

# CALIFORNIA

## HIGHWAYS AND PUBLIC WORKS



*Scene on State Highway No. 1.  
(Redwood Highway) North of Garberville*

Official Journal of the Department of Public Works

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# Biennium Work 96 Per Cent Completed June 1st. 473 Projects Put Under Way

Construction Contracts for the Twenty-three Elapsed Months  
Total \$38,093,300 Leaving Only an Estimated \$1,453,600  
to be Advertised for Bids by July 1st

By **GEORGE T. McCOY**, Assistant State Highway Engineer

**I**N THE recovery of the Nation from the pressure of unemployment and business stagnation, the State Division of Highways has accomplished its potential contribution to the cause during the past two years.

Recognizing the objective towards which the people of the United States are striving, the State of California and the Federal government have bent every effort to place revenues available for highways and related projects in circulation without undue loss of time.

With the current biennium, covering the period from July 1, 1933, to June 30, 1935, nearing its end, the Division of Highways has about completed a program of construction, reconstruction and maintenance for expenditure of available State and Federal funds in an orderly improvement of the State Highway System, Federal Highway System, connecting streets through municipalities and county feeder roads of traffic importance.

Early in 1933 the Federal government established a policy of providing intensive public works as a means of affording both direct and indirect employment on a large scale while at the same time producing

permanent improvements on which dividends would be realized in the future.

As part of the National Industrial Recovery Act which Congress passed for carrying out this policy, provision was made for the appropriation of \$400,000,000 as Federal aid

to the several states for construction on State highway systems between July, 1933, and July, 1934.

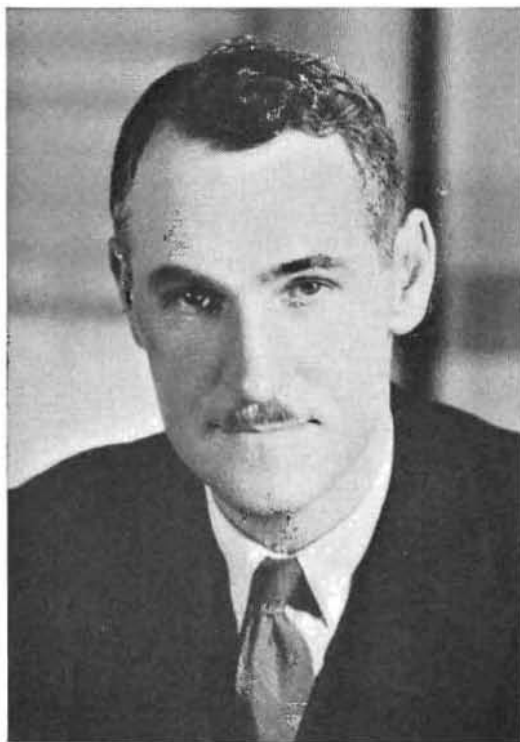
This Federal assistance was continued for the fiscal year 1934-35 by congressional action in June, 1935, under the Hayden-Cartwright Act, which appropriated an additional \$200,000,000 for the current fiscal year.

California's apportionment under the NIRA amounted to \$15,607,354 and the 1935 apportionment of the Hayden-Cartwright Act provided \$7,932,206.

This Federal money, totaling \$23,539,560, when added to the \$18,745,000 in State funds budgeted for highway construction made available to the Division of

Highways the sum of \$42,284,560 for major construction purposes on the 14,000 miles of the State Highway System, Federal Highway System, within municipalities and on county feeder roads.

However, in commenting on the expendi-



**GEORGE T. McCOY**

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# California Steel Girder Bridge Wins Award in National Beauty Contest

By W. A. DOUGLASS, Assistant Construction Engineer of Bridges

AS A UNIT of the San Francisco-Eureka Highway, crossing the South Fork of the Eel River, Humboldt County in 1919 designed and constructed a bridge across this fork of the river about six miles north of the Mendocino-Humboldt County line. Built of native redwood timber the bridge consisted of two 154-foot Howe truss spans and one hundred feet of timber trestle approaches.

Impending necessity for extensive repairs or possible failure of one or both truss spans together with the desirability of line improvement led to road and bridge contracts for the line change as shown on the accompanying sketch.

The old bridge and roadway, having been built to standards long since abandoned for primary routes, included sharp curves with radii as short as 70 feet and formed a real hazard and delay to present day traffic.

Construction of the realignment of this section of State Highway No. 1 with 20-foot hard surface and wide shoulders and the new bridge with 24-foot roadway was started in 1934 and completed early in 1935.

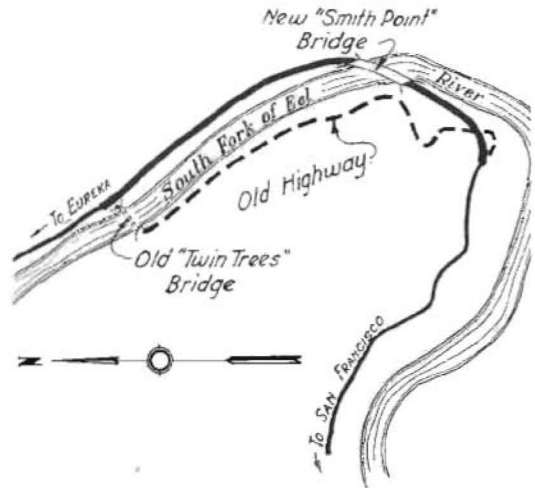
The accompanying pictures indicate the type of structure chosen for this site. Four continuous steel girder spans were used—two 120 foot each and two 100 foot each—which together with the abutment spans make a total length of 555 feet. The north one-half of the bridge lies on a curve.

## UNUSUAL DESIGN

The design of this bridge is noteworthy for three reasons.

1. It is the second continuous girder steel bridge built on the State Highway system.
2. It is, so far as we know, the first continuous girder bridge on a curve built in this country.
3. It was awarded honorable mention on June 5th in the national annual competition held in New York by the American Institute of Steel Construction, Inc., for the most beautiful bridge in steel built last year.

Similar designs have been worked out and built in Germany but due to complications involved, this type of structure has not been developed in the United States.



MAP SHOWS LOCATION of new bridge at Smith Point on relocated highway relative to old structure across Eel River.

Since the steel girders are straight while the concrete deck slab is curved, the deck overhang beyond the girders is variable thus producing constantly changing conditions of loading and distribution throughout the entire length.

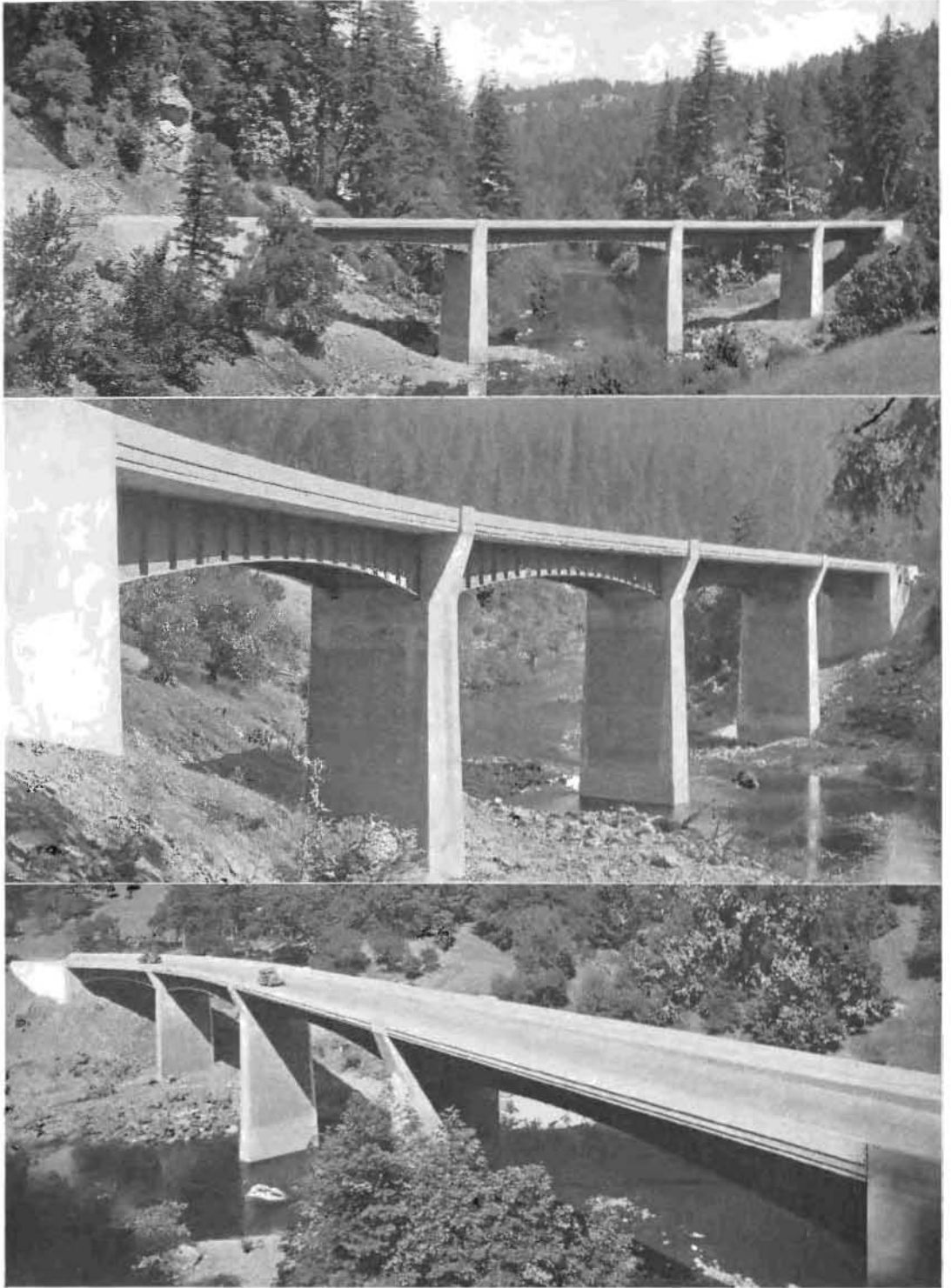
The effect of continuity or of continuous girder design is to carry stresses from one span to the next, in fact to several adjacent spans, reversing the stresses at each support. That is, a load tending to produce a sag in one span will tend to produce a raise or crown in the first span on either side and a lesser sag in the second spans, crown in third and so on thus producing "waves" decreasing in magnitude each way from the loaded span.

The extent and direction of the stresses developed in bridge members and joints have been fairly well developed for bridges on tangent. However it can be readily seen that, with a bridge on a curve and the girders joined at an angle rather than a line, the effect of stresses carried through the joints may be quite different.

In addition to the "wave" effect mentioned above, a load on one span introduces an overturning moment in the girders of adjacent

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**BEAUTY AWARD WINNER** in a bridge contest and not a card game, is this State designed structure on the Redwood Highway where it crosses the South Fork of the Eel River just south of Garberville. It is the first continuous steel girder bridge built on a curve in America and was awarded honorable mention in a national competition for the most beautiful steel bridge built last year.

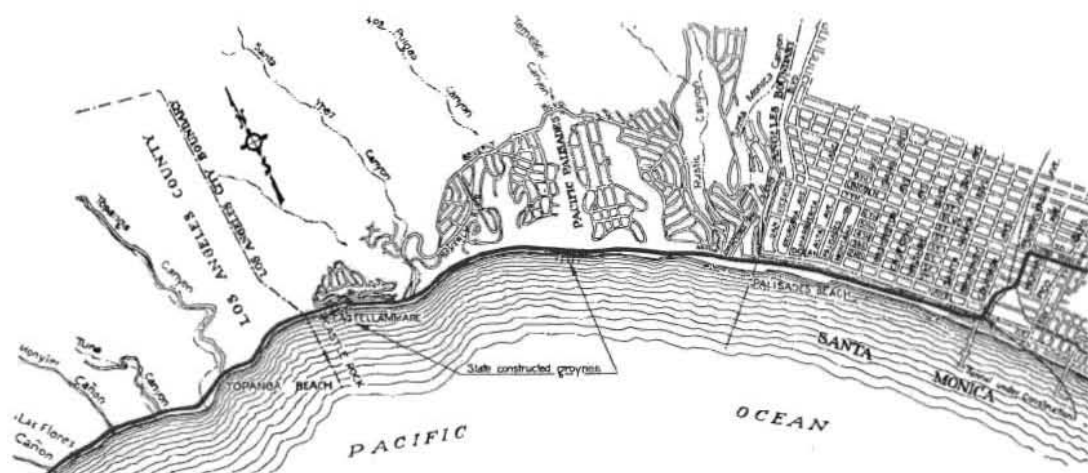
## Last Unit of \$1,235,000 Coast Highway Project Under Way at Santa Monica

**A**N EXTENSIVE program begun in 1932 for improving the Coast Highway through the great recreational beach area in the vicinity of Santa Monica, entered its final stage of construction with the recent award of contracts for a tunnel and roadway connecting the shoreline section with Lincoln Boulevard in the city of Santa Monica.

The improvement program involved the widening of the existing 20-foot Coast Highway and the construction of connecting links in Santa Monica to provide a broad, paved coastal roadway stretching from Las Flores Canyon on the north to Lincoln Boulevard on the south.

been necessary to grade the fills extending to the ocean on the one side with the cuts biting into the cliffs or palisades on the land side. As much parking area as possible, outside of the actual traveled way, has thus been provided for the large number seeking recreation at the beaches.

Los Angeles is famed for its beaches, and on week ends and holidays probably one-quarter million people visit those at Santa Monica and the beaches stretching northerly to Las Flores Canyon. A 16-hour traffic count taken on the old 20-foot pavement at Santa Ynez Canyon on July 4, 1929, was 53,303 vehicles.



MAP OF HIGHWAY IMPROVEMENT along Santa Monica coast shown by heavy black line.

The total length of the project is 11.35 miles and includes 11 contracts at a total cost of approximately \$1,235,000 excluding right of way.

The design of the highway was based on the necessity of handling a very large flow of traffic, especially on week ends and holidays, which comes into the beach area over every road and thoroughfare leading from and through the metropolitan area of Los Angeles.

#### PARKING AREA PROVIDED

Over much of the distance between Las Flores Canyon and Santa Monica, in order to provide an adequate width of roadway, it has

This was the largest traffic count ever taken on a State highway in California.

#### TRAFFIC CONDITIONS IMPROVED

Building a road in this manner between the cliffs and the ocean resulted in a huge excess of excavated material. The excess was used to widen the highway embankment and provide additional parking areas outside of the highway proper, which accommodate capacity crowds on holidays and greatly contribute to safe traffic conditions.

The new roadbed is graded throughout to an 80-foot width and is paved with asphalt concrete or portland cement concrete 40 feet

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**SANTA MONICA COAST HIGHWAY** extension and widening operations—In the top picture workmen are constructing reinforced concrete slope protection for retaining walls that support walks and roadways on private property. Center picture shows a portion of the old Southern Pacific Railroad right of way through which the highway will be extended from the shoreline to Lincoln Boulevard by open cut and construction of a 400-foot reinforced concrete arch tunnel under Ocean Avenue and Colorado Avenue in Santa Monica. The tunnel will have a clear span of 56 feet and 48-foot roadway with sidewalks. In the lower picture steam shovel equipment is widening the right of way where the shoreline highway, at its lower end, starts to swing through the cut and tunnel and over Pennsylvania Avenue to the connection with Lincoln Boulevard.



## Governor Merriam Dedicates Redwood Highway Link Eliminating 96 Curves

By J. W. VICKREY, District Engineer

**I**N A MINIATURE forest of Redwoods set up on the main thoroughfare of the little town of Garberville and accompanied by picturesque ceremonial pageantry Governor Frank F. Merriam, on June 9th, officially opened and dedicated the new seven mile Benbow-Garberville unit of the Redwood Highway reconstructed at a cost of \$450,000,

luncheon at Benbow Inn attended by Governor Merriam as guest of honor, State and county officials, and representatives of various civic associations.

Governor Merriam's official party included: Director of Public Works Earl Lee Kelly; Assistant Director Justus F. Craemer; California Highway Commissioners Ray Ingels



**PICTURESQUE CEREMONY** marked the ribbon-cutting scene at the dedication of the Benbow-Garberville unit of the Redwood Highway relocation project. Left to right, the State officials in the group are: Senator H. A. Perry; Highway Commission Secretary Julien D. Roussel; Commissioner T. A. Reardon; Governor Merriam; Director of Public Works Earl Lee Kelly; Assistant Director Justus F. Craemer; Commissioner Ray Ingels.

which eliminates a dangerous and obsolete section of roadway, saves approximately one-half mile in distance and straightens out 96 curves.

Elaborate arrangements were made by the Garberville Chamber of Commerce and the Humboldt County Board of Trade, sponsors of the event which began with an official

and Timothy A. Reardon; the Commission's secretary, Julien D. Roussel; Senator Harry A. Perry and Assemblyman Michael Burns of Humboldt County; James Snook, Chief of Division of State Parks; Construction Engineer C. S. Pope of the Division of Highways and District Engineer J. W. Vickrey.

Following luncheon, the official caravan

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**REDWOOD HIGHWAY**  
**SCENES** along the  
South Fork of the Eel River  
in Humboldt County,  
where seven miles of highway  
between Benbow and the  
Redway Bluffs north of  
Garberville have been  
reconstructed at a cost of  
\$450,000 and numerous  
curves eliminated or  
straightened.



**BEAUTIFUL SCENIC VISTAS** of redwood forests, canyon-like valleys and silver reaches of the winding river several hundred feet below mark that part of the new highway along the precipitous Redway Bluffs where much new heavy grading was necessary in widening and straightening this once dangerous section of the road. Through the redwood forests the new highway was constructed to harmonize with the natural scenery. Native redwood logs were used for cribbing, retaining walls, trench backfill, and in embankments, thus preserving the rustic atmosphere of that part of the project.

# \$5,291,693 Gas Tax Funds Apportioned to Cities During 1933-35 Biennium

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

**T**HE Department of Public Works recently completed the apportionment of \$5,291,693.72 of gas tax revenue to cities for the biennium ending June 30, 1935. The allocation, or cities' share, made in accordance with legislation enacted in 1933, represents the net revenue derived from one-quarter cent per gallon tax on motor vehicle fuel.

The apportionment to each city was made, as prescribed in Chapter 767, Statutes of 1933, on a population basis in the proportion that the total population of each city bears to the total population in all cities in the State, as determined by the last Federal census of 1930.

Five cities in the State, namely: Bayshore in San Mateo County, Fairfax in Marin County, Gardena in Los Angeles County, Indio in Riverside County, and Westmorland in Imperial County, although municipalities, were incorporated subsequent to the last decennial federal census, which, under the terms of the one-quarter cent gas tax allocation law, precluded their participating in the funds allocated for the current biennium. This condition has been corrected recently by the legislature and such cities will participate in future gas tax apportionments, commencing with the July apportionment for the 1935-37 biennium.

Gas tax money is allocated to municipalities for expenditure upon State highway routes and city streets within incorporated cities. This money has been used to some extent for the maintenance of State highway routes and other city streets within municipalities. By far the greater portion

of the money, however, has been used for the improvement of the principal thoroughfares.

## SECURED HIGHWAY IMPROVEMENTS

Many cities continued to maintain the State highway routes within their limits with city forces, defraying the cost from city funds, and applying the entire amount of the gas tax allocation toward improvement of the highways. In the comparatively short time that the act allocating gas tax revenue to cities has been operative, a noticeable improvement of the State highway routes through cities has resulted from the expenditure of these funds.

The work accomplished and under way, in addition to maintenance work, consists of widening narrow pavements, moving back curbs and gutters to provide a wider street, resurfacing rough pavements to provide a smooth riding surface, realigning and straightening crooked tortuous streets and sharp turns, acquiring and opening new routings, and placing new pavements.

Many cities where funds are insufficient for immediate accomplishment of improvements have undertaken stage construction with right of way acquisition as the initial project, or are accumulating funds for future construction.

## CITIES RECEIVING FUNDS

Following is a list of the incorporated cities, giving the symbol or abbreviation for each city, the county abbreviation, the Division of Highways district in which the city is located, the population according to the 1930 Federal census, and the total apportionment of gas tax funds to the city for the 1933-35 biennium:



L. V. CAMPBELL





WEST ENTRANCE TO RIVERSIDE as realigned eliminating right angle turn, graded and paved with \$12,769 of gas tax funds and \$10,000 from State Cooperative fund.

**APPORTIONMENT OF ONE-FOURTH CENT GAS TAX TO CITIES FOR BIENNIUM ENDING JUNE, 1935**

District	City or town	Symbol	County	Abbr- viation	Population	Total allocation
IV	Alameda	Ala	Alameda	Ala	35,033	\$43,458 55
IV	Albany	Alb	Alameda	Ala	8,569	10,629 87
VII	Alhambra	Alh	Los Angeles	L.A.	29,472	36,560 11
II	Alturas	Alt	Modoc	Mod	2,338	2,900 30
IV	Alviso	Alvs	Santa Clara	S.Cl.	381	472 63
X	Amador City	Ama	Amador	Ama	171	212 13
VII	Anaheim	Ana	Orange	Ora	10,995	13,639 33
X	Angels	Ang	Calaveras	Cal	915	1,135 06
IV	Antioch	Ant	Contra Costa	C.C.	3,563	4,419 91
VII	Arcadia	Ada	Los Angeles	L.A.	5,216	6,470 46
I	Arcata	Arc	Humboldt	Hum	1,709	2,120 02
V	Arroyo Grande	Ar.Gd.	San Luis Obispo	S.L.O.	892	1,106 53
IV	Atherton	Atn	San Mateo	S.M.	1,324	1,642 43
X	Atwater	Atw	Merced	Mer	917	1,137 54
III	Auburn	Aub	Placer	Pia	2,661	3,300 98
VII	Avalon	Ava	Los Angeles	L.A.	1,897	2,353 23
VII	Azusa	Azu	Los Angeles	L.A.	4,808	5,964 34
VI	Bakersfield	Bkd	Kern	Ker	26,015	32,271 69
VIII	Banning	Ban	Riverside	Riv	2,752	3,413 87
VIII	Beaumont	Bau	Riverside	Riv	1,332	1,652 35
IV	Bay Shore	By.Sh.	San Mateo	S.M.		
VII	Bell	Bell	Los Angeles	L.A.	7,884	9,780 13
IV	Belmont	Brlt	San Mateo	S.M.	984	1,220 65
IV	Belvedere	Blv	Marin	Mrn	500	620 25
X	Benicia	Ben	Solano	Sol	2,913	3,613 59
IV	Berkeley	Ber	Alameda	Ala	82,109	101,856 47
VII	Beverly Hills	Bv.Hs.	Los Angeles	L.A.	17,429	21,620 73
III	Biggs	Big	Butte	But	463	574 35
IX	Bishop	Bis	Inyo	Iny	1,159	1,437 74
I	Blue Lake	B.Lk.	Humboldt	Hum	555	688 48
XI	Blythe	Bly	Riverside	Riv	1,020	1,265 31
XI	Brawley	Brw	Imperial	Imp	10,439	12,949 61
VII	Brea	Bre	Orange	Ora	2,435	3,020 62
VII	Burbank	Brb	Los Angeles	L.A.	16,662	20,669 26
IV	Burlingame	Burl	San Mateo	S.M.	13,270	16,461 48
XI	Calexico	Cix	Imperial	Imp	6,299	7,813 93

(Continued on page 26)

## Ray Ingels Takes Office as Member of California Highway Commission

**R**AY INGELS of Mendocino County, former representative of that county in both houses of the State Legislature, has been appointed a member of the California Highway Commission by Governor Frank F. Merriam.

Always a booster for good roads and a supporter of the Department of Public Works throughout his public career, Mr. Ingels, while Senator became closely acquainted with Governor Merriam, then Lieutenant Governor, who announced his appointment to the commission on May 21st, to succeed Dr. W. W. Barham. The office carries no salary.

### SIX YEARS A LEGISLATOR

As a member of the Assembly for two years and for an additional four years as a member of the Senate, Mr. Ingels obtained a rare and valued knowledge of conditions throughout the State.

Born in Indiana in the year 1890, Mr. Ingels came to California with his parents in 1903 and settled in Fresno. He graduated from the high school of that city in 1909. Entering the University of California the same year he graduated with the class of 1913, College of Agriculture.

### SERVED IN THE ARMY

Ranch foreman in Kern County and Butte County; Extension Specialist with the University of California; head of the Real Estate Department of the Union Trust Co. were successive positions held by Mr. Ingels during the next four years.

In 1917 when the United States declared war against Germany Mr. Ingels enlisted in the artillery branch of the U. S. Army. He worked his way up from private to first lieutenant and the close of the war found him commanding a battery in the officers' training school at Camp Taylor, Kentucky.

### PREFERS RANCHING BUSINESS

Since the close of the war, Mr. Ingels has pursued his chosen profession of ranching in Potter Valley, Mendocino County. In 1928 he decided to enter politics and in that year ran for and was elected to the Assembly, representing Mendocino County. In 1930 he



RAY INGELS

was elected to the Senate to represent Mendocino and Lake Counties.

Declaring that he desired to withdraw from public life he declined to again enter the contest for reelection to Senate in the 1934 campaign.

### POOR ROADS COST MOTORISTS

**\$1,500,000,000 ANNUALLY**

High driving costs due to poor roads vastly swell the highway transportation bill, says an engineering authority. American motorists annually travel more than 200 billion miles. Naturally the good roads and streets in service have largely reduced car driving costs. Yet conservatively estimating excessive driving costs on the poor roads and streets at one cent a mile, motorists yearly spend \$1,500,000,000 in excess of what they would pay if the bulk of them were provided with traffic facilities better suited to the motor vehicle.

That continued highway improvement at an accelerated rate would pay for itself is indicated by the fact that the costs of driving cars today is probably more than one-third less than it was 15 years ago when good road building got under way.



PROVIDING RAIL TRANSPORTATION for the San Francisco-Oakland Bay Bridge, Governor Frank F. Merriam signs the bill empowering the Toll Bridge Authority to contract for the operation of trains across the 8½-mile structure. Seated, left to right are: Finance Director A. E. Stockburger, Governor Merriam and Lieutenant Governor George J. Hatfield. Standing are: Florence J. McAuliffe, Bay Bridge attorney; Chief Engineer C. H. Purcell, Assemblyman Gardiner Johnson of Berkeley, Senator William F. Knowland of Alameda County, and Assemblyman Thomas A. Maloney of San Francisco.

## Governor Signs Bay Bridge Trains Bill

With officials of the Department of Public Works, the California Toll Bridge Authority, Department of Finance, Division of Highways and members of the San Francisco, Alameda and Contra Costa County legislative delegations looking on, Governor Frank F. Merriam on May 27th signed A. B. 947, the important permissive measure providing that the Toll Bridge Authority may permit and in the future acquire rail transportation on the San Francisco-Oakland Bay Bridge.

Under this bill, the Toll Bridge Authority is authorized to enter into contracts for the operation of trains on the bay bridge.

Witnessing the signing of the measure were Lieutenant Governor George J. Hatfield, Assemblymen Melvyn I. Cronin, Jefferson Peyser, Patrick J. McMurray, Ray Williamson, James F. Brennan, William B. Hornblower, Thomas Maloney and Joseph P. Gilmore of San Francisco; Senators William F. Knowland, Alameda, and William R. Sharkey, Contra Costa; Assemblymen Charles W. Fisher, Charles J. Wagner, Arthur H. Breed, Jr., Gardiner Johnson, Henry P. Meehan and James M. Cassidy, Alameda County; Assemblyman T. H. DeLap, Contra Costa.

Representing State departments were Deputy Director of Public Works E. J. Neron; State Highway Engineer and Bay Bridge Chief Engineer C. H. Purcell; Florence J. McAuliffe, attorney for the Toll Bridge Authority; Director of Finance A. E. Stockburger; Julien D. Roussel, secretary State Highway Commission; Harold Norton, Department of Public Works; C. C. Carleton, Chief of Division of Rights of Way.

### MAN-YEAR COST IN ENGLAND

In England, it is estimated that the direct cost per man-year on public works is about \$1,750. An expenditure of \$7,500 is calculated to employ four men directly on the site and six men indirectly in the materials, plant, and transport work, a total employment of ten men at a cost of \$750 per man-year.

"Hello, Totz, how are you?"

"Not so good—I have indigestion."

"How come?"

"Eought and ate an unemployed apple and it started to work."

A judge gave an Oregon grocer who beat up a government inspector a chance to defend himself. The grocer said:

"I'm guilty. I lost my head. All the morning I held my temper while government agents inspected my scales, tasted my butter, smelled my meat, graded my kerosene. Then this bird comes along and wants to take moving pictures of my cheese. It was more than I could stand—I pated him in the eye."



# Monterey Park Celebrates Completion of Los Angeles-Pomona Highway Link

By R. C. MYERS, Assistant District Office Engineer

AS THE CLIMAX to a five-day celebration in the city of Monterey Park, the new State highway improvement of Garvey Avenue through the city was officially dedicated on the afternoon of May 25th by Assistant Director of Public Works Justus F. Craemer and other State and county officials.

An extensive parade was held through the streets of Monterey Park and ended at a specially built platform where Mayor Williams introduced Mr. Craemer and the other speakers.

In addition to Mr. Craemer addresses were made by District Engineer S. V. Cortelyou and District Right of Way Agent Frank C. Balfour of the Division of Highways, by Chairman H. C. Legg of the Los Angeles County board of supervisors and various city officials.

As explained by the speakers, the improvement of Garvey Avenue through Monterey Park is an important link in the new Los Angeles-Pomona highway by which traffic entering Los Angeles from the east can travel nearly to the Civic Center of Los Angeles without the usual interruptions of intersecting streets or railroads crossing at grade.

## PROVIDES 76-FOOT ROADWAY

The link from Atlantic Boulevard to New Avenue along which the dedication ceremony was held, is 1.49 miles in length and, through the business district of Monterey Park, is paved the full 76 foot width between curbs. For the five blocks through the business section the existing curbs were left in place on the north side and new curbs constructed on the south side to provide the 76 foot width of roadway.

On each side of the business district curbs and gutters were constructed throughout on the south side of Garvey Avenue and the areas between the edges of pavement and gutter were oil treated.

Work under this contract was started last January and completed May 6, 1935, at a cost of \$43,380 under Resident Engineer C. P. Montgomery of the Division of Highways.

Just previous to the completion of the contract through Monterey Park work was

finished on the last construction contract on Ramona Boulevard, which includes the portion of this route in the city of Los Angeles.

## SOME DIFFICULT CONSTRUCTION

Started more than a year ago, and completed last April, this Ramona Boulevard link carries the route from State Street to its present terminus at Aliso Street and Mission Road near the Civic Center of Los Angeles. From this point traffic has access to the Civic Center via Aliso Street, which is a wide paved thoroughfare.

This last contract on Ramona Boulevard, while only 0.96 mile in length, was one of the most difficult from a construction standpoint of any on the entire route between Los Angeles and Pomona. A natural drainage channel (Arroyo de las Posas) paralleled the project for its entire length and carried a large volume of drainage water during heavy rains from a considerable area lying north-east of Los Angeles.

## DRAINAGE CANAL BUILT

A drainage canal lined with gunite and capable of carrying the flow of water from this source, with an ample factor of safety for exceptional rains, was constructed between the highway and the Pacific Electric Railway tracks, which parallels the highway. Curbs and heavy cable guard rail were built to protect traffic from the hazard of running into this ditch.

A new concrete pavement 40 feet wide was constructed with a 12-foot oiled shoulder on each side, making a width of traveled way of 64 feet. This can be widened in the future by covering the storm drain.

The location of the route through this part of Los Angeles was restricted to the space between the Pacific Electric Railway tracks and very steep and high bluffs. Homes on the bluffs made it necessary to use extreme care in the excavation for the wide roadbed.

## FINAL CONTRACT LET

All important intersecting streets are carried over the new highway on overhead bridges so that from Aliso Street and Mission

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**RAMONA BOULEVARD UNIT** of the Los Angeles-Pomona airline arterial, presented some difficult construction between State Street and Mission Road, restricted for most of the distance between the railroad, a natural drainage channel and high bluffs, and passing under bridges carrying intersecting highways. A gunnite lined canal was constructed for the drainage channel.

# Biennial Budget 96 Per Cent Awarded

(Continued from page 1)

ture during this biennium, it must be borne in mind that the requirements far exceed the available funds. These requirements are based on the amount of traffic, and the necessity for replacement of existing facilities on which the investment has been amortized and on which the maintenance costs are excessive and justify replacement.

Another factor for consideration is the addition of 6800 miles of county roads by act of the State Legislature of 1933. The major part of this mileage was constructed on standards and alignment far below that required by present day traffic and included many bridges which are structurally unsound, necessitating temporary repairs or posting for reduced legal load and speed limits.

The bringing of these roads up to a standard adequate for the accommodation of existing and anticipated traffic is an obligation of the State to be undertaken as funds become available.

With the funds available the Division of Highways has expended every effort to place the work under contract and the results are evidenced by a review of the period since July 1, 1933.

With twenty-three of the twenty-four months of the biennium elapsed, projects amounting to \$40,830,900, or 96 per cent of the \$42,284,000 budget, have been awarded as contracts or are now advertised for bids, leaving only \$1,453,600 or 4 per cent to be advertised by July first, and, with the present speed of advertising continued, this will be accomplished.

The following summations set forth in tabular form the figures given above:

## CONSTRUCTION AND MAINTENANCE BUDGET

Construction:	
State funds .....	\$18,745,000
NIRA apportionment .....	15,607,354
Subtotal (legislative budget) .....	\$34,352,354
Hayden-Cartwright Act apportionment .....	7,932,205
Total construction budget .....	\$42,284,560
Maintenance and Betterments (legislative budget) .....	17,722,000
Total .....	\$60,006,560

## STATUS OF CONSTRUCTION AND MAINTENANCE JUNE 1, 1935

Construction put under way.....	\$38,093,300
Expenditures for construction rights of way in cities .....	1,855,100
Projects advertised for bids.....	882,500
Subtotal .....	\$40,830,900
Maintenance and Betterment allotments .....	16,446,800
Subtotal .....	\$57,277,700
Construction to be advertised .....	\$1,453,600
Maintenance funds remaining .....	1,275,200
Subtotal .....	2,728,800
Total .....	\$60,006,560

Progress on highway maintenance during the biennium has paralleled that of construction and on June first maintenance work orders amounting to approximately \$16,446,800 had been written leaving only some \$1,275,200 of the \$17,722,000 originally budgeted for maintenance and betterments during the biennium.

That the State Highway System, with its 14,000 miles of interlacing routes, is one of California's greatest assets, is an indisputable fact and the increase made in the last two years in the permanent value of the system to the citizens of the State may best be judged from the following summary of construction put under way and advertised since July 1, 1933.

Types of Improvement	Miles	Amount
Pavement .....	322.6	\$13,643,600
Bituminous treated crushed rock surfacing .....	281.5	5,336,700
Untreated crushed rock surfacing .....	71.3	1,086,800
Graded roadbed .....	242.8	6,375,700
Oiled roadbed and oiled shoulders .....	2299.1	1,668,200
Bridges and grade separations.. (149)		7,232,500
Miscellaneous contracts .....		918,200
Minor improvements .....		759,400
Miscellaneous day labor .....		1,954,700
Expenditures from construction funds for rights of way on State routes in cities.....		1,855,100
Totals .....		\$40,830,900

The advancement of this large construction program has required the persistent and unified effort of the entire State highway organization. However, a contributing factor has been the realization that this accomplishment is not only adding to the wealth of the

(Continued on page 29)





VERY FAIR INDEED was this meeting of Governor Merriam and the fair little Mary Catherine Taylor when she invited him to come to "our party" at San Diego. Left to right, Director of Finance A. E. Stockburger, Governor Merriam, Director of Public Works Earl Lee Kelly, Mary Catherine Taylor, her mother Mrs. Taylor and Senator Ed Fletcher, her grandfather.

## Little Lady Bids Governor to "Party"

Proudly bearing an envelope almost as long as she, herself, is tall, enclosed in which was the official invitation of the California Pacific International Exposition to Governor Frank F. Merriam to attend the World's Fair opening in San Diego, May 29, little Miss Mary Catherine Taylor, eight years old, called upon the Governor in the Capitol.

As the special representative of Frank Belcher, President of the Exposition, the diminutive lass presented the invitation to the State's chief executive. Written in her own handwriting, it read:

"Dear Governor Frank:

Please come to our party. Everybody in America is coming.

Always yours,

MARY CATHERINE TAYLOR,  
Special representative of the President of the  
California Pacific International Exposition."

Accompanied by her mother, Mrs. B. H. Taylor of San Diego, and escorted by her grandfather, Colonel Ed Fletcher, State Senator from the Exposition City, Miss Taylor was ceremoniously received by Governor Merriam in the gubernatorial office on May 21st. The invitational document, embellished with a huge colored seal of the Exposition drawn by Mary Catherine, is three feet long and two feet wide.

### CITY POPULATION AVERAGES

#### 235 PER MILE OF STREET

Approximately 3300 miles of streets in California cities of under 50,000 population are available to serve an additional population of 786,000 people, or 47 per cent more persons than now are served.

This is one of the interesting facts developed by the road transportation survey made by the Division of Highways. Statistics on the relation between population and road mileage show that the average population per mile of street for all cities of the State is 235.

# Kennett Dam Project Entails Rebuilding 16 Miles of Highway, 37 Miles Railroad

By F. N. DRINKHALL, District Locating Engineer

**C**ONSTRUCTION of the proposed Kennett Dam will necessitate the rebuilding of some 16 miles of State Highway Route No. 3 (U. S. 99) in Shasta County and approximately 37 miles of the Southern Pacific Railway.

Preliminary surveys for the relocation of both highway and railroad began in February of this year, and field work on both surveys was practically complete by June 1st. Plans and estimates are in progress.

For the past year or more the Division of Water Resources and the U. S. Geological Survey have had parties in the field contouring the entire area covered by this project. From the data obtained, contour maps on a 20-foot interval were made and placed at the disposal of both highway and railway officials.

## TWO POSSIBLE ROUTINGS

These maps permitted an intelligent study of re-routing possibilities prior to actual field work. They were of great help, particularly to the railway company, as their grades stayed within the contour limits of the maps. In our own case it permitted a study of two possible highway routings—one, in general, along the shore line of the proposed lake on easy grades, the other a direct route using grades up to 6 per cent.

The largest single construction item in the relocation of both highway and railroad is a 3200-foot bridge across Pit River, and, as its location could seriously affect both line and grade, it was our first problem. Tentative crossings were placed on the contour maps, and field inspection of the sites followed.

While alignment requirements practically forced the adoption of one particular site, it was decided to call for expert advice on the geological and foundation merits of two possible sites, one above, the other below the present highway crossing of Pit River, before adopting a definite site and proceeding with surveys.

A joint field investigation was made by Chester Marliave, geologist of the Division

of Water Resources, and C. J. Sielaff, geologist for the Southern Pacific Company, and separate reports made thereon. Their findings indicated that the downstream site, tentatively adopted because of alignment requirements, was suitable from a geological standpoint.

## SUITABLE FOUNDATION EXISTS

To quote from Mr. Marliave's report, "There are no major structural weaknesses. Suitable foundation rock exists that when properly prepared, will safely withstand the loads to which it will be subjected and which will not deteriorate by continual submergences in water." The formation is described as "a massive ridge of granite" or "quartz hornblende diorite."

This bridge will be a joint structure carrying the railway below and highway above. Its overall length will be approximately 3500 feet, including structure approaches for the highway, necessitated because of railway interference. Highway grade will be about 477 feet above river bed and 395 feet above the grade of the present highway bridge across this river.

As noted above, there are two possible general policies as to re-routing the highway, one to use easy grades and stay on the slopes above the proposed lake, the other to use up to 6 per cent grades to climb up into easier country and take out distance. The first had scenic possibilities with less rise and fall, and merited investigation, at least. Our first preliminary lines were run with this object in view but were eventually abandoned as too costly.

## SATURATED AREA AVOIDED

The minimum curvature we had adopted had to be dropped and pieces of maximum grade introduced to turn and cut through knife-edged ridges. One string of 600-foot radius curves introduced fills of 250,000 cubic yards hanging on 29° slopes, with a large part of their free area below the water surface. Enough of line was run on this basis to provide a convincing comparison with the adopted route.



**NEW BRIDGE SITE** across the Pit River for the proposed joint highway and railroad bridge made necessary by the Kennett Dam project is indicated by the white line, 325 feet higher than present bridge shown in background.



**RELIEF SKETCH MAP** by Paul Green and Bart. Dunn of District II shows proposed relocation of State highway and railroad in Kennett Dam and lake area. Existing highway is shown by dotted line.

As against this questionable type of construction, use of 6 per cent grade, starting at the north end of the proposed Pit River bridge, quickly took the line out of the saturated area up into easier country where better

alignment was possible. While this necessitated taking higher summits, the total rise and fall in the revision is 372 feet less than the existing highway, and a saving of 3.2 miles in distance is secured. Shore line sur-

(Continued on page 30)



## Highway Dedicated With Pageantry

(Continued from page 6)

proceeded to a large tree-embowered grandstand erected on the roadside in the heart of Garberville where Governor Merriam performed the dedication ceremonies of cutting the ribbon barrier and made the principal address of the day to a large crowd of assembled citizens.

The crowning feature of the program was a spectacular pageant featuring Indian characters resplendent in native costumes and a score of beautiful Humboldt County girls garbed to represent the various recreational activities of the Redwood Empire and particularly Humboldt County.

The first State highway was constructed through this area twenty years ago. It was very crooked and narrow as compared with present day requirements, but at that time was considered a very high type of road and a substantial improvement to the locality.

It opened up territory that had never before been accessible except to those traveling by foot or horseback and was the transportation route by which the potential recreational value of a then sparsely settled section of California has been realized. As the recreational value of this section became better and wider known, traffic increased rapidly and the original constructed highway has for several years been inadequate for present day traffic.

### BEAUTIFUL SCENIC VISTAS

The new highway was designed and has been constructed so as to harmonize with the natural scenic beauties of the territory, parking turn-outs being constructed at several locations where particularly pleasant panoramic vistas of the forests and canyon-like valleys are obtained. Noteworthy among these is the magnificent view of Garberville where the South Fork of Eel River lying several hundred feet below the highway makes a bend to the west and partly surrounds a beautiful cattle ranch of early day origin. Another is the view from high up on Redway Bluffs down the canyon of Eel River as it follows its meandering course to the Pacific Ocean.

The project was constructed in two sections, one extending northerly from Benbow at the mouth of the east branch of the South Fork of Eel River over the so-called Benbow Summit into Garberville, a thriving little town

located high above a beautiful section of the river.

### THROUGH REDWOOD GROVE

The northerly section of the new construction work commenced at Bluff Creek, a point approximately one mile north of Garberville, and extended through a rolling, lightly wooded area to Redway Bluffs, a sandstone cliff where very heavy grading work was required to obtain a satisfactory standard of alignment. Immediately north of these bluffs the new highway passes through the beautiful Holbrook Grove, one of the many State Redwood Parks in this area, and continues northerly for five miles along the east bank of the South Fork of Eel River.

The road for its entire length passes through one of those areas frequently encountered in the Coast Range where the material slides when either wet or dry, and many large slides and embankment failures occurred during the construction. At Benbow Summit the ground above a 50-foot cut broke back for a distance of from 400 to 500 feet and a large area of the mountain side, comprising several acres, gradually moved toward the roadway.

Over 100,000 cubic yards of this moving material were removed along benches at an elevation from twenty to thirty feet above the road bed. A portion of the material was used to reconstruct a large embankment immediately to the south which had failed and the remainder was deposited in terraces on the adjoining property, a safe distance from the roadway.

### REDWOOD TIMBER USED

One of the most interesting features of the construction work was the use of native redwood timber for cribbing, retaining walls, trench backfill and in embankments. The disposition of redwood timber cut during highway construction work has heretofore presented a very difficult problem, it being practically impossible to burn green redwood and there is no commercial market in isolated districts.

"And this is your bump of curiosity."

"Right, Professor. I got that by sticking my head in the elevator shaft to see if the elevator was going up. It was coming down."



**EARLY SPANISH** in its architectural style, the new district office building of the Division of Highways in San Diego is of concrete construction, 115 feet long by 116 feet wide with a two story corner tower. Designed by the Division of Architecture of the State Department of Public Works.

## *New Highway Office Building in San Diego*

**A** NEW office building for District XI of the State Division of Highways is under construction and nearing completion in the City of San Diego. It is located at the corner of Harbor and Ash streets, facing the site of the proposed new Civic Center Group and having, as well, a view towards the water front. The lot is 125 feet wide by 200 feet long.

The style of architecture of the building was chosen with the idea of harmonizing with the projected development and is of a simple Early Spanish type, adopted to modern needs. In the main the structure is one-story in height, accented at the corner by a tower, which also acts as an entrance feature.

The building is of Class "C" construction with exterior walls of concrete while the interior partitions and roof framing are of wood.

The floor plan is roughly "U" shaped being 150 feet long and 116 feet wide.

On the ground floor are nine offices, a public waiting room, blue print room, accounting room, vault and a large drafting room.

The second floor of the tower is used as a conference room and overflow drafting room.

In the basement are a laboratory, store room and heater room.

The magician's wife knew he was up to his old tricks because she discovered a hare on his shoulder.

## *Smith Point Bridge Wins Contest Award*

(Continued from page 2)

spans and because of the restraint a torsional or twisting stress is developed at the joints.

This is one phase of design on which very little has been written and no definite rules developed. For this reason individual credit is due Designing Engineer H. D. Stover and Designer A. B. Willett for the ingenuity displayed in developing a rational solution for this problem.

The principal advantages of this type of design are in the use of longer girder spans, some reduction in metal required and pleasing appearance. Further embellishments were added for appearance such as the distinct form marks on piers and abutments, massive abutments and solid concrete rails.

The cost of bridge was about \$110,000, or nearly \$8.00 per square foot of roadway. The relatively high cost was due in a large measure to high (75 foot) piers required.

The news that this bridge had won an award in a national contest came in a letter from F. H. Frankland, technical director of the American Institute of Steel Construction, Inc., of New York under date of June 5, advising that it was awarded honorable mention in Class C.

Each year the Institute invites a jury composed of architects and engineers of national prominence to select the most beautiful bridges in each of three cost classes.

# Relocation of Highway Through Taft Celebrated With Dedication Ceremony

**I**N THE PRESENCE of a large number of citizens, city, county and State officials and representatives of the local chamber of commerce, Chairman Harry A. Hopkins of the California Highway Commission, on May 28, officially opened the recently completed relocation of State Highway Route No. 138 through the city of Taft in Kern County.

This State highway, extending from Ventura on the south to Coalinga on the north, a distance of 220 miles, formerly entered the city by a circuitous route marked by a number of right angle turns, several of which were within the city limits.

The new route enters Taft on long, easy curves and runs through the city on Kern

construct a portion of an oil company plant and relay pipe lines of several other oil and gas companies.

## LUNCHEON PRECEDED CEREMONIES

The improvement involved the construction of two bridges and grading and surfacing roadway with a 20-foot width of bituminous treated rock, with 8-foot shoulders.

The dedication ceremonies were preceded by a luncheon given by the Taft Chamber of Commerce at which former Mayor Clarence A. Williams acted as toastmaster and introduced Councilman Davis, acting mayor in the absence of Mayor Emmons, District Engineer R. M. Gillis of the Division of Highways,



SKETCH MAP showing relocated highway routing compared with old traveled way.

Street, a 100-foot boulevard which had been previously paved by the city for its full width.

## COST SHARED BY CITY

While only 0.16 of a mile of the project was within the city limits, the whole improvement covered a distance of 1.6 miles and relocated the highway from one mile east of Taft to one-half mile west of the city.

The cost of the improvement was \$41,000 of which the city paid \$4,000 from its allotment of the gas tax funds and the State paid \$11,000 for construction and right of way inside the city limits.

In addition to construction and right of way costs it was necessary to remove and re-

Chairman Harry A. Hopkins of the Highway Commission and other guests.

During the ceremonies the Taft Union High School Band played several patriotic and inspiring numbers.

"What caused the explosion at your house, Jones?"  
"Well, I'll tell you, old boy, it was a little bit of powder on my coat sleeve."

The preacher was out on the links and thought a small moral lesson might not be amiss.

"I notice," he remarked mildly, "that the players who get the lowest scores are not those who swear."  
"What the h—l have they got to swear about?" snorted the gloomy golfer as he dug up another slice of turf.





**NEW HIGHWAY LINK** on a portion of the State Route 138 between Coalinga and Ventura. The photograph shows the east end of the Taft relocation project where it crosses the old highway.



**SCISSORING THE RIBBON**, assisted by Miss California and Miss Taft, Chairman Harry A. Hopkins of the California Highway Commission officially opens the relocated link of the Ventura-Coalinga highway through the city of Taft. The man at Mr. Hopkins' elbow holding the hat is Acting Mayor T. E. Davis.

#### **CAMPAIGN STARTED TO ESTABLISH U. S. DEPARTMENT OF PUBLIC WORKS**

Establishment of a Department of Public Works in the Federal government and the addition of a Secretary of Public Works to the President's cabinet, is to be the object of a campaign by the National Society of Professional Engineers, according to an announcement made by D. B. Steinman, president of

the society at the annual meeting of the New Jersey Association of Professional Engineers held in Newark on March 16. A like proposal was put before the New York State Society of Professional Engineers at its winter meeting held in Albany on March 2. At that time a resolution was adopted calling upon the national society to promote the appointment of a professional engineer to the position of Secretary of Public Works.

## Plantings Beautify Coast Road Slopes

(Continued from page 4)

wide in the outlying sections and 76 feet wide through the built-up areas. Outside of the heavier built-up areas where the pavement is 40 feet wide, oil shoulders 20 feet wide were laid to be used both for parking and to relieve congestion in traffic.

In the city of Santa Monica there are certain isolated sections where the roadway width was reduced because the acquisition of the necessary right of way was economically unsound, as it would entail the moving and reconstruction of large buildings.

### FIRST PAVED IN 1923

The first construction by the State on this highway was in 1923, when a 20-foot strip of pavement was placed. In April, 1932, work was started to widen the pavement and roadbed, beginning at Beverly Boulevard in Santa Ynez Canyon and ending at West Channel Road in Santa Monica Canyon, some 2½ miles. On the ocean side, particularly on State Park lands, the fill was widened an extra 20 feet to provide parking area, and the fill slope temporarily protected with riprap until the beach could be built up.

For the purpose of building up and protecting the beach, five groynes were constructed under a separate contract concurrently with the road work, and it was expected that the beach would be built up sufficiently by these groynes to protect the fill.

### MAJOR SLIDE OCCURRED

Even before this part of the road was completed, slides started on the palisades side. A major slide, known as the McCormick slide, occurred in front of the estate of that name, bringing down some 93,000 cubic yards of material, which blocked the highway and closed the road to traffic entirely for ten days.

The occurrence of this slide showed the necessity for the placing of slope protection work and other work of more or less pioneering nature to prevent loss by slides.

Some of the slope protection work was done under separate contracts and some as a part of the highway work. In one case it was found necessary, in order to avoid further slides, to remove the material of the slopes which seemed to be out of equilibrium with the material already down, and to terrace the slopes, constructing an oiled ditch and install-

ing suitable drainage facilities to take care of the collected water.

### GROYNES BUILD BEACH

The groynes mentioned above, constructed of interlocking steel sheet piling, were placed approximately 400 feet apart and extended 200 feet out into the ocean from the fill, with the top of groyne elevation +9 feet at the road end and +1 foot at the ocean end. These groynes were constructed with a two-fold purpose; first, to build up the beach for protection of the fills that were exposed to heavy sea action; secondly, to materially increase the useful beach area for the public.

On the cliffs just westerly of Beverly Boulevard the original subdividers had constructed a 10-foot walk with a parapet wall above the highway. In order to get the necessary 80-foot width of roadway to handle the large volume of traffic, it was necessary to narrow the walk and reconstruct the parapet wall, steepening the earth slopes below the wall and supporting them with a substantial system of concrete slope reinforcement.

### BEAUTIFUL LANDSCAPE EFFECT

The slope was then planted with mesembryanthemum, with one row of Monterey Cypress placed just in back of the curb. This whole installation, approximately 400 feet long, produced a beautiful landscape effect, which falls in line with the State and Federal Government's program for the beautification of highways.

Further landscaping work is being done inside the city of Santa Monica on the land side, materials and supervision being furnished by the State and all labor from the SERA in the city of Santa Monica.

The greatest amount of excavation was done on the next section of the highway, from Las Flores Canyon to the west city limits of Los Angeles, amounting to 1,060,000 cubic yards. Of this, 560,000 cubic yards were excess excavation which it was necessary to haul a considerable distance for disposal, as it could not be spread over valuable beaches adjacent to the roadway cuts. About sixty per cent of this material was distributed in the lower Topanga Creek basin, and some of the rocky excavated material was used for constructing small groynes.

## Beach Houses Removed to Build Fill

(Continued from preceding page)

In making this fill at the lower Topanga Creek basin, it was found necessary to remove 129 small beach houses, and they were then moved either to a new location or returned to their former location after completion of the fill.

### CONCRETE SLOPE PROTECTION

Construction is practically completed on the portion of the road between the west city limits of Los Angeles and Beverly Boulevard. The owners of the property on the cliff side along this portion of the road had constructed expensive retaining walls supporting walks and roadways, and as the highway was widened on the land side, this necessitated the placing of considerable reinforced concrete slope protection to give the owners equal facilities after the road was constructed.

Four more steel sheet piling groynes were constructed along the fill near Castle Rock at the points where the fills extended out on the beach, and it is expected that these will furnish, eventually, additional beach for recreational purposes, as well as protection for the highway embankment slopes.

One of the main traffic feeders from Los Angeles into the beach area is West Channel Road. In 1934 it became necessary to relieve traffic congestion at this important intersection. During the latter part of February, 1934, work on that portion of the Coast Highway between West Channel Road and the California Incline in the City of Santa Monica was started. As a replacement of the old 20-foot pavement without shoulders, a pavement 76 feet wide between curbs with a sidewalk on each side thereof was authorized and constructed.

### UNDERPASSES FOR PEDESTRIANS

Because of expensive improvements on the beach side of the highway, the widened right of way in connection with this contract was all on the land side. Two pedestrian underpasses were constructed, one at West Channel Road and the other about 700 feet southerly. These underpasses carry pedestrian traffic under the highway to the public beach.

Adjacent to this contract and running from the California Incline to the west portal of the proposed Colorado Street tunnel, a contract is now under way, the pavement to have

a minimum width of 76 feet. This contract will complete that portion of the highway which is constructed next to the beach proper, and starts the swing of the highway at its lower end through the tunnel and over Pennsylvania Avenue to Lincoln Boulevard.

The old wooden overhead structure which carried pedestrian traffic over the highway is being removed, and a new steel and concrete bridge constructed in its place.

### TUNNEL 400 FEET LONG

At the southerly end of the above work, a tunnel 400 feet in length, having a reinforced concrete arch with a clear span of 56 feet, is at present being constructed to carry the Coast Highway under Ocean Avenue and Colorado Avenue in Santa Monica. Through the tunnel a roadway of 48 feet will be provided, with sidewalks 3 feet eight inches in width on each side.

An open cut is to be made through the City Park and across Ocean Avenue and Colorado Avenue, and after the tunnel section is concreted, backfill will be made and the street over the tunnel regraded and restored.

Beginning at the southeasterly portal of the tunnel is the final link of the project, which will connect with Lincoln Boulevard in Santa Monica. On this portion bids were recently opened, and award of the contract has just been made. As projected, this location follows along the old Southern Pacific Railroad right of way, which was purchased from this company, passing under the existing bridge at Main Street and extending to Fifth Street, and thence along Pennsylvania Avenue to Lincoln Boulevard.

### TRAFFIC NOT INTERRUPTED

The existing road surface of the highway on the western section of the project from Las Flores Canyon to Santa Monica was still in excellent condition so that the pavement was either widened or used as a base for new pavement. The location of this route at the base of the cliffs precluded the possibility of detours while construction was under way. This necessitated the handling of a heavy volume of traffic through the work at all times which was accomplished without any serious congestion or any major accident that could be attributed solely to construction of the new road.



## Wire Mesh Catwalks, Spool Brakes and Electric Spinning Control on Bay Bridge

THE FOOTBRIDGES completed for one mile over the San Francisco-Oakland Bay Bridge between Rincon Hill and the center anchorage, are the latest development in catwalks—fireproof and fallproof; and the spinning wheels thereon will have new safety controls never before used in suspension bridge building, it was revealed with the arrival of Curtis S. Garner and H. C. Hunter, Pennsylvania experts in suspension bridge construction, who will join forces with the contractors on the \$22,000,000 superstructure of the bridge.

"Catwalks in the past have been made of lumber and easily caught fire," Garner explained. "The solid lumber catwalks were sails in the wind and their movement endangered workmen. By installing the wire mesh flooring catwalks, we have at once removed the fire hazard and the wind hazard. The steel mesh is, of course, impervious to fire, and lets the wind blow through without much swaying."

### TWO SAFETY FEATURES

On his arrival from Pittsburgh, Garner went into conference with State Director of Public Works Earl Lee Kelly; Chief Engineer C. H. Purcell; Edward J. Schneider, contracting manager of the Columbia Steel Company; W. J. Ward, superintendent of erection; and E. E. McKeen, steel company resident engineer.

Two features will make spinning the cables of the San Francisco-Oakland Bay Bridge safer than any similar work undertaken previously. Those features are: (1) steel wire catwalks, which are fire and wind proof; (2) automatic, mechanical, and manual electrical control of the cable spinning operations.

One of the dangers of cable spinning in the past has been the jerking and jumping of the spinning wheel movement. The steel company and affiliated engineers believe they have eliminated this danger by means of a tower with a system of counter-balancing pulley wheels, working in cooperation with the reels of wire so that all slack is constantly kept out of the spinning wire.

### BRAKES ON SPOOLS

By mechanical devices it is provided that any slack is immediately taken up by brakes applied to the huge spools of cable wire. In addition to this mechanical control of slack, an electrical system of switches is provided at 250-foot intervals over the entire catwalk so that in case of accident or a snarled wire all movement can be immediately shut down by the workmen witnessing the accident.

In the past, spinning wheels becoming snarled in the wire continued jumping and plunging until the reel workers at the ends of the bridge could be notified by telephone or signal cords to shut down operations. Peril to workmen resulted because of these unchecked snarls.

The spinning wheel arms will carry two wheels so that four wires can be laid in the cable simultaneously. The wheels will travel approximately seven miles an hour over the one-mile course.

### DOUBLE SPINNING WHEELS

The features of the bay bridge cable spinning which are new to suspension bridge engineering are: (1) automatic brakes on the spools connecting to counter-balancing towers to take up wire slack; (2) wire mesh (or chain link) fireproof, windproof catwalks; (3) electrical control of operations from switches at either end, and at intervals of 250 feet over the catwalk; (4) a perfected form of two-sheave spinning wheel.

Arrangements are being made by State Director of Public Works Earl Lee Kelly for inspection of the bridge catwalks by Governor Frank F. Merriam.

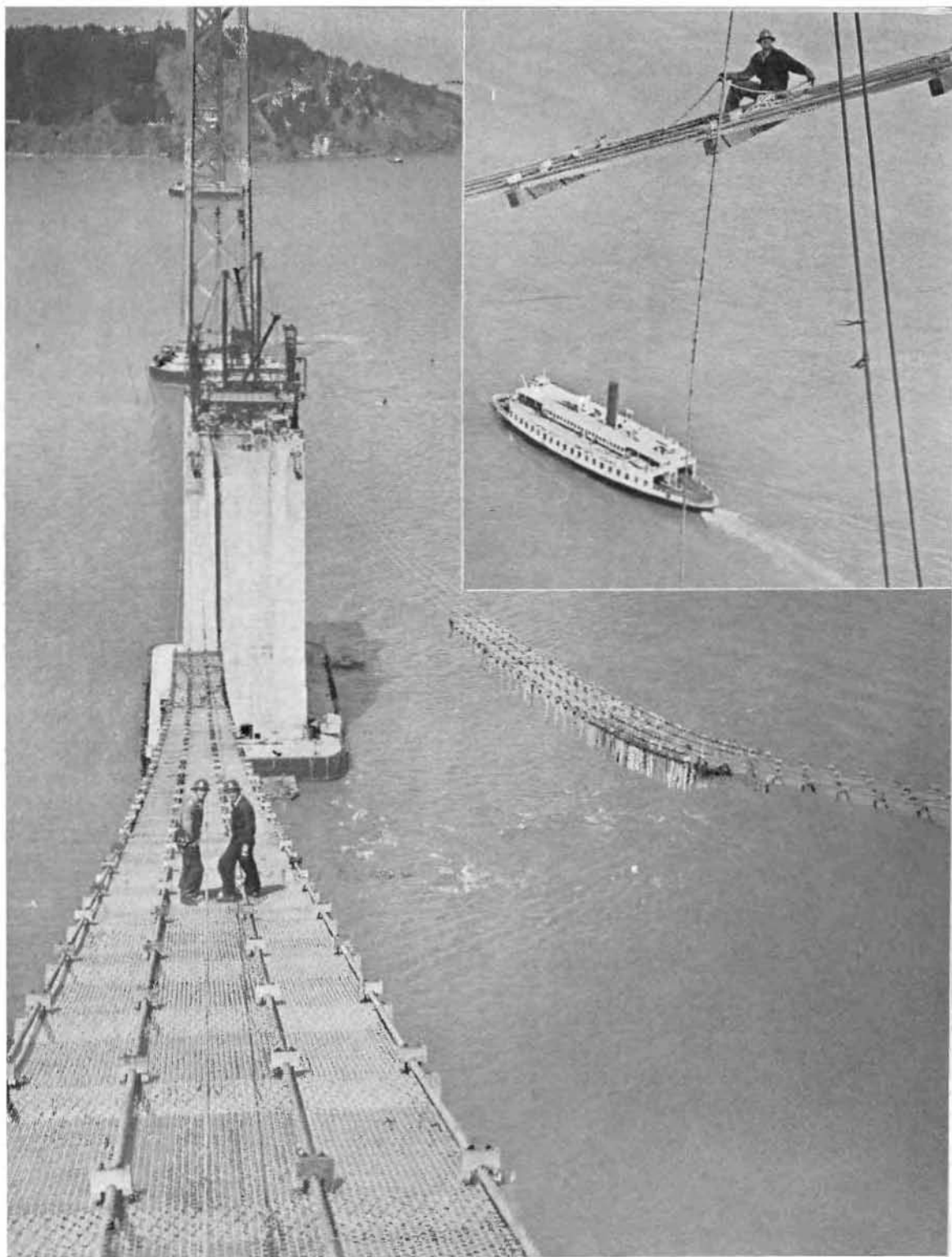
"Ish no use," sighed the drunk, as he staggered into the telephone pole for the third time. "I'm losht in an impen'trable fores'."

The Lady: "Hobo, did you notice that pile of wood in the yard?"

"Yes'm, I seen it."

"You should mind your grammar. You mean you saw it."

"No'm. You saw me see it, but you ain't seen me saw it."



A BOUNCING AERIAL WIRE TRAIL, ten feet wide, swinging high across the waters of San Francisco Bay, and no place for a promenade on a windy day, is a catwalk of the San Francisco-Oakland Bay Bridge. Built of steel mesh suggesting husky chicken wire, with mesh about a half inch square, and supported on timber cross-beams bolted to 2½-inch cables at intervals of 10 feet, it affords a springy footing for the iron-nerved helmeted workers. Cable hand-rails will later be provided supported by posts seen hanging like a fringe from the right catwalk. The inset affords an idea of the dizzy height of the walks in comparison with the ferryboat below.

**APPORTIONMENT OF ONE-FOURTH CENT GAS TAX TO CITIES FOR BIENNIUM  
ENDING JUNE, 1935—Continued**

(Continued from page 9)

District	City or town	Symbol	County	Abbreviation	Population	Total allocation
XI	Calipatria.....	Clp	Imperial.....	Imp	1,554	1,927 74
IV	Calistoga.....	Cstg	Napa.....	Nap	1,000	1,240 50
V	Carmel-by-the-Sea.....	Cml	Monterey.....	Mon	2,260	2,803 54
X	Ceres.....	Cer	Stanislaus.....	Sta	981	1,216 93
III	Chico.....	Chc	Butte.....	But	7,961	9,875 65
VIII	Chino.....	Chn	San Bernardino.....	S.Bd.	3,118	3,867 89
VI	Chowchilla.....	Chw	Madera.....	Mad	847	1,050 70
XI	Chula Vista.....	Ch.V.	San Diego.....	S.D.	3,869	4,799 51
VII	Claremont.....	Cl	Los Angeles.....	L.A.	2,719	3,372 93
IV	Cloverdale.....	Clvd	Sonoma.....	Son	759	941 54
VI	Clovis.....	Clo	Fresno.....	Fre	1,316	1,632 50
VI	Coalinga.....	Cng	Fresno.....	Fre	2,851	3,536 68
III	Colfax.....	Cfx	Placer.....	Pla	912	1,131 34
VIII	Colton.....	Col	San Bernardino.....	S.Bd.	8,014	9,941 39
III	Colusa.....	Chu	Colusa.....	Col	2,116	2,624 90
VII	Compton.....	Com	Los Angeles.....	L.A.	12,516	15,526 14
IV	Concord.....	Cnd	Contra Costa.....	C.C.	1,125	1,395 57
VI	Coreoran.....	Cren	Kings.....	Kin	1,768	2,193 21
II	Corning.....	Cng	Tehama.....	Teh	1,377	1,708 17
VIII	Corona.....	Cor	Riverside.....	Riv	7,018	8,705 85
XI	Coronado.....	Cord	San Diego.....	S.D.	5,425	6,729 73
IV	Corte Madera.....	C.M.ad	Marin.....	Mrn	1,027	1,274 00
VII	Covina.....	Cov	Los Angeles.....	L.A.	2,774	3,441 16
I	Crescent City.....	Cr.C.	Del Norte.....	D.N.	1,720	2,133 67
VII	Culver City.....	CLC.	Los Angeles.....	L.A.	5,669	7,032 41
IV	Daly City.....	DL.C.	San Mateo.....	S.M.	7,838	\$9,723 06
III	Davis.....	Dvs	Yolo.....	Yol	1,243	1,541 94
VI	Delano.....	Dln	Kern.....	Ker	2,632	3,265 01
VI	Dinuba.....	Db	Tulare.....	Tul	2,968	3,681 81
V	Dixon.....	Dxn	Solano.....	Sol	1,000	1,240 50
II	Dorris.....	Drs	Siskiyou.....	Sis	762	945 26
II	Dunsmuir.....	Dmr	Siskiyou.....	Sis	2,610	3,237 71
XI	El Cajon.....	E.Cj.	San Diego.....	S.D.	1,050	1,302 53
XI	El Centro.....	E.Ch.	Imperial.....	Imp	8,434	10,462 40
IV	El Cerrito.....	E.Cr.	Contra Costa.....	C.C.	3,870	4,800 75
VII	El Monte.....	E.Mte.	Los Angeles.....	L.A.	3,479	4,315 71
VII	El Segundo.....	E.Seg.	Los Angeles.....	L.A.	3,503	4,345 48
VIII	Elsinore.....	Esn	Riverside.....	Riv	1,350	1,674 68
IV	Emeryville.....	Emv	Alameda.....	Ala	2,336	2,897 82
XI	Escondido.....	Esd	San Diego.....	S.D.	3,421	4,243 76
II	Etna.....	Etn	Siskiyou.....	Sis	379	470 15
I	Eureka.....	Eur	Humboldt.....	Hum	15,752	19,540 41
VI	Exeter.....	Exr	Tulare.....	Tul	2,685	3,330 75
IV	Fairfax.....	Frxf	Marin.....	Mrn		
X	Fairfield.....	Frfd	Solano.....	Sol	1,131	1,403 01
I	Ferndale.....	Fer	Humboldt.....	Hum	889	1,102 81
VII	Fillmore.....	Fil	Ventura.....	Ven	2,893	3,588 78
VI	Firebaugh.....	Fir	Fresno.....	Fre	506	627 70
I	Fort Bragg.....	F.Bg.	Mendocino.....	Men	3,022	3,748 80
II	Fort Jones.....	F.Jn.	Siskiyou.....	Sis.	302	374 63
I	Fortuna.....	Fta	Humboldt.....	Hum	1,239	1,536 98
VI	Fowler.....	Fow	Fresno.....	Fre	1,171	1,452 63
VI	Fresno.....	Fre	Fresno.....	Fre	52,513	65,142 54
VII	Fullerton.....	Ful	Orange.....	Ora	10,860	13,471 86
VII	Gardena.....	Gar	Los Angeles.....	L.A.		
IV	Gilroy.....	Gil	Santa Clara.....	S.Cl.	3,502	4,344 24
VII	Glendale.....	Gndl	Los Angeles.....	L.A.	62,736	77,824 21
VII	Glendora.....	Gdr	Los Angeles.....	L.A.	2,761	3,425 03
III	Grass Valley.....	G.Vy.	Nevada.....	Nev	3,817	4,735 00
III	Gridley.....	Grd	Butte.....	But	1,941	2,407 82
X	Gustine.....	Gus	Merced.....	Mer	1,016	1,260 35
VI	Hanford.....	Han	Kings.....	Kin	7,028	8,718 25
VII	Hawthorne.....	Haw	Los Angeles.....	L.A.	6,596	8,182 36
IV	Hayward.....	Hay	Alameda.....	Ala	5,530	6,859 98
IV	Healdsburg.....	Hlbg	Sonoma.....	Son	2,296	2,848 20



**APPORTIONMENT OF ONE-FOURTH CENT GAS TAX TO CITIES FOR BIENNIUM  
ENDING JUNE, 1935—Continued**

District	City or town	Symbol	County	Abbr- via- tion	Population	Total allocation
VIII	Hemet	Hem	Riverside	Riv	2,235	2,772 52
IV	Hercules	Her	Contra Costa	C.C.	392	486 28
VII	Hermosa Beach	Hm.B.	Los Angeles	L.A.	4,796	5,949 45
IV	Hillsborough	Hil	San Mateo	S.M.	1,891	2,345 79
V	Hollister	Hst	San Benito	S.Bt.	3,757	4,660 57
XI	Holtville	Holt	Imperial	Imp	1,758	2,180 81
X	Hornitos	Hor	Mariposa	Mpa	62	76 91
VII	Huntington Beach	Hnt.B.	Orange	Ora	3,680	4,577 46
VII	Huntington Park	Hnt.P.	Los Angeles	L.A.	24,591	30,505 21
XI	Imperial	Imp	Imperial	Imp	1,943	2,410 30
XI	Indio	Ind	Riverside	Riv		
VII	Inglewood	Ing	Los Angeles	L.A.	19,480	24,165 00
X	Isleton	Ist	Sacramento	Sac	2,050	2,592 65
X	Jackson	Jkn	Amador	Arn	2,005	2,487 21
V	King City	Kn.C.	Monterey	Mon	1,483	1,830 66
VI	Kingsburg	Kngb	Fresno	Fre	1,322	1,639 95
VII	Laguna Beach	Lgn.B.	Orange	Ora	1,981	2,457 44
VII	La Habra	L.Hbra.	Orange	Ora	2,273	2,819 66
I	Lakeport	Lkpt	Lake	Lak	1,318	1,634 98
XI	La Mesa	L.Msa.	San Diego	S.D.	2,513	3,117 38
IV	Larkspur	Lksp	Marin	Mrn	1,241	1,539 46
VII	La Verne	L.Vn.	Los Angeles	L.A.	2,860	3,547 84
IV	Lawndale	Lndl	San Mateo	S.M.	369	457 75
VI	Lemoore	Lem	Kings	Kin	1,399	1,735 47
III	Lincoln	Lncn	Placer	Pla	2,094	2,597 61
VI	Lindsay	Lnsy	Tulare	Tul	3,878	\$4,810 67
IV	Livermore	Lvmr	Alameda	Ala	3,119	3,860 13
X	Livingston	Lvtn	Merced	Mer	803	996 12
X	Lodi	Lod	San Joaquin	S.J.	6,788	8,420 54
X	Lompoc	Lom	Santa Barbara	S.B.	2,845	3,529 23
VII	Long Beach	L.Bch.	Los Angeles	L.A.	142,032	176,191 14
VII	Los Angeles	L.A.	Los Angeles	L.A.	1,240,359	1,538,669 26
X	Los Banos	L.Bns.	Merced	Mer	1,875	2,325 94
IV	Los Gatos	L.Gts.	Santa Clara	S.Cl.	3,168	3,929 91
III	Loyalton	Loy	Sierra	Sie	837	1,038 30
VII	Lynwood	Lyn	Los Angeles	L.A.	7,323	9,084 20
VI	Madera	Mad	Madera	Mad	4,665	5,786 95
VII	Manhattan Beach	Man.B.	Los Angeles	L.A.	1,891	2,345 79
X	Manteca	Mtea	San Joaquin	S.J.	1,614	2,002 17
VI	Maricopa	Mcp	Kern	Ker	1,071	1,328 58
IV	Martinez	Mtz	Contra Costa	C.C.	6,569	8,148 87
III	Marysville	Mvl	Yuba	Yub	5,763	7,149 02
VII	Maywood	Myd	Los Angeles	L.A.	6,794	8,427 98
IV	Menlo Park	MIP.	San Mateo	S.M.	2,254	2,796 09
X	Merced	Mer	Merced	Mer	7,066	8,765 40
IV	Mill Valley	MI.V.	Marin	Mrn	4,164	5,165 46
X	Modesto	Mod	Stanislaus	Sta	13,842	17,171 05
VII	Monrovia	Mnro	Los Angeles	L.A.	10,890	13,509 08
II	Montague	Mntg	Siskiyou	Sis	507	628 94
VII	Montebello	Mtbl	Los Angeles	L.A.	5,498	6,820 29
V	Monterey	Mon	Monterey	Mon	9,141	11,339 44
VII	Monterey Park	Mon.P.	Los Angeles	L.A.	6,406	7,946 66
IV	Morgan Hill	Mg.H.	Santa Clara	S.Cl.	908	1,126 38
IV	Mountain View	M.Vw.	Santa Clara	S.Cl.	3,308	4,103 58
II	Mount Shasta	M.Sha.	Siskiyou	Sis	1,009	1,251 67
IV	Napa	Nap	Napa	Nap	6,437	7,985 12
XI	National City	Nat.C.	San Diego	S.D.	7,301	9,056 91
VIII	Needles	Ned	San Bernardino	S.Bd.	3,144	3,900 14
III	Nevada City	Nev.C.	Nevada	Nev	1,701	2,110 10
X	Newman	Newm	Stanislaus	Sta	1,209	1,574 20
VII	Newport Beach	Npt.B.	Orange	Ora	2,203	2,732 83
III	North Sacramento	N.Sac.	Sacramento	Sac	2,097	2,601 34
X	Oakdale	Okdl	Stanislaus	Sta	2,112	2,619 94
IV	Oakland	Oak	Alameda	Ala	284,063	352,381 05
XI	Oceanside	Ocn	San Diego	S.D.	3,508	4,351 69

(Continued on page 33)

## Sodium Vapor Lights Chosen to Illuminate Bay Bridge Roadways

**S**ODIUM VAPOR lighting has been selected by Chief Engineer C. H. Purcell to illuminate the San Francisco-Oakland Bay Bridge, and bids for electrification of the bridge will be received by State Director of Public Works Earl Lee Kelly June 26.

Approximately 1000 light standards, 26 feet above the roadway, will be located 150 feet apart on both decks of the bridge.

The sodium light consists of a tube, approximately 3 inches in diameter and from 10 to 12 inches in length, containing two electrodes, one in either end. The tube is filled with sodium gas, that gives off a golden yellow light, which, because it is monochromatic as contrasted with polychromatic incandescent lights, gives the eye a sharp picture of all that is illuminated, causing objects to stand out as if in relief.

### LONG USED IN EUROPE

The advantages claimed for this form of outdoor lighting, used successfully in Europe for approximately eight years and in the United States since early in 1933, are improved clarity, due to its monochromatic character, resulting in maximum safety to motorists; cheapness of operation, in that it supplies 10,000 lumens on 220 watts of electricity compared to 500 watts for the same number of lumens in an incandescent light; and lastly, lack of glare, because the source of the light is not concentrated in a small space as in the incandescent bulb.

So free of glare is the sodium light that the eye can look directly at a powerful globe from a few feet without being blinded. The monochromatic feature of the sodium light gives the eye somewhat the same picture as that which is presented by the infra-red photograph.

Before selecting the lights, Chief Engineer Purcell appointed a committee to study and pass upon them.

The lights were recommended unanimously by the committee, consisting of: H. J. Brunner, California State Automobile Association; Superintendent Carl E. Hardy, of electrical department, City of Oakland; Designing Engineer W. H. Ohmen, City of San Francisco; Chief Electrical Engineer Paul J. Ost, City of San Francisco; Street Lighting Engineer A. O. Olson, City of San Francisco.



GLARELESS SODIUM VAPOR light and beside it Chief Engineer C. H. Purcell who selected it for use on the San Francisco-Oakland Bay bridge for reasons of efficiency, safety and economy.

## Alma Mater Confers Honors on C. H. Purcell

The University of Nebraska at Lincoln conferred on June 10th the honorary degree of Doctor of Engineering upon Charles H. Purcell, State Highway Engineer of California and Chief Engineer of the San Francisco-Oakland Bay Bridge.

This signal honor comes to Mr. Purcell from his alma mater in recognition of his distinguished accomplishments as a bridge and highway engineer.

The degree conferred upon him is the highest honor given by universities to men who are outstandingly preeminent in the engineering profession.

Mr. Purcell's years of experience in engineering have covered varied phases of railroad, bridge and highway work, not only in the United States, but in foreign fields as well, and on this occasion the Department of Highways extend to Mr. Purcell heartiest congratulations on this timely recognition of his distinguished attainments.

## CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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

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

EARL LEE KELLY.....Director  
JOHN W. HOWE.....Editor

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

Vol. 13 JUNE, 1935 No. 6

### Highway Landscaping

The first comprehensive State highway landscaping project has been started on the new six-mile Ramona Boulevard major artery from Los Angeles civic center into Garvey Avenue.

Approximately 8000 trees and shrubs and 25,000 ground cover plants will be placed along this route.

The job represents the first State landscaping contract on record, for which \$30,000 of Federal aid money has been allotted. This includes cost of laying the pipe lines to water plants, which were put in before the final paving job was completed a few weeks ago.

This beautifying work on a definite plan along the new route promises to make the highway especially attractive, declare auto club engineers who recently lauded the State department for construction of the new through route in record time. Ramona extension is now a direct line from Mission and Aliso Streets, Los Angeles, insuring rapid and safer transit east through elimination of all main intersections and grade crossings by bridge separations.

Landscaping will be in naturalistic style from Monterey Park west some two miles to the first overhead crossing. Absence of sidewalks there and the rolling terrain resulted in the plan to plant sugar gum eucalyptus trees in groups on this section, and as many native plants and flowers as possible on all cut and fill slopes.—*Automobile Club of Southern California.*

Kissing her gently: "Haven't I met you before somewhere?"

Kissing her gent: "No, it's just the situation that's so familiar."

## 473 Contracts Put Under Way Since This Biennium Began

(Continued from page 14)

State by improvement to the State Highway System, but also that through the effort expended in preparation, advertising, awarding and supervision of the 473 contracts which have been put under way since the beginning of the biennium, thousands of Californians have found employment and have been aided in weathering the vicissitudes of the depression.

To those outside an organization such as the Division of Highways it is difficult to realize the vast amount of work necessary to put under way a construction program of the magnitude of the one now nearing completion. Each project, whether large or small, requires careful planning; comprehensive surveys in the field; expert design of the proposed work; accurate estimates of materials and work involved; preparation of drawings, plans and specifications; laboratory tests of materials and settlement of right of way negotiations.

The Division of Highways feels gratification for the loyal support the members of the organization have given in accomplishing the program, thereby making work available to thousands of Californians throughout the State.

#### CHEER FOR MAINTENANCE CREWS

One of the most important duties of the division, and one which rarely receives public recognition, involves the maintenance of the State's highways. Efficiently, and without blare of trumpets, maintenance crews labor to protect and conserve the public's investment, waging continual warfare against the destroying attacks of time and the elements to keep the State roads in usable condition.

One has only to observe the rapid deterioration of a discontinued stretch of road to realize the great value of the work performed by the maintenance branch of the State highway organization. Road surfaces irrespective of type, shoulders, side ditches, and drainage structures require constant attention, and while the Division of Highways feels pride in the construction accomplishments of its engineers, there is equal satisfaction in the loyal work of the members of the maintenance organization.



## Relocations Plan 6 Bridges, 12 Tunnels

(Continued from page 17)

vey would have saved little, if any, distance over the present highway length.

### OREGON TRAIL COUNTRY

The line as tentatively adopted turns to the right at the north end of the proposed Pit River bridge, climbs to a summit elevation of 1670 feet, then descends to elevation 1280 just north of O'Brien summit, where it crosses to the east of the present highway. From this point ahead, the line roughly traverses the country through which the original Oregon Trail was built.

While maximum grade had to be used on the descents into Salt Creek and the Sacramento River, a very direct line was obtained with good alignment, including one tangent of 6700 feet. Salt Creek is crossed in fill. The Sacramento River crossing, about 2000 feet below Antler station on the railway, calls for a 1400-foot structure with grade about 190 feet above river bed.

From the north end of this proposed bridge to a connection with the present highway, a long fill is required, averaging 15 feet in height. Just ahead of this point of connection, the railroad relocation crosses the highway on a 22-foot fill. So an underpass solves the final problem of the last crossing.

### CROSSES RAILROAD TUNNELS

Between the proposed Pit River bridge and the underpass just mentioned, the highway line crosses the railroad relocation twice, both times over their proposed tunnels. Apart from these crossings and interference at the joint bridge approaches, there is no conflict between lines whatever.

Railway relocation would start in Redding approximately at the new overhead crossing now being constructed. The present tentative railroad proposal calls for four crossings of the Sacramento River: one at Redding, a 1600-foot structure all on curve, placed between the old and new highway bridges; one below Antler and two below Delta; also a long structure across O'Brien, Salt and Doney creeks, totaling in all some 8200 lineal feet.

Twelve tunnels are also required totaling approximately 19,000 lineal feet, the longest tunnel being 2800 feet in length. Grades used were +0.9 per cent compensated north

bound with a -0.5 per cent adverse grade. This is practically the same as is now in use on the line to be rebuilt, but the proposed revision has more adverse grade and greater rise and fall. The total length of revision from Redding to Delta is approximately 30 miles.

Railroad surveys were made under direction of J. A. Given, Division Engineer of the Southern Pacific Company, with Russell Chase in charge as Locating Engineer.

Both highway and railroad relocation plans are in a preliminary stage, subject to change. Figures and statements made above and summarized in the following tabulation are given with this reservation:

	Highway		Railroad	
	Old	New	Old	New
Length of Line Miles -----	16	12.8	37.2	29.6
Maximum Grade Used Per Cent	6.5	6.0 Comp.	1.0 Comp.	6.9 Comp.
Highest Summit Used Elev. ....	1351	1670.0	1123	1215
Rise and Fall Feet -----	2590.0	2218.0	637	854
Bridges Required Lin. Ft. ....	2027	1620.0	2300.0	8200
Bridge Across Pit River-Joint Use Lin. Ft.		3500		3500
Tunnels Required Lin. Ft. ....			3754	19000

## MONTEREY PARK CELEBRATES COMPLETION OF HIGHWAY LINK

(Continued from page 12)

Road in Los Angeles one can travel to Atlantic Boulevard in Monterey Park, a distance of six miles, without encountering a "Stop" sign to impede his progress.

Although this route is now open all the distance from Aliso Street and Mission Road in Los Angeles to Pomona, there is still one major construction contract remaining to be done. This is for widening of Garvey Avenue from New Avenue in Monterey Park to Mountain View Avenue at El Monte, to bring it up to the same high standard as the rest of the route. The contract has just been awarded for this section, which is 4.7 miles in length.

The finishing touch is being added to the Ramona Boulevard portion of the route, from Monterey Park to Los Angeles, by landscaping the edges of the highway with groups of trees and shrubs, and by planting ice plant on the high cut slopes, both to beautify the highway and to prevent excessive erosion.



Loans have been granted by the Federal Reconstruction Finance Corporation for refinancing the indebtedness of thirteen irrigation districts. The total amount of funds available for immediate disbursement under these completed loans is approximately \$6,525,000, which amount is being used in the purchase and refunding of approximately \$13,242,000 of irrigation district bonds.

An order approving for certification by the State Controller refunding bonds of the Vista Irrigation District in the principal amount of \$937,500, was issued by the Districts Securities Commission.

News of dam applications and construction, stream flow, water distribution and other activities of the Division of Water Resources are contained in the regular monthly report as follows:

**SERA RELIEF WORK**

Work was continued with SERA relief labor up to May 18th but, as the number of men available for each job was decreasing so rapidly, all the projects have now been discontinued. The majority of men on the relief rolls are now finding work in private employment, particularly in agricultural pursuits. At this date it is not possible to secure sufficient relief labor on any of our projects to warrant the expenditure of the necessary overhead.

A total of 15,917 man-hours of relief labor was worked during this period, making a total to date of 244,384 man-hours. The labor utilized upon various relief projects to this date is as follows:

	Man-hours
Federal Transient Service, upper Sutter By-pass .....	8,333
SERA Project No. 58-B14-15, Feather River north of Marysville.....	63,737
SERA Project No. 58-B13-35, Feather River south of Marysville.....	44,356
SERA Project No. 35-B14-222, American River, leveling spoil bank.....	6,905
SERA Project No. 51-B13-10, Bear River.....	15,175
Federal Transient Service, seepage canal.....	850
SERA Project No. 51-B14-39, Butte Slough By-pass .....	7,783
SERA Project No. 35-B14-27, American River clearing .....	61,918

	Man-hours
Federal Transient Service, lower Sutter By-pass .....	15,490
Federal Transient Service, Tisdale By-pass .....	2,989
SERA Project No. 35-B14-40, Mokelumne River .....	7,376
SERA Project No. 57-B14-4, Sacramento By-pass .....	9,472
<b>Total</b> .....	<b>244,384</b>

Work has been started with a crew of 30 men, clearing timber and brush from the right bank of the Mokelumne River near New Hope Landing.

**DAMS**

Application for the construction of the West Valley dam was filed on April 24, 1935. The dam will be an earthfill structure located on West Valley Creek approximately two miles above its junction with the South Fork of the Pit River in Modoc County. The dam is to be approximately 47 feet in height with a storage capacity of 16,700 acre feet of water for the use on lands of the South Fork Irrigation District. After a complete review of the plans and inspection of the site the application was approved on May 4, 1935. The estimated cost of the dam is \$73,000.

Application for the construction of the Grant Lake dam was filed by the City of Los Angeles, Bureau of Water Works and Supply on April 26, 1935. The dam will be located on Rush Creek in Mono County, is to be 72 feet in height and will store approximately 49,300 acre feet of water for domestic and power purposes. The estimated cost of the structure is \$347,600.

RECONSTRUCTING SPILLWAY

Application for the repair of the Kelly and Greiner dam in Modoc County was filed on April 20, 1935. The work proposed consists of reconstruction of the spillway increasing the freeboard and the section of the dam. This application was approved on May 2, 1935.

Application for the repair of the Paicines reservoir in San Benito County was filed on May 4, 1935. The work proposed consists of increasing the freeboard on the structure, protection of the embankment against wave wash and elimination of seepage conditions. This application was approved on May 15, 1935.

Application for the enlargement of the Flora Steele reservoir, filed on April 12, 1935, was approved by the State Engineer on April 22, 1935.

The amended application and revised plans and specifications providing for modification of the design of the San Gabriel dam No. 1 were disapproved

# Building Six Santa Clara Valley Dams

(Continued from page 31)

by the State Engineer on May 8, 1935, after exhaustive study of the plans and site by the personnel of the Division, aided by board of consulting engineers consisting of Professor Charles D. Marx, F. C. Herrmann and W. L. Huber.

Work is under way on all six of the dams of the Santa Clara Valley Water Conservation District. On the Coyote dam the contractor has completed the roadways to the structure, has moved in his equipment and is proceeding with the stripping. At the Calero dam the outlet conduit has been installed, the cutoff trench completed across the streambed section of the site and fill is being placed. At the Almaden and Guadalupe dams preliminary stripping only is under way. The Vasona dam is nearing completion. Excavation of the cutoff trench and stripping of the site is under way at Stevens Creek dam.

The timber facing has been placed on the San Gabriel No. 2 dam and work is in progress in asphaltting the joints and completing a section of cutoff.

Maintenance inspections and inspections of repair work under way have been carried on as usual in addition to the construction work.

## SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

Work is rapidly nearing completion on compilation of the 1933 and 1934 Water Supervisor Reports which will comprise the records of all diversions, stream flow, return flow and delta salinity.

With a discharge of 65,000 second feet in the Sacramento River at Sacramento in the latter part of April, this flow has only diminished very slowly so that on May 21st there was still a discharge of 40,000 second feet. This is reflecting the runoff from a snowpack very close to normal. With this flow the lower delta channels and Suisun Bay have been kept practically free of salinity as shown by the following tests for samples taken on May 14, 1935.

### Salinity at Upper Bay and Delta Stations on May 14, 1935

Station	Salinity in parts of chlorine per 100,000
Point Orient.....	880
Bulls Head.....	40
O and A Ferry.....	4
Collinsville.....	1
Emmaton.....	2
Antioch.....	5
Dutch Slough.....	2
Rindge Pump.....	2
Middle River.....	1

## WATER RIGHTS

### Supervision of Appropriation of Water.

Twenty-six applications to appropriate water were received during April, 19 were denied and 24 were approved. In the same period 3 permits were revoked

and 23 passed to license. Mining continues to predominate in the size of the projects involved and the activity of the appropriators.

Field work in connection with inspection of projects reported complete and investigation of miscellaneous matters was initiated on April 15th. During the current season 219 projects will be inspected, calling for visits to practically every county in the State.

### Water Distribution.

Water master service in the following districts for the 1935 season was commenced about May 1st: Hat Creek, Burney Creek and Cow Creek Water Master Districts (Shasta County).

Water master service in the following districts was continued through the month: Owl, Soldier, Emerson, Cedar, Deep and Mill Creek Water Master Districts (In Surprise Valley, Modoc County); New Pine, Davis and Franklin Creek Water Master Districts (In Goose Lake Valley, Modoc County); South Fork Pit River, Pine Creek, Hot Springs Valley, and Big Valley Water Master Districts (Modoc and Lassen Counties); Shasta River Water Master District (Siskiyou County).

## FEDERAL COOPERATION—TOPOGRAPHIC MAPPING

Office work in connection with the Treadwell Quadrangle in Kern County was completed during April. This is a cooperative sheet.

Office work was completed also on the Parkfield No. 1 and Dudley No. 2 Quadrangles in Kings, Fresno, Monterey and San Luis Obispo Counties and progress was made in connection with the Yreka Quadrangle in Siskiyou County. These three quadrangles are Federal sheets.

Progress was made also in the field in connection with the mapping of Federal quadrangles of Burney in Siskiyou County and Paynes Creek in Tehama County.

## WATER RESOURCES

### South Coastal Basin.

Work on the South Coastal Basin Investigation continued along routine lines during the month.

### Central Valley Project.

Final action has not been taken on the financing of the Central Valley Project by Federal authorities in Washington. Reports indicate that the project will receive Federal approval and that an initial amount will be allocated to the first year's work. However, definite decision has not been reached as to whether funds will be made available to California to carry it on as a State project or whether it will be constructed by Federal agencies as a Federal project. The State Engineer is following the situation closely in Washington and is hopeful that a decision will be reached regarding the construction of the project within the next two weeks.



**APPORTIONMENT OF ONE-FOURTH CENT GAS TAX TO CITIES FOR BIENNIUM  
ENDING JUNE, 1935—Continued**

(Continued from page 27)

District	City or town	Symbol	County	Abbreviation	Population	Total allocation
VII	Ojai.....	Oji	Ventura.....	Ven	1,468	1,821 06
VIII	Ontario.....	Ont	San Bernardino.....	S.Bd.	13,583	16,849 76
VII	Orange.....	Ora	Orange.....	Ora	8,066	10,005 90
III	Orland.....	Orl	Glenn.....	Gle	1,195	1,482 40
III	Oroville.....	Ovl	Butte.....	But	3,698	4,587 38
VII	Oxnard.....	Oxn	Ventura.....	Ven	6,285	7,796 56
V	Pacific Grove.....	P.Gr.	Monterey.....	Mon	5,558	6,894 72
IV	Palo Alto.....	P.A.	Santa Clara.....	S.Cl.	13,652	16,935 35
VI	Parlier.....	Par	Fresno.....	Fre	564	699 64
VII	Pasadena.....	Pas	Los Angeles.....	L.A.	76,086	94,384 92
V	Paso Robles.....	Ps.Rs.	San Luis Obispo.....	S.L.O.	2,573	3,191 82
X	Patterson.....	Pat	Stanislaus.....	Sta	905	1,122 66
VIII	Perris.....	Per	Riverside.....	Riv	763	946 50
IV	Petaluma.....	Pet	Sonoma.....	Son	8,245	10,227 95
IV	Piedmont.....	Pdmt	Alameda.....	Ala	9,333	11,577 62
IV	Pinole.....	Pin	Contra Costa.....	C.C.	781	968 83
IV	Pittsburg.....	Pit	Contra Costa.....	C.C.	9,610	11,921 23
VII	Placencia.....	Plcn	Orange.....	Ora	1,606	1,992 25
III	Placerville.....	Plcr	El Dorado.....	E.D.	2,322	2,880 45
IV	Pleasanton.....	Ple	Alameda.....	Ala	1,237	1,534 50
X	Plymouth.....	Ply	Amador.....	Ama	343	425 49
I	Point Arena.....	Pt.A.	Mendocino.....	Men	385	477 59
VII	Pomona.....	Pom	Los Angeles.....	L.A.	20,804	25,807 43
VI	Porterville.....	Ptrv	Tulare.....	Tul	5,303	6,578 39
II	Red Bluff.....	R.Bl.	Tehama.....	Teh	3,517	4,362 85
II	Redding.....	Rdg	Shasta.....	Sha	4,188	5,195 23
VIII	Redlands.....	Rld	San Bernardino.....	S.Bd.	14,177	17,586 61
VII	Redondo Beach.....	Rdo.B.	Los Angeles.....	L.A.	9,347	11,594 98
IV	Redwood City.....	Rdw.C.	San Mateo.....	S.M.	8,962	11,117 39
VI	Reedley.....	Reed	Fresno.....	Fre	2,589	3,211 66
VIII	Rialto.....	Ria	San Bernardino.....	S.Bd.	1,642	2,036 91
IV	Richmond.....	Rch	Contra Costa.....	C.C.	20,093	24,925 43
X	Rio Vista.....	R.Vs.	Solano.....	Sol	1,309	1,623 82
X	Riverbank.....	Rvbk.	Stanislaus.....	Sta	803	996 12
VIII	Riverside.....	Riv	Riverside.....	Riv	29,696	36,837 98
III	Rocklin.....	Roc	Placer.....	Pla	724	898 13
III	Roseville.....	Rsv	Placer.....	Pla	6,425	7,970 23
IV	Ross.....	Ros	Marin.....	Mrn	1,355	1,680 88
III	Sacramento.....	Sac	Sacramento.....	Sac	93,750	116,297 17
IV	St. Helena.....	S.Hla.	Napa.....	Nap	1,582	1,962 48
V	Salinas.....	Sul	Monterey.....	Mon	10,263	12,731 28
IV	San Anselmo.....	Slmo	Marin.....	Mrn	4,650	5,768 34
VIII	San Bernardino.....	S.Bd.	San Bernardino.....	S.Bd.	37,481	46,495 30
IV	San Bruno.....	S.Br.	San Mateo.....	S.M.	3,610	4,478 22
VII	San Buenaventura.....	Ven	Ventura.....	Ven	11,603	14,393 56
IV	San Carlos.....	S.Car.	San Mateo.....	S.M.	1,132	1,404 25
VII	San Clemente.....	S.Cle.	Orange.....	Ora	667	827 41
XI	San Diego.....	S.D.	San Diego.....	S.D.	147,995	183,588 27
VII	San Fernando.....	S.Fr.	Los Angeles.....	L.A.	7,567	9,386 89
IV	San Francisco.....	S.F.	San Francisco.....	S.F.	634,394	786,967 76
VII	San Gabriel.....	S.Gb.	Los Angeles.....	L.A.	7,224	8,961 39
VI	Sanger.....	Sgr	Fresno.....	Fre	2,967	3,680 57
VIII	San Jacinto.....	S.Jc.	Riverside.....	Riv	1,346	1,669 72
VI	San Joaquin.....	S.J.	Fresno.....	Fre	163	202 20
IV	San Jose.....	S.Js.	Santa Clara.....	S.Cl.	57,651	71,516 25
V	San Juan Bautista.....	S.J.B.	San Benito.....	S.Bt.	772	957 67
IV	San Leandro.....	S.Ln.	Alameda.....	Ala	11,455	14,209 96
V	San Luis Obispo.....	S.L.O.	San Luis Obispo.....	S.L.O.	8,276	10,266 40
VII	San Marino.....	S.Mro.	Los Angeles.....	L.A.	3,730	4,627 08
IV	San Mateo.....	S.M.	San Mateo.....	S.M.	13,444	16,677 32
IV	San Rafael.....	S.Rf.	Marin.....	Mrn	8,022	9,951 32
VII	Santa Ana.....	S.A.	Orange.....	Ora	30,322	37,614 54
V	Santa Barbara.....	S.B.	Santa Barbara.....	S.B.	33,613	41,697 03
IV	Santa Clara.....	S.Cl.	Santa Clara.....	S.Cl.	6,302	7,817 65
IV	Santa Cruz.....	S.Cr.	Santa Cruz.....	S.Cr.	14,395	17,857 04

(Continued on page 36)

# Highway Bids and Awards

FOR MAY

**ALAMEDA COUNTY**—Under S. P. tracks at Folger Ave., R. C. structure, District IV, Route 69, Section Ber. E. T. Lesure, Oakland, \$119,329; Merritt-Chapman & Scott Corp., San Francisco, \$130,994; Healy-Tibbits Const. Co., San Francisco, \$118,720; Bates & Rogers Const. Co., Oakland, \$120,028; Clington Const. Co., San Francisco, \$121,623; MacDonald & Kahn Co., Ltd., San Francisco, \$125,493; N. N. Fall & Bodenhamer Const. Co., Berkeley, \$126,701; Barrett & Hilp, San Francisco, \$133,899; Fredrickson & Watson Const. Co., Fredrickson Bros., Oakland, \$134,617; A. Teichert & Son, Inc., Sacramento, \$165,926. Contract awarded to J. F. Knapp, Oakland, \$117,478.00.

**HUMBOLDT COUNTY**—Between Ferndale and Fernbridge 3.70 miles shoulders to be graded, select material borders constructed and curves superelevated with selected material base and plant mix surfacing (medium curing type). District I, Route 56, Section A. Contract awarded to Hemstreet & Bell, Marysville, \$14,064.00.

**LOS ANGELES COUNTY**—0.5 Miles Northwest of Colorado Ave., Pedestrian Overhead Structure, District VII, Route 60, Section S. Mca. E. S. and N. S. Johnson, Pasadena, \$12,339; R. H. Travers, Los Angeles, \$13,186; Byerts & Dunn, Los Angeles, \$13,913; Oscar Oberg, Los Angeles, \$14,100. Contract awarded to Dighton A. Loomis, Glendale, \$11,283.82.

**LOS ANGELES COUNTY**—Across Arroyo de los Posos and P. E. Ry. at Marengo St., R. C. girder bridge. District VII, Route 4, Section L.A. R. H. Travers, Los Angeles, \$88,844; Byerts & Dunn, Los Angeles, \$79,697; Oscar Oberg, Los Angeles, \$87,432; Bates & Rogers Construction Co., Oakland, \$77,875; Griffith Co., Los Angeles, \$72,791; Bannister Field Co., Ltd., Fred E. Potts Co., Los Angeles, \$72,788. Contract awarded to Bodenhamer Construction Co. and Silveria & Robbins, Oakland, \$72,166.00.

**LOS ANGELES COUNTY**—Between Monterey Park and Mt. View Road; 4.7 miles, widen and A. C. and P. C. C. pave portions. District VII, Route 25, Section A & E Mte. Griffith Co., Los Angeles, \$117,538; Gogo & Rados, Los Angeles, \$122,121; Geo. R. Curtis Paving Co., Los Angeles, \$127,042; Sander Pearson, Santa Monica, \$127,045; J. L. McClain, Los Angeles, \$128,276; United Concrete Pipe Corp., Los Angeles, \$129,874; J. E. Haddock, Ltd., Los Angeles, \$145,531. Contract awarded to Oswald Bros., Los Angeles, \$116,509.00.

**LOS ANGELES COUNTY**—Across Newhall Creek, near Newhall, R.C. Girder Bridge, District VII, Route 4, Section E. Parish Bros., Los Angeles, \$13,824; Oscar Oberg, Los Angeles, \$14,090; Lynch-Cannon Engr. Co., Los Angeles, \$16,145; Byerts & Dunn, Los Angeles, \$14,862; Griffith Co., Los Angeles, \$17,592; Contracting Engrs., Inc., Los Angeles, \$21,012; E. S. and N. S. Johnson, Pasadena, \$14,467; Oswald Bros., Los Angeles, \$16,567. Contract awarded to R. R. Bishop, Long Beach, \$13,730.25.

**LOS ANGELES COUNTY**—R. C. bridge across Tudunga Wash on San Fernando Road, District VII, Route 4, Section I. A. R. H. Travers, Los Angeles, \$111,195; J. F. Knapp, Oakland, \$99,779; R. R. Bishop, Long Beach, \$111,506; Bates & Rodgers Construction Co., Oakland, \$112,873; Lynch Cannon Eng. Co., Los Angeles, \$100,398; Bannister Field Co., Ltd., Fred E. Potts Co., Los Angeles, \$98,744; Oscar Oberg, Los Angeles, \$97,482. Byerts & Dunn, Los Angeles, \$99,342. Contract awarded to Griffith Co., Los Angeles, \$91,119.95.

**NAPA COUNTY**—Between Yountville & Oakville about 0.2 mile graded and crusher run base and plant mixed surfacing (medium curing type) constructed. Ransome Co., Emeryville, \$8,500; A. G. Raisch, San Francisco, \$8,841; Pac. States Construction Co., San Francisco, \$9,487. Contract awarded to Harold Smith, St. Helena, \$7,804.75.

**ORANGE COUNTY**—R. C. girder bridge across Trabuco Creek, grade and P. C. C. pave approaches, District VII, Route 2, Section A. Oscar Oberg, Los Angeles, \$43,369; Bannister Field Co., Ltd., Fred E. Potts Co., Los Angeles, \$44,931; R. H. Travers, Los Angeles, \$53,164; Lynch Cannon Eng. Co., Los

Angeles, \$53,530. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$39,633.00.

**ORANGE COUNTY**—Between 17th Street and Fairhaven Ave., 1.1 mile grade and P. C. C. or A. C. pave, District VII, Route 181, Sections S.A. and A. Griffith Co., Los Angeles, \$31,820; Geo. R. Curtis Paving Co., Los Angeles, \$35,580; Oswald Bros., Los Angeles, \$31,739.50. Contract awarded to Mundo Enr. Co., Los Angeles, \$28,543.50.

**SACRAMENTO COUNTY**—Between Ryde and 1/2 mile east of Steamboat Slough, 2.1 miles, grade, surface and armor coat. District III, Route 100, Section A. E. F. Hilliard, Sacramento, \$22,791; A. Teichert & Son, Inc., Sacramento, \$23,910; Ransome Company, Emeryville, \$27,679; J. A. Casson, Hayward, \$28,555. Contract awarded to Lee J. Immel, Berkeley, \$22,572.00.

**SAN BERNARDINO COUNTY**—At 3d and 8th Streets in Redlands, 618 lineal feet of R. C. Box storm drain, District VIII, Route 26, Section Rld. Geo. Gardner & Sons, Redlands, \$15,897; Parrish Bros., Los Angeles, \$19,840; Kemper Construction Co., Los Angeles, \$21,144; H. A. Taget, Ontario, \$15,684; Tower Construction Co., Culver City, \$20,550. Contract awarded to S. M. Milovich, Montebello, \$15,422.01.

**SAN DIEGO COUNTY**—Between 1 mile east of Barrett and Tecate Road, 2.8 miles, grade and treat with liquid asphalt, District XI, Route 200, Section C. V. R. Dennis Construction Co., San Diego, \$58,565; Sharp & Fellows Construction Co., Los Angeles, \$53,767; Gogo & Rados, Los Angeles, \$61,167; J. L. Connor, Monterey, \$99,984. Contract awarded to Daley Corporation, San Diego, \$45,437.40.

**SAN DIEGO COUNTY**—Park Blvd., between Russ Blvd. and Calle Colon, A. C. pave, widening and grading. District XI, Route 12, Section S.D. Daley Corporation, \$17,582. Contract awarded to V. R. Dennis Construction Co., \$13,789.50.

**SAN DIEGO COUNTY**—Between Broadway and N. City Limits in City of San Diego, 15.3 miles; shoulders to be treated with liquid asphalt. District XI, Route 2, Section S.D. Morgan Bros., Huntington Park, \$5,793; Lamb's Transfer Co., Long Beach, \$5,865; Gilmore Oil Co., Los Angeles, \$5,943. Contract awarded to Paulson & March, Inc., Los Angeles, \$4,773.60.

**SAN DIEGO COUNTY**—Between Lake Hodges Dam and Rancho Santa Fe, 3.5 miles, grade and road-mix surface treat. District XI, Route Lake Hodges Road, Geo. J. Beck & Son, Los Angeles, \$108,340; R. E. Campbell, Los Angeles, \$117,032; J. E. Haddock, Ltd., Pasadena, \$119,448. Contract awarded to Sharp & Fellows Construction Co., Los Angeles, \$86,265.50.

**SAN DIEGO COUNTY**—Between Encinitas and Ocean side, 10.1 miles highway, roadside to be planted. District XI, Route 2, Section B. Rexroth & Rexroth, Bakersfield, S. A. Cummings, San Diego, \$8,101. Contract awarded to Peterson Bros., Inglewood, \$7,432.09.

**SAN MATEO COUNTY**—Widen undergrade crossing under S. P. Ry. and So. S. F. Belt Rt. at So. San Francisco, District IV, Route 68, Section B. Healy Tibbits Construction Co., San Francisco, \$134,282; Chas. L. Harney, San Francisco, \$167,623; Bodenhamer Construction Co., Oakland, \$166,120; M. B. McGowan, Inc., and C. W. Caletti & Co., San Francisco, \$142,756; Barrell & Hilp, San Francisco, \$155,502. Contract awarded to Fredrickson & Watson Construction Co., Fredrickson Bros., Oakland, \$129,908.08.

**SANTA BARBARA COUNTY**—Between the west city limits of Santa Barbara and Hollister Ave., about one and six-tenths (1.6) miles in length; trees, shrubs, and ground cover to be planted. NRH 58-B (1935, District V, Route 2, Section P.K. Rexroth and Rexroth, Bakersfield, \$4,622. Contract awarded to Peterson Bros., Inglewood, \$3,896.18.

**VENTURA COUNTY**—R. C. girder bridge across Calleguas Creek, District VII, Route Camarillo State Hospital. R. R. Bishop, Long Beach, \$19,109; Byerts & Dunn, Los Angeles, \$21,295. Carlo Bongiovani, Hollywood, \$21,939. Contract awarded to Silveria & Robbins, J. P. Immel, Ventura, \$17,850.00.

## Frank J. Butler, Old Blue Print Chief, Retires From Service

By C. S. POPE, Construction Engineer

**F**RANK J. BUTLER, chief of blue printing for the Division of Highways, retired from the service of the State on June 1, 1935, as one of its oldest employees and one of the oldest men in the service.

Mr. Butler came into the State service in January, 1911, through the great friendship existing between himself and Governor Hiram Johnson. In January, 1912, he was assigned to the Division of Architecture then located in the Capitol Building and under control of State Engineer McClure. This organization had a considerable amount of blue printing to do and Frank gradually worked into that line of work.

In 1912 it was decided to expand the blue printing to take over the work of the Division of Highways, and at Butler's request he was furnished with one of the new type of indoor printing machines which made him independent of sun light.

For a number of years the highways blue prints were turned out in a room in the Forum Building, but on the completion of the laboratory in 1924, the equipment was transferred to that building.

### REQUIRED FOUR MEN

The work gradually expanded and what had been handled by two men required four men sometimes working day and night. In 1931 it became necessary to install an additional machine and the blue printing was moved to its present quarters in the Department of Public Works Building.

In the early days of his work, Frank used to order his blue print paper by the roll and turn out the work by the hundreds of sheets. During recent years, however, he has had to order it by the ton and turn out his work by the acre.

One of the biggest jobs the department ever handled was the preliminary tracings for the Bay Bridge, which required night and day work for a considerable period of time. The volume of work now approximates something like 200 rolls of 100 yards each per month and the cost of blue printing has been materially reduced over the earlier days.

During the many years with the Division



FRANK J. BUTLER

of Highways, Frank Butler has maintained his earlier friendships with Senator Johnson, C. K. McClatchy, and many of the important men of Sacramento.

He has been a fine representative of his race, faithful in his work, and well thought of by all with whom he came in contact. Although he passed his seventy-fifth birthday in May of this year, he enjoys good health and will, no doubt, spend many years in watching others carry on the work he started.

On the day of his retirement he received letters of remembrances from Senator Johnson, Director Earl Lee Kelly, and many others. Also, he was the recipient of gifts from numerous members of the Division of Highways, and from others who wished him well.

At the brief ceremony of presentation, Mr. Butler replied with an excellent talk expressing his appreciation of the friendliness he had enjoyed with other members of the organization and his regret at leaving the work in which he had been so much interested.

Frank Butler carries with him the good will of all of the employees and their wishes for the best of health during his remaining years.



### APPORTIONMENT OF ONE-FOURTH CENT GAS TAX TO CITIES FOR BIENNIUM ENDING JUNE, 1935—Continued

(Continued from page 33)

District	City or town	Symbol	County	Abbreviation	Population	Total allocation
V	Santa Maria	S.Mra.	Santa Barbara	S.B.	7,057	8,754 23
VII	Santa Monica	S.Mca.	Los Angeles	L.A.	37,146	46,079 73
VII	Santa Paula	S.Pa.	Ventura	Ven	7,452	9,244 23
IV	Santa Rosa	S.Ro.	Sonoma	Son	10,636	13,193 99
IV	Sausalito	Saus	Marin	Mrn	3,667	4,548 92
VII	Seal Beach	Sl.B.	Orange	Ora	1,156	1,434 02
IV	Sebastopol	Sob	Sonoma	Son	1,762	2,185 77
VI	Selma	Sel	Fresno	Fre	3,047	3,779 81
VII	Sierra Madre	Sie.M.	Los Angeles	L.A.	3,550	4,403 79
VII	Signal Hill	Sig.H.	Los Angeles	L.A.	2,932	3,637 16
V	Soledad	Sol	Monterey	Mon	594	736 86
IV	Sonoma	Son	Sonoma	Son	980	1,215 69
X	Sonora	Sra	Tuolumne	Tuo	2,278	2,825 87
VII	South Gate	S.Gt.	Los Angeles	L.A.	19,632	24,353 56
VII	South Pasadena	S.Pas.	Los Angeles	L.A.	13,730	17,032 11
IV	South San Francisco	S.S.F.	San Mateo	S.M.	6,193	7,682 44
X	Stockton	Stkn	San Joaquin	S.J.	47,963	59,498 25
X	Suisun	Suis	Solano	Sol	905	1,122 65
IV	Sunnyvale	Sunv	Santa Clara	S.Cl.	3,094	3,838 12
II	Susanville	Susv	Lassen	Las	1,358	1,684 60
X	Sutter Creek	St.Ck.	Amador	Ama	1,013	1,256 63
VI	Taft	Taf	Kern	Ker	3,442	4,269 81
VI	Tehachapi	Tapi	Kern	Ker	736	913 01
II	Tehama	Teh	Tehama	Teh	190	235 70
VII	Torrance	Tor	Los Angeles	L.A.	7,271	9,019 70
X	Tracy	Tra	San Joaquin	S.J.	3,829	4,749 89
I	Trinidad	Trnd	Humboldt	Hum	107	132 73
VI	Tulare	Tul	Tulare	Tul	6,207	7,699 80
X	Turlock	Tur	Stanislaus	Sta	4,276	5,304 39
VII	Tustin	Tus	Orange	Ora	926	1,148 71
I	Ukiah	Uki	Mendocino	Men	3,124	3,875 33
VIII	Upland	Upl	San Bernardino	S.Bd.	4,713	5,816 49
X	Vacaville	Vac	Solano	Sol	1,556	1,930 22
X	Vallejo	Val	Solano	Sol	14,476	17,957 52
VII	Vernon	Ver	Los Angeles	L.A.	1,269	1,574 20
VI	Visalia	Vis	Tulare	Tul	7,263	9,009 78
IV	Walnut Creek	Wl.C.	Contra Costa	C.C.	1,014	1,257 87
IV	Watsonville	Wat	Santa Cruz	S.Cr.	8,344	10,350 76
VII	West Covina	W.Cov.	Los Angeles	L.A.	769	953 95
III	Wheatland	Wht	Yuba	Yub	479	594 20
XI	Westmorland	Wmd.	Imperial	Imp.		
VII	Whittier	Wit	Los Angeles	L.A.	14,822	18,386 74
III	Williams	Wms	Colusa	Col	851	1,055 07
I	Willits	Wlts	Mendocino	Men	1,424	1,766 48
IV	Willow Glen	Wlw.G.	Santa Clara	S.Cl.	4,167	5,169 18
III	Willows	Wlos	Glenn	Gle	2,024	2,510 78
III	Winters	Win	Yolo	Yol	806	1,111 49
III	Woodland	Wd	Yolo	Yol	5,542	6,874 87
II	Yreka	Yre	Siskiyou	Sis	2,126	2,637 31
III	Yuba City	Y.C.	Sutter	Sut	3,605	4,472 01
	Grand total					\$5,291,693 72

"For the last time," shouted the sergeant, "I ask you the simple question, 'What is fortification?'"

The recruits stood fast to a man. No one answered. Striding up to the most intelligent looking man, the N. C. O. bawled out, "Tell me, what is a fortification?"

The answer came back like a cork out of a bottle. "Two twentifications, Sergeant."

—Carnegie Tech. Puppet.

Girls when they went out to swim,  
Once dressed like Mother Hubbard;  
Now they have a bolder whim,  
They dress more like her cupboard.

Gladys—What is your favorite sport?  
Young Doctor—Sleighbing.

Gladys—No, I mean apart from business.

STATE OF CALIFORNIA  
**Department of Public Works**

Headquarters: Public Works Building, Eleventh and P Sts., Sacramento

FRANK F. MERRIAM.....Governor  
EARL LEE KELLY.....Director  
JUSTUS F. CRAEMER.....Assistant Director  
EDWARD J. NERON.....Deputy Director

**DIVISION OF HIGHWAYS**

**CALIFORNIA HIGHWAY COMMISSION**

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TIMOTHY A. REARDON, San Francisco  
PHILIP A. STANTON, Anaheim  
FRANK A. TETLEY, Riverside  
RAY INGELS, Ukiah

C. H. PURCELL, State Highway Engineer, Sacramento  
JULIEN D. ROUSSEL, Secretary

**HEADQUARTERS STAFF, SACRAMENTO**

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J. G. STANDLEY, Principal Assistant Engineer  
R. H. WILSON, Office Engineer

T. E. STANTON, Materials and Research Engineer  
FRED J. GRUMM, Engineer of Surveys and Plans

C. S. POPE, Construction Engineer

T. H. DENNIS, Maintenance Engineer

F. W. PANHORST (Acting), Bridge Engineer

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

R. H. STALNAKER, Equipment Engineer

E. R. HIGGINS, Comptroller

**DISTRICT ENGINEERS**

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F. W. HASELWOOD, District II, Redding

CHARLES H. WHITMORE, District III, Marysville

J. H. SKEGGS, District IV, San Francisco

L. H. GIBSON, District V, San Luis Obispo

R. M. GILLIS, District VI, Fresno

S. V. CORTELYOU, District VII, Los Angeles

E. Q. SULLIVAN, District VIII, San Bernardino

S. W. LOWDEN (Acting), District IX, Bishop

R. E. PIERCE, District X, Stockton

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General Headquarters, Public Works Building,  
Eleventh and P Streets, Sacramento, California

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HAROLD CONKLING, Deputy in Charge Water Rights

A. D. EDMONSTON, Deputy in Charge Water  
Resources Investigation  
R. L. JONES, Deputy in Charge Flood Control and  
Reclamation

GEORGE W. HAWLEY, Deputy in Charge Dams  
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Rights

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H. M. STAFFORD, Sacramento-San Joaquin Water  
Supervisor

GORDON ZANDER, Adjudication, Water Distribution

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Division

P. T. POAGE, Assistant Chief

W. K. DANIELS, Administrative Assistant

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man

C. H. KROMER, Principal Structural Engineer

CARLETON PIERSON, Supervising Specification  
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W. H. ROCKINGHAM, Principal Mechanical and  
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RIGHTS OF WAY**

C. C. CARLETON, Chief

CLARENCE W. MORRIS, Attorney, San Francisco

FRANK B. DURKEE, General Right of Way Agent

C. R. MONTGOMERY, General Right of Way Agent

ROBERT E. REED, General Right of Way Agent

**DIVISION OF PORTS**

Port of Eureka—William Clark, Sr., Surveyor

Port of San Jose—Not appointed

STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS

# MAP SHOWING STATE HIGHWAY SYSTEM

LEGEND  
Primary Roads —————  
Secondary Roads - - - - -

