

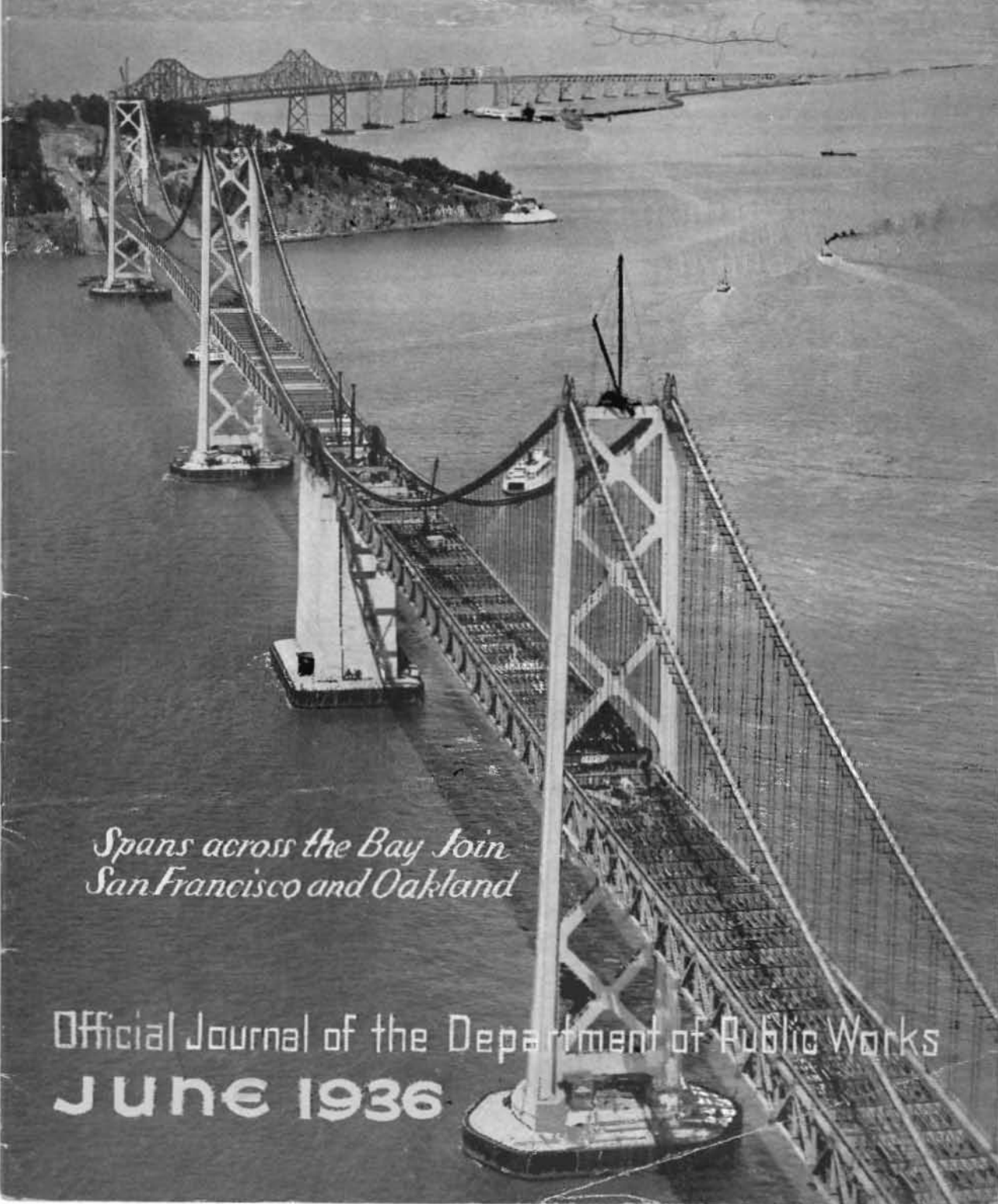
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CALIFORNIA  
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# CALIFORNIA

## HIGHWAYS AND PUBLIC WORKS

*San Francisco*



*Spans across the Bay Join  
San Francisco and Oakland*

Official Journal of the Department of Public Works  
**JUNE 1936**



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# *Safety First Policy Dominates*

## *California State Highway Construction*

### *10% to 15% of Every Dollar for*

#### *Maintenance Also Used to Protect Traffic*

By **EDWARD J. NERON**, Deputy Director of Public Works

**E**ACH month during 1935 in the United States an average of 233 persons were killed in motor vehicle accidents. In the seven-year period, 1929-1935, approximately 225,000 accidents involving motor vehicles injured 306,000 persons and caused the deaths of 17,599.

While the figures for the first three months of 1936 were encouraging, showing a reduction of eight per cent in fatalities compared with 1935, that gain had dropped to only six per cent in April when 2460 persons were killed, 100 more than in March.

This tragic toll is a matter of grave concern to the California Department of Public Works and all that engineering skill can accomplish to make our State highways safe for the motoring public is being done by the department through the Division of Highways.

Records show that only a relatively small percentage of accidents in this State can be directly attributed to road conditions. The average motorist can drive over every mile of traversable State highway at any time of day or night in perfect safety as far as road conditions are concerned.

There are instances of course where reckless speeders take advantage of safer driving conditions resulting from the straightening and widening of highways to "step on the gas" and add to the accident total. Only education and law enforcement can remove this dangerous human factor.

As a governmental agency vitally interested in the problem of loss of life and property damage from automobile accidents, it has always been recognized as a paramount duty of the Division of Highways, to contribute to the universal safety by building and maintaining safe roads.

It is estimated that from ten to fifteen cents of every dollar expended for highway maintenance purposes is used directly to safe-

guard traffic and pedestrians. The Department of Public Works is determined that State highway construction and maintenance shall be of a standard to allow motor vehicle traffic to move with the greatest safety.

Each phase of highway work is considered from a safety standpoint. Before a road survey is undertaken, the relative safety features of the road are determined. The width, slopes of cuts and fills, maximum rate of grade and minimum rate of curvature, minimum sight distance, etc.,

are tentatively established. Particular attention is given to subgrade, uniformity and non-skid quality of the surface during the stage of construction, as well as for the permanent pavement.

Of the total amount each motorist pays annually for license fee and gas tax, the sum of \$3.37 goes for maintenance of the State highway system and of this 10 per cent goes directly into safety work.

Minimum pavement width of our highways



**EDWARD J. NERON**

(Continued on page 8)

## Governor Merriam Lays Cornerstone of New Public Works Building in Capital

UNDER a cloudless summer sky that the night before had been sullen with a threat of rain, Governor Frank F. Merriam on Thursday afternoon, June 4th, laid the cornerstone of the \$750,000 Department of Public Works Building that is being constructed on the southwest corner of Twelfth and N streets in Sacramento.

With scores of distinguished guests from many sections of California seated on the speakers' platform and several hundred interested spectators in attendance, Earl Lee Kelly, Director of Public Works, conducted impressive ceremonies of dedication.

The fact that the new structure will be erected without the cost of an extra cent to the taxpayers of the State was announced by Governor Merriam, who told of the plan that will enable the Department of Public Works to own its own building outright in less than five years without any legislative appropriation or necessity of any additional tax monies.

### COST AMORTIZATION PLAN

The edifice will be built with the department's own funds. It will be financed in part from the sale of the department's equity in the present Public Works Building at Eleventh and P streets, and the remaining cost will be amortized over a period of years by means of a rental charge which, including operating expense, will be considerably less than half the rental rate per square foot which normally would apply on buildings of the type of the new structure.

Dedication exercises, which began at 2.30 o'clock, were preceded by a concert rendered by the Southern Pacific Club Band of San Francisco. As chairman of the day, Director Kelly introduced Rabbi Norman M. Goldberg, who offered an invocation. Following raising of the flag by members of Sacramento Troop 32, Boy Scouts of America, Hon. Arthur Ferguson, mayor of Sacramento, was introduced.

Mayor Ferguson said the city of Sacramento is deeply appreciative of the action of the State administration in erecting a new Department of Public Works Building and a similar structure on the southeast corner of Twelfth and N streets for the Department of Motor Vehicles.

"This progressive step," he said, "has done much to help relieve the unemployment situation in our city. It has given an impetus to building activities. It brings the State government and the city of Sacramento closer together. We are proud of our State Capitol and hail with pleasure additions to it such as this building and the sister structure that will house the Department of Motor Vehicles."

George B. McDougall, State Architect and head of the Division of Architecture of the Department of Public Works, briefly described the design of the new building. He said the structure was planned so as to provide the maximum facilities for the highly specialized work performed by the various divisions of the department and the greatest comfort for the employees rather than to present an imposing appearance. However, he added, the exterior attractiveness of the building would not suffer.

In a few words, John Azevedo, the contractor whose low bid won him the contract for the building, expressed his thanks for the cooperation he is receiving from the Department of Public Works and its agencies in the work of construction.

### WILL SAVE STATE MONEY

As Director of Finance, Arlin E. Stockburger took a leading part in the conferences between Governor Merriam and Director Kelly, which followed the latter's suggestion that the Department of Public Works erect its own headquarters building. He worked out the plan whereby the department will be able to build a structure of its own and in the doing save the State money.

Introduced by Director Kelly as "Governor Merriam's administration banker," Director Stockburger spoke in a light vein concerning the conferences that resulted in the Governor's decision to construct two new buildings for the Department of Public Works and the Department of Motor Vehicles.

"When Earl Lee Kelly goes out after a thing he usually gets it," the Finance Director said. "And so when he came to us with his idea for this building we considered it, found it sound, and he got what he was after. This building will save the State money and the erection of it and the Motor Vehicle Building will enable the general fund of the State to purchase the present



**SCENES AT CORNERSTONE LAYING** of Public Works Building in Sacramento. At top, Governor Frank F. Merriam making an address from the speakers' stand. In center, part of crowd in front of stand. Lower right, Governor Merriam and Director of Public Works Earl Lee Kelly holding copper box filled with documents to be placed in cornerstone. Lower left, Governor Merriam and Director Kelly spreading cement over the stone.

## Labor Official Commends Governor

(Continued from page 2)

**Public Works Building and house there governmental agencies that now are scattered over Sacramento paying rents. It's a good deal all around."**

### LABOR LEADER COMPLIMENTS GOVERNOR

M. B. Kunz, secretary of the Sacramento Building Trades Council, paid compliments to Governor Merriam and to the Department of Public Works for what he termed their "whole hearted cooperation with organized labor on all construction projects undertaken by the State."

"This undertaking," he said, "has put men to work in Sacramento. It has helped the men of labor and their families. On this job, as on all other jobs of the Department of Public Works, there exists a spirit of mutual cooperation between labor and the State that is worthy of commendation. Sacramento will benefit greatly by this new construction program. I want to say that organized labor duly appreciates the splendid cooperation extended to labor by Governor Merriam and his administration."

In the introduction by Director Kelly of Ray Ingels, Director of the Department of Motor Vehicles, and the latter's response, the two officials exchanged pleasantries. Director Kelly said he promised Ingels that if he were invited to speak at the dedication of the Motor Vehicle Department Building he, in turn, would invite Ingels to say a few words when the Public Works structure cornerstone was laid.

### EXCHANGE OF COMPLIMENTS

Director Ingels said the most cordial relations always had existed between the two departments and that only the imperative need for more room which confronted both agencies was separating them.

In Washington on official business connected with the Central Valley Project, State Engineer Edward Hyatt, Chief of the Division of Water Resources, was represented by J. J. Haley, Jr., Administrative Assistant, who conveyed Hyatt's regrets.

George T. McCoy, Assistant State Highway Engineer, said he and his associates were particularly glad that a new Public Works Building was being erected. He said the Division of Highways had outgrown its present offices

and that the highly technical and scientific work its personnel had to perform made large and more modern quarters absolutely necessary.

"When we move into this new building," he said, "we will have the facilities we now lack which will enable us to more efficiently carry on the work we have to do."

### WARNS AGAINST DIVERSION

Introduced by Director Kelly as the man who not only heads the great Division of Highways, but is the Chief Engineer of the San Francisco-Oakland Bay Bridge, "The largest bridge ever built by man," State Highway Engineer C. H. Purcell spoke briefly.

He said there were many present who could remember back to the years when the Division of Highways occupied small offices in Sacramento and was wrestling with the stupendous problem of launching a State Highway System. Through the years, he said, the Division of Highways has kept pace with the highway transportation needs of California and from time to time has had to increase its office facilities.

"Once more we have outgrown our headquarters," he said, "and must have more space in which to carry on our work. This work, the building of a greater highway system and the maintenance of existing highways are made possible by the gas tax funds."

"It is to be hoped that the gas tax funds will remain intact always. Governor Merriam has done much to prevent diversion of these monies. We are going into our new building with much work ahead and our gas tax funds must be preserved for the purposes for which the people intended them, the construction and maintenance of highways."

### FATHER OF CALIFORNIA HIGHWAYS

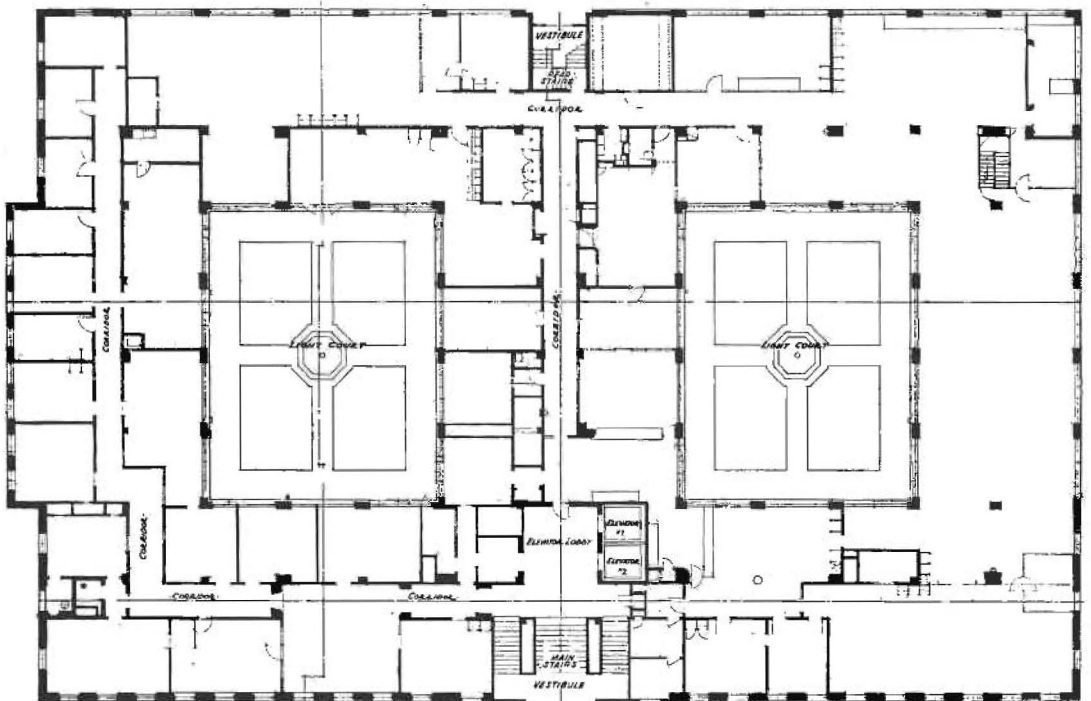
On the speaker's platform was one man who well remembered the early days of highway planning in California to which Mr. Purcell referred. He is Burton A. Towne of Lodi, chairman of the first California Highway Commission created in 1911. Director Kelly in introducing the many distinguished guests on the platform referred to Mr. Towne as "the father of California's highways."

Speaking as chairman of the California Highway Commission, Harry A. Hopkins said

(Continued on page 16)



DIGNITY AND BEAUTY characterize the simple modern design of the new Public Works Building under construction in Sacramento, a 4-story reinforced concrete structure with provision for a fifth story.  
*Drawing by A. W. Eichler*



GROUND FLOOR PLAN shows a width of 226 feet 6 inches and depth of 146 feet, providing 26,200 square feet of floor space, and two light courts each 48 feet wide and 61 feet deep.

# Relocation Abolishes Danger Curves and Shortens Redlands-Colton Route

By E. Q. SULLIVAN, District Engineer

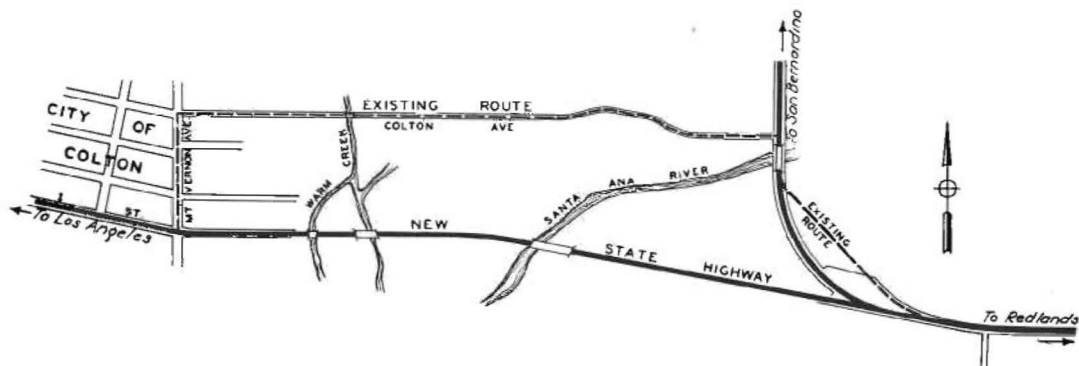
**E**LIMINATION of three right angle turns and two exceedingly dangerous curves on the existing route between Redlands in Riverside County and Colton in San Bernardino County will be accomplished by a realignment of a portion of the present highway and provide a more direct route into Colton. This improvement which will save five-tenths of a mile in distance between the two cities will be constructed by the Division of Highways.

The project includes the building of an easy, sweeping curve designed to do away with a hazardous right turn at the south approach to the Santa Ana River bridge which will

south, negotiated a dangerous turn to cross the Santa Ana River bridge and another right hand turn to continue on the route through Colton. In the city of Colton two more right hand turns are involved in making connection with the direct route to Los Angeles.

Even were there no increase in traffic on this new section, which will serve as a connecting link in the Los Angeles-Imperial Valley lateral, the saving in operating expenses of the 3700 cars and trucks which now travel the route daily would more than justify the cost of the improvement, estimated at about \$230,700.

It is figured that the yearly saving in gaso-



Map shows direct alignment of new Redlands-Colton project compared with existing route.

continue to be used by north and south bound traffic via San Bernardino.

For years truck and passenger car blockades continually have occurred in the area east of Colton due to excessively heavy truck traffic between Imperial Valley and the great wholesale markets of Los Angeles, and the flow of traffic over the three transcontinental routes, U. S. 60, U. S. 99 and U. S. 70 on State Highway 26.

## THROUGH TRAFFIC CONGESTED

This traffic has had to move slowly between Redlands and Colton and between San Bernardino and Colton and has been snarled up because of sharp turns. Trucks have followed a roundabout way east of Colton on which they have traveled north, west and

line, oil and tires, due to the one-half mile shortened distance, to the operators of the 3000 cars and 700 trucks that daily use the route, will be approximately \$23,000.

The accompanying sketch map shows the existing and proposed routes and emphasizes the long, sweeping curve that will provide a safe approach to the Santa Ana bridge for traffic from Redlands to San Bernardino and Colton.

The new project involves construction of another bridge across the Santa Ana River and two bridges across the two branches of Warm Creek. The route crosses overflow land and will be built up on an embankment. Three lanes of pavement will be constructed to meet the heavy traffic demands.

(Continued on page 18)





**DANGEROUS CURVE** at south end of Santa Ana River bridge east of Colton to be replaced by a sweeping, easy curve as shown by dotted lines.



**THROUGH CITY OF COLTON**, the State Highway follows I street, which has recently been widened to provide four traffic lanes in addition to an ample strip for parallel parking.



**ANOTHER SAFETY FEATURE** of the Redlands-Colton relocation will be elimination of this sharp turn at the north end of Santa Ana River bridge, leaving a straight approach for traffic from San Bernardino.

## Safety Exhibit at San Diego Enlarged

(Continued from page 1)

is twenty feet, two ten-foot traffic lanes. Minimum width of roadway is thirty-six feet to provide an eight-foot shoulder on either side so that the motorist may park his machine entirely clear of the pavement. Maximum grade is fixed at six per cent and minimum curvature at 300-foot radius.

Rolling grades, with sharp vertical curves of the sort which hide the oncoming car are eliminated. Curves of less than 2000-foot radius are superelevated and the crown in pavements is so slight as to be scarcely perceptible to a motorist.

Bridges are designed with a roadway four feet wider than the pavement on either end so there will be no tendency for drivers to crowd toward the center. Short vertical curves and sharp curves at the foot of heavy grades are avoided.

### NUMEROUS SAFETY MEASURES

In reconstruction work a great deal is done each year to make highways safer. Horizontal curves are flattened and superelevated. Vertical curves are flattened. Shoulders are widened. Railroad grade crossings are eliminated by separation or realignment. Guard rails are installed where necessary.

Highway pavement is divided into traffic lanes by painted white stripes. Wide double stripes and reflectorized signs warn drivers against trying to pass on curves and grades where sight distance is insufficient. "School Slow" signs are kept painted on pavement near schools to protect children.

An extensive program of dust laying is carried out. Sanding of roads is carried on in foggy and frosty sections during periods of danger. Reflector signs are also installed at dangerous curves and intersections. Trees along the highways are inspected and overhanging limbs and decayed trees removed. Bridges are constantly inspected.

These are only a few of the things done by the Department of Public Works through the Division of Highways to contribute to the program of public safety.

The Department of Public Works desires to cooperate in every way possible with all State agencies, automobile associations and other organizations interested in safety measures to the end that the public may use its highways in safety.

In line with this policy the department has enlarged its highways exhibit in the State Building at the California Pacific International Exposition in San Diego.

This exhibit graphically portrays the many safety features employed in the construction, maintenance and administration of the highway system. One section is devoted to a display of all types of road signs. An enlarged traffic accident map of 1935 shows where all serious and fatal accidents occurred on State highways last year.

Photographs show conditions before and after major correctional construction work. One group of photographs shows certain sections of highways where the accident record last year was highest and which is intended to reveal that the wider and safer the road the greater tendency there is for the user to disregard the rudimentary rules of safety and thereby increase accidents. This exhibit is designed to call attention to the fact that while Division of Highway engineers provide safe and adequate roads it is beyond human power to build fool proof highways and that, therefore, intelligent use of such highways is a paramount duty of motorists.

Another exhibit is devoted to the highly important work of striping highways into two, three and four traffic lanes.

Photographs of safety construction show the effect upon traffic in cities and on the main arterials.

## *Double Traffic Line is a Danger Signal*

One of the most important danger warnings on State highways is the orange colored line painted in the center of the double white stripes dividing traffic lanes on four-lane pavements, curves and crests of grades. Motorists are forbidden to cross these lines and motor vehicle patrol officers are enforcing this regulation.

Because orange is a color that has been found to be not clearly distinguishable in the glare of automobile headlights at night, the Division of Highways gradually is eliminating the orange stripe between the double

white lines in favor of black.

On four-lane highways the double line is continuous, but on two-lane roads it is used on grade crests and curves only. Where it is in use, signs warning motorists that they are approaching the beginning of the double stripe are placed at the right side of the highway 400 feet from the point where it starts. These signs read: "No Passing Over Orange Line On Crests of Grades." The word "Double" will be substituted for "Orange" on these signs.

Requests have been made to the Division of Highways to paint the double line on certain mountain roads, but the division is of the opinion that it would not be feasible to do so owing to the many successive grades on such highways, which would necessitate an almost continuous double line and defeat the purpose of this safety precaution.

#### DOUBLE LINE AND WARNING SIGN

New style double line sign is exhibited by fair auto club employee decorated with jewelry made of reflector buttons. Lower pictures show one of signs on which word "Double" will be substituted for "Orange." These signs are placed 400 feet from beginning of double lines which will have black instead of orange centers.



*Courtesy Auto Club of Southern California*



# Ten-Mile Improvement Under Way on Indio to Palm Springs Highway

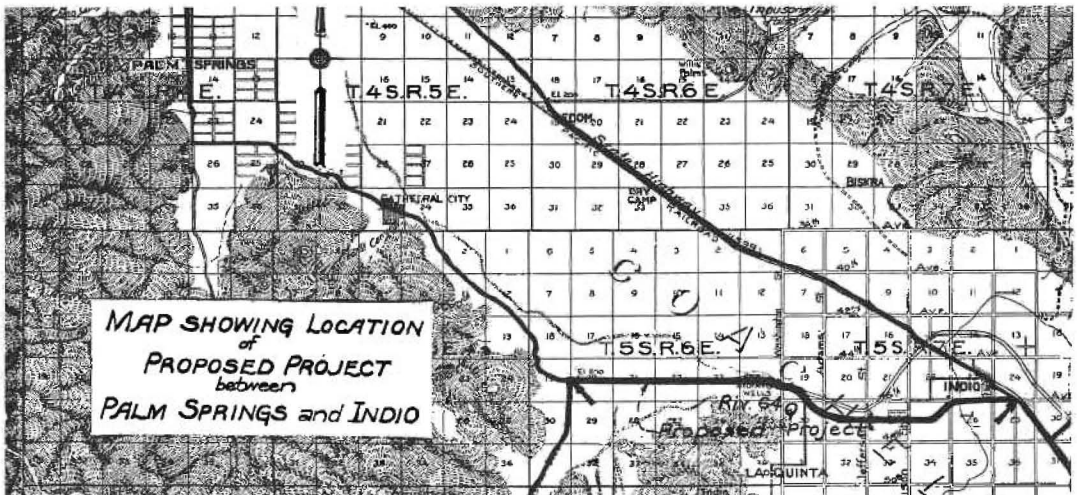
By W. L. McFADDEN, Assistant District Construction Engineer

**H**IGH up on the east wall of the towering San Jacinto Peak in Riverside County is a rock formation which stands out with startling clearness as an angel with outstretched wings poised for flight. The image is especially clear to the travelers below at the time of the day when the sun is sinking behind the mountain range.

There are many legends concerning this "Angel" which has, for countless ages, looked down upon the activities of man and nature. It saw the formation and disappearance of the great inland sea a short distance to the south; the coming of De Anza, the first white man in

awarded a contract for the construction of a highway between Indio and a point ten miles westerly.

The construction is of major importance to this locality in that it serves an increasing amount of traffic each year. This increase is due to the growth of the date and citrus industries in the North Coachella Valley, the popularity of this route from the metropolitan area to the desert resorts of the Coachella and Imperial valleys, and the accessibility of the high mountain recreational areas to the valley residents during the hot summer season. A large number of the visitors to the construc-



that vicinity; and now it is watching the formation of a great agricultural center and the recreational activities at Palm Springs.

Palm Springs has, in the last few years, become a popular desert resort. It numbers among its visitors many distinguished people, some of whom soon cease to be visitors and become winter residents after building beautiful homes.

## TEN-MILE PROJECT

In order to improve the highway facilities of the North Coachella Valley and its increasingly important date industry together with the communities of Indio and the desert resort of Palm Springs, the Department of Public Works, through the Division of Highways, has

tion activities of the Metropolitan Water District also use this road.

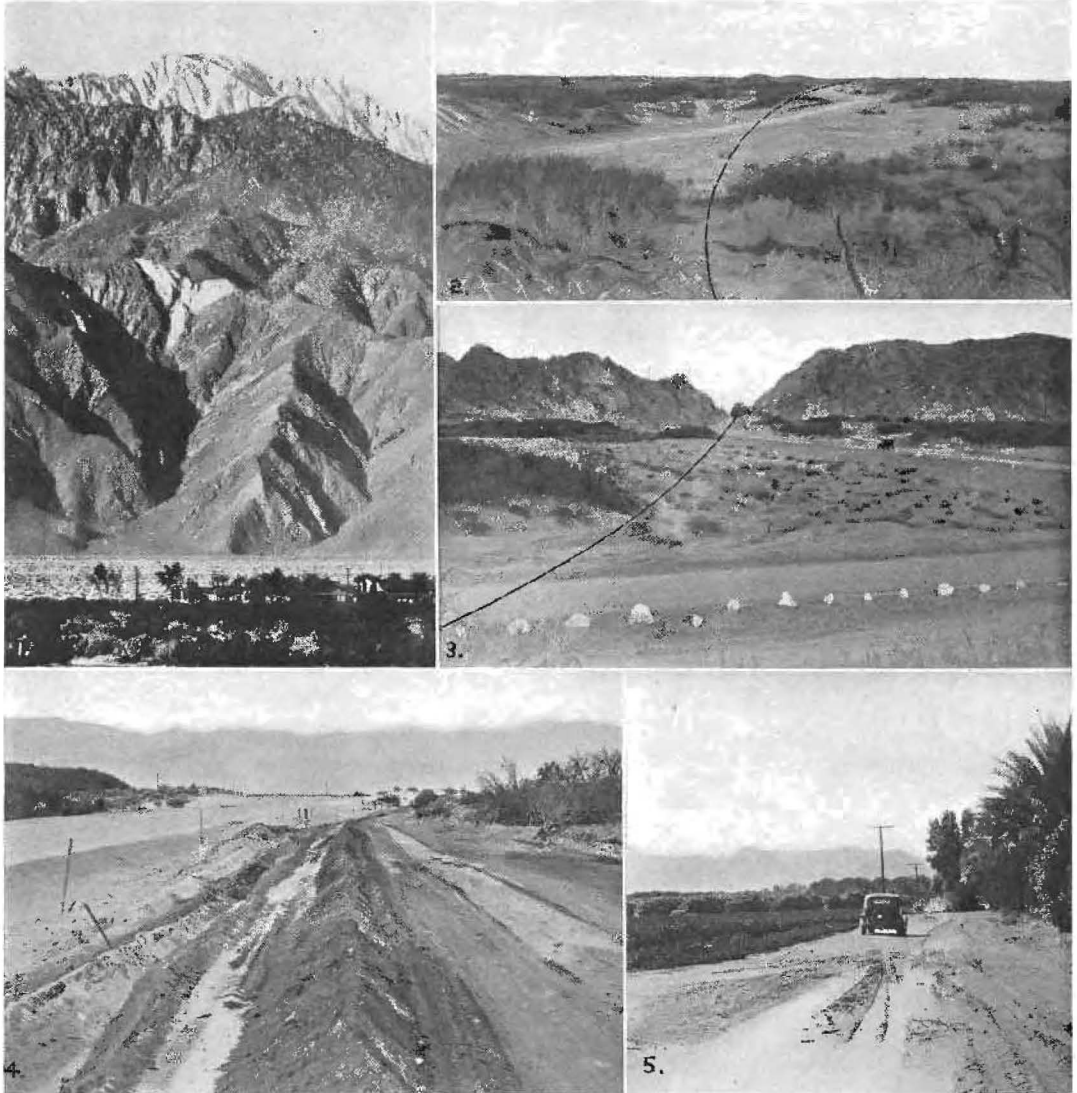
The present road consists of a rather narrow oil surfaced pavement, constructed a number of years ago by Riverside County, which has as its bad features some rather sharp radius curves, poor sight distances, and inadequate drainage protection.

Work was started on the new highway in February of this year and should be completed by early fall.

ESTIMATED COST \$153,000

It is estimated that the new construction will cost approximately \$153,000, consisting, in general, of constructing a graded roadbed 30 feet wide, treating the subgrade over a

(Continued on next page)



INDIO-PALM SPRINGS REALIGNMENT. 1—The San Jacinto "Angel" as seen from the main highway north of Palm Springs (Frashear Photo). 2-3—The new alignment eliminates several short, dangerous curves. 4—New grade on left composed of local, sandy soil and detour on right in course of construction. 5—Transportation conditions as they are at present in the date garden and orchard districts on this section of highway.

width of 22 feet with liquid asphalt by the roadmix method, and the surfacing of the central 20 feet with oil treated material also by the roadmix method. A timber bridge is to be constructed together with other adequate drainage structures to care for the occasional extreme storms that occur in this vicinity.

Many obstacles to the construction of a high type highway are encountered through this location. The new alignment traverses a terrain which varies from a nearly ideal con-

struction material to a soft "floury" sand, similar to that found in the Sand Hills in lower Imperial Valley.

The principal construction obstacles are the soft sandy sections over which a stable sub-grade must be built to support the surfacing properly. This sand-silt is so soft that the contractor's equipment has had difficulty in operating in these sections.

The soil conditions are such that nearly 30 per cent of the total cost of the work is being expended in providing for the proper

(Continued on page 12)

## New Alignment of Indio to Palm Springs Sector Under Way

(Continued from page 11)

stabilization and blanketing of this unsuitable material. Even after this means is taken to correct the sandy condition, it will be necessary that material brought in for the embankment be oil treated before the surfacing can be placed.

In proper sequence, the construction involves the following steps: First—the embankments are being constructed to approximate grade with the local material, which, in most cases, consists of the sand mentioned above. Second—over this embankment is spread a blanket of imported material of a coarser composition. Liquid asphalt is then applied and mixed with this imported material to form a subgrade and mixing table for the road mix surfacing. Third—selected material of a still higher type than the imported borrow is then spread on the oiled subgrade, liquid asphalt being applied to this; it is then road-mixed, shaped and compacted to form an excellent low cost pavement.

### FURNISHING LOCAL EMPLOYMENT

The minimum radius curve on the new highway will be 1500 feet and the minimum sight distance, 1000 feet, which is a great improvement over the road now in use.

The present work is furnishing employment for an average force of approximately 75 men, most of whom are employed from the immediate vicinity of the work, with resulting relief in the unemployment situation in the community.

The work is under the direct supervision of E. E. Wallace, District Engineer of District XI, at San Diego, and E. E. Sorenson, District Construction Engineer. E. L. Evans is resident engineer on the project.

Persons killed in accidents at highway-railroad grade crossings in 1935 totaled 1680, compared with 1554 in 1934. Persons injured in such accidents in 1935 totaled 4858, an increase of 358 compared with the preceding year. The number of grade-crossing accidents in 1935 was 3933, compared with 3728 in 1934. There were more grade-crossing fatalities in 1935 than in any year since 1931.

"It's scandalous to charge us \$10 for towing the car only three or four miles," protested the motorist's wife.

"Never mind, dear," replied hubby, "he's earning it; I've got my brakes on."—*Answers.*

## Huge Steel Machine Wraps Wire Around Bay Bridge Cables

WHILE the more spectacular construction work on the San Francisco-Oakland Bay Bridge has been attracting nation-wide attention, one of the most important phases in the erection of the bridge has been going quietly forward. This is the wire wrapping of the main cables of this world's largest bridge.

Early in March of this year the first stage of the wrapping was undertaken between Pier W-1 and the San Francisco anchorage.

Wherever the cables approach the proximity of the steel trusses, it is necessary to first wrap the cables before continuing work on the deck structure. This is so because after the erection of rails and trusses it would not be possible to get the huge wire wrapping apparatus around the cables.

### CARRIES THREE WIRE SPOOLS

This apparatus takes the form of a steel ring five feet in diameter and is operated by an electric motor at the top of the machine. The ring carries three 18-inch spools of heavy galvanized wire, each spool containing 500 pounds.

From these spools, operating somewhat after the fashion of a large steel bobbin, the wire is wound around the cable at the rate of about 14 feet per hour. There is enough wire in the three spools to wrap the cable between cable bands, a distance of approximately 30 feet.

Before the wrapping is put in place a heavy coat of red lead paste is applied to the cable. Later the wrapping itself will be painted with several coats, the final one of which will be aluminum.

The wrapping wire differs from the cable wire in that it is softer and easier to bend.

Approximately 1550 feet have been wrapped to date on each cable, according to C. H. Purcell, Chief Engineer, who is directing construction of this 8½-mile bridge.

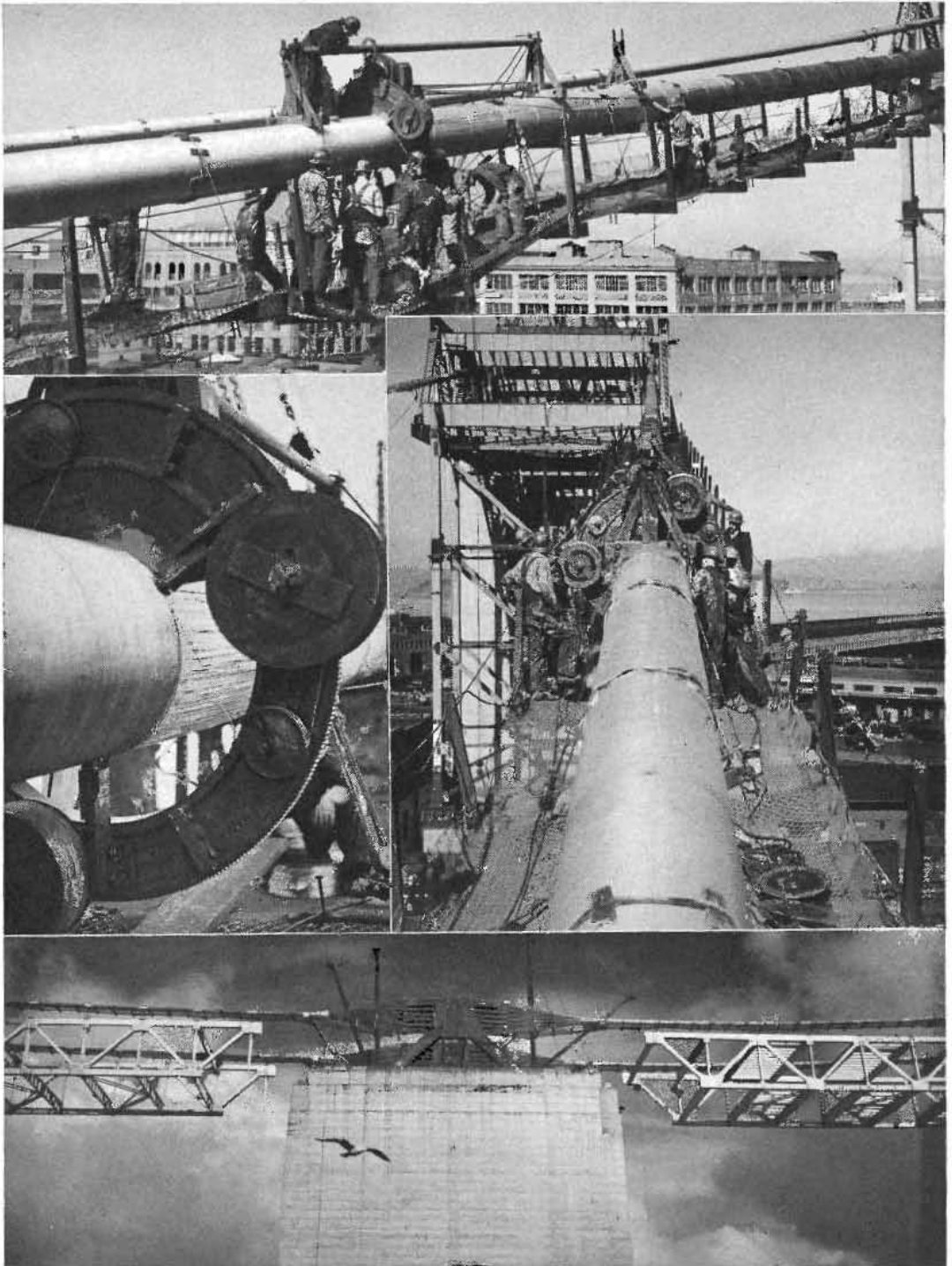
"A bachelor has left his fortune to a woman who refused him."

"And then you say we men are not grateful."

—*Buen Humor, Madrid.*

She—We really should get a new car this year.

He—What! When I'm still paying installments on the car I sold in part payment for the car I traded for the car I've got now?



**CABLE WRAPPING** on the San Francisco-Oakland Bay Bridge is done by means of a steel ring 5 feet in diameter operated by an electric motor on top of the machine. The ring carries three 18-inch spools each containing 500 pounds of galvanized wire. The bottom picture shows the A-frame anchorage atop the central anchorage pier for cables of the twin suspension bridges of the West Bay crossing.

# New Conejo Grade Alignment Will Reduce Forty-Nine Curves to Twelve

By R. C. MYERS, Assistant District Office Engineer

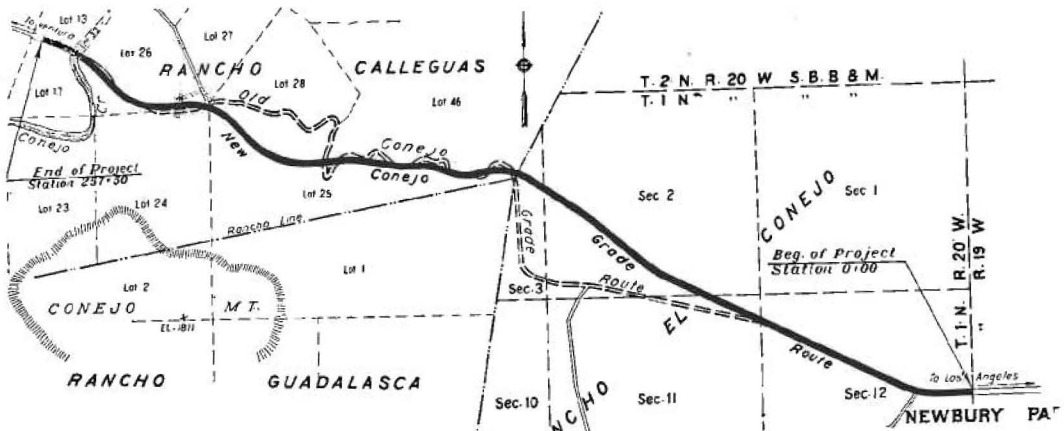
**W**ITH work now 30 per cent complete, the reconstruction of Conejo Grade in Ventura County is proceeding at a satisfactory rate which should assure completion of the project by the end of the present year.

Designed to thoroughly modernize this tortuous length of highway which was originally located in 1912, the present project is of the greatest importance in improving highway transportation conditions on the "Ventura Boulevard" route between Los Angeles and Ventura.

Records of accidents compiled by the California Highway Patrol indicate that the old

necessary to entirely relocate the highway from Newbury Park to Conejo Creek. This requires some extremely heavy grading near the summit of the Conejo Range of mountains but it has been possible to save 0.84 mile in distance which in itself is of great economic value, in addition to reducing the number of curves to 12, the total degrees of curvature from 2067 to 373 and increasing the minimum radius of curvature to 1200 feet.

The new roadbed will be 46 feet wide as compared to a 30-foot width of the old roadbed. With such a sweeping reduction in curvature and increase in width of roadbed, this grade will become as safe to drive as



HEAVY BLACK LINE shows new alignment compared with old Conejo Grade Route.

Conejo Grade was the most dangerous stretch of highway on this important route. The reason for the large number of accidents is apparent from a study of alignment conditions and width of roadbed which, on such a steep grade, tend to make driving conditions dangerous.

## ELEVEN CURVES TO MILE

There is a total of 49 curves on the old route with radii of curvature ranging down as low as 65 feet. The total curvature was 2067 degrees in the 5.6 miles of highway which is being relocated and reconstructed.

In order to render this much needed improvement thoroughly effective, it has been

other sections of Ventura Boulevard and the tiresome affect of driving through sharp curvature will be entirely eliminated.

## PROVIDES GREATER SAFETY

Much attention has been given to providing as long sight distance as possible, the minimum clear sight distance being 800 feet. With unrestricted view of this length, wide oil treated shoulders and freedom from objectionable curvature, driving conditions will be as safe as present standards will permit.

The Department of Public Works has recognized the importance of this project to the extent of allocating more than one-half million dollars for its construction. On the 46-foot graded roadbed will be placed a 20-foot con-

(Continued on page 17)





**CONEJO GRADE REALIGNMENT**—Left foreground, constructing base for big fill which will cover old highway. Upper left, new cut.



**LARGE CUTS AND FILLS** on new direct alignment; old winding road at right.



**CUTS BEING OPENED UP** on new line which crosses old road in center at right angles.

## Erected Without Cost to Taxpayers

(Continued from page 4)

that amazing progress had been made in highway building since the year 1878, when the office of State Engineer was created, and out of which grew the old Bureau of Highways, established by the Legislature in 1895. He recalled that the members of the Bureau of Highways had bought a span of horses and a buckboard and had traveled from one end of the State to the other, covering 7000 miles, in their first highway survey.

"Now we have 14,000 miles of paved State highways and we have just begun to build to meet the road transportation needs of California," he said. "We are building our highways with gas tax funds and those funds must not be diverted to other uses. Governor Merriam has been and is a firm believer in the gas tax for highways and has always vigorously opposed the diversion of those monies to any other purposes. He will continue to fight diversion of gas tax funds."

Mr. Hopkins said the Highway Commissioners were highly pleased with the decision of Governor Merriam and Director Kelly to erect the new Public Works Building.

### AMPLE ROOM PROVIDED

"For one thing," he said, "a fine board room has been provided for the Highway Commission and in the future the public will have ample accommodations when attending our meetings. Contractors bidding on projects and persons having official business with us will not be compelled to stand up along the walls and out in the hallways as they now are compelled to do."

Governor Merriam made the principal address of the afternoon. He briefly told the story of how Director Kelly had come to him with a proposal to erect a new Public Works Building and how a plan was worked out by himself, Director Kelly and Director of Finance Stockburger which would enable the Department of Public Works to construct a building of its own without imposing any burden whatever upon the taxpayers.

When the Division of Highways purchased the Public Works Building at Eleventh and P streets in 1927 from the private owners it was agreed that other State agencies occupying the building, including the Motor Vehicle Department, the Division of Printing and the Bureau of Criminal Identification should con-

tinue paying the same rentals they had been paying the private owners, the excess of such rentals over actual costs of operation, depreciation and repairs to be credited to their account as an investment in the building.

Under this agreement, as the other State agencies moved out the increasing work of Motor Vehicle Department demanded additional floor space.

In explaining the situation that developed between the two departments Governor Merriam said:

"We finally came to realize that at the rate rentals paid by the Department of Motor Vehicles were accruing as an equity of that department in the building it would not be long before the Motor Vehicle Department would own the building and the Department of Public Works would have to begin paying rent to the Department of Motor Vehicles. So we decided to erect a building for each department and let each pay for its own structure out of their respective equities in the present building and savings they would effect in rentals.

### GOVERNOR ENVISIONS FUTURE

"Now, everybody should be pleased with such an arrangement because the taxpayers will not have to pay any additional money for the buildings and, strange as it may seem, the two departments will pay for their buildings in less than five years."

"It may sound funny," the Governor said, "that the State can build two fine structures without asking the legislature or the taxpayers for any money, but it's true and so simple that I look forward to the day when all of N street facing Capitol Park will be lined with State buildings which have been erected under the same plan and without cost to the taxpayers."

While the Southern Pacific Club Band played appropriate music, the Governor and Director Kelly placed in the cornerstone a sealed copper box containing various records, photographs and other articles which should prove of interest to future generations when the cornerstone is removed.

The new building will be a reinforced concrete structure, four stories high and will include a full basement. The building will be

## Construction will be Practically Fire and Earthquake Proof

(Continued from preceding page)

226 feet long on N street and 146 feet on Twelfth street.

Provision has been made to enable the construction of an additional story in the future.

The new structure will provide 155,000 square feet of floor area which will care for the requirements of the Department of Public Works.

Due to the nature of the underground conditions it was necessary to construct on concrete pile foundations, some of the piles extending down to a depth of 40 feet below basement floor area.

Five thousand seven hundred eight cubic yards of concrete will be used to complete the structure exclusive of pile foundation.

### FIRE AND EARTHQUAKE PROOF

The building will be practically fireproof and will withstand earthquake shock in so far as it is structurally possible.

Two high speed elevators are provided to meet the demands of the public. An additional elevator is provided for departmental use.

One important feature is that all offices and work spaces will be air conditioned for proper cooling in the summer and warming in the winter. Scientific acoustical treatment will be applied throughout.

### "H" SHAPE DESIGN

The architectural design is in the modern manner and has been planned in the form of the capital letter "H." Special effort has been given to provide the maximum amount of window area which will provide an abundance of natural light to all offices and work spaces. The exterior walls will be finished in the original concrete.

Ample ground space has been left to permit the planting of shrubs to harmonize with Capitol Park.

The building will not be monumental in character but will be the last word in office structures bearing on practicability and efficiency.

A city visitor from one of the windswept states gazed intently at the spiral fire escape that wound its way down the rear of a very tall building.

"Gosh," he exclaimed, "that must have been a danged long ladder before the cyclone hit it."

## HIGHWAY DEVELOPMENT ESSENTIAL IN ALL STATES TO MEET TRAFFIC DEMANDS

As an investment, nothing is comparable to highways. Between 1919 and 1926 North Carolina constructed \$125,000,000 worth of highways. What was the economic result? The number of farms in the state was increased by 13,000 during the period when the number of farms in the country as a whole was falling off. The true value of North Carolina property increased eight times between 1900 and 1926 while in the entire United States the true value of property increased only four times. We thus have concrete proof of the business benefits from highways. I am not indulging in idle theories. I am giving authentic and attested facts.

Population is increasing; traffic is multiplying. Between 28,000,000 and 30,000,000 automobiles are in daily operation on the highways of the nation. A continuing program of highway construction is essential to meet the increasing demands for additional highway facilities in all of the States of the Union. Existing highways must be widened; other highways must be constructed.

Congress has laid its hand to the plow. The Federal Highway Act of 1921 marked the real beginning of highway construction in the United States. Time has vindicated the wisdom of the policy. Highways and progress go hand in hand.—Congressman W. M. Whittington, member of House Committee on Roads.

## CONEJO GRADE TO HAVE CENTER LANE FOR PASSING

(Continued from page 14)

crete pavement with a wide oiled shoulder on each side.

### TRAFFIC LANES SEPARATED

This type of construction will prevail over the greater part of the improvement except that on the steeper portion where descent is made on the westerly slope of the range, two 10-foot strips of concrete pavement will be separated by a 10-foot width of plant mixed oil surfacing to provide a traffic lane for vehicles to pass on the grade.

In the neighborhood of 770,000 cubic yards of excavation and 5,300,000 station yards of overhaul will be required in grading the 4.8 miles of new alignment. More than 100 men are employed regularly and will be given gainful employment until the latter part of the present year.

## Annual Conference of District Engineers Held in Sacramento

By R. H. WILSON, Office Engineer

**M**EETING in Sacramento for a two-day conference, the district engineers of the Division of Highways' eleven districts assembled in the Public Works Building Thursday morning, June 5.

The first session was given over to a round-table discussion of ways and means of advancing the Division's construction program. Recent appropriation by Congress of funds to provide for regular federal aid to the several states during the fiscal year from July 1, 1936, to June 30, 1937, means that work in preparation of plans and specifications on many projects originally budgeted for the current biennium but which were dependent upon the 1937 federal aid will now go forward.

### SPEEDS UP PROJECTS

The results of discussion at the Thursday morning meeting will assure advancement of these projects in all sections of the State with utmost speed, in addition to the forwarding of the regular program of the Division of Highways.

Thursday afternoon the session adjourned to attend the laying of the cornerstone of the new Public Works Building at Twelfth and N streets and in the evening a dinner was held at the Del Paso Country Club at which Governor Merriam, as principal speaker, explained relief legislation passed at the recent special session of the State legislature.

### KEEPING CALIFORNIA IN FRONT

The sessions on Friday were given over to discussions of latest construction methods and practice, maintenance procedure and standards and financing matters. The frank and open discussion of such pertinent matters by engineers in charge of the work of the Division of Highways throughout its various districts, has been one of the most important factors in keeping California in the forefront of State highway construction.

Late Friday afternoon the conference adjourned and traveled to San Francisco, where, on Saturday morning, an inspection of the San Francisco-Oakland Bay Bridge was made with Mr. C. H. Purcell, State Highway Engineer and the Chief Engineer of the Bay structure, as their guide.

During the conference, much of the dis-

## Line Change Means Savings of \$23,000 Yearly to Motorists

(Continued from page 6)

The new highway will provide a 30-foot Portland cement concrete pavement on a 46-foot roadbed with a 40-foot asphalt concrete pavement connection to I Street in Colton. These three bridges will provide 340-foot roadways with two 4-foot sidewalks. The existing route is a narrow bituminous surfaced road, which has an average total width of surface and shoulders of 20 feet, and the bridge over Warm Creek, which provides only 17 feet of clear roadway.

### STREET WIDENING COMPLETED

Work on the project, which will be constructed in four units, already is under way. One contract has been completed for the widening of I Street through Colton. A second contract has been let for that part of the undertaking east of the present Santa Ana River bridge and which also includes the widening of the existing pavement to three traffic lanes as far as Alabama Street near Redlands, a distance of 5.4 miles. This contract is now under way and pavement is now being laid on that unit.

Bids were opened for the balance of the undertaking on June 4th, involving contracts for the construction of two bridges, and the other for the building of the roadway and pavement extension.

Discussion was led by Mr. Purcell and the meetings were arranged by and conducted under the direction of G. T. McCoy, Assistant State Highway Engineer, and James G. Standley, Principal Assistant Engineer.

The headquarters office was represented by the following departmental heads:

R. H. Wilson, Office Engineer; Fred J. Grumm, Engineer of Surveys and Plans; C. S. Pope, Construction Engineer; T. H. Dennis, Maintenance Engineer; T. E. Stanton, Materials and Research Engineer, and R. H. Stalnaker, Equipment Engineer.

In the absence of F. W. Panhorst, Acting Bridge Engineer, the Bridge Department was represented by Assistant Bridge Engineer James Gallagher.

The District Engineers who attended the meeting were:

J. W. Vickrey, Eureka; F. W. Haselwood, Redding; C. H. Whitmore, Marysville; J. H. Skeggs, San Francisco; L. H. Gibson, San Luis Obispo; R. M. Gillis, Fresno; S. V. Cortelyou, Los Angeles; E. Q. Sullivan, San Bernardino; S. W. Lowden, Bishop; R. E. Pierce, Stockton; E. E. Wallace, San Diego.

## CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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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

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Vol. 14 JUNE, 1936 No. 6

### HIGHWAY HEAD-WORK

Motorists today are able to drive mechanically perfect cars along improved highways, guarded at every turn by uniform safety signs, but their personal safety depends entirely upon their fitness as drivers.

Federal, State and city officials are advancing toward a solution of the motoring safety problem. They are doing their part by allotting huge sums of money each year to provide for wider, improved roads; to establish safer overhead and underground railroad crossings, and to install a practical system of traffic regulation. The automobile industry cooperates by manufacturing mechanically safer automobiles. Even with this safety-minded concentration mobilized for the motorists' welfare, lowering the number of highway fatalities and injuries rests solely with each and every motorist.

Traffic officials can discard and bring obsolete motoring laws up to date, but they can't sit behind the wheel of every car on the road and advise each driver what to do when an emergency arises. The amount of skill required to operate a new model automobile is negligible, but it does take a whole lot of sanity to drive a car safely along our crowded highways.

Money, as well as necks, is saved when an automobile is driven at a sensible rate of speed. The United States Bureau of Standards has compiled figures to prove that the gasoline consumption of a car is determined by the speed at which it is driven. An automobile capable of going 18 miles on a gallon of gasoline at a speed of 30 miles an hour will do but 16.4 miles at a speed of 40 miles per hour; 14.6 miles at 50 miles per hour; 12.6 miles per gallon at 60, and at 80 miles per hour only 8.6 miles on a gallon of gasoline.

## Truck Association Official Gives Some Helpful Suggestions

THE following excerpts taken from a letter written by John A. Zech, District Secretary of the Truck Owners Association of Santa Clara County, disclose the fine spirit of cooperation exhibited in general by truck owners to improve traffic conditions on our highways:

"Please be advised that on Monday, May 18th, I invited Captain Eddie Tressler, State Highway Patrol, to accompany me in making a general inspection of the Pacheco Pass Highway.

"We checked heavy laden trucks descending the grade, operating under low gear at a speed of ten miles per hour, which seemed to be a feasible rate of speed with equipment under control at all times.

#### Suggest Warning Signs

"We would suggest that signs be placed with a notice to the effect that heavy laden trucks should STOP and shift gears for the down grade.

"Also would advise a broad painted line across the highway with the words TRUCKS STOP in order that the lighter traveling public may proceed down the grade ahead of the trucks.

"This information is a suggestion on the part of this Association as an assistance to the general public as a safety measure for the interest of all concerned.

"I would like to be of any further assistance at any time. Thank you for the opportunity of cooperating with your department."

"If vehicle owners as a class would give equal consideration to the observance of safety measures, our highway accident rate would undoubtedly be materially lessened," says Maintenance Engineer T. H. Dennis. "It is the practice of the Division of Highways to place gear shift stop signs for trucks on grades and we are installing such signs on Pacheco Pass."

### MOLASSES USED FOR ROAD

#### SURFACING BINDER IN INDIA

Reverting to a practice of olden days in India when a mixture of water and jaggery, a kind of coarse sugar made by evaporation from the sap of palm trees, was added to lime to produce a mortar, highway engineers in India are experimenting with molasses as an inexpensive substitute binder material for road surfacing.

A short length of road formed of lime kankar carrying heavy traffic was treated with molasses and the result was so encouraging that the process has been applied to 50 miles of roadway. The sand and molasses get worked thoroughly into the interstices of the highway by the traffic and the surface has a dark appearance, similar to a bituminous surface.

# Grade Separation Project Under Way at Dangerous R.R. Crossing Near Indio

By D. E. WARREN, Senior Bridge Engineer

**D**OWN at Indio, near the Salton Sea, the traffic over State Highway Route 26 travels at a fast pace. Indio is located on the north edge of Coachella Valley in Riverside County. Near by is Palm Springs, the well known desert resort of the movie colony. But there are no other towns on Route 26 within forty miles. Therefore nearly every one traveling this portion of Route 26 is "going places."

Coming down out of the San Geronio Pass, to the Salton Sea, the traveler passes through miles of sparsely inhabited desert country. Near Indio, after thirty miles of desert road with a down hill grade and scarcely a turn, the driver is suddenly confronted with a sharp "S" turn across the main line of the Southern Pacific Railroad. Here the usual hazard of a grade crossing is accentuated by the prevailing high speed of traffic and the inclusion of sharp approach curves in the long straight stretches of highway.

Aside from being a hazard, this crossing is also a source of delay on an important highway. State Route 26 connects the Imperial Valley with the Orange Belt cities and the Los Angeles metropolitan area. It also carries interstate traffic to and from Arizona and eastern points via U. S. Routes 60 and 80.

## DAINGEROUS CROSSING FACTORS

**The highway traffic at this crossing is about 3000 vehicles per day with a large proportion of heavy through trucks operating between Los Angeles and the Imperial Valley. The Southern Pacific Railway runs between these same points and about twenty trains per day cross the highway.**

To eliminate the present dangerous grade crossing, a new overhead crossing is now being constructed about three miles west of Indio and about one mile further from the town than the present crossing.

In order to provide approaches of high standard alignment in keeping with the other portions of the route, the project includes the relocation of 8650 feet of highway. Fifteen hundred feet of highway on each side of the structure is included in the separation contract and the remainder of the relocation is

to be constructed as a separate highway contract.

## CLEARANCE FOR TWO TRACKS

The overhead structure is located on a tangent between two 2500-foot radius curves which are connected to the existing highway by curves of 5000-foot radius. The maximum grade will be 4.25 per cent, with a sight distance of 600 feet.

The structure, 168 feet long, spans space for two railroad tracks and has a thirty-four foot roadway for highway traffic. It is of reinforced concrete slab and girder construction consisting of two fifty-three foot approach spans and one sixty-four foot main span. The alignment requires a skew of 55 degrees so that the sixty-four foot main span is necessary to provide clearance for two tracks.

The end bents consist of columns which allow the approach fill to spill through. The center bents are columns combined with a collision wall. The collision walls protect the columns from the impact which might occur from derailment of a passing train, and also serve to prevent the fill from spilling out onto the tracks. The bents and deck system are designed as a continuous frame which conserves materials and lowers the deck elevation over the tracks by reducing the depth of the deck girders.

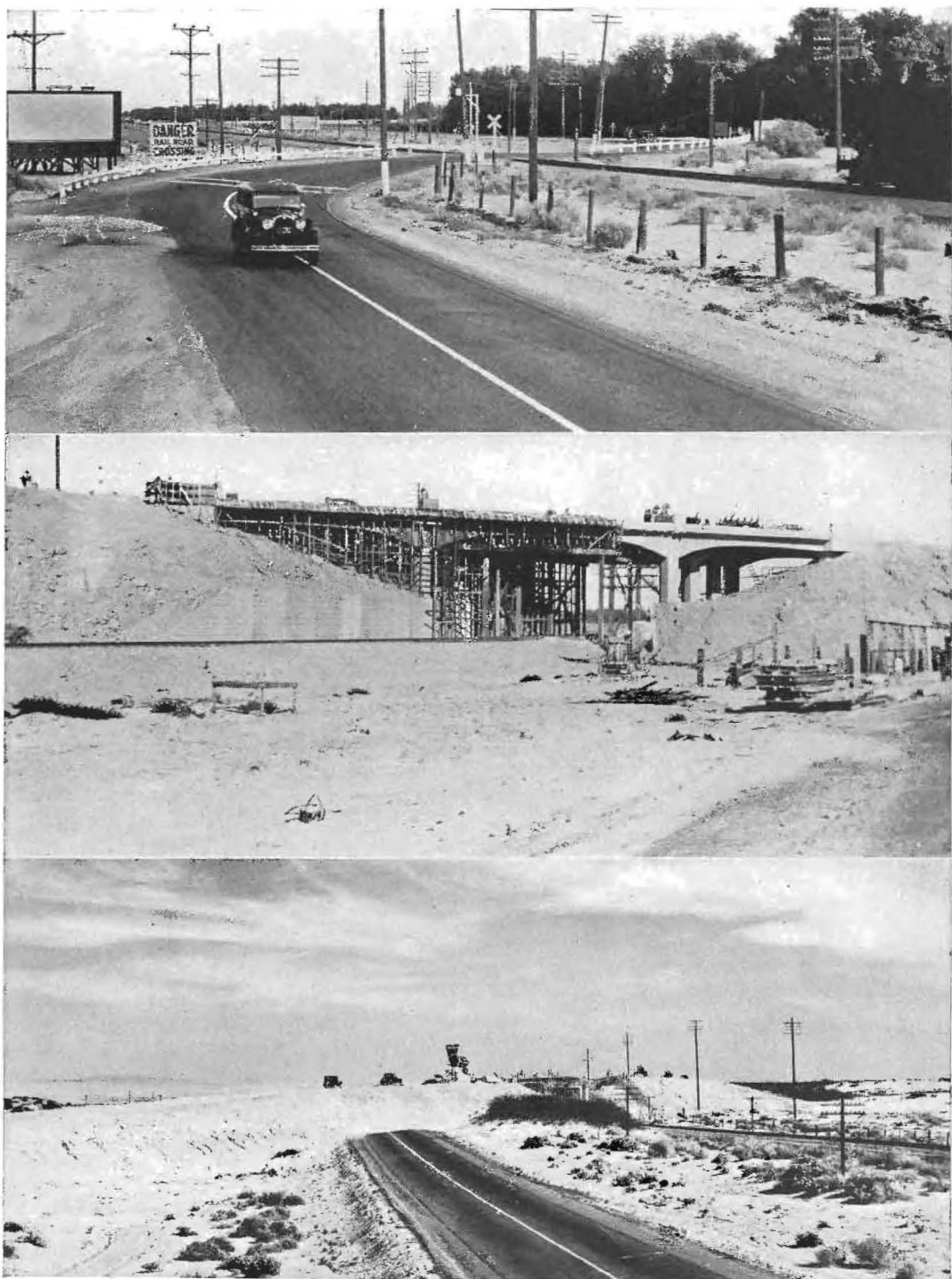
Although the structure is designed for two tracks there is but one track now in place. In order to maintain the required clearance it was necessary temporarily to shift this track seven feet.

## WILD WINDS STOP WORK

Work on the project has been stopped several times because of wind and dust. The winds in this region blow almost unceasingly up and down the pass. At times the wind reaches hurricane intensity. Automobiles caught in one of these winds have been sand-blasted clean of paint on the windward side, and their windows frosted by the impact of driven sand.

Not far from the site stands a large revolvable wind tunnel which can be faced into the wind like a weather vane. This tunnel is part of experimental equipment erected by private

(Continued on page 23)



**GRADE SEPARATION CONSTRUCTION NEAR INDIO** on State Highway 26, the "Inland Route" through Coachella and Imperial Valleys to Calexico. At top, the present "S" curve crossing over rail-road at grade, a danger spot with a traffic count of 3000 vehicles per day. In center, constructing concrete slab and girder overhead structure, 168 feet long with 64-foot main span to provide clearance for two tracks. At bottom, view of approaches to overhead structure looking southeasterly. In order to provide approaches of high standard alignment in keeping with the other portions of the route, the project includes the relocation of 8650 feet of highway.

# How Laboratory Tests Aggregates for Concrete Highway Construction

By ALLEN NICOL, Junior Mineralogist, Materials and Research Department

**T**HE PURPOSE of this article is to discuss only one of the various highway research problems, that pertaining to the soundness of coarse and fine aggregates, i.e., rock and sand, for use in portland cement concrete.

In many sections of the State, these aggregates come from gravel pits located on rivers which drain areas covered with a heavy mantle of sedimentary rocks. Certain types of sedimentary rocks have been found to be unsound for use in concrete highways; hence it becomes necessary to determine the percentage content of such unsatisfactory rock types in streambed gravels prior to their adoption for use in highway construction.

## SATURATED WEATHERING TEST

The determination of soundness as applied to coarse and fine aggregates covers a wide range of standard tests and experimental procedure. Suffice it to say here that one of the tests used by this department as an index of rock behavior and soundness is an accelerated weathering test using saturated sodium sulphate or magnesium sulphate solutions.

After a careful preliminary petrological examination, sufficient particles of a streambed gravel or other aggregate to be tested are graded to a standard size, weighed, and the number of pieces recorded. One sample is subjected to the sodium sulphate test, and another of the same material to the magnesium sulphate test.

The samples are immersed in these solutions for eighteen hours at constant temperature, followed by a four-hour drying period at a temperature of 105 to 110 degrees Centigrade. This treatment is continued for five cycles, a cycle constituting one immersion phase and one drying phase.

## EFFECT OF SALT AIR

The effect of this treatment is largely physical, similar in many respects to that of freezing and thawing. Actual freezing and thawing tests are conducted on aggregates in the highway testing laboratories of many eastern states to duplicate actual highway conditions, but in California, most of our highways are

not subjected to such severe climatic conditions.

**Our investigations indicate that salt air may produce concrete highway failure along our coast. Because the sulphate solutions produce a similar type of failure, this test, therefore, is an accelerated test trending toward duplication of actual highway conditions.**

The general effect produced on unsound rocks is the growth and development of crystals of sodium sulphate or magnesium sulphate, with their attendant force of expansion between the grains, cracks, fissures, and capillary openings or pores of the rock during the drying phase. The sulphate solution, of course, permeates these openings during the immersion phase.

Sound rock types either do not offer very great pore space for the solutions to permeate, or are resistant to the expansive effect of the sulphate crystals. Unsound types of rocks, however, are those which usually afford considerable permeation of the solutions and are at the same time weakly resistant to the expansive force of the sulphate crystal development, with the result that these rocks split apart, disintegrate, crack, or in other ways show the effect of the salt.

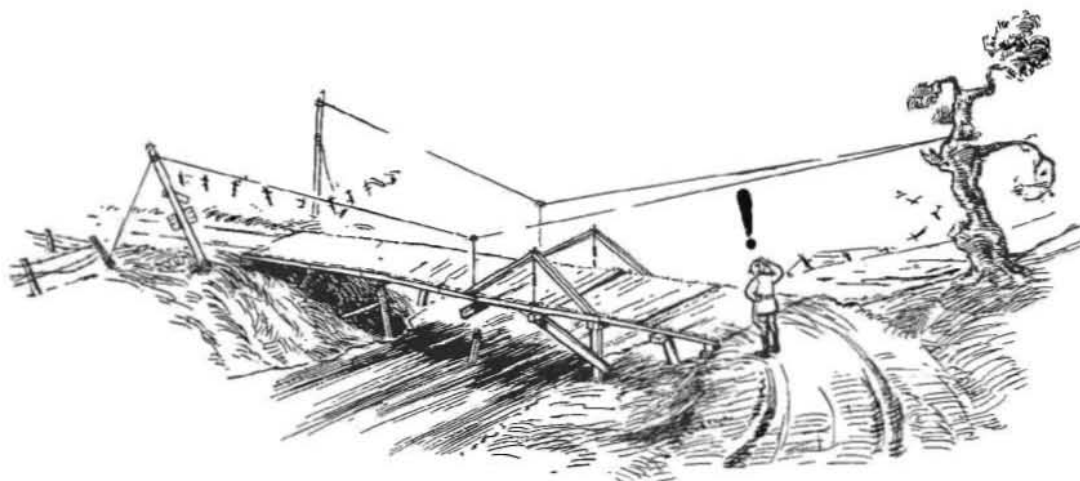
## SOUND AND UNSOUND ROCKS

**Tests on rock samples from the eleven districts of the State show that certain types of rocks are affected seriously, whereas other types are only partially or slightly affected.**

It is possible to arrange or group these rocks petrologically according to their general ability to withstand the test. As a rule, most igneous and metamorphic rocks are but slightly affected by the treatment. The exceptions of note are some rather badly altered granites or other plutonics, certain types of schists, and some secondary gneisses.

In the sedimentary rocks, it has been found that sandstones having a calcareous cementing bond between the grains are usually sound, whereas micaceous sandstones, ferruginous sandstones, many graywackes, and





WELL, WHAT TO DO?

**BRIDGE INVESTIGATOR.**—"All I'm supposed to figure out now is how to take a hundred bucks and make this bridge safe for traffic for another couple of years."

## LABORATORY TESTS FOR HIGHWAY CONSTRUCTION

(Continued from preceding page)

conglomerates frequently show in one way or another some type of breakdown. The argillaceous or clayey sandstones, siltstones, laminated shales, and argillites usually show severe effects from the test.

Many semi-indurated clay rocks, ochers, and arkoses are similarly affected. It is desirable in highway construction to eliminate such unsound rock types wherever possible.

Each type of rock has a different breakdown reaction. Laminated or fissile shales split along bedding planes; prior to splitting apart, they swell at right angles to the bedding plane and resemble in many respects the pages of an old book. This type of swelling and splitting so characteristic of shales and some thin-bedded sandstones is extremely injurious to concrete inasmuch as the stresses set up produce cracking, "pop-outs," or other effects.

Coarse-grained sandstones generally disintegrate on the surface. Fine-grained sandstones usually crack or spall. Some micaceous sandstones show a remarkable disintegration to the extent of crumbling completely to a very fine dust. Occasionally a gneiss may by impact break along its schistosity plane.

The number of rocks affected by each test is recorded, the type of breakdown reaction noted, and the loss computed by sieve analysis.

## GRADE SEPARATION PROJECT NEAR INDIO

(Continued from page 20)

parties in the hope of putting the wild energy of the winds to some useful purpose.

The only material available locally for the construction of the approach fills is sand piled up by the desert winds. This sand is so fine that it has to be wetted before it will support the equipment which loads and delivers it to the fill. After the sand is placed in the approach fills a layer of heavy selected material imported from the hills is placed over it to protect it from the wind. When completed the approach fills will be paved with twenty foot width of Portland cement concrete and eight foot asphaltic shoulders.

The approach fills covered the existing highway so a detour was constructed to by-pass traffic during construction. The detour provides a twenty-two foot roadway surfaced with four inches of asphaltic road mixed material.

The structure and adjacent roadway now under contract, are financed from Federal funds appropriated for grade crossing elimination, supplemented by State gas tax funds necessary to complete the highway relocation.

The contract for construction of the separation structure and 3000 feet of approach fill was let for approximately \$105,000. J. H. Horn is Resident Engineer. The project is scheduled for completion in July.

## Federal Road Chief Decries Uneconomic Highway Building

**T**HOMAS H. MACDONALD, Chief of the Bureau of Public Roads, at a recent transportation conference at the U. S. Chamber of Commerce, in discussing policies in highway administration, said:

"There is, and has been, a tremendous pressure upon public officials for surfacing for motor vehicles, a larger and larger mileage of our public highways. This pressure has resulted in a large relative and actual increase in the mileage of the so-called low-type roadways. This statement is not intended to be critical, except to the extent that the design and cost of these low-cost roads have been forced below reasonably economical standards. The danger in this policy lies in the certain rapid increase of maintenance costs and the exclusion of necessary new construction.

"The policy here expressed of extending the mileage of new construction has been brought about by transferring large mileages, in some cases the total public road mileage within the State, to the jurisdiction of the State, without an equivalent transfer of funds.

"Both of these policies, placing an enlarged commitment against the State highway funds, have been simultaneous with a diversion to other than highway purposes of income from the special taxes on road users.

"All of these policies are tending to destroy the logical and necessary stage construction policy which was adopted by practically all of the states, by utilizing funds which should go to replace and to bring to more adequate standards the roads which have received the first stage improvement."

### CALIFORNIANS PAY LOWEST AUTOMOBILE OPERATING TAX

A study of the annual cost of operating an average passenger automobile and the amount of taxes paid in connection with its operation which was made by the Highway Research Board, Washington, D. C., reveals that California motorists pay the lowest tax bills and those in Florida the highest.

Excluding the District of Columbia, where taxes were 5.5 per cent of costs, the difference between the highest and lowest tax bills (15.93 per cent in Florida and 7.51 per cent in California) was 112 per cent.

"Auntie," asked little Jane, "why do you put powder on your face?"

"To make me pretty, my dear."

"Auntie," suggested Jane, after thinking a moment, "are you sure you're using the right kind of powder?"

### RESOLUTIONS PASSED BY CONVENTION OF WESTERN STATES HIGHWAY OFFICIALS

WHEREAS, the continued and adequate service to motor transportation in this country requires a well planned, orderly and economic construction and development of the highway system of our nation; and

WHEREAS, the continuance of regular Federal aid is more effective in assuring the successful application of this basic principle than are other methods of Federal appropriation; now, therefore, be it

RESOLVED, by the Western Association of State Highway Officials that this Association reiterate its previous recommendations and urge the continuance of the regular Federal aid appropriations as authorized and administered under the Federal Aid Act and amendments thereto.

WHEREAS, the Western Association of State Highway Officials believes that Motor Vehicular fees and gasoline taxes should be expended exclusively for the construction, maintenance and operation of highways; and

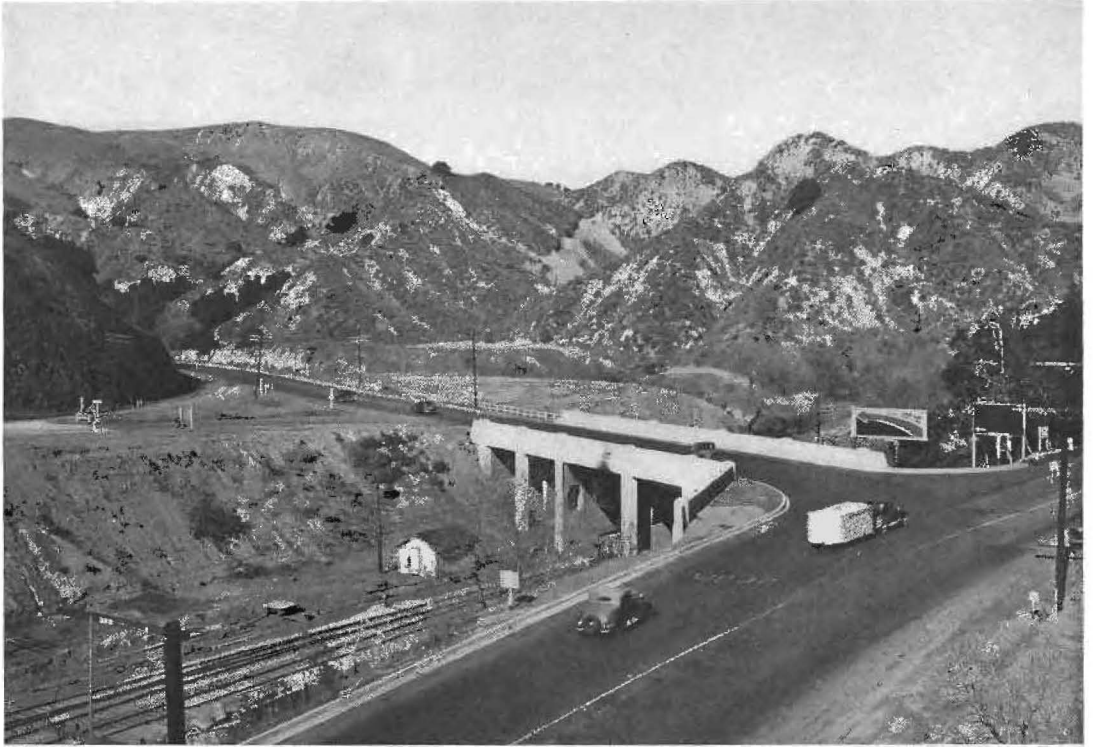
WHEREAS, the expenditure of road funds for other than road use is manifestly a form of unequitable taxation, now, therefore, be it

RESOLVED, that the Western Association of State Highway Officials request their local delegates to appear before the proper committees of the legislatures of the several states, when again assembled, and protest against continued or increased diversion of road revenues to other than road use.

WHEREAS, there is now before the Congress a bill sponsored by Senator Carl Hayden of Arizona and Congressman Wilbur Cartwright of Oklahoma to amend the Federal Aid Act to provide for an expenditure on secondary highways, for the elimination of railroad crossings at grade, and for the authorization of funds for the fiscal years of 1938 and 1939 for the above purposes and for the continuance of the past policy of Federal aid for highways and the building of forest roads, Indian roads, park roads, and public road highways; now, therefore, be it

RESOLVED, that the members of this association continue in their efforts to express to their congressional delegations the importance of the passage of this bill, in order to insure an orderly progress of highway improvement throughout the nation.

RESOLVED, that the Western Association of State Highway Officials point out to the regulatory bodies of the states that loss of life and property is not due to any appreciable extent to engineering or highway construction when highways are built to modern standards, but are largely attributed to a nonobservance of laws, rules and regulations on the part of highway users.



**AN IMPORTANT BRIDGE RECONSTRUCTION PROJECT** recently completed at Tunnel Station on State Route 4 connects this Los Angeles-Sacramento main highway near its entrance to Weldon Canyon with the Newhall-Saugus route and the Foothill Boulevard cut-off near San Fernando. The widened rebuilt structure is shown at top and below the narrow old structure.

## In the Field With the Old Timers

**H**ISTORICAL data of absorbing interest concerning the early days of highway construction in California not to be found in the matter of fact records of the State Division of Highways are revealed in reminiscences of members of the Old Timers' Club of the division.



E. E. EAST

To anyone acquainted with the State Highway System of today it is difficult to believe that only 24 years ago dirt roads, many of them almost impassable in winter, stretched from south to north and from east to west in California

where now are splendid paved thoroughfares.

The membership of the Old Timers' Club is made up of men who took part in the launching of the present great highway system in 1912, who constituted the first field force of the old California Highway Commission, which in that year began the building of the modern network of standard highways that places California today in the front rank of states of the Union in the matter of good roads.

### INTERESTING OLD PICTURES

Many of these men still are with the Division of Highways. Others have attained high positions outside of public service. Among the latter is E. E. East, chief engineer of the Automobile Club of Southern California, who, by virtue of his appointment as instrumentman by the original Highway Commission in February, 1912, is a member of the Old Timers' Club.

From Mr. East comes an entertaining reminiscent account of his first days as an employee of the State. He sends photographs showing a section of Route 2, (U. S. 101), in Ventura County, as it was in those pioneer times and after it was converted into a State highway. The contrast is well nigh unbelievable. The pictures were taken at a point between Springville and Rice Road.

The first California Highway Commission created seven State highway divisions and placed each in charge of a division engineer. Division VII, as designated at that time, included the counties of Ventura, Los Angeles, San Bernardino, Riverside, Orange, San Diego and Imperial. Los Angeles was Division Headquarters with W. Lewis Clark, Division Engineer, and S. V. Cortelyou, assistant, in charge.

### REPORTED AT LOS ANGELES

Appointed an Instrumentman by State Highway Engineer Fletcher, Mr. East reported for duty in Los Angeles on the morning of February 15, 1912. He found that headquarters consisted of three rooms in the Union Oil Building. He humorously relates how he timidly approached the young red-headed stenographer in the outer office and presented his credentials.

"The young lady received the letter without any outward display of emotion, in fact, her attitude was rather cold and indifferent, from which I gained the impression that I did not like red-headed stenographers," says Mr. East. He was told to wait in an adjoining room.

"Upon entering the waiting room," recalls Mr. East, "I met many men with whom I was to work during the entire period of my service with the Highway Commission. Some of these men still are employed with the Division of Highways, some entered other fields, while others have taken the long road. C. G. Kolster, J. C. More, E. S. Gripper, Abe George, L. W. Cummings and Francis Hart were among those present.

### \$18,000,000 JUST FOR ROADS!

"During the forenoon we discussed many subjects, mostly having to do with the new job of building highways. I recall that there was a difference of opinion as to how long it would take to spend the \$18,000,000 bond issue voted for good roads. Some guessed five years, others longer, while a few contended that it never could be spent as there was not that much money in the whole world."

Mr. East's first assignment was to take J. C. More's party and equipment to Ventura County, establish camp on the Hunt Ranch near the Conejo Grade, then return to Los Angeles and join Kolster's party. On the

(Continued on page 23)

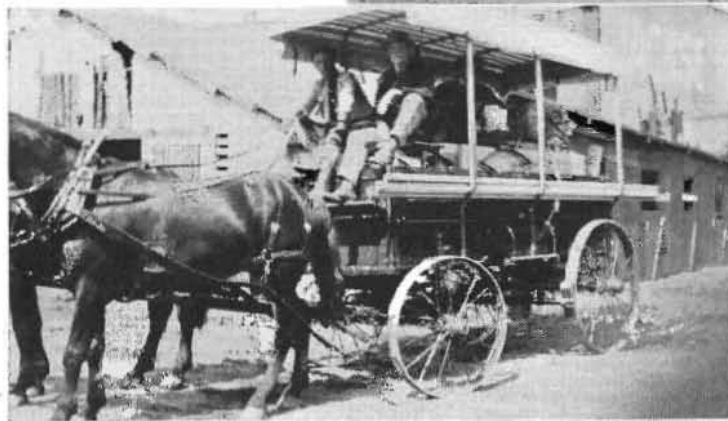


#### WHEN COAST HIGHWAY WAS A MUD ROAD

Typical scene on present State Route 2 (U. S. 101) when Spring came to Ventura County in 1912 and State began building a highway system.

#### SAME SCENE WHEN PAVEMENT CAME

as a result of first surveys made by State highway field party of which E. E. East was instrument man, between Springville and Rice Road.



#### STATE FIELD PARTY OUTFIT IN 1912

consisted of a team of more or less refractory hayburners, a steel tired Davenport wagon, tents, blankets, lanterns, grub and surveying equipment.

#### SUNDAY WAS WASH DAY FOR ENGINEERS

E. E. East, now Chief Engineer of Automobile Club of Southern California, is man bending over the washtub in foreground. Chief of Party Charles Kolster is seated on oil can.



## Two-Hour Trip of Today Took Days Over Roads of 1912

(Continued from page 26)

morning of February 16, he and the other members of the party met in a wagon yard on Lyon Street where they received a team of horses, wagon, camp equipment and supplies.

"Of the eight horses purchased or sold at that time for the use of the survey parties of Division VII," recounts Mr. East, "four were fairly good while the other four combined all the physical and mental defects found in horses. Each team consisted of one of the fairly good horses and one of the other kind.

### LEARNED ABOUT HORSES

"One of these other kind of horses, I remember, among other things objected to a bridle. When we first met this horse down on Lyon Street he had his bridle on. At the end of the day, as was customary, we took the bridle off. That was a mistake. The next morning, after using all sorts of suggestions, persuasion and devices, we finally got this horse's feet tangled up with a rope, whereupon he fell down. This proved to be his undoing, for with one man sitting on his head another forced the bit into his mouth and adjusted the head stall. After this experience he worked, slept and ate with his bridle on."

Mr. East says that he and his companions set out in their wagon in a high spirit of adventure and met adventure unexpectedly when they encountered a horseless carriage at the intersection of Hollywood Boulevard and Cahuenga. The strange vehicle frightened the horses and the animals almost wrecked their conveyance.

"When repairs were made," continues Mr. East, "we set forth again. Out over Cahuenga Pass, where today 60,000 motor vehicles daily rush back and forth, we did not meet a single vehicle of any description.

About one mile beyond Lankershim Boulevard darkness overtook us and we stopped for the night. Unhitching our horses and tying them to the barbed wire fence that lined the roadway, Cummings and the chainman undertook to make the animals comfortable for the night. Taking a lantern from the wagon with the intention of searching for the nearby Los Angeles River, they discovered that although we had a perfectly good lantern we had no coaloil. Proceeding in the dark, Cummings stumbled and plunged headlong into the river. He persevered and in due time returned with a bucket full of water, which was divided between the horses and ourselves."

### BOTHERED BY WILD CATS

Mr. East tells of the trip the next day through San Fernando Valley to Calabasas and then on to the Lewis ranch where camp was made under some oak trees alongside the road. During the day the party had passed one horse and rider and a team and wagon.

"We spent a troubled night here under the oaks," Mr. East remembers. "It later developed that the particular spot we had selected for our camp was a favorite congregating spot for wild cats. Just as we were falling asleep, one of our horses emitted an ear-

### EIGHT-YEAR HIGHWAY PROGRAM URGED BY STUDY COMMITTEE OF NEW YORK

A new order of things for motorists, more and safer modern roads and streets, the end of tax discrimination against motorists, planned highway building, are some of the things possible under the highway plan recently reported by the New York State Highway Study Committee.

"The necessity of adopting a comprehensive program of highway construction arises from the fact that neither this State nor any other State has kept pace in its highway construction with the development of the automotive industry and of motor vehicle transportation," declares the State Legislature's committee.

A high point of the program proposed by the New York Study Committee is the ending of diversion, which has deprived New York motorists of nearly \$200,000,000 worth of highway improvements. Under the new plan every cent of a three-cent gas tax and all license fee income will be used for roads and streets only, and not for general purposes.

New York's proposal details an eight-year program to complete the main State highway system and a five-year program to reconstruct and modernize 5,300 miles of busy State roads.

splitting squeal, which brought all hands out of their cots. Although we could see nothing, we threw rocks into the trees until convinced that the wild cats had departed, and returned to our beds. This disturbance was repeated at short intervals until early morning hours, when Cummings, in desperation, suggested we shoot the horses. His proposal was considered and would, without doubt, have been executed had not a faint light in the eastern sky told us that day was breaking. We knew then our wild visitors would leave.

### THREE DAYS TO VENTURA

"Getting under way at about eight o'clock on the third day out of Los Angeles, we arrived at the Hunt ranch at three o'clock in the afternoon where we were met by Judge Elliott and a party from Oxnard, come to bid us welcome to Ventura County and inviting us to a baseball game the following day, Sunday, as guests of the city.

"This, at least, was the asserted purpose of the visit. However, as it soon developed, it was in reality the opening shot in a highway battle which was to rage for many years between Oxnard and the remainder of Ventura County over the location of the coast highway. This route was built by way of Camarillo, but in 1919 the legislature added the Oxnard-San Juan Capistrano highway to the State System, thus restoring peace in Ventura.

"We set up camp near the ranch house and later enjoyed a delicious supper as guests of the Hunt family. Later in the evening, being anxious to begin the important job of laying out a State Highway System, we set up a transit and established a north line.



Final snow surveys made during the past month confirm the forecasts of run-off previously published indicating that the 1935-1936 water year will be the best the State has experienced since 1927.

Refinancing programs of the irrigation districts approved by the Districts Securities Commission; applications for repair and construction of dams; progress of topographic mapping and other activities of the Division of Water Resources are detailed in the monthly report of State Engineer Edward Hyatt as follows:

#### IRRIGATION DISTRICTS AND DISTRICTS SECURITIES COMMISSION

##### *Irrigation Districts.*

A field investigation and report were made on the proposal of Linden Irrigation District, relative to their entering into contract for repair of Salt Springs Valley Dam, and for purchase of water stored therein to be diverted to the district.

Request was received from the Districts Securities Commission for a report on the application of Fair-oaks Irrigation District, seeking approval of contract to drill test well for supplemental domestic water supply.

At a special election held May 1, 1936, South San Joaquin Irrigation District voted approval of the refinancing program, previously passed upon by the Securities Commission, through which outstanding bonds in the amount of \$5,806,250 will be bought up with a loan of \$3,978,000 from the Reconstruction Finance Corporation.

##### *Districts Securities Commission.*

A regular monthly meeting of the commission was held in San Francisco on May 8, 1936, at which the following business was transacted:

Approval was given to a revised plan for refunding the outstanding bonded debt of Corcoran Irrigation District. First issue bonds in the amount of \$733,000, will be retired at approximately 75 cents on the dollar. This to be accomplished by a loan of \$484,500 from the Reconstruction Finance Corporation, supplemented by funds provided by the district.

An amended plan of refinancing for Little Rock Creek Irrigation District was approved. Outstanding bonds in the amount of \$358,000 are to be retired through a loan of \$102,500 from the Reconstruction Finance Corporation, augmented by district funds.

Petition of Linden Irrigation District for approval of agreements entered into with R. G. Kann, by which the district is to secure an additional water supply, was favorably acted upon.

#### FLOOD CONTROL AND RECLAMATION

##### *Maintenance of Sacramento Flood Control Project.*

During this period the maintenance force has been engaged in routine work largely in connection with repair of bridges and structures. Pumping plants Nos. 1 and 3, located in the Sutter By-pass, have been completed by F. W. Snook Company under contract with the California Debris Commission. Pumping Plant No. 2 will be completed in about three weeks. These plants are of the most modern design and are equipped with Worthington pumps and General Electric motors throughout.

##### *Flood Measurements and Gages.*

The records for the past flood season are being collected and arranged for report in the office. The operation of all automatic water stage recorders for the season was discontinued on May 1st.

#### SUPERVISION OF DAMS

Application for approval of the Thomas Briles Dam located in Modoc County was filed on April 30, 1936. This dam was constructed a number of years ago.

Application for the construction of the Long Valley Dam was filed on March 19, 1936, by the Bureau of Water Works and Supply, City of Los Angeles. This application was approved May 12, 1936. The reservoir formed by this dam will be an essential unit of the Owens Valley aqueduct.

In the southern part of the State work is under way on construction of the Cajaleo Dam of the Metropolitan Water District and of the San Gabriel Number 1 Dam of the Los Angeles County Flood Control District.

In the Owens Valley area work is being done excavating the sites in preparation for placing of the fill of the Grant Lake and Long Valley dams of the Bureau of Water Works and Supply, city of Los Angeles.

Work of rehabilitation and strengthening of the Lake Hodges Dam of the city of San Diego is progressing.

The placing of additional fill for the enlargement of the Veeh Dam near San Diego is practically completed.

The fill is being placed for the enlargement of Sheffield Dam of the city of Santa Barbara.

(Continued on next page)

# Final Snow Surveys Confirm Forecast

(Continued from preceding page)

Work on the enlargement of the O'Shaughnessy Dam for the city of San Francisco is under way with excavations being made for the foundations in the stream bed and abutments.

Construction at the Kent Dam No. 2 in San Mateo County is nearing completion.

Placing of fill has been resumed at the West Valley Dam of the South Fork Irrigation District in Modoc County.

At the Mad River Dam of the city of Eureka exploratory work is still under way.

In addition to the inspections required for construction and repair work, the usual operation and maintenance inspections of a number of dams have been made during the month.

## WATER RIGHTS—ADJUDICATIONS

### *Supervision of Appropriations of Water.*

Twenty-six applications to appropriate water were received during April; 17 were denied and 10 were approved. Three permits were revoked during the month and rights under 19 permits were confirmed by the issuance of license.

Field inspections were made in Monterey, Santa Barbara, Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Inyo counties, preliminary to the issuance of license which would confirm the rights under permit.

Water master service for the 1936 season was commenced in the following water master districts about May 1: Hat, Burney and Cow Creek water master districts (in Shasta County).

## FEDERAL COOPERATION—TOPOGRAPHIC MAPPING

Field work was completed during April on the San Bernardino No. 1 and No. 2 Quadrangles in San Bernardino County and progress was made in the mapping of the Tobias Peak Quadrangle in Kern and Tulare counties and the San Bernardino No. 4 Quadrangle in San Bernardino County. Further progress was made on the cultural revision along the San Andreas fault on the Hesperia, San Antonio, San Bernardino and Cucamonga Quadrangles in San Bernardino County.

The field work has been completed and office work is progressing on the Paynes Creek and Burney Quadrangles in Tehama and Shasta counties and the Kreyenhagen Hills Quadrangle in Fresno County.

## SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

During the past month the work has been chiefly toward bringing to completion the compiling of data obtained in 1935 from which to present a report showing the diversions, return flow, stream flow and acreage irrigated in the Sacramento-San Joaquin

territory and the encroachment and recession of salinity in the Delta.

Field work preliminary to gathering similar data for 1936 is under way. Recording gages are being installed where necessary on stream flow and return flow channels, staff gage observers are being instructed, salinity observers have been furnished schedules for taking water samples, and all points of diversion are being visited and the diverters furnished with printed forms upon which to record the operation of their pumping plants. Some current meter measurements of diversions have been made.

The stream flow into the Delta from both the Sacramento and San Joaquin valleys remains high and has kept the salt water from encroaching into the Delta channels.

## CALIFORNIA COOPERATIVE SNOW SURVEYS

During the first week of May the final scheduled snow surveys for this year were completed at all established key courses. These surveys were for the purpose of determining the amount of snow melting that had taken place in the mountains during the preceding month and serve as a check on the estimates of stream flow determined at the end of March and published in the April snow survey bulletin of the division.

The results of these surveys were incorporated in the regular May snow survey bulletin, published May 12th. This is the final bulletin for this year. Inasmuch as the snow melting and also the monthly precipitation during April were just about normal, the April forecasts of run-off as previously published, were not modified in any way.

Office work since the completion of the May bulletin has been devoted to bringing up to date certain precipitation run-off data and to research work regarding the involved relations between the amount of snow on the ground as revealed by the snow surveys, and the spring run-off from the watersheds.

## CENTRAL VALLEY PROJECT

Progress has been made by the United States Bureau of Reclamation and the State Department of Public Works on the preparation of plans for preliminary work preparatory to starting construction on the initial units of the project. Surveys are progressing at Kennett and Friant dam sites and along the proposed route of the Contra Costa Conduit and appraisers are working in the field evaluating land and necessary rights of way for the construction of the project. Exploration work was continued during the month at Kennett and Friant dam sites as was the drilling of the proposed site of the combination highway and railroad bridge across the Pit River. The Department of Public Works and all State agencies interested are assisting the Bureau of Reclamation in every way possible in an effort to speed work on the project.



# Highway Bids and Awards

For May, 1936

**ALAMEDA COUNTY**—Furnish and apply armor coat between Scotts Corner and Arroyo Del Valle, about 2.1 miles. District IV, Route 108, Section A. E. E. Dias, Niles, \$4,180; Ransome Co., Emeryville, \$4,374; Pacific Truck Service, Inc., San Jose, \$4,327.50; Palo Alto Road Materials Co., Palo Alto, \$4,307.50. Contract awarded to Lee L. Immel, Berkeley, \$3,864.

**ALAMEDA COUNTY**—At San Leandro Street in Oakland under the Southern Pacific Co. and Western Pacific R. R. tracks. District IV, Route Feeder, Section Oak. Barrett & Hilp, San Francisco, \$233,981; MacDonal and Kahn Co., Ltd., San Francisco, \$232,769; Eaton and Smith, San Francisco, \$220,233; Heafey-Moore Co., & E. T. Lesure, Oakland, \$229,738; J. F. Knapp, Oakland, \$226,375. Contract awarded to Bodenhamer Construction Co., Oakland, \$214,065.10.

**CONTRA COSTA COUNTY**—Between Broadway Tunnel and 2 miles west of Lafayette, 3.2 miles to be graded and surfaced with plant mixed surfacing on crusher run base. District IV, Route 75, Section A. Heafey-Moore Co., Oakland, \$433,589; A. Teichert & Son, Inc., Sacramento, \$325,917; George Pollock Company, Sacramento, \$336,532; Union Paving Co., San Francisco, \$348,301. Contract awarded to Granfield, Farrar and Carlin and John Carlin, San Francisco, \$306,238.50.

**EL DORADO COUNTY**—Between Kyburz and Strawberry, 8.3 miles to be surfaced with crusher run base and plant mixed surfacing. District II, Route 11, Section H. Hanrahan Co., San Francisco, \$159,849; A. Teichert & Son, Inc., Sacramento, \$164,404. Contract awarded to Union Paving Co., San Francisco, \$145,532.50.

**IMPERIAL COUNTY**—Between Araz and Yuma and between Seeley and Calexico. Furnish and apply liquid asphalt to existing roadbed, 23.8 miles. District XI, Route 27-202, Section B-AB. Paulsen & Marsh, Los Angeles, \$6,298; Gilmore Oil Co., Los Angeles, \$6,548; Morgan Brothers, Huntington Park, \$6,679. Contract awarded to Square Oil Co., Los Angeles, \$5,795.

**INYO COUNTY**— $\frac{1}{2}$  mile north of Bishop to 1.4 mile north of Laws. Furnish and apply SC-2 to existing roadbed, 2.6 miles. District IX, Route 76, Section A. Basich Bros., Torrance, \$1,692; Paulsem & March, Inc., Los Angeles, \$1,625; Morgan Bros., Huntington Park, \$1,443; Oilfields Trucking Co., Bakersfield, \$1,622; Lambs Transfer Co., \$1,548; Regal Oil Co., Long Beach, \$1,493. Contract awarded to Square Oil Co., Los Angeles, \$1,343.75.

**INYO COUNTY**—Furnish and apply SC-2 to existing roadbed 7.0 miles. District IX, Route 63, Section B. Oilfields Trucking Co., Bakersfield, \$1,500; Lamb Transfer Co., Long Beach, \$1,334; Paulsen March, Inc., Los Angeles, \$1,500; Square Oil Co., Inc., Los Angeles, \$1,450. Contract awarded to Regal Oil Co., Long Beach, \$1,106.

**KERN COUNTY**—Between 5 miles east of Hart's Station and 2 miles west of Wasco. District VII, Route 23, Section C. Palo Alto Road Materials Co., Palo Alto, \$4,092; John Jurkovich, Fresno, \$4,550; Oilfields Trucking Co., Bakersfield, \$4,100; Square Oil Co., Los Angeles, \$4,225; A. S. Vinnell Co., Los Angeles, \$4,741; Leo F. Piazza, San Jose, \$4,350. Contract awarded to L. A. Brisco, Arroyo Grande, \$3,900.

**KERN-TULARE-FRESNO COUNTIES**—Between Greenfield and north city limits of Fowler (portions) landscaping. District VI, Route 4, Section C Bkd.G. California Nursery Co., Niles, \$17,952; Leonard Coates Nurseries, Inc., San Jose, \$12,992. Contract awarded to Rexroth & Rexroth, Bakersfield, \$9,798.40.

**LASSEN COUNTY**—Near Bieber Station, an overhead crossing over the Great Northern railway. District II, Route 28, Section A. J. G. Chigris, San Francisco, \$72,742; M. J. B. Construction Co., Stockton, \$67,518; Dunn & Baker, Klamath Falls, Ore., \$69,884; Fredericksen & Westbrook, Lower Lake, \$70,561; P. L. Crooks & Co., Inc., Portland, Ore., \$97,761. Contract awarded to Poulos & McEwen, Sacramento, \$61,727.15.

**LOS ANGELES COUNTY**—For landscaping 3 miles between Monrovia and Azusa. District VII, Route 9, Section G. N. P. Valkenburg, Los Angeles, \$2,699. Contract awarded to Peterson Bros., Inglewood, \$1,829.56.

**LOS ANGELES COUNTY**—Between Castaic School and Piru Creek, 6.8 shldr. mi. bit. mac. and plant-mixed surf. shldr. District VII, Route 4, Section G.H. Southwest Paving Co., Inc., Roscoe, \$31,880; P. J. Akmadzich, Los Angeles, \$33,390. Contract awarded

to Geo. R. Curtis Paving Co., Los Angeles, \$29,887.25.

**MODOC COUNTY**—Between Hot Creek and Cedarville Mountain and between southern boundary and Alturas, 32.9 miles oil treatment to portion and seal coat entire project. District II, Routes 28, 73, Sections BC, C.D. Hayward Building Material Co., Hayward, \$21,343; Dunn & Baker, Klamath Falls, Ore., \$21,693; J. C. Compton, McMinnville, Ore., \$24,251. Contract awarded to C. F. Fredericksen & Sons, Lower Lake, \$18,959.65.

**MONO COUNTY**—Between 2 miles south of Rush Creek and 2 miles north of Leavining, grade and bit. tr. sel. matl. surf. District IX, Route 23, Section G.H. Isbell Construction Company, Reno, Nev., \$145,454; George Pollock Co., Sacramento, \$162,210. Contract awarded to Basich Bros., Torrance, \$119,350.50.

**ORANGE COUNTY**—Between Seal Beach and Newport Beach, 9.8 miles P. C. C. pavement widening. District VII, Route 60, Sections S1B, A, Npt.B. Match Bros., Elsinore, \$146,326; J. E. Haddock, Ltd., Pasadena, \$150,108.50; C. O. Sparks and Mundo Engineering Co., Los Angeles, \$178,180; Griffith Co., Los Angeles, \$162,440; Oswald Bros., Los Angeles, \$160,663. Contract awarded to Geo. R. Curtis Paving Co., Los Angeles, \$143,965.50.

**ORANGE COUNTY**—Between Gypsum Creek and Riverside County line, 2.7 miles to be graded and paved with P. C. C. District VII, Route 43, Section B. Griffith Co., Los Angeles, \$163,278; Daley Corp., San Diego, \$198,595; J. E. Haddock, Ltd., Pasadena, \$192,781; Oswald Bros., Los Angeles, \$174,467; United Concrete Pipe Corp., Los Angeles, \$233,696. Contract awarded to Gibbons & Reed Co., Burbank, \$165,813.75.

**ORANGE AND LOS ANGELES COUNTIES**—Between Routes 183 and 179 and between Route 60 and Santa Ana River. Constr. ab't 15.4 miles of shoulders with import borrow. District VII, Routes 171 and 179, Sections A, A. C. D. Gifford, Receiver Owl Truck & Materials Co., Compton, \$30,191; Mojave Corp., Los Nietos, \$19,882. Contract awarded to Parish Bros., Los Angeles, \$14,520.

**PLUMAS COUNTY**—Between 4 miles east of Beckwouth & Ede's Ranch 5.6 mile grade and pen. oil treatment. District II, Route 21, Section G. Harms Bros., Doyle, \$32,364; A. Teichert & Son, Inc., Sacramento, \$33,917; J. B. Galbraith and Don A. Canevari, Santa Rosa, \$31,068; M. J. B. Const. Co., Stockton, \$39,793. Contract awarded to Fredericksen & Westbrook, Lower Lake, \$29,750.50.

**RIVERSIDE COUNTY**—About 2.2 miles west of Indio, 1.3 miles grade and P. C. C. pavement. District XI, Route 26, Section E. Oswald Bros., Los Angeles, \$55,080. Contract awarded to B. G. Carroll, San Diego, \$51,720.50.

**RIVERSIDE COUNTY**—Between Temecula River Br. and Sly. Bdy., and between Sage and 4.2 miles south of Hemet; 27.6 miles; road mix surf. tr. rd. hd. District VIII, Routes 78, 194, Sections AB, B. Geo. Herz & Co., San Bernardino, \$16,653; R. E. Hazard & Sons, San Diego, \$16,906; Clyde W. Wood, Stockton, \$18,664; Dimmitt & Taylor, Los Angeles, \$23,436; Match Bros., Elsinore, \$17,016; Oswald Bros., Los Angeles, \$19,314; A. S. Vinnell Co., Los Angeles, \$16,339. Contract awarded to Oilfields Trucking Co., Bakersfield, \$13,081.81.

**RIVERSIDE COUNTY**—1 mile north Box Springs an overhead crossing over A. T. & S. F., 1-37', 2-34', 2-8' spans to be constructed. District VIII, Route 19, Section C. Byerts & Dunn, Los Angeles, \$19,260; John Oberg, Los Angeles, \$18,890; Robert D. Patterson, Santa Barbara, \$19,305; R. R. Bishop, Long Beach, \$20,618; J. F. Haddock, Ltd., Pasadena, \$19,680; Oswald Bros., Los Angeles, \$18,970. Contract awarded to D. A. Loomis, Glendale, \$17,022.70.

**SAN BENITO COUNTY**—San Benito County, 120' bridge to be salvaged from Pacheco Creek and erected at San Benito River, and 100' San Benito River bridge to be salvaged. District V, Routes 22-119; Sections B, D. W. J. Tobin, Oakland, \$4,624; Union Paving Co., San Francisco, \$5,138. Contract awarded to Lord & Bishop, Sacramento, \$3,850.

**SAN BERNARDINO COUNTY**—Between Vidal and Route 58, between Doble and 20 miles northerly and between Route 26 and 11.5 miles northerly, about 76.5 miles road mix surf. trmt. to be applied. District VIII, Routes 146, 43, 187, Sections A, B, C, D, H, J, K, E, A. Clyde W. Wood, Stockton, \$109,824; A. S. Vinnell Co., Los Angeles, \$101,508; Oswald Bros., Los Angeles,

(Continued on next page)

## Highway Bids and Contracts Awarded in Month of June

(Continued from preceding page)

\$117,453; Dimmitt & Taylor, Los Angeles, \$114,246. Contract awarded to R. E. Hazard & Sons, San Diego, \$88,083.60.

**SAN BERNARDINO COUNTY**—Highway roadside landscape project between Alabama Street and State Street in Redlands, about 1.9 miles in length. District VII, Route 26, Section A and Rld. Match Bros., Elsinore, \$13,232; S. A. Cummings, San Diego, \$6,816. Contract awarded to Peterson Bros., Inglewood, \$6,607.14.

**SAN BERNARDINO AND RIVERSIDE COUNTIES**—Various locations, 19.4 miles plant-mixed surfacing (SC Type) and seal coat. District VII, Routes 31, 190, 64, Sections A C, C E, L, A. S. Vinnell Co., Los Angeles, \$67,596. Contract awarded to George Herz & Co., San Bernardino, \$63,603.20.

**SAN DIEGO COUNTY**—Bridge across Santa Margarita R. 2½ miles north of Oceanside. District XI, Route 2, Section C. V. R. Dennis Const. Co., San Diego, \$295,693; Dimmitt & Taylor, Los Angeles, \$222,900; Shofner & Gordon, Los Angeles, \$233,081; Pacific Bridge Co., San Francisco, \$236,377; E. O. Larsen, San Diego, \$181,063; J. E. Haddock, Ltd., Pasadena, \$251,961. Contract awarded to C. W. Wood, Stockton, \$175,529.65.

**SAN LUIS OBISPO COUNTY**—Between 1 mile east of Pozo and Kern County line, about 40.6 miles, liquid asphalt to be furnished and applied to existing roadbed. District V, Route 58, Sections B, C, D and E. L. A. Brisco, Arroyo Grande, \$12,636; Square Oil Co., Los Angeles, \$12,870; Paulsen & March, Inc., Los Angeles, \$12,116; Oilfields Trucking Co., Bakersfield, \$13,624. Contract awarded to Lambs Transfer Co., Long Beach, \$12,038.

**SHASTA COUNTY**—Between forest bdy. on Route 20 and Bridge Camp on Route 83, about 21.6 miles in length, seal coat to be applied. District II, Route 20 and 83, Sections E, A-B. E. F. Hilliard, Sacramento, \$10,759; Hayward Bld. Material Co., Hayward, \$11,529; Dunn & Baker, Klamath Falls, Ore., \$12,192; C. F. Fredericksen & Sons, Lower Lake, \$12,780; Palo Alto Road Materials Co., Palo Alto, \$14,772. Contract awarded to Pacific Truck Service, Inc., San Jose, \$8,464.

**SIERRA AND NEVADA COUNTIES**—Between Downieville and Route 83, between 7.1 miles north of Truckee and 5.7 miles north of Nevada-Sierra county line, and between Sierraville and Calpho, about 48.2 miles of penetration oil treatment to be applied. District III, Routes 25 and 83, Sections, various. C. F. Fredericksen & Sons, Lower Lake, \$10,522; Lee J. Immel, Berkeley, \$10,971; Oilfields Trucking Co., Bakersfield, \$11,362; Pacific Truck Service, Inc., San Jose, \$10,821; Hayward Bldg. Mtls. Co., Hayward, \$10,788. Contract awarded to Edw. F. Hilliard, Sacramento, \$10,297.

**TULARE COUNTY**—Between wly. bdy. and 4 miles east and between Yettem and Lemon Cove, 24.6 miles road-mix, shoulders and armor coat, portions of pavement. District VI, Routes 121, 129, Sections A B C, E. M. J. E. Construction Co., Stockton, \$34,798; L. A. Brisco, Arroyo Grande, \$27,485; A. S. Vinnell Co., Los Angeles, \$29,240; Stewart & Nuss, Inc., Fresno, \$25,336. Contract awarded to Palo Alto Road Materials Co., Palo Alto, \$24,401.

**TULARE COUNTY**—Between 2.7 miles and 13.5 miles east of Porterville. (Road-mix surface treatment (shoulders). District VI, Route 127, Section B. Oilfields Trucking Co., Bakersfield, \$5,599; Square Oil Co., Los Angeles, \$3,210; A. S. Vinnell Co., Los Angeles, \$4,645; Stewart & Nuss, Inc., Fresno, \$4,330; L. A. Brisco, Arroyo Grande, \$4,197. Contract awarded to Palo Alto Road Materials Co., Palo Alto, \$3,143.

**VENTURA COUNTY**—Within Camarillo State Hospital Grounds, grade and A. C. and P. C. pavement. District VII, Camarillo State Hospital. Contract awarded to Oswald Bros., Los Angeles, \$18,164.

**YOLO COUNTY**—Between Yolo Causeway and M Street subway, 2.5 miles to be graded and paved with asphalt concrete. District III, Route 6, Sec. C. Heafey-Moore Co., Oakland, \$183,537; Union Paving Co., San Francisco, \$159,184. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$157,485.10.

### CARRY ON!

THE miner drives the tunnel and  
The weaver runs the loom,  
Though twenty wizards prophesy  
The dismal day of doom.

The builder sets the girder,  
The farmer tills the farm,  
Though thirty anxious editors are  
Viewing with alarm.

And science, art and industry  
Propel the world along,  
Though forty experts testify that  
Everything is wrong.

Then gayly help to decorate your  
Little nook or space,  
Though fifty college faculties have  
Flunked the human race.

—ARTHUR GUITERMAN.

## Each Dollar Spent on Roads Develops \$3 in Other Business

**H**IGHWAY construction not only provides roads, but also plays a vital part in the restoration of general business to a sound basis. This is revealed in a recent survey made by the United States Bureau of Public Roads.

The survey indicates that every \$1 expended on roads initiates a movement which results in the distribution of \$3.15 in wages and materials and that for every four men put to work on highways, employment is created for seven additional workers in twenty-four different industries.

An annual expenditure of \$1,000,000,000 on road work would furnish continuous employment for twelve months for more than 1,000,000 persons, about equally divided between urban and rural areas. Of this number less than 40 per cent would be employed on road work directly, the remaining 60 per cent in industries.

Business transactions beneficial to many industries and many different communities result from every order for highway materials. Each successive stage in the processing of materials represents the distribution of enormous sums for labor, equipment, materials and other expenses which make up the cost of doing business.

It is the total value of the business thus stimulated which multiplies the value of each dollar invested in highway work.

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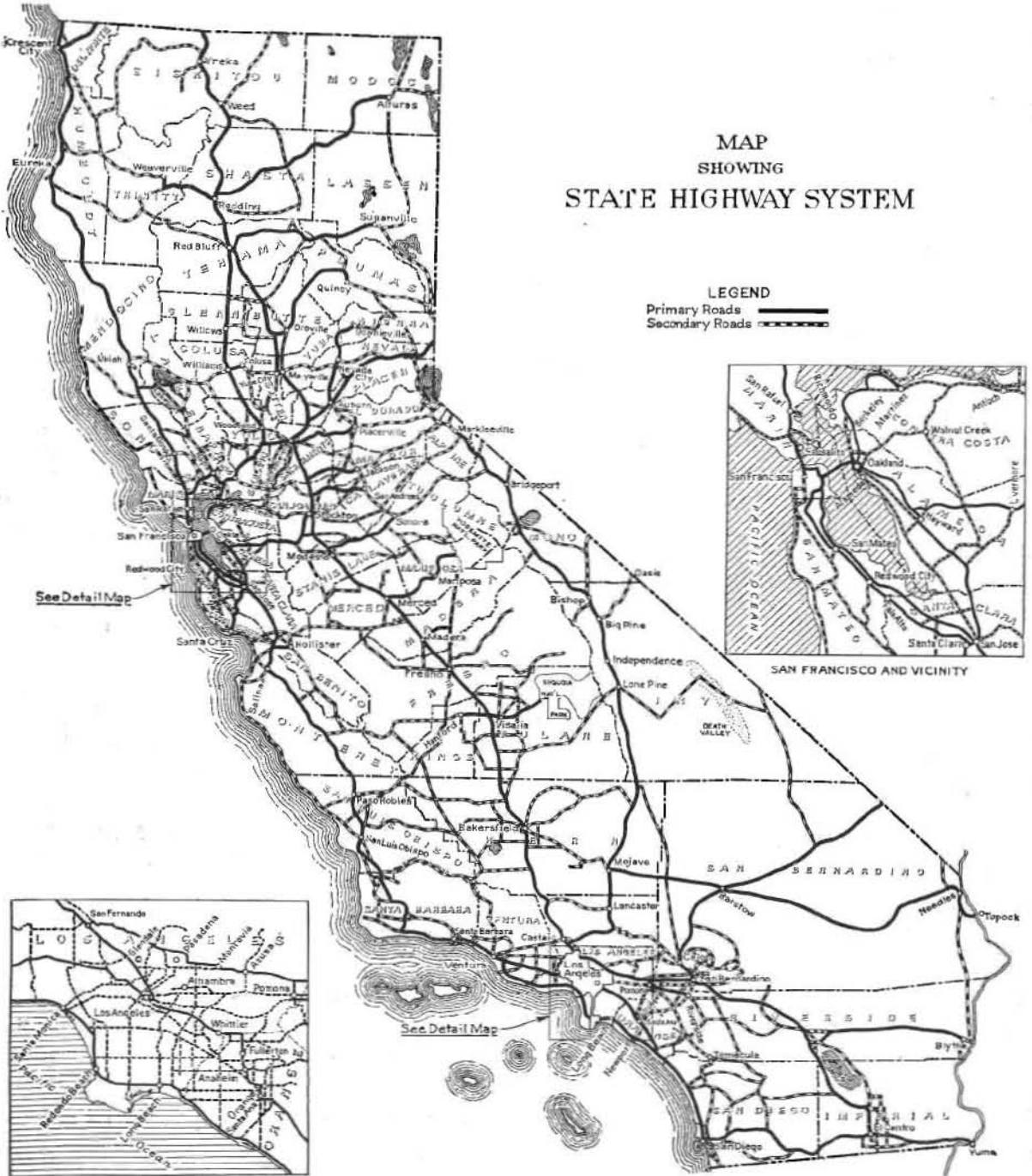
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