreated crushed gravel or stone surfacing and a seal coat to be applied. District III, Feeder road. M. J. Ruddy, Modesto, \$54,508; Poulos & McEwen, Sacramento, \$56,084; Valley Construction Co., San Jose, \$56,626; Hemstreet and Bell, Marysville, \$57,229; Fredericksen & Westbrook, Sacramento, \$58,533; J. P. Brennan, Redding, \$63,433; Piazza & Huntley, San Jose, \$65,267. Contract awarded to R. P. Shea & Del R. Beebe, Glendale, \$52,712.60.

LOS ANGELES COUNTY—Over Arroyo Seco Channel and Arroyo Seco Parkway, at Avenue 43, a reinforced concrete girder bridge to be constructed and roadway approaches to be graded and paved with asphalt concrete. District VII, Route 205, Section L. A. Oberg Bros., Los Angeles, \$47,670; Byerts & Dunn, Los Angeles, \$47,829; J. S. Metzger & Son, Los Angeles, \$48,618; United Concrete Pipe Corp., Los Angeles, \$51,328; J. E. Haddock, Ltd., Pasadena, \$51,767; Heuser & Garnett, Glendale, \$52,415; C. O. Sparks & Mundo Engineering Co., Los Angeles, \$54,589; Carlo Bongiovanni, Hollywood, \$55,535. Contract awarded to The Contracting Engineers Co., Los Angeles, \$42,551.50.

County at a cost of approximately \$5,000. This work will be undertaken immediately.

Work was continued in clearing the Tisdale By-pass channel and the Feather River overflow with WPA labor.

Relief Labor Work

Under WPA Project No. 10612, sponsored by this department, a total of 45,321 man-hours of labor have been applied from April 23 to May 26, inclusive, 1939, equivalent to a continuous working force of 189 men working eight hours per day.

A contract has been awarded to Peter F. Bender for \$6,300 for construction of two timber bridges in the Tisdale By-pass. Piles have been driven for two additional bridges in the Sutter By-pass and the decks will be placed within the next two weeks with assistance of WPA labor. Repairs to several other bridges have been made.

The repair of wave wash damage on the east levee of the Sutter By-pass and of breaks in the Nelson Bend Bow Levee has been practically completed. Repair of the Butte Basin Levee along the Sacramento River will be commenced about June 5th.

Preparations are complete for resumption of levee repair work on River Junction Reclamation District No. 2064 in San Joaquin County and additional work will cost approximately \$4,600. This work will be carried on by force account by the division.

Praise for Maintenance Men

San Jose, California, May 5, 1939
Division of Highways,
Sacramento, California

Gentlemen:

I want to put in a boost for the maintenance crews of the Division of Highways. These hard working and conscientious employees are the backbone of our highway system. They keep the roads traversable. The better the job they do, the less credit they get. The public has come to expect a perfect road as a matter of course and utter loud complaints over any inconsequential chuckhole.

What started me on this was an incident I observed on May 4 about 10 a.m. on U. S. 101 between Santa Clara and Sunnyvale where I saw a member of the maintenance crew digging a grave to bury a large dog that evidently had been the victim of some passing motorist. I understand that the burial of an animal killed on a highway is not a responsibility of the maintenance crews and that in this particular case the job was taken over on the initiative of the crew members. It was a kind act and one that would seem to call for commendation of maintenance men by all persons who have any regard for the dogs and cats that are victims of present day traffic.

HARRY G. SHAW,
1227 Minnesota Ave.,
San Jose, California

The Bronx-Whitestone bridge across the East River in New York City opened April 29th. It is an \$18,000,000 span, a vital link in a great belt highway. Traffic is accommodated in six broad lanes, three lanes for traffic in each direction. Northbound and southbound traffic is separated by a raised concrete barrier.



One of the scenes of sylvan beauty on the realigned Route 2 between Gaviota Pass and Santa Ynez River.

Nojoqui Canyon Realignment Abolishes 19 Curves

(Continued from page 9)

The performance of this equipment was satisfactory.

The Portland cement concrete pavement section was 22 feet wide, 0.55 foot thick, with the outer edges thickened to 0.75 foot. Weakened plane and expansion joints were reinforced with single $\frac{1}{2}$ -inch transverse bars and $\frac{3}{4}$ -inch dowels; $\frac{3}{4}$ -inch tie bolts at 4-foot centers were placed along longitudinal joint. The pavement was placed half-width at a time.

PAVING PROGRESS DELAYED

The first paving operations began October 11, 1938. As three of the bridges and a part of the grading were not completed, it was necessary for the contractor to skip paving the central portion of the project. Paving was not completed until March 29, 1939. The slow progress made may be attributable to delays caused by weather, occurrence of slides and changes in bridge footings.

In the early stages of paving operations, considerable difficulty was experienced in obtaining aggregates from nearby commercial

sources that would uniformly pass the sulfate tests for soundness. It became necessary to require material to be stockpiled several weeks in advance of use, so that time for tests for acceptability could be made. The first 1600 cubic yards of pavement poured required the blending with a high sulfate-test aggregate from San Gabriel River plants. As the work progressed, the local commercial aggregate became more uniform in acceptability, probably due to obtaining it from a better portion of the pit, permitting its use for the remainder of the paving period.

Steel headers were used. Where the supporting stakes punctured the asphalt membrane seal, the contractor was required to reseal the punctures, upon removal of the headers, with SC-2 liquid asphalt.

ADEQUATE DETOURS CONSTRUCTED

Either constructed detours or existing roadbed outside of new slope stakes were available for traffic over most of the project. Numerous crossings of the work, however, were necessary, due to the crooked and meandering alignment of the

old road. Constructed detours consisted of a graded roadbed topped with 0.5 foot imported borrow, the upper 0.33 foot of which was road-mixed with SC-12 liquid asphalt.

Work was completed April 21, 1939, and acceptance by the director was on May 2, 1939.

W. J. Curran and R. A. DeLano, were successively superintendents for C. O. Sparks and Mundo Engineering Corporation, Contractor; and J. C. Adams was resident engineer for the State.

The work was a Federal Aid Project; total construction cost, including the four bridges, was approximately \$307,000.

Demand For Magazine

April 13, 1939

Department of Public Works,
Sacramento, California

Many people are asking for this magazine. If there is no charge for it, could it be sent monthly to the Broadmoor County Branch Library, 642 Dowling Boulevard, San Leandro. Thanks.

M. R. L.,
Broadmoor County
Library Branch



Congratulations

Downtown Improvement Association
Sacramento, California

Mr. John W. Howe, Editor,
California Highways and
Public Works,
P. O. Box 1499,
Sacramento, California.

Dear Mr. Howe:

We read your publication from cover to cover and enjoy every article, which are all very instructive and educational. It is through your magazine that we keep informed of the splendid work being done by the Department of Highways and Public Works for the benefit of the general public throughout the State of California.

May we extend to you our congratulations and best wishes for continued success in your good work.

Sincerely yours,

Downtown Improvement Association,
By Roy Cothrin, Managing-Director.

Texas Wants Index

The State of Texas
State Highway Department
Austin

California Highways and
Public Works,
Sacramento, California.

Gentlemen:

We will appreciate your sending us an index or table of contents to the 1938 issues of California Highways and Public Works if you compile one. We have your publication in our Department Library, and such an index would be of great advantage to our engineers.

Sincerely yours,
Julian Montgomery,
State Highway Engineer.

A Boost from Kern County

1914 Maple Avenue,
Bakersfield, California.

Editor, Highway Bulletin,
Sacramento, California.

Dear Mr. Howe:

For a number of years we have been enjoying the Highway Bulletin, and think that it is one of the finest of its kind.

For a period of years my husband was in the road construction work, and being an engineer, reviewed your magazine from an engineer's view point.

I was principal of a Junior High school, and used the magazine in the social studies classes to a great advantage, after which it was put in the school library, and used daily until ready for discard.

There are so many fine articles and photographs of construction work that is being done in Kern County within its pages, that it makes it especially valuable for use here.

We were especially interested in the article in a recent issue describing the New Divided Highway, which is a joy to all who use it.

Thank you for keeping us on your mailing list, and permit me to congratulate you upon the superior publication of an excellent magazine.

Very sincerely yours,

JUNE CARNAHAN.

From Kentucky

City of Louisville
Kentucky

California Highways and
Public Works,
Sacramento, California.

Gentlemen:

Will you kindly put the City of Louisville on your mailing list for your magazine directing it to me at this office. We will greatly value receiving it so that it may be read and preserved in our library. Thanking you, I remain.

Very truly yours,

DEPT. OF PUBLIC WORKS,
J. B. Wilson, Chief Engineer,
Room 214,
City Hall, 6th and Jefferson,
Louisville, Kentucky.

Bestows Praise

To the Editor,
California Highways and
Public Works,
Sacramento, California.

My dear Sir:

If I did not take this opportunity of congratulating you upon the slant you are giving the road situation in our State I would indeed be derelict in public duty, for I hold it just as needful to bestow

praise as blame. I refer to the illustrations of poor roads on pages 4, 5, 6, and 7 of your January issue. The very looks of the roads were enough to send the shivers down one's back because of their horror possibilities. Your monthly tries to get us away from that difficult state of mind—provincialism. It also tends to make us conscious of the fact that other States have good roads and are spending even more than California only, as an Illinois resident once pointedly remarked when I praised their road systems "Yes, we have good roads in Illinois—only we don't talk about them!"

Sincerely yours,

FORD A. CARPENTER.

Teacher is Interested

346 W. Park St.,
Stockton, Calif.
January 9, 1939.

California Highways and
Public Works,
Sacramento, Calif.

Gentlemen:

Kindly place me on your mailing list for your publication, "California Highways and Public Works."

I am a teacher and I feel that your publication would be a splendid reference to have on hand enabling children to know what is going on in highway construction throughout the State, and how wisely our tax money is being spent in this department.

Thank you for this favor,

Cordially yours,

L. A. FARRAR.

City of Glendale

California Highways and
Public Works,
Sacramento, California.

Dear Sirs:

I have just read a borrowed copy of your publication "California Highways and Public Works," with much interest. I believe this publication will help me in my present position and would like very much to be placed on your mailing list. Thanking you very much, I am

Very truly yours,

M. F. EATON, State Foreman,
4844 San Fernando Road,
Glendale, California.

Gas Tax Apportionments to Cities During Biennium

(Continued from page 17)

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
San Bernardino County			
Chino	\$2,826.54	\$2,829.63	\$5,656.17
Colton	7,264.87	7,274.75	14,539.62
Needles	2,850.11	2,853.22	5,703.33
Ontario	12,313.29	12,326.75	24,640.04
Redlands	12,851.77	12,865.82	25,717.59
Rialto	1,488.50	1,490.12	2,978.62
San Bernardino	35,416.01	35,454.73	70,870.74
Upland	4,272.43	4,277.11	8,549.54
Totals	\$79,283.52	\$79,372.13	\$158,655.65
Totals District VIII	\$121,443.15	\$123,894.73	\$245,337.88

District IX

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Inyo County			
Bishop	\$1,050.65	\$1,051.80	\$2,102.45
Mono County			

District X

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Amador County			
Amador City	\$155.01	\$155.18	\$310.19
Jackson	1,817.57	1,819.57	3,637.14
Plymouth	310.94	311.28	622.22
Sutter Creek	918.31	919.31	1,837.62
Totals	\$3,201.83	\$3,205.34	\$6,407.17
Calaveras County			
Angels	\$829.47	\$830.38	\$1,659.85
Mariposa County			
Hornitos	\$56.20	\$56.26	\$112.46
Merced County			
Atwater	\$831.28	\$832.19	\$1,663.47
Dos Palos	843.07	844.00	1,687.07
Gustine	921.03	922.03	1,843.06
Livingston	727.93	728.73	1,456.66
Los Banos	1,699.74	1,701.58	3,401.32
Merced	6,405.48	6,412.48	12,817.96
Totals	\$11,428.53	\$11,441.01	\$22,869.54
Sacramento County			
Isleton	\$2,634.35	\$2,637.23	\$5,271.58
San Joaquin County			
Lodi	\$6,596.76	\$6,603.98	\$13,200.74
Manteca	1,463.13	1,464.73	2,927.86
Stockton	43,479.53	43,527.06	87,006.59
Tracy	3,471.07	3,474.86	6,945.93
Totals	\$55,010.49	\$55,070.63	\$110,081.12

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Solano County			
Benicia	\$2,640.70	\$2,643.59	\$5,284.29
Dixon	906.52	907.51	1,814.03
Fairfield	1,025.27	1,026.40	2,051.67
Rio Vista	1,186.64	1,187.94	2,374.58
Suisun	820.41	821.30	1,641.71
Vacaville	1,410.55	1,479.34	2,889.89
Vallejo	13,848.93	13,864.08	27,713.01
Totals	\$21,839.02	\$21,930.16	\$43,769.18

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Stanislaus County			
Ceres	\$889.31	\$890.27	\$1,779.58
Modesto	12,566.94	12,686.79	25,253.73
Newman	1,150.38	1,151.63	2,302.01
Oakdale	1,914.58	1,916.67	3,831.25
Patterson	820.40	821.30	1,641.70
Riverbank	727.93	728.73	1,456.66
Turlock	3,876.28	3,880.53	7,756.81
Totals	\$21,945.82	\$22,075.92	\$44,021.74

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Tuolumne County			
Sonora	\$2,065.06	\$2,067.32	\$4,132.38
Totals District X	\$119,010.77	\$119,314.25	\$238,325.02

District XI

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Imperial County			
Brawley	\$9,463.19	\$9,473.53	\$18,936.72
Calxico	5,710.18	5,716.42	11,426.60
Calipatria	1,408.74	1,410.27	2,819.01
El Centro	7,645.60	7,653.97	15,299.57
Holtville	1,593.67	1,595.41	3,189.08
Imperial	1,761.37	1,763.30	3,524.67
Westmorland	1,338.03	1,339.48	2,677.51
Totals	\$28,920.78	\$28,952.38	\$57,873.16

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
Riverside County			
Blythe	\$924.66	\$925.66	\$1,850.32
Indio	2,357.86	2,360.45	4,718.31
Totals	\$3,282.52	\$3,286.11	\$6,568.63

CITY	STREETS OF MAJOR IMPORTANCE Section 194		STATE HIGHWAYS Section 203
	Fiscal Year Ending June 30, 1938	Fiscal Year Ending June 30, 1939	Biennium Ending June 30, 1939
San Diego County			
Chula Vista	\$3,507.34	\$3,511.17	\$7,018.51
Coronado	4,917.88	4,923.26	9,841.14
El Cajon	951.84	952.89	1,904.73
Escondido	3,101.21	3,104.60	6,205.81
La Mesa	2,278.10	2,280.59	4,558.69
National City	6,618.52	6,625.75	13,244.27
Oceanside	3,185.52	3,189.00	6,374.52
San Diego	137,512.05	137,664.31	275,176.36
Totals	\$162,072.46	\$162,251.57	\$324,324.03
Totals District XI	\$194,275.76	\$194,490.06	\$388,765.82

State of California

CULBERT L. OLSON, Governor

Department of Public Works

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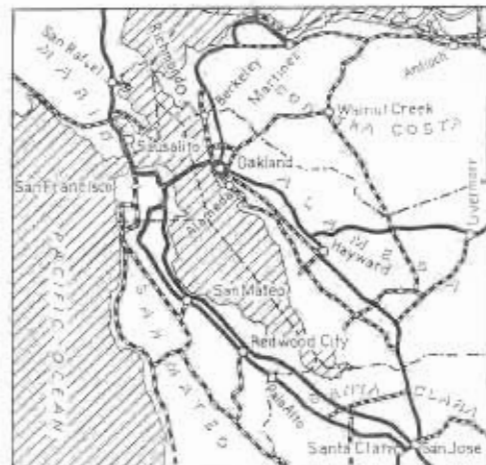
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MAP
 SHOWING
STATE HIGHWAY SYSTEM

LEGEND
 Primary Roads 
 Secondary Roads 
 Proposed Roads 



SAN FRANCISCO AND VICINITY



LOS ANGELES AND VICINITY

See Detail Map

See Detail Map