

CALIFORNIA

HIGHWAYS AND PUBLIC WORKS

*Widening and Surfacing State
Route 34 Along North Shore
of Lake Tahoe.*

Official Journal of the Department of Public Works
OCTOBER...1936

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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

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Table of Contents



	PAGE
Governor Merriam to Open Bay Bridge November 12.....	1
Pictures of Bay Bridge Upper and Lower Decks Approaching Completion.....	3
Death Valley Roads Restored After Summer Cloudbursts.....	4
<i>By S. W. Lowden, Acting District Engineer</i>	
Pictures of Death Valley Roads Damaged by Flood Waters.....	5
Tracy Grade Separation Completed and Opened to Traffic.....	6
<i>By R. B. Anderson, Resident Engineer</i>	
Pictures of Tracy Grade Separation Overpass.....	7
Last Grapevine Canyon Unit Completed and Opened.....	8
<i>By R. M. Gillis, District Engineer</i>	
Pictures and Map of Grapevine Canyon Realignment.....	9
Construction, Progress and Pavement Records for 1935.....	10
<i>By Earl Withycombe, Assistant Construction Engineer</i>	
Tabulations of Pavement Construction Records.....	12, 13
Highway Planting at Entrance to Redlands.....	14
<i>By B. A. Switzer, Assistant Engineer</i>	
Friant Dam Plans Approved by State Water Authority.....	15
Panorama of Friant Dam Site, Map, and Official Group Picture.....	18, 19
Reconstruction of State Route 6 Between Tower Bridge and Yolo Causeway.....	20
<i>By E. J. L. Peterson, Assistant District Office Engineer</i>	
Illustrations of Tower Bridge to Yolo Causeway Reconstruction.....	21
Last Desert Link of U. S. 91 in California under Construction.....	24
<i>By E. Q. Sullivan, District Engineer</i>	
Pictures of Flooded Mountain Pass and Ivanpah Dry Lake.....	25
Calwa Overpass Opened to Traffic with Official Ceremonies.....	26
Pictures of Calwa Overpass and Official Dedication Group.....	27
Monthly Water Resources Report of State Engineer.....	28, 29
Highway Bids and Awards for September.....	30, 31
Most Accidents Due to Drivers and Pedestrians.....	32

Governor Merriam to Open San Francisco-Oakland Bay Bridge November 12th

CALIFORNIA will celebrate the formal opening to automobile traffic of the \$77,000,000 San Francisco-Oakland Bay Bridge, greatest structure of its kind in the world, at 10 o'clock on the morning of November 12.

Highlighting a four days' jubilee in observance of the event, a ribbon barrier on the Oakland side of San Francisco Bay will be officially broken at that hour and Governor Frank F. Merriam, Director of Public Works Earl Lee Kelly and State Highway Engineer Charles H. Purcell will lead an automobile caravan across the bridge for appropriate dedication ceremonies which will be held on the San Francisco side at 11 o'clock.

State, Federal and county officials, officers and men of the U. S. battle fleet and the army, squadrons of army and navy planes and citizens of the entire bay region and many sections of California will participate in the exercises and gala celebration events.

PARADE BEGINS CEREMONIES

Celebration of this epochal event will begin on November 11, Armistice Day, in Oakland, with a parade in the morning, a military luncheon at the Hotel Oakland, a military pageant, football game and boat races on Lake Merritt in the afternoon and fireworks and a regatta on the lake in the evening. A ball at the Oakland Auditorium, open to the public without admission charge, will conclude the festivities on the first day of the four-day fiesta.

On November 12, coincident with the dedication ceremonies on both sides of the bay, the San Francisco Citizens' Committee, working through the Junior Chamber of Commerce of

San Francisco, will stage a series of maritime events in which the battle fleet will take part and navy and army flyers will put on a spectacular air show.

Following exercises on the San Francisco side, the official party will return to Oakland for luncheon as the guests of the eastbay city.

In the afternoon, the start of the

races off the Marina, outboard motor and rowing races and swimming and diving events at Aquatic Park. In the evening brilliant displays of fireworks on both sides of the bay will signalize the lighting of the bridge.

On November 13, San Francisco will celebrate with a great parade that will move from the Ferry Building to the Civic Center, where grandstands accommodating 40,000 persons will be erected. A feature of this event will be a pageant of floats depicting the past, present and future of the metropolitan bay area. Twenty-two counties already have accepted invitations to participate.

A spectacular pageant of light is scheduled for Saturday night, November 14, in San Francisco. Floats showing replicas of all the great bridges in the world will move up Market street and past the grandstands and on each will be singers and dancers representing the nations in which the bridges depicted were built.

San Francisco's churches will hold special services on Sunday, November 15, to present the spiritual aspect of progress as represented in the completion of the bridge.

300,000 VISITORS EXPECTED

Transportation experts anticipate at least 300,000 visitors to the bay region during the celebration and in honor of the occasion San Francisco will be brilliantly decorated. Along Market street silver and rainbow-hued decorations will suggest an elongated bridge with great silver structures spanning the thoroughfare at eight different points.

The foreign quarters of the city will be decked in gala attire, and



GOVERNOR FRANK F. MERRIAM

Pacific Coast yacht regatta will dot the entire bay north of Yerba Buena shoals with white sails. Later there will be a flight of commercial planes, fish-boat races, air races, merchant life-boat races, a fire-boat demonstration off Yerba Buena shoals, a Coast Guard exhibition and Sea Scouts'

every hotel, the principal restaurants and night clubs and theaters will produce special events. There will be fireworks each night.

Anticipating a heavy demand for the souvenir fifty-cent piece being issued to commemorate completion of the bridge, the San Francisco-Oakland Bay Bridge Celebration Committee has arranged with every bank in the bay area to accept and handle orders for the coins.

45 MILE SPEED LIMIT

Representing as it does a highly important link in the transcontinental and State highway systems, the San Francisco-Oakland Bay Bridge will offer to motorists the finest highway facilities in existence.

An effective safety measure is provided automobile drivers in the separation of pleasure cars from trucks and heavier motor vehicles, such as buses. These latter will be routed over the three lanes of the lower deck, while automobiles will speed over the six lanes of the upper deck. Traffic regulations, on the whole, will be those applying to all California State highways, with the speed limit set at 45 miles per hour. No minimum limit has been set.

Motorists will not have to worry about pedestrians, bicycles or animals, all three being expressly prohibited from using the vehicular crossings.

A special bridge detail under Captain Rudy Schmoke of the California Highway Patrol will be assigned to duty for the protection of motorists. Its members will have headquarters in the Administration Building on the Toll Plaza.

POLICE PHONE SYSTEM

A system of police phones has been installed. These phones, 22 in number, extend from the junction of the "off" ramp and the main approach west of the San Francisco anchorage to the distribution structure in Oakland. They connect directly with the desk sergeant at the Administration Building.

The phones are a typical handset, enclosed in a box, so arranged that when an officer inserts his key into the box the signal and its positions are recorded in the Administration Building, and even should he not be able to call, aid would immediately be sent him.

A violet fresnel lens placed on the police box will signal the officer on duty, should the desk sergeant wish to talk with him.

The San Francisco-Oakland Bay Bridge stretches into two counties, Alameda and San Francisco, making it necessary to establish a boundary line for the purpose of determining to which county justice the erring motorist will be sent should he be charged with violating traffic regulations.

This boundary has been determined at Pier E-6, about half way over the East Bay Crossing.

In addition to police phones, 32



C. H. PURCELL, Chief Engineer of Bay Bridge

tow car signals for the convenience of motorists have been installed on the bridge. These signals will be enclosed in a box with a fire signal and connect directly with the garage and fire station east of the east portal on Yerba Buena Island. The tow car signals will be operated like the ordinary fire signal, by the breaking of a glass dial, and the registered signal will indicate the location of the distressed motorists.

Three-wheel motorcycles are being contemplated for use by the bridge patrol, so that gasoline and individual fire equipment may be carried conveniently by each officer when necessary.

No other highway lighting in the United States will equal the vast illuminating system of the San Francisco-Oakland bridge. Sodium vapor lighting will be used. It not only is cheaper to operate than the incandescent light, but is a great contribution to safety in night driving. It provides improved vision without glare and can allow for the elimination of headlights.

This lighting system will illuminate approximately 15 miles of roadways, including the bridge proper, its upper and lower decks and its approaches. The lights will be placed at a distance of about 150 feet apart and will be wired on a staggered system, permitting a circuit to be cut out without plunging any one section of the bridge into darkness. A total of 1074 sodium luminaires, including 10,000 and 6000-lumen lamps, will be required to light the roadways.

SIXTEEN TOLL LANES

The entire lighting system will be operated through a 26-foot control board in the Administration Building.

All tolls will be collected at the Toll Plaza, adjacent to the Administration Building on the Oakland side.

Sixteen lanes will pass by the toll booths, twelve of which will be utilized by pleasure cars and four by trucks. Trucks and automobiles will, of course, be separated. A sidewalk indicator will show in lights the amount paid in tolls by the motorists. All tolls will be collected, and not dropped into a box.

The expediting of traffic after it leaves the bridge has been one of the great problems. On the east side, the difficulty was solved through the Distribution Structure, which distributes traffic in three directions, without necessitating a left-hand turn or a right-angle crossing.

AN INTERLACING VIADUCT

Traffic reaches Alameda and lower Oakland through an approach to Cypress and Seventh streets; to central Oakland, through an approach to 38th and Market streets, via the San Pablo Underpass; and to Berkeley, Albany, and Richmond, through a four-lane approach, the East Shore Highway.

The Distribution Structure has a

(Continued on page 14)

BAY BRIDGE FINISHING SCENES

At right—View of upper deck of suspension span with its six traffic lanes completely paved.

Below—San Francisco end of top deck showing main central approach to Fifth Street Plaza with off-ramp (right) to Clementina and First streets and on-ramp from Harrison and Fremont.



Below—View of top deck entrance to tunnel through Yerba Buena Island.



At left—Views of the lower bridge deck with its three-lane paved roadway for trucks and two tracks for railway cars.

Death Valley Roads Restored After Summer Cloudbursts

By S. W. LOWDEN
Acting District Engineer

RESTORATION work on Route 127 of the State Highway Secondary System extending from Lone Pine easterly through Death Valley to the town of Baker in San Bernardino County, 14.5 miles of which were completely destroyed by torrential floods caused by cloudbursts last summer, was recently completed by the Division of Highways and the road reopened to traffic.

Approximately 57.7 miles of Route 127 were damaged by the storms. In several instances and shortly after repairs had been made under great difficulties by the maintenance forces of District IX subsequent floods again caused great havoc.

Damage was particularly heavy through the Darwin Wash bordering the westerly side of Panamint Sink and in the vicinity of Towne's Pass the westerly gateway to Death Valley proper. On the sections of State highway that were not totally destroyed, debris was deposited in depths varying from 1 foot to 4 feet. On the sections completely wiped out numerous washes were encountered that at places reached a depth of 8 feet below the former roadbed.

PRESENTS WEATHER PARADOX

For ages past the strange, arid area that is Death Valley, lying between Mount Whitney in the Sierra Range on the west, and the Mojave Desert to the east, has, rather paradoxically, been deluged by cloudbursts during July and August, the hottest months of the summer.

Last summer was no exception and numerous electrical storms accompanied by exceedingly heavy rains were experienced. Many of the washes through which Route 127 passes and which had not carried water for a number of years were filled with raging torrents, in some of them the water reaching a depth of from 3 to 5 feet.

These floods carried rocks of various sizes and huge quantities of gravel for many miles with the consequent destruction of all improvements in the way of roads and high-

ways that lay within their path rendering them totally impassable to traffic.

Contrary to the popular belief that the Death Valley area is uninhabitable or not traversable during the summer season, work carried out by the Division of Highways and by the National Park Service during the last three years has resulted in such betterment of existing roads that an appreciable amount of travel is encountered throughout the main valley highways even during the extreme heat of summer.

It is considered remarkable, therefore, that during the series of storms affecting this region during July and August no persons were injured or seriously endangered. The only damage other than that suffered by Highway 127 was to one car caught in the flood of Darwin Wash. This machine was abandoned by the occupants and completely wrecked in the swirling waters.

Route 127 follows, in general, the course of the wagons of the early immigrants and is located for the most part through what is ordinarily known as the dry washes of the mountains, over alluvial fans that have been accumulating since the time that Death Valley was an inland sea.

ROAD WASHED AWAY

An interesting section of this State highway extends from the foot of Darwin Wash across the Argus Mountains through Panamint Valley and over the Panamint Mountains by way of Towne's Pass to Stove Pipe Wells in Death Valley, a distance of 31 miles. It formerly was the famous Death Valley toll road. It became a free highway in December, 1934, when the State acquired it by purchase. It was on a portion of this road through the Darwin Wash and near Towne's Pass that the greatest amount of damage was done last summer.

Between Darwin and Panamint Valley destruction of the highway was complete at several points and

debris was piled deep on the road. In Darwin Wash run-off water obliterated the highway.

Highway shoulders and oil mix surfacing on the stretch between Furnace Creek and Death Valley Junction were swept away. Cross washes between Shoshone and Baker deposited large quantities of heavy debris and destroyed highway shoulders.

TOLL FEES ABOLISHED

The old toll road acquired by the State and where restoration work is extensive was constructed by H. W. Eichbaum, a pioneer of Death Valley, in 1926 under a franchise granted to him by Inyo County. Motorists using the road were charged \$2 per car and 50 cents per person. When the State took over the route and placed it in the highway system these fees were abolished.

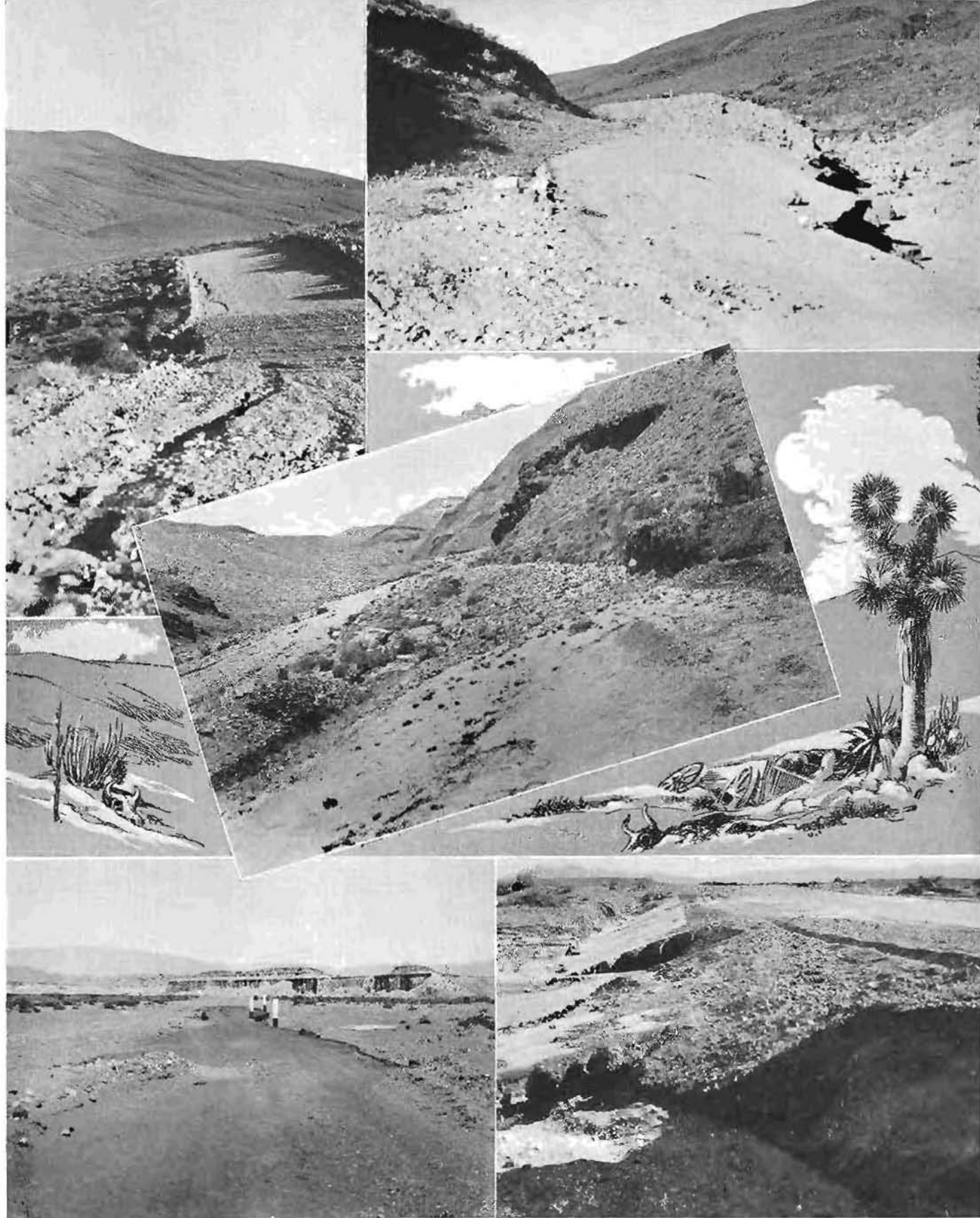
The Eichbaum Road became a part of Route 127. It ended at Stove Pipe Wells where a connection is made with a road through Daylight Pass to the abandoned mining towns of Rhyolite and Bullfrog and thence to Beatty and Tonopah, Nevada.

From Stove Pipe Wells, State Route 127 bends southeast to Death Valley Junction via Furnace Creek, to which point last summer's floods reached, and then runs south via Shoshone to a connection with State Route 31 (The Arrowhead Trail) at Baker.

WEIRD SCENIC BEAUTY

As a direct east-west highway across Death Valley, Route 127 provides for interstate traffic and attracts thousands of tourists each year. The scenic beauty of the region through which the highway passes is unusual. The mountains on the east and west sides of Death Valley rise precipitously from elevations below sea level to heights of more than a mile. The Grapevine and Armagosa ranges on the east are made up of layer upon layer of

(Continued on page 6)



Cloudbursts over Death Valley wrought much damage to State Highway No. 127 during the summer. Top pictures show typical washes of oil mix surfacing and deposits of debris on summit of Towne Pass, the western gateway. Center—Complete loss of road at lower end of pass. Bottom pictures show heavy cross-wash and damage to rubble masonry slope on sections of eastern approach via Shoshone.

OVERPASS GRADE SEPARATION AT TRACY OPENED TO TRAFFIC

By R. B. ANDERSON
Resident Engineer

IN THE presence of several hundred citizens and prominent city, State and Federal officials, Director Earl Lee Kelly of the Department of Public Works dedicated and opened to traffic on September 26th the overhead grade separation on State Highway No. 5 (U. S. No. 50) near the city of Tracy in San Joaquin County.

The ceremony marked the completion of another unit in the statewide grade separation program being financed with Federal funds through the U. S. Bureau of Public Roads for the elimination of some of the most dangerous grade crossings in California.

An elaborate program arranged by the Tracy Chamber of Commerce in collaboration with the Central Valley Council of the State Chamber started with the dedicatory ceremonies and ended with a dinner at the Tracy Inn attended by more than 250 civic leaders and officials.

MAIN TRAFFIC ARTERY

Following the cutting of the ribbon by Director Kelly hundreds of cars passed over the long concrete and steel structure which carries the main highway traffic artery between the San Francisco Bay region and San Joaquin Valley above the tracks of the Southern Pacific Railroad about one-half mile east of Tracy.

During the brief ceremonies held on the structure Director Kelly said that due to the heavy traffic on this highway and the number of accidents that had occurred at this particular crossing a grade separation had been under consideration by the Division of Highways for several years but funds had not been available for its construction.

Other speakers included Chairman Harry A. Hopkins of the California Highway Commission; District Engineer R. E. Pierce; Congressman Frank Buck; President C. P. Button of Tracy Chamber of Commerce; Mayor Fred Herzog of Tracy and Chairman C. E. Steinegul of San Joaquin County Board of Supervisors.

The cost of the entire project is approximately \$250,000. The con-

tractors were Lindgren & Swinerton and 58,000 man-hours of labor were employed during construction.

TOTAL LENGTH 3021 FEET

The structure is 1441 ft. in length, consisting of one 81-foot and two 48-foot plate girder spans, two 52-foot steel beam spans, and twenty-nine 40-foot reinforced girder spans, supported upon concrete column bents and caps. The footings of the bents are founded upon treated timber piling.

The approaches are paved with Portland cement concrete for a distance of 480 feet at each end of the structure. The entire length of the project is 3021 feet. A 34-foot roadway is provided on the structure and approaches with a 3-foot sidewalk on each side.

The four bents of the structure adjacent to and paralleling the railroad tracks are on a skew of 64 degrees from a normal to the center line of the highway. Collision walls were constructed between the columns of each of these bents, which give them a continuous face to a height of 7 feet above the top of the rails.

ROOM FOR EXTRA TRACK

Provision was made in the design of the structure for the construction of an additional track on each side of the existing double track railroad line.

At the official dinner in the evening, President Button of the Tracy Chamber of Commerce presided and Mr. Kelly was the principal speaker. He spoke informally, congratulating the citizens and organizations of the Tracy section on their cooperation, community spirit and enterprise and closed by making a plea for safe driving, declaring that 50 per cent of auto accidents are caused by 10 per cent of the drivers.

"We can build fine, safe highways," said Mr. Kelly, "but we can not cope with the accident toll unless there is more careful driving."

Congressman Buck told of the Federal appropriations for highway construction work that will be available for the fiscal year 1937-38.

Among those present introduced by the chairman were:

John F. Blakeley, chairman of the highway committee of the Central Valley Council of the State Chamber of Commerce; E. H. Kundert, president of the San Joaquin County Chamber of Commerce; Carl Knudsen, chairman of the highway committee of the San Joaquin Chamber of Commerce; Clarence A. Coggin, president of the Stockton Chamber of Commerce; A. M. Robertson, secretary-manager of the Stockton Chamber of Commerce; Charles Wherry, president of the Modesto Chamber of Commerce; Fred A. Tatton, manager of the Central Valley Council; C. E. Steinegul, chairman of the San Joaquin County Board of Supervisors; E. K. Finney, chairman of the Stanislaus County Board of Supervisors; Mayor Fred Herzog of Tracy; John B. Davidson, vice president of Lindgren & Swinerton, contractors for the overpass, and Carl Herziger, superintendent of construction for the contractors.

DEATH VALLEY ROADS RESTORED AFTER CLOUDBURSTS

(Continued from page 4)

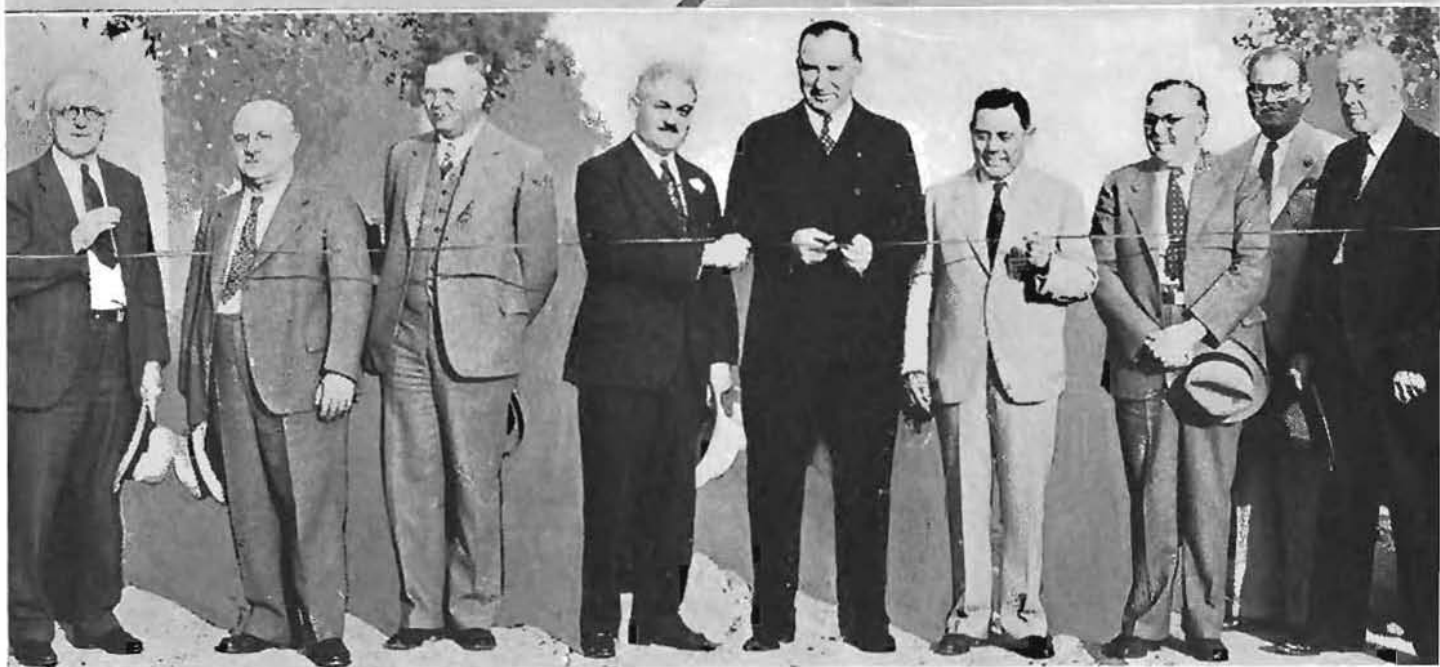
stratified rocks of many colors, particularly brilliant in the vicinity of Furnace Creek.

It is estimated that approximately 50,000 visitors to Death Valley used the State highway leading to points of interest last year.

The Division of Highways has been rushing the work of highway restoration in the hope that the opening of the winter tourist season in Death Valley will find Route 127 in the same excellent condition as prevailed before last summer's storms.

119,096 TOURISTS IN JULY

Figures just released show that 119,096 nonresident motor vehicle permits were issued in July 1936, as against 89,050 for the same month last year; an increase of 30.046 or 33.74 per cent. More than eighty-five per cent of the permits were issued at the eight border checking stations maintained by the department.



Scenes at dedication and official opening of overhead grade separation project near Tracy on State Highway 50, the main traffic artery between San Francisco Bay region and the San Joaquin Valley. At top—Overpass structure, 1441 feet long, spanning Southern Pacific railroad tracks. Old grade crossing shown in inset. Center—Parade of autos across new overpass after ribbon was cut. Structure provides a 34-foot roadway and two sidewalks. Bottom—Official party at ribbon cutting ceremony, left to right, C. B. Button, President Tracy Chamber of Commerce; Fred Herzog, Mayor of Tracy; District Engineer R. E. Pierce; Congressman Frank H. Buck; Director Earl Lee Kelly of Department of Public Works, wielding the scissors; Chairman Harry A. Hopkins of California Highway Commission; Clarence Coggins, President Stockton Chamber of Commerce; E. C. Stewart and A. M. Robertson.

Last Grapevine Canyon Unit Completed and Opened

By R. M. GILLIS
District Engineer

RECONSTRUCTION of the Grapevine Canyon Grade on the route through the Tehachapi Mountains between Los Angeles and Bakersfield became a reality with the opening to traffic on August 31 of the Lebec-Fort Tejon unit of this project, the last link in this major highway improvement.

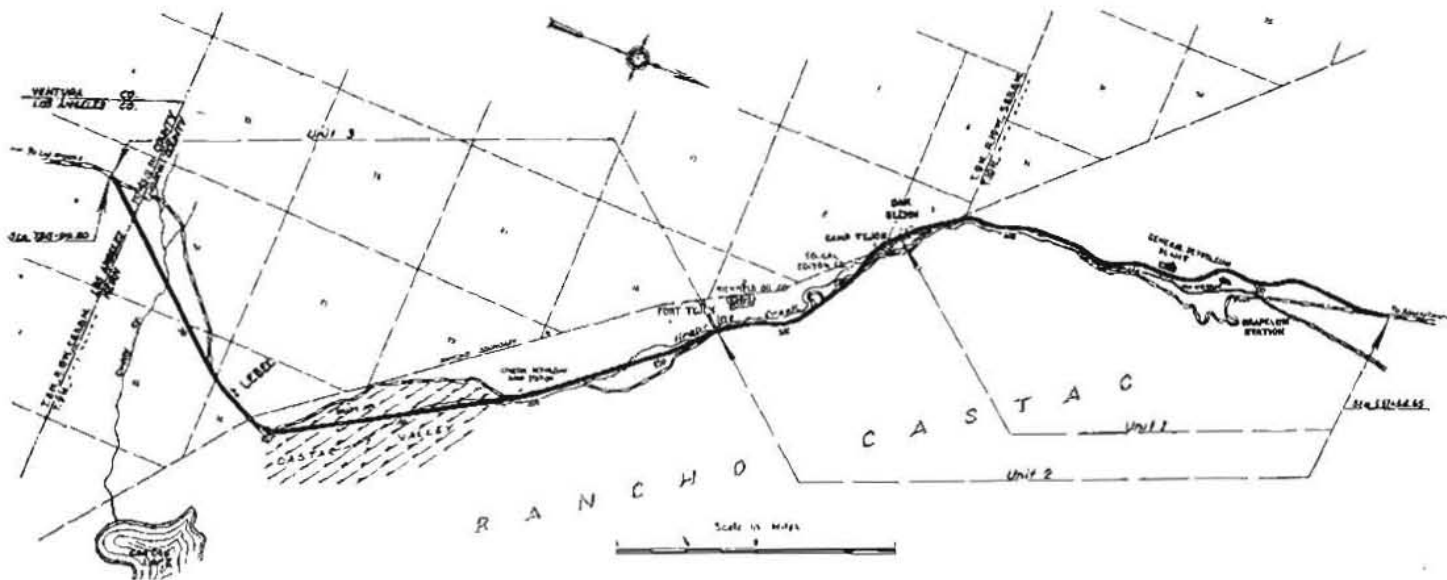
The Grapevine undertaking encompassed the continuance in Kern County of the Ridge Route Alternate improvement in Los Angeles County and its completion under three separate contracts calls attention to striking features of the project.

construction of these Grapevine Canyon units was the work of changing the channels of Grapevine and Cuddy creeks to control flood waters. While there were a few channel changes on Grapevine Creek on Units 1 and 2, extensive channel changes and diversion dykes on both Grapevine and Cuddy were required on Unit 3, just finished.

For the control of Grapevine Creek and its tributaries, almost a mile of channel changes and dykes were constructed. The creek was carried under the highway four times in box

Realignment of the route was complicated considerably by the fact that there were three gas lines, three oil lines and two power transmission lines all on private rights of way in the narrow confines of Grapevine Canyon. All of these were in conflict with the adopted location at many points. The moving of these various utility lines slowed up work as their removal had to be made during slack operation periods.

Completion of the Lebec-Fort Tejon unit gives to the Ridge Route Alternate a thirty-foot Portland cement concrete pavement from Los Angeles to the foot of



Construction of Unit 1 wiped out the tortuous hairpin curves on the climb up from the old Grapevine Station on the floor of the valley. Unit 2 did away with the aptly named Deadman's Curve, while Unit 3 eliminated the winding, rolling grade between Fort Tejon and the Los Angeles County line.

A large increase of traffic on the Ridge Route Alternate following the completion of this part of the route in Los Angeles County made an immediate widening of Unit No. 1 imperative.

An outstanding task accomplished by the Division of Highways in the

culverts, ranging in size from single 8-foot by 8-foot to double 8 by 8 boxes.

Cuddy Creek being in a cloudburst area, its control was of the greatest importance to prevent damage to and loss of the road in times of flood. This operation called for the construction of 6000 lineal feet of channel change and dykes, and a reinforced concrete bridge, consisting of four thirty-three foot spans.

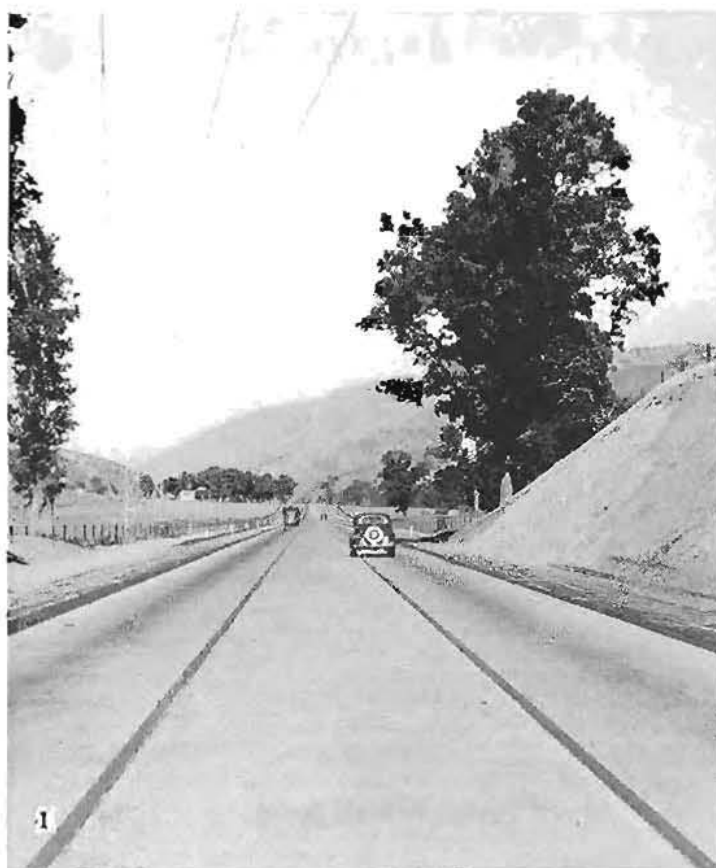
In addition to the two major flood control operations, there were changes made on minor water courses which aggregate well over half a mile.

Grapevine, about twenty-nine miles south of Bakersfield.

At the inception of the project, it was determined to grade a 46-foot roadway and place a 20-foot pavement. Unit 1 was so planned and constructed. Traffic, however, had increased so remarkably with the opening of the Ridge Route Alternate that Unit 2 provided for a 30-foot pavement on the new construction, and an additional 10-foot lane on Unit 1 as well. In view of traffic growth, Unit 3 was constructed as a three-lane pavement.

The Ridge Route Alternate, in Los

(Continued on page 23)



The narrow old road on the section of the Grapevine Canyon between Fort Tejon and Lobeo follows the contours of the hills with some steep grades and 119 sharp turns in 11.91 miles as shown in picture No. 2 while the new highway route pursues an almost straight course across country on new location as shown in Nos. 1, 3 and 4, providing three traffic lanes with only 23 easy curves for a distance of 10.71 miles.

Construction Progress and Pavement Records for 1935

By EARL WITHYCOMBE, Assistant Construction Engineer

IN THE construction of various types of pavements during 1935, the selection of materials for the immediate subgrade continued to be of primary importance. It is becoming general practice to set up a blanket course to be obtained from an outside source, for a project that is spotted with poor soils, rather than depend upon obtaining the material from within the roadway section by cross hauling.

Funds expended in such corrective measures should return attractive future dividends in increased service life of pavements.

PORTLAND CEMENT CONCRETE

Construction Records

The maximum average daily output of concrete pavement, reduced

to an 8-hour comparative basis, was placed on Contract 67VC13-57VC1-47CS16, in Los Angeles County, Redondo Beach to Wilmington, where the United Concrete Pipe Corporation placed 432.3 cubic yards per day, using one paver. L. R. McNeely was resident engineer, with H. D. Johnson as street assistant. The average daily output for the State during 1935 was 343.3 cubic yards, as compared to 402.0 cubic yards in 1934.

The reduction in average daily production in this and other types of paving during 1935 is no doubt due to the disruption of contractors' organizations owing to the necessity of absorbing local relief labor.

Strongest Concrete

The strongest concrete placed during 1935 was on the same contract,

67VC13, with an average compressive strength of 5751 pounds per square inch. The average strength for the State was 4965 pounds, compared to 4465 pounds in 1934.

Cement Control

The record for cement control was made on Contract 68XC13-58XC4, in San Bernardino County, Riverside Avenue to Colton, with an average variation of 0.36 per cent. B. G. Carroll was the contractor, and E. A. Bannister was resident engineer, with W. Crawford, street assistant. The average variation for the State was 0.93 per cent, compared to 0.9 per cent in 1934.

Surface Smoothness

The record for surface smoothness was obtained on Contract 67XC11 in Orange County, where the average roughness index per mile was 5.6 inches. The contractors were Sharp & Fellows, the resident engineer, F. R. Pracht, and street assistant, G. H. Lamb. The average roughness index for the State on concrete pavements was 9.3 inches per mile, compared to 8.3 inches during 1934.

The increase in roughness is the result of being obliged to operate with partially inexperienced crews.



Nojoqui Grade on U. S. 101, the Coast Highway between Las Cruces and Buellton in Santa Barbara County, paved with 20-foot Portland cement concrete.



Thirty-foot asphalt concrete pavement on the Rincon section of the Coast Highway between Ventura and Carpinteria.

CONSTRUCTION METHODS AND DESIGN

Finishing of concrete pavement was performed in the specified manner with the one exception of Contract 67VC20-47VC24 in Orange County, where a box type of drag finisher, perfected by assistant resident engineer H. G. Johnson, was used for the first time. This finisher eliminated all floating with the exception of the steel-shod cut float used as a final finisher.

The use of the diagonal float as a substitute for the longitudinal float has become universal.

Reinforcement

Edge reinforcement was practically abandoned in the 1935 season's work. The only steel used was a single $\frac{1}{2}$ " square deformed bar on each side of the transverse joint to support the dowels.

Joint Construction

At the instigation of the U. S. Bureau of Public Roads, $\frac{3}{4}$ " dowels placed on 14" centers were used at all designed transverse joints. Expansion joint intervals ranged from 60 feet to 100 feet with joint widths varying from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch. Weakened plane joint intervals ranged from 20 to 30 feet.

Curing

The majority of projects were cured with water, but colorless membrane was used as a curing medium to a very limited extent. A few cotton mats were purchased and used experimentally for curing purposes in District VII.

ASPHALT CONCRETE

Construction Records

The maximum daily output of asphalt concrete was obtained on Contract 67XC9, in Los Angeles and Orange counties, between Downey and Buena Park, with 810.7 tons per 8-hour day. United Concrete Pipe Corporation was the contractor, E. A. Parker the resident engineer, and K. D. Lewis, street assistant. The average daily output for the State was 520.5 tons, compared to 594.4 tons in 1934.

Pavement Quality

The highest average stability of surface mixture was 4209 pounds, obtained on Contract 611VC12, in San Diego County, Emerald Avenue to East City limits, El Cajon. The contractor was V. R. Dennis Const. Co., the resident engineer, L. E. Liston, and L. E. Crayne, street assistant. The average sta-

bility for the State was 2908 pounds compared to 2950 pounds in 1934.

The densest surface mixture was found on Contract 67XC17, in Los Angeles County, Prairie Avenue to Commercial Street, Inglewood, with a relative specific gravity of 98.3%. United Concrete Pipe Corporation was the contractor, L. R. McNeely, resident engineer, and E. D. Davis, street assistant. The State average was 95.0%, compared to 95.9% in 1934.

The smoothest surface was obtained on Contract 67XC23 in Los Angeles County, between Los Angeles Street and Artesia Avenue, with 11.1 inches per mile. The contractor was Oswald Brothers, the resident engineer, W. J. Calvin, and A. L. Hawkins, street assistant. The State average was 21.1 inches per mile, compared to 21.4 inches in 1934.

CONSTRUCTION METHODS

With the large increase in the number of asphalt concrete projects during 1935, due to resurfacing of existing concrete pavement, new personnel has been added to organizations connected with this type of construction, and considerable ex-

(Continued on page 23)

PORTLAND CEMENT CONCRETE PAVEMENT RECORDS FOR 1935

Location	Contractor	Resident Engineer	Street Assistant	Average cu. yds. laid per 8-hour day	Average strength, 28 days—lbs. per square inch	Per cent average daily variation in cement	Roughness index, inches per mile
North entrance to Redding	T. M. Morgan Co.	M. Frederickson	A. A. Bigelow	102.4	4311	0.98	10.5
Gaviota Creek—Nojoqui Creek	Hanrahan-Wilcox Corp.	M. H. Hubbs	H. J. Daggart	381.6	3598	.41	9.0
Ft. Tejon—1 mi. N. of Grapevine Sta.	Griffith Company	F. M. Reynolds	P. Coykendall	416.5	4754	.90	7.5
State St.—Mission St., Los Angeles	C. O. Sparks & Mundo Engr. Co.	M. L. Bauders	W. A. MacInnes	380.5	4580	.82	10.5
Monterey Park—Mountain View Road (per)	Oswald Brothers	C. P. Montgomery	J. Flaherty	162.9	4270	2.60	14.1
Redondo Beach—Wilmington	United Concrete Pipe Corp.	L. R. McNeely	H. D. Johnson	432.3	5751	.72	9.8
Winter Canyon—Las Flores Canyon	Los Angeles Paving Co.	E. L. Seitz	E. C. Daniel	357.6	4981	1.00	14.2
Loma Ave.—Hathaway Ave.	Sully-Miller Contr. Co.	G. E. Farnsworth	G. H. Lamb	256.1	5077	.98	7.8
Stanley Ave.—Loma Ave.	Sully-Miller Contr. Co.	W. D. Eaton	C. J. McCullough	168.5	4360	1.43	14.4
California Ave.—Colorado Ave.	J. L. McClain	C. N. Ainley	J. R. Rubey	357.7	5251	1.06	13.0
Pier Ave.—Sepulveda Blvd.	J. L. McClain	M. L. Bauders	E. C. Daniel	350.8	5687	0.80	8.8
0.4 mi. E. of Peralta School—Gypsum Cr.	Sharp & Fellows	F. R. Pracht	G. H. Lamb	364.5	5624	.70	6.6
Cypress St. S. City Limits, Laguna Beach	J. E. Haddock	M. H. Mitchell	H. G. Johnson	425.8	5580	.77	12.5
Anaheim—Miraflores	C. O. Sparks	F. B. Cressy	T. A. Roseberry	309.5	4771	.89	9.5
1 mi. E. of Beaumont—Whitewater	Matich Brothers	C. V. Kane	F. H. Sherry	229.5	4500	2.24	12.7
Alabama St.—State St., Redlands	Geo. Herz & Co.	C. V. Kane	W. Ford	349.4	4634	2.40	6.2
Riverside Ave.—Colton	B. G. Carroll	E. A. Bannister	W. Crawford	398.0	4980	.38	10.5
Averages				343.3	4965	0.93	9.3

ASPHALT CONCRETE PAVEMENT RECORDS FOR 1935

Location	Contractor	Resident Engineer	Street Assistant	Average tonnage laid per day	Average stability of surface mixtures in lbs.	Per cent average relative specific gravity of surface mix	Roughness index, inches per mile
Southerly Boundary—B St., Hayward	Jones & King	F. W. Montell	W. A. Marsh	325.0	2685	—	17.3
38th St. and Moss Ave., Market St.—Broadway	Peninsula Paving Co.	Geo. Mattis	W. A. Marsh	701.1	3000	92.1	15.7
Fell and 10th Sts., Van Ness Ave.—Bryant St.	Fay Improvement Co.	C. F. Price	G. L. Beckwith	263.1	2584	96.0	46.1
Bryant St., 5th St.—10th St.	A. J. Ralsch	L. G. Marshall	W. Thomas	377.4	2725	94.4	19.8
Potrero Ave., Division St.—Army St.	Union Paving Co.	L. G. Marshall	W. Thomas	487.2	2720	95.2	15.8
Harrison St., 5th St.—10th St.	A. J. Ralsch	L. G. Marshall	W. Thomas	518.0	3122	93.8	23.7
5th St., Harrison St.—Bryant St.	Chas. L. Harney	L. G. Marshall	W. Thomas	477.4	2900	98.0	29.1
Huron St.—San Pedro Ave., Daly City	Union Paving Co.	H. S. Payson	E. W. Harlinger	512.6	2775	93.0	21.9
Crystal Springs Road—Third Ave.	A. G. Ralsch	C. F. Price	B. Allison	285.9	3000	91.2	51.0
College Ave.—S. City Limits, Santa Rosa	Union Paving Co.	A. L. Gladney	C. E. Ginner	378.0	3170	91.7	44.3
Selma—Fowler Switch Canal	Union Paving Co.	F. W. Howard	C. D. Willoughby	775.5	3062	94.8	25.0
Hanford—Easterly Boundary	Southern California Roads Co.	C. F. Oliphant	W. M. Nett	517.8	2863	92.9	17.6
In Madera	Union Paving Co.	F. W. Howard	C. D. Willoughby	683.9	3360	92.4	27.9
In Tulare	Basich Brothers	H. B. LaForge	W. M. Nett	556.6	2950	94.7	27.0
Visalia—Merryman	Basich Brothers	J. W. Cole	P. A. Boulton	390.8	3100	93.5	28.3
Sunset Blvd., La Veta Ter. Santa Monica Blvd.	Griffith Company	G. E. Farnsworth	A. W. Carr	273.2	3191	96.0	49.3
Newhall Tunnel—Saugus	Oswald Brothers	E. T. Telford	R. Cooley	531.3	3012	95.7	18.5
Ocean Ave.—Lincoln Blvd., Santa Monica	Griffith Company	L. R. McNeely	J. Upham, J. R. Rubey	490.2	3332	95.0	14.9
Monterey Park—Mountain View Road	Oswald Brothers	C. P. Montgomery	R. M. Olson	427.3	3875	—	18.9
Atlantic Blvd.—New Ave., Monterey Park	Griffith Company	C. P. Montgomery	R. A. Collins	604.8	3150	95.9	20.8
W. City Limits, Los Angeles—Beverly Blvd.	Los Angeles Paving Co.	E. L. Seitz	A. W. Carr	640.4	3212	94.8	28.2
Los Angeles Pumping Plant—West Channel Rd.	Griffith Company	P. E. Ruplinger	V. A. Miller	241.3	3450	91.8	33.1
Redondo Beach—Wilmington	United Concrete Pipe Corp.	L. R. McNeely	A. W. Carr	624.0	2276	97.0	15.2
Alameda St.—E. City limits, Los Angeles	Oswald Brothers	H. B. Lindley	A. W. Carr	643.6	3117	96.5	19.8
W. City limits, Los Angeles—Wilmington Blvd.	Basich Brothers	F. B. Cressy	A. W. Carr	603.8	1935	93.4	19.4
Pacific Ave.—Olive Ave., Long Beach	Griffith Company	W. D. Eaton	E. C. Daniels	430.4	2627	93.3	47.0
Stanley Ave.—Loma Ave.	Sully-Miller Contr. Co.	W. D. Eaton	R. A. Collins	472.0	3508	92.8	13.4
Cerritos Ave., Los Angeles St.—Artesia Ave.	Oswald Brothers	W. J. Calvin	A. L. Hawkins	724.7	3203	96.8	11.1
State St.—Los Angeles Street	Sully-Miller Contr. Co.	W. J. Calvin	W. L. Hurd	635.2	2735	95.1	19.3
Prairie Ave.—Commercial St., Inglewood	United Concrete Pipe Corp.	L. R. McNeely	E. D. Davis	611.8	2800	98.3	14.9
Downey—Buena Park	United Concrete Pipe Corp.	E. A. Parker	K. D. Lewis	810.7	2770	95.4	15.8
Manchester Ave., Buena Park—Anaheim	C. O. Sparks	E. A. Parker	F. E. Bosch	419.0	2687	95.5	11.9
17th St., Anaheim—Fairhaven Ave.	Mundo Engineering Co.	H. B. Lindley	C. L. Aisthorpe	503.6	3150	97.3	16.2
Ventura—Mussel Shoal	Basich Brothers	W. I. Templeton	W. H. Hurd	712.1	3250	95.5	13.7
Seacliff—Benham	Basich Brothers	W. I. Templeton	A. W. Carr	512.1	3505	93.1	17.5
1 St., bet. W. and E. City Limits, Colton	Griffith Company	J. M. Hollister	W. Ford	499.9	2857	97.5	16.8
San Antonio Ave.—E. City Limits	C. O. Sparks	J. M. Hollister	B. Nelson	385.6	3130	97.8	38.8
South Broadway—R Street, Merced	Valley Paving & Const. Co.	G. R. Hubbard	E. W. Ray	237.2	3590	95.0	33.1
French Camp—Stockton	Heafey-Moore Co. & J. A. Casson	A. K. Nulty	R. H. Lapp	448.6	3200	94.8	24.5
At Fresno Ave grade separation, Stockton	Heafey-Moore Co.	A. K. Nulty	—	204.0	2700	92.6	45.0
Emerald Ave.—E. City limits, El Cajon	V. R. Dennis Const. Co.	L. E. Liston	L. E. Crayne	326.2	4209	95.6	28.9
Averages				520.5	2908	95.0	21.1

BITUMINOUS TREATED SURFACE RECORDS FOR 1935

Location	Contractor	Resident Engineer	Roughness, inches, per mile
Plant Mix			
3 mi. N. of Willows—Orland	Tiffany Construction Co.	J. D. Greene	31.9
South City Limits—Main St., Woodland	A. Teichert & Son	W. G. Remington	43.7
In Hayward and San Leandro	Lee J. Immel	F. W. Montell	45.3
Napa—Greenwood Corner	E. A. Forde	E. Carlstad	30.3
Thornton—Daly City	Peninsula Paving Co.	W. A. Rice	36.7
Coarse Gold—Oakhurst	A. Teichert & Son	J. W. Cole	47.9
1.5 mi. N. of Moreno—2.5 mi. W. of Beaumont	Mittry Brothers	H. O. Regan	24.2
1 mi. E. of Beaumont—Whitewater	Matich Brothers	C. V. Kane	59.9
Martell—Jackson	J. R. Reeves	A. K. Nulty	32.8
Through Fairfield	Pacific States Const. Co.	G. R. Hubbard	59.5
4 mi. W. of Shavers Summit—Shavers Summit	Oswald Brothers	R. C. Payne	35.2
Approaches Escondido Creek Bridge	Sharp & Fellows	W. T. Rhodes	21.7
Hill St., Wisconsin Ave.—8th St.	Southwest Paving Co.	W. T. Rhodes	21.8
Average			38.0

Road Mix			
Court St.—California St., Redding	Hemstreet & Bell	M. Frederickson	65.1
North entrance to Redding	T. M. Morgan Co.	M. Frederickson	34.9
South entrance to Red Bluff	Hemstreet & Bell	G. Sundman	91.0
At Ogleby Canyon	M. J. B. Construction Co.	W. G. Remington	38.8
Hollister Ave.—Painted Cave Road	Granfield, Farrar & Carlin	V. E. Pearson	14.8
Route 2—San Juan Bautista	A. J. Ralsch	J. C. Adams	23.2
West Boundary—2.4 mi. S. of Maricopa	C. W. Wood	W. T. Rhodes	22.0
4 streets in Maricopa	C. W. Wood	W. T. Rhodes	28.5
1 mi. E. of Taft—1 mi. W. of Taft	D. O. C. Const. Co. & R. D. Paterson	T. W. Voss	21.9
1.5 mi. S.—4 mi. E. of W. Waterworks Pump Sta.	Basich Brothers	H. B. LaForge	19.5
5.5 mi. E. of Llano—Camp Cajon	Geo. Herz & Co.	E. A. Bannister	46.2
1.8 mi. S.—0.9 mi. S. of Fish Springs School	Tiffany Construction Co.	A. P. McCarton	22.6
2 mi. S. of North Bdy.—North Bdy.	Tiffany Construction Co.	A. P. McCarton	22.2
1 mi. N. of Bodie Road—Point Ranch	Kennedy Construction Co.	A. P. McCarton	42.0
Centerville Bridge—Markleeville	Frederickson & Watson	A. L. Tschantz-Mahn	55.2
Nevada State Line—3.4 mi. N. of Woodfords	Frederickson & Watson	A. L. Tschantz-Mahn	40.3
0.8 mi. N. of Newman—0.2 mi. S. of Crow's Landing	Union Paving Co.	A. N. Lund	51.4
Indio—Shavers Summit	Frederickson & Watson	E. L. Evans	46.4
Lake Hodges Dam—Rancho Santa Fe	Sharp & Fellows	L. Evans	29.0
Through the Narrows	Dimmitt & Taylor	C. R. Hogberg	46.4
1 mi. E. of Barrett—Tecate Road	Daley Corporation	B. F. Moore	31.8
Average			37.0

Miscellaneous Types			
Oregon Mountain—Oregon State Line	E. B. Bishop	C. W. Backe	172.5
1 mi. E. of Upper Lake—Manila Ranch	Hemstreet & Bell	H. C. Amesbury	98.5
In Ukiah and Willits	E. A. Forde	W. W. Compton	132.5
2.8 mi. N. of Junction Rte. 21—State Line	Harms Brothers	L. H. Williams	80.0
Near Steamboat Slough	Lee J. Immel	J. P. Murphy	49.5
Ryde—1 mi. E. of Steamboat Slough	Lee J. Immel	J. D. Greene	48.0
3 mi. E. of Half Moon Bay—Summit	Mittry Brothers	H. A. Simard	37.8
Military Reservation—Cannon Street	V. R. Oennis Co.	J. M. Hodges	57.6
Average			102.0

BITUMINOUS TREATED SURFACES

While the plant-mix type of oiled surface predominated during 1934, in 1935 the road-mix type gained in popularity, about 84 miles being constructed against 38 miles of plant-mix. There were also constructed under supervision of the Construction Department about 24 miles of seal coat, 4.2 miles of re-tread, and 1.9 miles of bituminous macadam.

The record for surface smoothness for plant-mix type, 2.7 inches per mile, was made on Contract 611VC8, in San Diego County, approaches to Escondido Creek

Bridge; contractor, Sharp & Fellows, and resident engineer, W. T. Rhodes. The average roughness index for the State during 1935 was 36 inches, compared to 26.4 inches in 1934.

For road-mix type, the smoothest surface was obtained on Contract 65XC3-45CS3 with 14.8 inches per mile, in Santa Barbara County, Hollister Avenue to Painted Caves Road. Granfield, Farrar & Carlin were the contractors, with V. E. Pearson as resident engineer. The State average was 37 inches, compared to 27.3 inches in 1934. The average smoothness of the miscellaneous types was 102 inches per mile, compared to 47 inches in 1934.

GLAD TO BE CALLED

Willingness of Maintenance Department men to answer calls at any time is illustrated by a story told by Maintenance Engineer E. T. Scott. The Los Angeles sheriff's office phoned Scott that a truck had broken a hole through the deck of the Olive Street Bridge across the Los Angeles River on Route 167 (Atlantic Boulevard). To make sure that the situation was taken care of immediately, Scott telephoned the two foremen nearest the bridge. One was Foreman Louis Knecht.

"After I had given Knecht his instructions," Scott reports, "he thanked me for the assignment, saying he was glad to be called."

Highway Planting at Entrance to City of Redlands

By B. A. SWITZER
Assistant Engineer

A FEW months ago the State completed the construction of a new westerly entrance to the city of Redlands on Central Avenue. Upon the completion of the new entrance, the city beautification committee, cooperating with the city planning commission, requested landscaping of the right of way.

A study of the new entrance indicated that the principal problems would be to screen an old city dump, certain industrial sections, including railroad yards, gas storage tanks, and other commercial and industrial structures.

It was decided to plant Sydney wattle (*Acacia longifolia*) along the edge of the borrow pit, interplanting with sugar gums (*Eucalyptus corymbosa*). This same planting was continued along the railroad on the north side of the highway. Opposite the railroad yards and east of the borrow pit the eucalyptus were interplanted with Australian tea trees (*Leptospermum laevigatum*) which tend to soften and obscure unsightly industrial buildings and structures.

ROADSIDE PARK DEVELOPED

Near the westerly city limits and across from the dump was a wide three-cornered area. This area has been planted to serve as a small roadside park. Large and flourishing pepper trees already growing there were taken advantage of and the landscaping was designed about them. In this area it was found possible to plant California Holly (toyon), whose deep greens are set off by brilliant red berries during the holiday seasons. As a contrast to the toyon, desert trees (Palo Verde) were planted. The name of this tree is Spanish for "Green Stick" evidently given it because of its scarcity of leaves and because the limbs and twigs are a pale green. But in spite of its lack of foliage, during the Spring it presents a beautiful show of yellow blooms. Additional trees planted for

Increase in Car Owners Greatest in Golden State

California last year led all states in the greatest numerical gains made in car ownership and also had the greatest density of car ownership with a ratio of one car for every 2.62 persons, according to reported figures in a nationwide study of automobile registration totals.

Ownership of motor vehicles in California increased 145,246 cars in 1935. Ohio was second with an increase of 98,786. New York continued to head the list as to the aggregate number of motor vehicles registered, with a total of 2,330,962, but was closely followed by this state with a total of 2,280,485. Nevada boasts one car for every 2.84 persons.

At the close of last year there were 26,221,052 motor vehicles registered in the United States, or one for every 4.86 persons. This was an increase of five per cent over the preceding year and, with the exceptions of 1929 and 1930, was the highest in motoring history.

shade will some day make this an attractive and pleasant place.

The part of the highway in the business section of the city was planted to Cocos palms (*Cocos plumosa*). This is a continuation of a palm planting which has already been extensively carried out throughout the business section of Redlands.

BRILLIANT GROUND COVER

On the easterly end of the project, the highway passes through a semi-residential area; on this section, palm planting was continued, but they were interplanted with the purple-leaved cherry plum (*Prunus pissardi*), with a ground cover of Mesembryanthemum Croceum.

The ground cover is already making a brilliant show of green to the passing motorists and exciting comment from those who note the red and bronze colored flowers.

Funds for the project were allotted by the Federal government from the one per cent of Federal funds assigned to highway beautification and roadside improvement.

The beautification of the new Central Avenue entrance to Redlands will be in keeping with the many other tree- and palm-lined avenues throughout the city.

Gov. Merriam to Open Bay Bridge Nov. 12th

(Continued from page 2)

total length of 8500 feet of interlacing viaduct, and sixteen separate grade crossings.

It is really a twin structure of roads for incoming and outgoing bridge traffic.

Large illuminated signs "To Oakland," "To Alameda," "To Berkeley," et cetera, will seek to guide the motorists to their proper designations, although the structure is so logical that about all that is necessary is to "follow one's nose."

FREMONT PARKING AREA

Motorists entering or leaving San Francisco over the bridge may proceed from the Fifth Street Plaza, near the heart of the shopping district, up the mile-long main approach. Or they may leave the bridge over a curving ramp just west of the San Francisco anchorage, Clementina at First Street in lower downtown San Francisco. They may enter the bridge from this district over another curving ramp from Fremont at Harrison.

Trucks and buses enter and leave over an approach entering the lower deck from a point on Harrison Street between Sterling and Rincon or at Folsom and Essex Streets.

To further facilitate the traffic problem on the San Francisco side, parking areas will be provided for the use of those using the bridge under the main approach. The space is sufficient to accommodate from 1500 to 2000 automobiles. The parking space will be paved and fenced.

Motorists desiring to park here will indicate their intention as they pay their fare at the toll gate and will be given a parking ticket.

OBSOLETE, NOT ABSOLUTE

"My word is law, I'll have you know"—
The husband thus discoursed.
"I know it," sweetly said his wife—
"A law that's not enforced."

"He was kicked out of school for cheating!"

"How come?"

"He was caught counting his ribs in a physiology exam."—Gargyle.

Friant Dam Plans Approved-- New Impetus Given Water Project

IMPEtus was given to work on the Central Valley Project on September 22 when the Water Project Authority of California, at a meeting attended by John C. Page, Acting U. S. Commissioner of Reclamation, and other Federal officials, approved the general plans for Friant Dam at Friant, important unit of the Central Valley Project.

Encouragement was given to Director of Public Works Earl Lee Kelly and State Engineer Edward Hyatt by Mr. Page, who said that while the question of future appropriations for the project rests with Congress the official attitude in Washington at present is exceedingly friendly, and he expressed his confidence that the great undertaking will be pressed to completion.

Mr. Page was accompanied to the meeting, which was held in Sacramento, by E. K. Burlew, Administrative Assistant, United States Department of Interior; Richard J. Coffey, District Counsel, Bureau of Reclamation, and Walker R. Young, construction engineer in charge of the Central Valley Project.

BUREAU PLANS APPROVED

Prior to coming to Sacramento, Commissioner Page, on a tour of western reclamation projects, was met at Redding by State Engineer Hyatt, Mr. Young and State Senator John B. McColl of Redding and with them inspected the Kennett Dam site and the proposed Pit River crossing combination highway and railroad bridge. The party inspected the Orland Project on September 21 and then came to the Capital City for a conference with the Water Project Authority.

At this meeting the Authority approved the general drawing submitted by the U. S. Bureau of Reclamation entitled "Plans—Elevation and Sections"—of Friant Dam, in accordance with the contract entered into between the United States and the Authority on March 25, 1936, requiring the approval by the Authority of all general plans of project works.

Words of Praise for the Central Valleys Project

John C. Page, acting reclamation commissioner, has commented that the Central Valleys Project will benefit more people and do more good than any other project undertaken by the federal government.

The statement is not an exaggeration.

The project is not alone a plan to produce more power, although power is a most important item. The water that will flow through the turbines at Kennett Dam will only have started on its long course of usefulness. Coming down the river it will be scouring out out sand and silt and restoring navigation conditions which have not existed for fifty years.

In the delta it will shove back salt water that gradually has been encroaching on some of the richest lands in the United States.

Finally, it will be pumped up the San Joaquin River to be spread into irrigation canals and ditches and provide moisture for growing crops.

The project's usefulness will not end with the disposition of the waters to be stored at Kennett Dam. The Friant Dam and the system of canals that will carry water to a half million acres in Tulare County will save a vast area from reverting to desert.

It is difficult to conceive of a like project the benefits of which would reach so many people.

California is gratified that a federal official of such high standing as Page has given recognition to these benefits.—*Sacramento Bee.*

The dam is to be located about one mile up stream from the town of Friant at a stream bed elevation of 308 feet above sea level.

\$15,000,000 FUND AVAILABLE

During a general discussion of the problems confronting the Central Valley Project, it was stated by the commissioner that approximately \$15,000,000 are now available for work on the undertaking.

President Roosevelt, on September 10, 1935, allocated \$20,000,000 to the Bureau of Reclamation from the Emergency Relief Appropriation of 1935, for the purpose of starting work on the project. On November 16, 1935, by executive order, this appropriation was reduced to \$15,000,000 and, owing to the need for drought relief funds in the Middle West, later was reduced to \$8,100,000.

The last Congress, in the First Deficiency Bill, appropriated \$6,900,000 for continuance of the project, to remain available until June 30, 1937, with the provision that \$6,000,000 be used for construction of Friant Reservoir and irrigation facilities therefrom in the San Joaquin Basin.

FURTHER APPROPRIATIONS EXPECTED

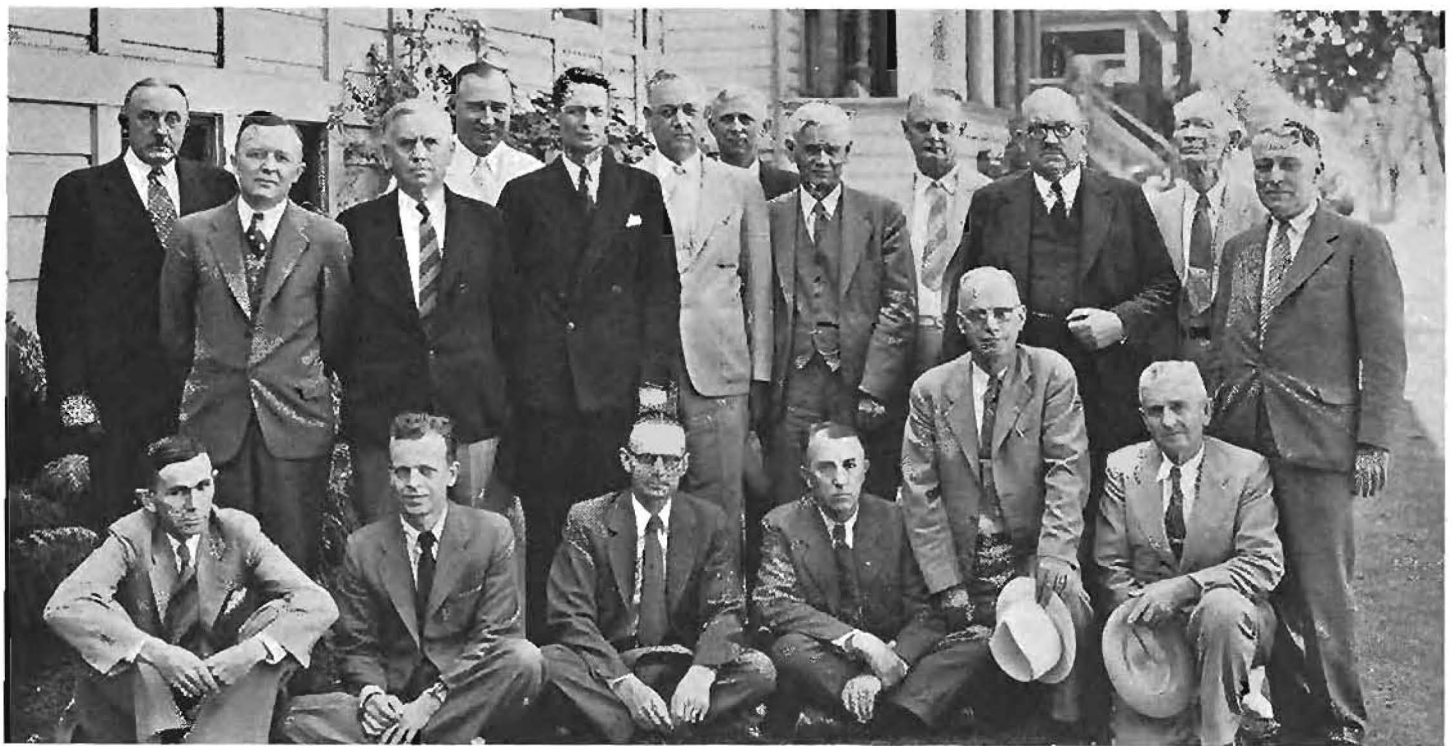
There is apparently available now, therefore, \$15,000,000 for the construction of the project, which is estimated to cost \$170,000,000. It is assumed that the funds advanced will be reimbursable under the terms of the Reclamation Act by repayments without interest over a period of 40 years.

Under House Resolution 6732, adopted by the last Congress, a special direct contribution of \$12,000,000 by the Federal government to the cost of Kennett Reservoir was authorized in accordance with the recommendation of the Chief of Engineers of the United States Army, which was contained in House Rivers and Harbors Document No. 35, Seventy-third Congress, second session. It is expected that continuing congressional appropriations will be made to complete the project as rapidly as the construction program necessitates.

The site of Friant Dam is in Fresno and Madera counties, about 20 miles



Friant Dam Site on the San Joaquin River 20 Miles East of the
 DOTTED LINE SHOWS WHERE STRUCTURE WILL EXTEND ACROSS



Official group at State Water Project Authority Meeting in Sacramento. Front row, left to right: Edward Hyatt, State Engineer; Spencer Burroughs, Attorney; Walker Young, Construction Engineer, U. S. Bureau of Reclamation; Harry Barnes, J. A. Secara, and T. S. Coffee, Madera District. Rear Row: A. B. Tarpey, Fresno District; R. J. Coffey, U. S. Reclamation Bureau; U. S. Webb, Attorney General; Public Works Director Earl Lee Kelly; John C. Page, Acting Commissioner, U. S. Reclamation Bureau; A. E. Stockburger, Director of Finance; Chas. Kaupke and W. T. Boone, Kings River Association; J. R. Fauver, Tulare Association; M. T. Farmer and L. B. Hayhurst, Fresno District; C. C. Carleton, Chief, Contracts and Rights of Way.

east of the city of Madera and 20 miles northerly from the city of Fresno.

The dam will provide primarily for the conservation and regulation of the tributary run-off of the San Joaquin

River and diversion of San Joaquin River water to the upper San Joaquin Valley to meet the needs therein of



City of Madera and 20 Miles Northerly From the City of Fresno

STREAM BED WITH LENGTH OF 3400 FEET AND HEIGHT OF 260 FEET



Sketch showing location of Friant Dam and distribution system by Madera and Friant-Kern canals

imported water supplies now necessary.

A concrete gravity type structure straight in plan, across the stream channel, is proposed, with a maximum height above stream bed of 260 feet and a crest length of 3400 feet.

An overflow spillway is provided at the center. Spillway controls consist of three drum gates 18 feet high by 100 feet long, having an estimated

combined discharging capacity of 90,000 second-feet.

A set of irrigation outlets is to be located on each side of the river: outlets for the Madera Canal on the north side at an elevation of 446 feet with discharging capacity of 1500 second-feet; and outlets for the Friant-Kern Canal on the south side at an elevation of 464 feet with discharging capacity of 3500 second-feet.

Outlets are also provided near the stream bed to be utilized for release of lower San Joaquin crop land water until the San Joaquin pumping system is constructed and a complete exchange of supplies effected. A regulatory flood control outlet is provided for by the construction of six outlets through the dam near stream bed.

At flow line elevation of 563 feet, the reservoir will have a gross stor-

(Continued on page 29)

Westerly Approach to Capital City Reconstructed as Multi-lane Arterial

By E. J. L. PETERSON, Assistant District Office Engineer

WIDENING and resurfacing of the section of the State highway between the Yolo causeway and the M Street Bridge, west of Sacramento, approximately 3½ miles in length, is expected to be completed before the end of this month. Paving was finished on October 7.

This project improves the heavy traffic routes U. S. 40 and U. S. 99, west, and provides a three-lane highway for the westerly approach to Sacramento. The easterly terminus of the project is about one-half mile west of the beautiful Tower Bridge recently completed over the Sacramento River. The westerly terminus of the project is the Yolo causeway, which was widened to 42 feet in 1933 to accommodate the increasing traffic on this route.

During construction maintenance of public traffic was a serious concern on this heavily traveled road. No practicable detours were available and provision had to be made for routing a continuous stream of automobiles and trucks—that at times reached an hourly total of between 400 and 500, 10 per cent of which were trucks—within the right of way. A temporary road, alongside the existing pavement, was graded and surfaced 3 inches thick and to a width of 22 feet to adequately care for the heavy units and dense volume of traffic. The route of the temporary road was crossed from side to side to avoid destruction of some very fine trees and improved driveways.

TEMPORARY SURFACE SALVAGED

As full sections of the asphaltic concrete pavement were completed public traffic was routed over it. The temporary road surfacing is to be salvaged and used in the construction of 4-foot borders on each side of the new pavement and for surfacing road approaches.

This project required approximately 51,000 cubic yards of imported hor-

row. The grading required about 22,000 cubic yards of unclassified material. The paving will require 23,500 tons of asphaltic concrete.

Landscaping of the approach to the Tower Bridge has been recently completed and planting is proposed on this project to augment the landscaping at the bridge, thereby providing a beautiful approach to the Capital City.

The reconstruction of this highway will represent an expenditure of approximately \$168,000. It is being financed from the State highway funds and Federal funds under control of the United States Bureau of Public Roads. J. D. Greene is the Resident Engineer for the State. A Teichert & Son, Inc., is the contractor.

OLD ROAD BUILT IN 1916

The old road, constructed in 1916, consisted of an 18-foot by 5-inch Portland cement concrete pavement with an oiled surface. Oil-mixed borders 2 feet wide were subsequently constructed on each side of the pavement. The pavement had reached the stage of obsolescence and was requiring increasingly costly maintenance. Several sections which had been blanketed to provide a suitable surface for traffic were beginning to show signs of disintegration.

Funds for the reconstruction of this section were provided in the budgets for the 87th-88th fiscal years and the contract was started on June 10.

The new road is graded to the right of way lines and provides for a 56-foot roadbed with a 40-foot asphaltic concrete pavement for a length of approximately one-quarter mile at the westerly end of the project; the remainder of the project being on a 46-foot roadbed with asphaltic concrete pavement 30 feet wide.

The position of the new pavement with respect to the right of way lines and the crown of the pavement is such that development of the 30-foot pavement to a 40-foot

width can be readily effected. This has been achieved by establishing the construction center line in the middle of the 100-foot right of way and constructing a 20-foot width of pavement on one side of the construction center line and a 10-foot width on the other with the pavement sloping transversely from the center line.

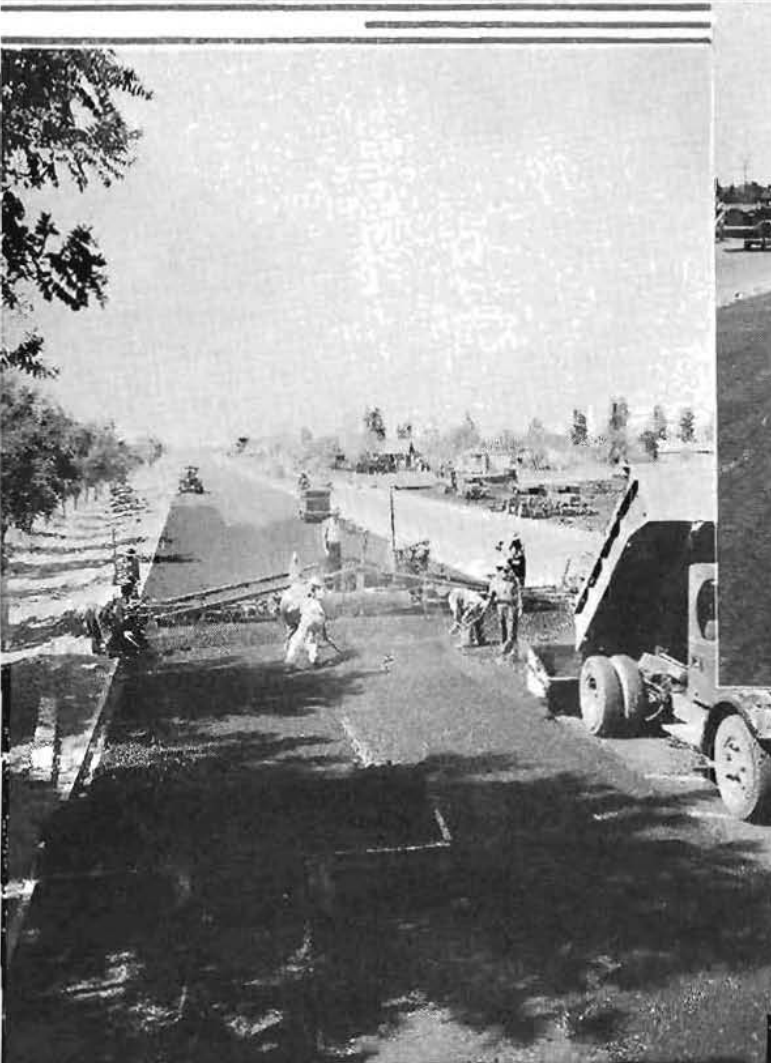
The 40-foot pavement was constructed in two 20-foot widths and the 30-foot pavement was constructed full width. Where the pavement is on new subgrade the typical section is standard with 0.6 of a foot thickness at the center, increased to 0.75 of a foot thickness at the edges. Where the old pavement is being resurfaced the minimum thickness over the existing pavement is 0.33 of a foot.

SELECTED MATERIAL BLANKET

The major portion of the native soil on this project consisted chiefly of adobe having a high shrinkage value which made it necessary to provide a subgrade treatment of selected material to form a cushion course between the new pavement and the native material. At other locations where the existing pavement was badly broken, a cushion course was also placed between the new pavement and the old pavement. The selected material blanket underneath the new pavement was constructed approximately 1 foot in thickness and extends for the full width of the roadbed.

Over the greater portion of the project the old Portland cement concrete pavement was utilized as a base for the new asphaltic concrete pavement. The subgrade was specially treated at the edge bordering the Portland cement concrete pavement base where the asphaltic concrete pavement was designed to be placed over and adjacent to the base. The earth subgrade was first given the standard treatment after which, at the edges of the old concrete base, a

(Continued on page 22)



Reconstruction of the Sacramento-San Francisco arterial between the Tower Bridge entrance to the Capital City and Yolo Causeway will be completed this month. Widening and surfacing to provide three and four lanes paved with asphaltic concrete is progressing rapidly while heavy traffic is enabled to proceed over a surfaced by-pass within the right of way. Upper right picture shows narrow old road.

All-color Motion Picture of Highways Has Premiere

ACCLAIMED by movie critics as one of the most beautiful all-color motion picture travelogues ever produced, "California Highways," depicting the progress of road building in this State from the days of the Franciscan mission padres to the present time, had its premiere showing at the Alhambra Theater in Sacramento on the night of October 6 before two capacity audiences.

Conceived as a means of informing the people of California of the splendid system of State highways that has been made possible by the bond issues they have voted and the gas tax which they willingly pay, the picture was made by the Division of Highways with the approval and co-operation of Governor Frank F. Merriam and Earl Lee Kelly, Director of the Department of Public Works.

Even before its first showing, word of its production had spread afar and numerous requests for its display in other states have been received by the Department of Public Works, so that in addition to its educational and informative value to Californians it already has become an asset of great potential possibilities in advertising to the world the scenic and highway attractions of California.

TWO PREMIERE SHOWINGS

Two large audiences, the first composed of State, county, municipal and highway officials and invited guests from every section of California and the second of the public generally, which was admitted free, witnessed the premiere.

Photographed in colors, the beauty spots of the Golden State which may be seen from State highways make a film of unrivaled charm. The scenes pictured range from rugged mountain regions to the desert country of southeastern California and present a variety of topography unequalled in this country.

The picture does not overlook the industries and progress in town and city building made possible by the State highways so vividly portrayed in color.

To an attentive audience, Director Kelly explained the purpose of the film and added that he wanted to publicly express his appreciation of the work done by three men of his department who had made possible the taking of the picture—Deputy Director of Public Works Edward J. Neron, J. G. Standley, Principal Assistant Engineer, and Merritt Nickerson, Department Photographer.

WORTH WHILE, SAYS GOVERNOR

The introduction of other speakers he delegated to Pat West, Hollywood movie comedian, who acted as master of ceremonies. Brief talks commending the State officials responsible for the production of "California Highways" were made by Mayor Arthur Ferguson of Sacramento and A. J. Affleck, president of the Sacramento Chamber of Commerce. Carroll H. Dunning, of the Dunning Color Process Co. of Hollywood, who directed the picture, extolled the scenic attractions of the State as shown in the film and urged all Californians to take advantage of their highways to visit the places pictured. Following remarks by C. H. Purcell, State Highway Engineer, Governor Merriam was introduced.

The Governor said the question had been raised whether it had been worth while to devote four months to the making of the picture.

"It was worth while," he said, "because this film will show Californians what becomes of the gas taxes they pay. It was worth while because this film will attract thousands of tourists to this State. It was worth while because many states already have asked that we loan the picture to them for showing. Decidedly, it was worth while to make this picture."

Hollywood sent three of its most promising young movie actresses to the premiere in the persons of Judith Barrett, Muriel Robert and Thelma Byron. They received the plaudits of the audiences.

SCENES TOTAL 355

The film consists of 355 separate scenes, the first of which reproduces conditions confronting the Franciscan friars when, under the zealous guidance of Father Junipero Serra, they began their treks from San Diego north to San Francisco over footpaths and trails that were to become in time El Camino Real—the King's Highway.

A Franciscan monk and his burro are shown plodding their weary way over El Camino Real, primitive beginning of what today is one of the greatest highway systems in the world—California's vast network of paved highways.

The padres passed on, leaving their missions behind them, and their places were taken by the miners and pioneer settlers of '49, and the inevitable stage coach and methods of travel in those turbulent times are depicted by the film.

Then follow the horse and buggy days and horse-drawn vehicles traverse dusty California roads. Progress triumphs again and the first automobile makes its appearance. By 1910, more than 36,000 cars were using dirt roads, which steadily were getting worse while rapid strides were being made in the manufacture of improved and faster automobiles. These roads the picture shows.

EXPANDED WITH GAS TAX

And then in 1910 came the awakening of Californians to the need of good highways and they voted the first highway bond issue, following this action by approving of a second bond issue. In 1923 came the imposition by the legislature of the first gas tax and the expansion of the State highway system begun in 1912 is graphically shown by the film.

The producers of the picture traveled over 11,000 of the 14,000 miles of the State Highway System. Beginning at Donner Summit, the film takes a viewing audience in imagination throughout the length and breadth of California.

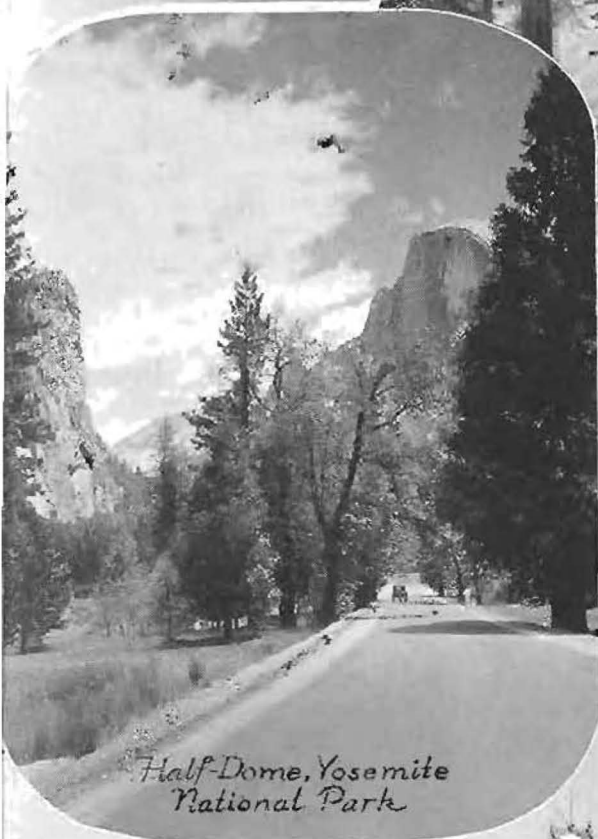
There are beautiful views of Donner Lake and the massive bridge of architectural beauty which the Divi-

(Continued on page 22)

SCENES from "CALIFORNIA HIGHWAYS" *Motion Picture in Color*



*Redwood Highway, Humboldt
County*



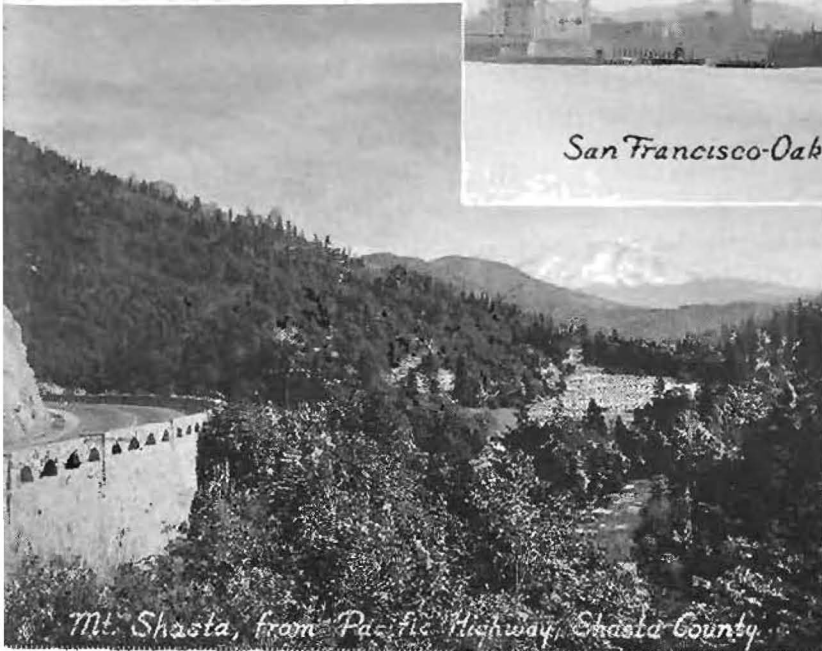
*Half-Dome, Yosemite
National Park*



San Francisco-Oakland Bay Bridge



*Bixby Arch, Carmel San Simeon
Highway, Monterey*



Mt. Shasta, from Pacific Highway, Shasta County



Rincon Overpass on Coast Highway, Ventura County

From Mountains to Desert by Highway Picture Travelogue

(Continued from page 20)

sion of Highways erected over a great gorge nearby; of Lake Tahoe, Emerald Bay and Lake Topaz; of Mono Lake and Leevining Grade, to only eastern approach to Yosemite. Maintenance crews of the Division of Highways are shown with their rotary plows and equipment clearing mountain roads of thousands of tons of snow.

From snow-capped ranges the film suddenly transports one to the desert lands in the south where the Yucca flower and Joshua trees provide a startling contrast. Here the desert sands have been conquered by engineers of the Division of Highways and excellent roads attract tourists even in the middle of summer.

GRADE CROSSING IMPROVEMENT

Then the film changes to show what has been done to eliminate hazardous railroad crossings by the construction of underpasses and overpasses and quite suddenly whisks one to Lake Arrowhead, high in the mountains of San Bernardino. Here, as at Lake Tahoe and Donner Lake, Nature's lavish colors lend enchantment to the picture.

Modern sections of highways with the various road signs for the protection of motor and pedestrian traffic are shown in scenes taken at Santa Ana, Santa Monica, Los Angeles and other southern California points, where automobile traffic is exceedingly heavy. There are shots of Hollywood Boulevard, the beaches and beach highways of Los Angeles, San Diego Bay, across which lies Coronado, famous playground, all of which reveal how the modern highways of the State handle the congested traffic that uses them.

The oil fields of Los Angeles, which supply the new product for the extraction of the gasoline on which is levied the tax that provides Californians with their highways are shown. There are scenes on the new Ridge Route, in Altamont Pass, in Sequoia National Park, in Kings River Can-

yon, where a new State highway is being built; in the Merced River Canyon and in Yosemite National Park.

HISTORIC MOTHER LODE SCENES

The Yosemite scenes are particularly beautiful. From Yosemite it is a natural jump to the Mother Lode country, to the cabins of Mark Twain and Bret Harte and to the old mining towns through which now run paved State roads.

Scenes along the highways in the Mt. Lassen, Mt. Shasta and Shasta River gorge country are delightful color studies.

The film devotes much attention to the bridges built by the State on its highways and shows the new Sixteenth Street Bridge and Tower Bridge in Sacramento; the Eel River span on the Smith River near the State's northern boundary; and the bridges along the route of the Feather River Highway now approaching completion, only a few of California's thirty-five hundred highway bridges.

The Redwood Empire highways, Clear Lake and the highways of Lake County, the San Francisco Bay cut-off and the Sky Line Boulevard from San Francisco south; the Dumbarton underpass, the incomparable coast line of Monterey County with Carmel Mission, Del Monte, the Bixby Arch, highest bridge structure on the State Highway System; Cuesta Grade in San Luis Obispo County and many other equally interesting scenes go to make up a fascinating picture travelogue.

Numerous shots of wild flowers along California highways and in fields bordering them are shown together with examples of highway beautification work performed by the Division of Highways in the way of flowers, shrubbery and trees planted alongside State roadways, and drinking fountains erected at suitable points for the use of thirsty motorists.

Excellent views of the San Fran-

cisco-Oakland Bay Bridge and the Golden Gate Bridge are shown. The magnitude of the former structure, largest of its kind in the world, is revealed in the film, which takes in the major points of interest on this great undertaking, which will be dedicated and thrown open for automobile traffic on November 12.

"California Highways" is indeed a remarkable picture. The Department of Public Works plans to have it widely shown in this and other states so that Californians may become better acquainted with their priceless highway possessions and in order that the entire country may come to know more of the scenic beauties of the Golden State and their easy accessibility made possible by the most modern of highways.

CAPITAL CITY APPROACH

(Continued from page 18)

layer of coarse rock 6 inches wide and 2½ feet thick was spread and rolled into the earth subgrade until it became flush with the designed subgrade section.

This edge is a critical point because adequate scarifying, blading, mixing and rolling of the subgrade at the edges are almost impossible to achieve. This treatment tightened the subgrade at this critical point and increased the bearing power so that it was more nearly equal to that on the remaining portion of the subgrade.

AUTO REGISTRATIONS IN

CALIFORNIA TOTAL 2,352,771

An increase of nearly eight per cent in automobiles registered in California on August 31, 1935, as compared with the same period in 1935, is shown in a report by Ray Ingels, Director of the State Motor Vehicle Department, to Governor Frank F. Merriam.

Registration of all classes of vehicles increased 179,707 during this period, as compared with the same period last year, total registration being 2,352,771 as against 2,173,064 in August, 1935.

Licenses issued to dealers for this period also gained, dealers' trailer licenses leading the way with an increase of 66.67 per cent. caused, officials believe, by the camp trailer vogue.

"I see where Jones is advertising a new kind of underwear without any buttons."
"I've been wearing that kind for years."

Freddie Frosh: "Darling, I love you as no one ever loved before."

College Widow: "Humph! I can't see any difference."

Construction and Pavement Records for 1935

(Continued from page 11)

perimenting was carried on to improve old established methods.

One of the most difficult tasks in resurfacing jobs is to spread the proper amount of asphalt mixture in front of the finishing machine to insure that it is not at times carrying an excess which has to be carried ahead by hand, or that it is running with a deficiency of mixture which again calls for hand work.

Two types of spreading devices were developed for this purpose. One consisted of V-type drag with blades adjustable for height, built by Basich Bros. The other device was a screw conveyor type of spreader with screws reversing at the center and conveying toward each side form with an adjustable strike-off behind the screw designed by the United Concrete Pipe Corporation.

Both of these devices ride on the side forms and are operated just in advance of the finishing machine. The mixture is dumped through a spreader box riding on the base or tail-gated from a truck in front of the spreaders. These spreaders reduce to a minimum the amount of hand labor required in front of the finishing machine and eliminate entirely the necessity of tramping over the uncompressed mixture.

Finishing machines are now being manufactured in California and in many respects they are superior to any machine manufactured in the east.

The three-axle roller has been given a trial on a number of projects this season and the results have been very gratifying. This type of roller will not produce the riding surface demanded in California without the addition of supplemental cross-rolling with a tandem roller, but they do reduce the amount of this cross-rolling to the extent that one tandem can handle the normal day's run.

The specifications have been strengthened in regard to plan operation, tending to improve control

Highway Project and Bridge Bring Coast Nearer Capital

Completion of the new bay bridge and of three highway projects will bring downtown San Francisco within two hours of Sacramento.

The realization of this dream of rapid transit is but one example of the tremendous undertakings, now commonplace, in the fight to save a few minutes' time in travel. The projects referred to cost millions; only about 11 miles is saved in the distance between the bay cities and the state capital. But that 11 miles taken from the schedules of thousands and hundreds of thousands of travelers, commercial operators, business men, state officials, will pay for itself many times over. This is the theory of modern road building.

The highway projects which will shorten the distance between Sacramento and San Francisco include the straightening of the road west of Vacaville, the American canyon cut-off and the new East Shore highway, which will route the traveler away from several towns and much of the congested district of Oakland. A campaign of straightening the existing curves along these highways will later be entered upon, and this is expected to clip off another four miles at least.

The bridge and the highways will be completed by November 12. That will be a red letter day in travel annals. It will mark the inauguration of great new conveniences in transportation between here and the coast.—*Sacramento Union*.

of mixtures. Dust collectors are a requirement. Driers must be fed by blending belts and fine aggregate fed to the belt by means of automatic feeders, mixers must be equipped with timers, and driers must be provided with pyrometers to aid in heat control.

Last Grapevine Canyon Unit Completed

(Continued from page 8)

Angeles County, was completed in October, 1933. Traffic counts on this road from 1932 to 1936 indicate the importance of this highway and reveal the steadily increasing use of it by motorists. Here are the counts:

	Sunday	Monday
July, 1932.....	2641	2317
July, 1933.....	2857	2316
July, 1934.....	4177	2976
July, 1935.....	5099	3872
July, 1936.....	4786	4699

The extent of the improvements resulting from reconstruction of the three units from the Los Angeles County line to the foot of the Grapevine is shown by the following comparison of the old and new work:

	Old Road	New Road
Maximum Grade.....	6.0%	6.0%
Adverse Grade.....	2153 lin. ft.	650 lin. ft.
Number of Curves.....	119	23
Minimum Radius Curve	80' (2 curves)	1000' (2 curves)
Maximum Radius Curve	2000'	10000'
Total Curvature in degrees.....	4300° 30'	576° 56'
Curvature in Equivalent Full Circles.....	11.9	1.6
Length.....	11.91 mi.	10.71 mi.

Distance Reduced by the Improvement is..... 1.2 mi.

The cost of the entire project, the three units of which were constructed by one contractor, Griffith Co., was approximately \$1,270,000, summarized as follows:

	Cost Moving Utilities	Construction Cost	Total Cost
Unit 1.....	\$90,014.06	\$404,740.97	\$494,755.03
Unit 2.....	47,472.38	371,751.92	419,224.30
Unit 3.....	26,565.38	328,837.56	355,402.94
Totals.....	\$164,051.82	\$1,105,330.45	\$1,269,382.27

To these costs are to be added a small amount, relatively insignificant, for the highly important items of traffic striping and directional signs, which will bring the total to slightly more than \$1,270,000 for 10.71 miles, or \$118,600 per mile.

A young lady who had never seen a game of baseball attended one with her escort. "Isn't that pitcher grand?" she said. "He hits their bats no matter how they hold them!"

LAST DESERT LINK OF U. S. 91 IN CALIFORNIA UNDER CONSTRUCTION

By E. Q. SULLIVAN
District Engineer

WORK is under way on the last link of U. S. Highway No. 91 to be constructed by the Division of Highways between Los Angeles and the Nevada state line.

This route, leading to the city of Las Vegas in Nevada, has carried a heavy burden of traffic during and since the erection of the Boulder Dam.

The section under construction extends over rough desert country between Mountain Pass and the Nevada line, a distance of 15.4 miles and constitutes the largest and longest contract let in District VIII during the present biennium. The George Pol-

lock Company are the contractors and the cost will approximate \$285,203.

It is a region subject to sudden and extreme weather disturbances both summer and winter. Mountain Pass is a picturesque desert pass guarded on the north by rugged Clark Mountain that rises to an altitude of 7903 feet.

SUMMER CLOUDBURSTS FREQUENT

In the summer, hardly a week passes without spectacular thunder storms striking against the sides of the mountain with cloudbursts as the frequent results of such storms.

In winter it is the one spot between southern California and Nevada where heavy desert snowstorms are

almost certain to occur, making it necessary to have a snow plow stationed at Mountain Pass to keep the road open.

After a snowstorm the temperature drops so low that surface ice forms and the maintenance crew is obliged to keep equipment on hand to "sand" the road so that traffic can proceed with safety.

The present contract work starts at Mountain Pass at an elevation of 4700 feet. The old road winds down the eastern slope with many sharp turns to the desert floor where it meanders around the edge of Ivan-

pah Dry Lake, dipping abruptly into washes and climbing over hummocks.

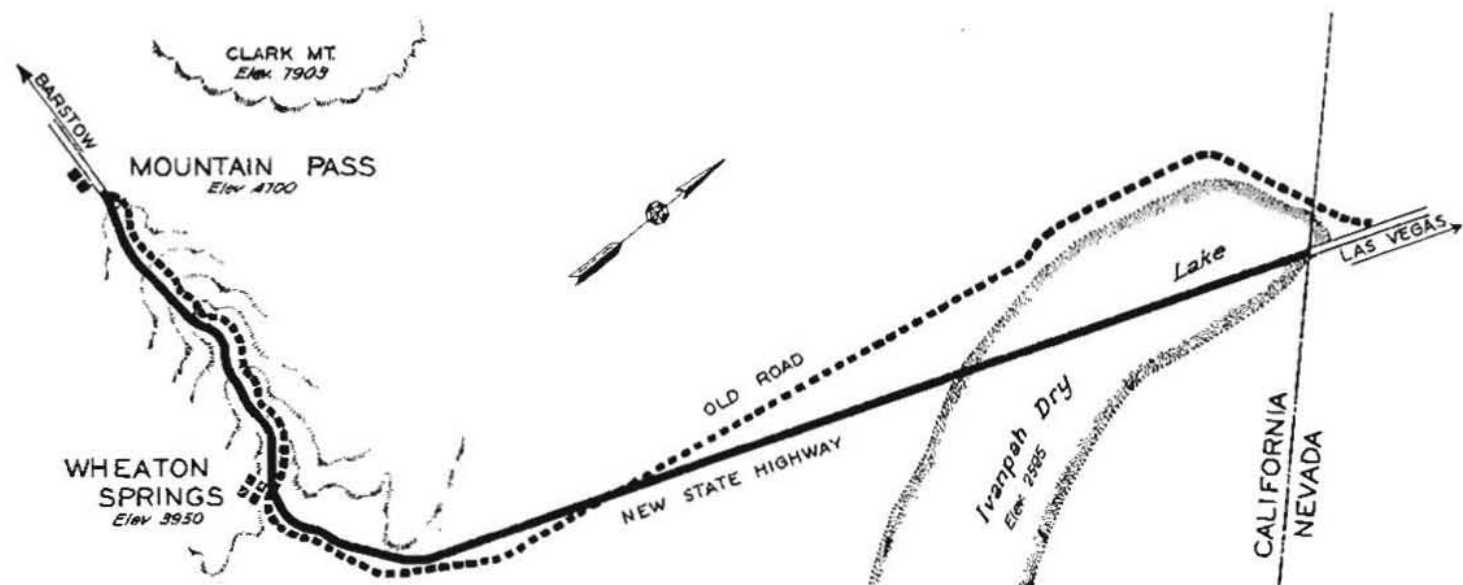
In summer cloudbursts interrupt the heavy traffic from Los Angeles to Boulder Dam by piling sand and gravel across this section of the old road where it dips into the washes. Snow and ice have made it equally difficult to keep the road safe for traffic in winter.

Ivanpah Dry Lake is a very large expanse of perfectly flat, hard-baked mud in dry weather, tempting the motorist to speed straight across it instead of following the road around its borders. Winter storms transform it into a small inland sea, the shallow muddy waters often obliterating the road and compelling wide detours.

The new road will follow a high standard of alignment eliminating sharp turns on Mountain Pass, spanning the washes on bridges and proceeding straight across Ivanpah Dry Lake on an embankment four miles long.

This roadway embankment will be covered with coarse, rocky material taken from a deposit on the north shore of the lake to make a good, substantial foundation for the oil-treated pavement.

Culverts will be placed under the roadway at 1000-foot intervals to allow the water to cross from one



side of the lake to the other. This precaution is necessary because storms often break on one side of this queer lake, causing floods to pour into and across it, when the opposite side has received no rain. Were culverts not provided the embankment would act as a dam and the lake would rise behind the roadway and finally overflow it.

The contractors are pushing the work on this dry lake section at top speed and expect to complete the road across it before the winter storms begin.

"You mean to say you work 16 hours a day. I wouldn't think of doing that."

"I wouldn't either; it was the boss' idea."



The existing road on the Mountain Pass grade of U. S. 91 occasionally flooded by cloudburst waters is being relocated under contract now under way.



Ivanpah Dry Lake, appearing as white expanse extending nearly to foot of mountain, will be crossed by new road on an embankment four miles long.

21,000 RECKLESS DRIVERS PENALIZED BY JUDGES

Reckless, malicious, and careless drivers of motor vehicles during the

month of August in California did not succeed so well in evading legal consequences, for over 21,000 of them were called before judges in all coun-

ties except Alpine and Colusa, and received penalties in fines and jail sentences as a result of the vigilance of motor vehicle officers.

CALWA OVERPASS NEAR FRESNO OPENED WITH OFFICIAL CEREMONIES

DEDICATION of the Calwa Overpass on U. S. 99, the Golden State Highway, four miles south of Fresno, on Monday, October 5, signaled the elimination of one of the most dangerous highway grade crossings in California.

The overpass carries the highway over North Avenue and across The Atchison, Topeka and Santa Fe main line where high board fences and buildings shut off the view of approaching trains. Twelve trains daily pass this point during normal train movements, but during the fruit season in September and October as many as seventy to eighty trains a day run over the crossing or switch back and forth across it.

Traffic counts taken by the Division of Highways revealed that more than 8000 motor vehicles daily used the old crossing. At times cars were backed up as much as a mile on either side of the intersection as a result of train blockades.

OFFICIALS WHO PARTICIPATED

The ceremonies attending the formal opening of the overpass were sponsored by the Fresno County Chamber of Commerce and participated in by Federal, State, county and city officials and representatives of neighboring communities. Governor Frank F. Merriam and Director of Public Works Earl Lee Kelly were represented by Edward J. Neron, Deputy Director of the Department of Public Works. Harry A. Hopkins, chairman of the California Highway Commission, officiated at the cutting of the ribbon which formally opened the overpass.

The Division of Highways was represented by R. M. Gillis, District Engineer, Fresno, and Earl Cummings, District Director of the WPA, took part in the dedication for the Federal government, which cooperated in the project.

Mayors of three cities, Z. S. Leymel of Fresno, G. Paul Vincent of Selma, and A. L. Lindquist of Kingsburg, together with P. H. McMurtry, chairman of the Fresno Board of Supervisors, and David E. Peckinpah, president of the Fresno Cham-

'State's Highway Construction on Most Modern Basis'

Examples of this State's highway policy of straightening, re-locating, and grade reducing are legion. All these put the road as nearly as can now be foreseen on its permanent location—the place where it will stay until the characteristics of motor transportation change materially.

Also, they all evince the most modern ideas of construction. In fact, all highway construction throughout the State system is on a highly modern basis. The engineers consider the amount and quality of traffic which will use the road, the foundation materials available, difficulties of producing a proper grade and other conditions, and then decide on the type and weight of construction, the exact routing and other phases of the project which will be most economical in the long run. This requires nice balancing between the cost of construction and the cost of operating the vehicles which will use the route, but the constant effort is to build the road that will cost the least to construct, maintain and use.

Motor Land.

ber of Commerce, participated in the program.

Two little girls from the Calwa Kindergarten, Eleanor Olson and Dorothy Wilson, proudly cut the ribbon stretching across the highway and Calwa Overpass was officially opened to the public.

A double line of automobiles from Fresno moved south over the bridge and another double line from Fowler, Selma and Kingsburg moved north, while the Fresno State College Band played.

Harry A. Hopkins, the principal speaker, told of the nation-wide grade separation program and praised the Federal government for making it possible. Other speakers cited the value of the improvement and the importance of railroad grade separations in the highway safety program.

"If one life is saved by the erection of this bridge, the cost will have been justified," said Frank G. Everts, chairman of the roads committee of the Fresno County Chamber of Commerce, who was master of ceremonies.

Following the dedication, R. R. Bishop of Long Beach, the general contractor on this project, and his superintendent, R. B. Wood, were hosts at a dinner attended by 75 participants in the celebration.

PLANNED IN 1929

Preliminary surveys for the overpass were made in May, 1929, but lack of funds prevented actual construction work until 1935 when California's allotment from the Works Program grade crossing fund became available. Bids were called for on December 4, 1935, and the contract was awarded in January, 1936.

The overpass is 2000 feet long, including the approaches. The reinforced concrete structure is 1740 feet in length with a roadway 44 feet wide, providing ample space for four lanes of traffic, and has a cantilever sidewalk on each side. With approaches made on 5 per cent grades with connecting vertical curves, motorists are assured a sight distance of 600 feet.

Twenty-eight 40-foot reinforced concrete girder spans, five skewed spans adjacent to the railroad span, and one central skewed steel span over the railroad comprise the superstructure.

The completed project cost approximately \$210,000, largely financed with Federal funds.

"Is this the laundry? Well, you sent me a half a dozen very old handkerchiefs instead of my shirt."

"Them ain't handkerchiefs. That is your shirt."



Calwa Overpass on U. S. 99 near Fresno officially opened October 6 has a roadway width of 44 feet between sidewalk curbs providing space for four lanes of traffic crossing the main line of Atchson, Topeka and Santa Fe railroad where peak traffic count is 70 to 80 trains and 8000 automobiles daily.

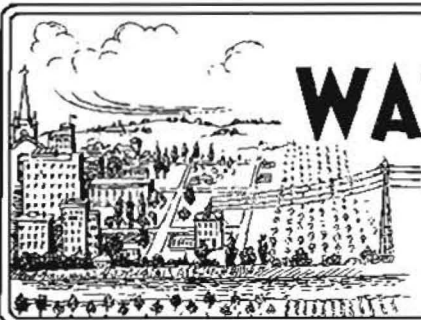
Another view of the overpass structure showing surfaced de-tour that accommodated a large volume of heavy and light traffic avoiding any interruption of construction activities while the project was under way.



The reinforced concrete structure is 1740 feet in length with a cantilever sidewalk on each side of the roadway. The total length of this overhead grade separation including the approaches is 2000 feet.



The official group, left to right: P. H. McMurtry, chairman Fresno Supervisors; Z. S. Leymel, Mayor; R. B. Wood, Bishop Co. superintendent; Deputy Director of Public Works Ed Neron; President Peckinpah, Fresno Chamber of Commerce; Mayor Lindquist, Kingsburg; Norman Asp; Mayor Vincent, Selma; Chairman Hopkins, Highway Commission; F. G. Everts, Fresno; Resident Engineer M. E. Whitney; W. P. Jennings; George Hamm; Contractor R. R. Bishop; Dorothy Wilson and Eleanor Olsen.



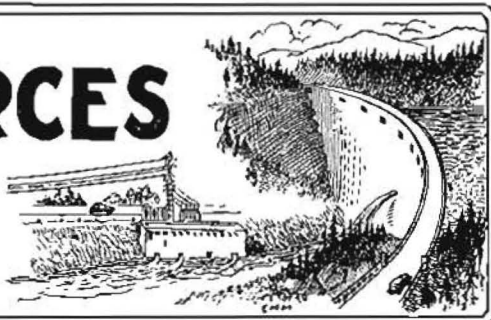
DIVISION OF WATER RESOURCES

OFFICIAL REPORT

FOR THE MONTH OF

September, 1936

EDWARD HYATT, State Engineer



Preparations for snow survey work during the coming winter have been made during the past month. Three new survey courses have been laid out on the slopes of the most westerly divide of the Sierra mountain range in Tulare County with the assistance of rangers of the Sequoia National Forest.

News of the irrigation districts, flood control and reclamation work, dam applications and approvals, topographic mapping and other activities of the Division of Water Resources during the past month will be found in the following report of the State Engineer:

IRRIGATION DISTRICTS

Among the matters referred to the State Engineer during the past month for investigation and report were several petitions filed with the District Securities Commission for approval of expenditures in connection with construction or repair of irrigation systems.

The plans of West Side Irrigation District to improve the drainage conditions were inspected. The work contemplates expenditure of about \$3,500 for a booster pump and excavation of 22,000 cubic yards in lateral drains.

A project of Fair Oaks District for replacing a section of its old supply line with 3000 feet of 30-inch steel, soil proofed pipe was investigated. The proposed work will be carried out with the assistance of WPA labor.

Petition of Grenada Irrigation District for approval of expenditure of \$1,800 on its main pipe line, was the subject of a report. The district plans to replace 750 feet of 48-inch wood stave pipe which has deteriorated with age.

Fallbrook Irrigation District requested an investigation regarding feasibility of \$500,000 bond issue for construction of irrigation works and purchase of water bearing lands.

Citrus Heights Irrigation District has applied to the RFC for loan of \$91,200 to refinance outstanding indebtedness of \$152,000.

El Camino Irrigation District has accepted a refinancing plan to be carried out with private funds. This is the only district that has recently attempted readjustment of financial difficulties without seeking federal aid.

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento Flood Control Project

Routine maintenance work has been carried on by a small regular crew. In the repair of the Davis bridge in the Sutter Bypass, five new trestle bents have been driven, using creosoted piles and timber. It is expected that the three new drainage pumping plants, costing approximately \$250,000, constructed by the California Debris Commission, will be fully completed and turned over for operation by October 15th.

Relief Labor Work

Clearing of the Feather River channel above Marysville has continued with a relief labor crew of about 30 men. It is expected that the relief labor available will show a rapid increase during the Fall months.

Bank Protection Program

Preparations are being rushed to commence work on maintenance bank protection program by the State and the United States under agreement of June, 1932. Surveys and preparation of plans are progressing rapidly, and it is expected that actual construction will be commenced within ten days.

Sacramento Flood Control Project

Work on incidental construction on levee rights of way has continued employing approximately 30 men. New work to be undertaken shortly consists of the construction of fences, the pumping plant on Keller ranch on the west side of Sacramento River above Colusa, and a concrete retaining wall on the Sartain and Terrill Ranch on the east side.

Flood Measurements and Gages

Actual operation of the flood gages maintained by this Division will commence November 1st. Preliminary work is under way preparing and putting stations in good condition and improving certain installations. This division is installing a new automatic recorder station at junction of Sacramento and Yolo Bypasses. The War Department is preparing to install similar gages on Sacramento River at Ord's Ferry and at Sacramento Weir, and on the Feather River at Shanghai Bend.

SUPERVISION OF DAMS

Application for approval of plans and

specifications for the Crater Lake Dam in Alpine County was filed on August 26, 1936. The dam is to be an earth fill 30 feet in height and storing 320 acre-feet of water for irrigation.

Application was filed September 12, 1936, for approval of plans and specifications for the Mowich Dam in Modoc County. The dam is to be an earth fill 11 feet in height storing 175 acre-feet of water for irrigation.

Application for approval of plans for alteration of the Thomas Briles Dam in Modoc County was filed August 20, 1936. The work consists of construction of an adequate spillway.

Application for approval of plans for repair of the Rye Grass Swale Dam in Modoc County was filed August 20, 1936. The work consists of widening the dam, enlarging the spillway and increasing the height to provide adequate wasting capacity and freeboard. This application was approved on September 2, 1936.

Application was filed August 21, 1936, for approval of plans for repair of the Green Valley Lake Dam in San Bernardino County. This application was approved September 1, 1936.

Application was filed September 15, 1936, for approval of plans for alterations to the Lake Spaulding Dam, consisting of buttress repairs on the small auxiliary dam.

Application for the approval of plans and specifications for construction of Putah Creek Dam of the city of Winters in Yolo County was approved August 28, 1936.

Application for the approval of plans and specifications for alteration of Pine Creek Dam in Modoc County was approved August 22, 1936.

Work which was discontinued during the spring and summer on Coyote Dam of the Santa Clara Valley Water Conservation District has been resumed. The work remaining to be done consists principally of concreting the spillway channel and placing rockfill on the two faces of the dam.

Excavation work at the site of Mad River Dam for the city of Eureka is nearing completion.

Construction of the West Valley Dam of South Fork Irrigation District in Modoc County has been completed.

Pouring of concrete on the enlargement of O'Shaughnessy Dam of the city of San Francisco in Yosemite National Park is progressing.

Work is under way at both Grant Lake and Long Valley dams of the city of Los Angeles.

Work is progressing satisfactorily at Cajalco Dam of the Metropolitan Water District.

Work of the Los Angeles County Flood Control District at San Gabriel Dam Num-

ber One and at Eaton Wash is proceeding satisfactorily.

Construction of Sheffield Dam of the city of Santa Barbara is practically completed and work is well along on Mono Dam.

Repairs to Lake Hodges Dam of the city of San Diego are approximately 50 per cent complete.

Construction of Judson Reservoir Dam in San Diego County is proceeding satisfactorily.

The usual inspections for maintenance and operation are being made in addition to those necessary on the construction and repair work.

WATER RIGHTS

Supervision of Appropriation of Water

Thirty-two applications to appropriate water were received during August, 12 were denied and 19 approved. Six permits were revoked during the month and rights under 5 permits were confirmed by issuance of license.

Since our last report projects have been inspected preliminary to the issuance of license, or orders revoking the permits, in Calaveras, Amador, Alpine, El Dorado, Placer, Nevada, Yuba, Butte, Sutter, Colusa, Yolo and Sacramento counties, which concludes the field work for this season.

Water Distribution

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

SACRAMENTO - SAN JOAQUIN WATER SUPERVISION

During the past month, the activities of this office have been that of carrying on the routine detail so that a report may be made at the end of the irrigation season which will show the amount of water diverted from and returned to streams in the Sacramento-San Joaquin territory. It will also show the amount of land irrigated; the flow in stream channels and the rate of advance and retreat of salinity in the Delta.

The stream flow has passed the minimum stage and is now showing a marked increase. Two factors contribute to this—lessened pumping and rice field drainage. Most of the rice is now being drained and in some areas harvesting has actively begun. Orchard and beans are the main crops being irrigated at present.

The salinity at the Delta stations has remained about constant during the month.

CALIFORNIA COOPERATIVE SNOW SURVEYS

During the past month, partial arrangements have been made for the snow survey

work to be done next winter. All agencies in the southern end of the San Joaquin Valley have been contacted, inventories checked over, and missing items of equipment replaced.

Three new snow survey courses were laid out on the slopes of the most westerly divide of the Sierra in Tulare County. One of these, on the headwaters of Deer Creek, is located at Dead Horse Meadow, above California Hot Springs and the other two on the headwaters of Tule River are at Quaking Aspen and the Old Enterprise Mill site, respectively, the former being above Camp Nelson and the latter in the vicinity of Balch Park.

Rangers of the Sequoia National Forest assisted in the laying out of these courses and arrangements have been made for the men of the Forest Service to conduct the necessary winter surveys at these locations, as well as at several other stations soon to be established in the mountains farther north.

TOPOGRAPHIC MAPPING

Progress was made during August on field work in connection with the Tobias Peak Quadrangle in Tulare and Kern counties and the Downieville No. 1 Quadrangle in Plumas and Sierra counties under the general cooperative mapping program.

Advance sheets of Acton, Boneyard Canyon, Camp Baldy, Camp Bonita, Camp Rincon, Cima Mesa, La Verne and Ewy Canyon, Mescal Creek and Valyermo Quadrangles in Los Angeles County are now available. This work was done by the United States Geological Survey in cooperation with the county of Los Angeles.

WATER RESOURCES

South Coastal Basin Investigation

Good progress has been made in the field and office on the South Coastal Basin Investigation during the past month.

Water supplies of four proposed prison sites in southern California have been investigated and reported upon.

San Luis Rey River—San Diego County

The investigation and survey of San Luis Rey River in San Diego County for the purpose of securing data and preparing plans for flood control, rectification of river channels and conservation and utilization of the waters of the San Luis Rey made by the Division of Water Resources in cooperation with WPA, city of Oceanside, county of San Diego and Carlsbad Mutual Water Company have been completed and a report on the results of the survey is now in course of preparation.

Central Valley Project

The United States Bureau of Reclamation is exerting every effort to complete at an early date the preparation of plans necessary for starting construction on the initial units of the project. Preliminary investigations and exploration work have been carried on during the month at Kennett and Friant dam sites and surveys continued along the Contra Costa Conduit and Friant-Kern Canal by the bureau. Appraisers are in the field evaluating lands and necessary rights of way to be acquired. The Division of Water Resources is conducting surveys and making

Friant Dam Lake Will Be 6 Miles Long By 2 Wide

(Continued from page 17)

age capacity of 450,000 acre-feet and will flood an area of 4510 acres, having a length of six miles and a maximum width of about two miles.

Following the meeting with the Water Project Authority, Mr. Page and a large number of guests were entertained at a dinner at the Sutter Club given in honor of the acting commissioner by the Sacramento Chamber of Commerce.

On Wednesday, September 23, Mr. Page, accompanied by Mr. Young, the State Engineer, and members of his staff, drove by automobile to Contra Costa County for an inspection of the Contra Costa County conduit and the district to be served therefrom. Lunch was served at Los Medanos Hotel, Pittsburg, attended by local representatives. The party then drove to Fresno by the West Side Highway, inspecting irrigation developments and the proposed San Joaquin pumping system of the project, arriving for dinner at the Fresno Hotel that evening.

Thursday morning, September 24, the party inspected Friant Dam and Friant-Kern Canal of the Friant Division of the project, and also Pine Flat Reservoir. The Fresno Chamber of Commerce arranged a luncheon at the Californian Hotel, after which the party proceeded to Navelencia, Orange Cove, and thence to Lindsay for dinner and a night meeting with local representatives at the Mount Whitney Hotel.

Friday morning, September 25, the acting commissioner and his party boarded a train en route for Los Angeles.

MILITARY ROAD MILEAGE 69,823

Highways classified by the War Department as "military priority roads" have reached a total of 69,823 miles. An official map issued by the department gives first priority designation to 23,429 miles of highway rated of prime importance from the viewpoint of national defense. Second priority roads total 32,230 miles, and third priority roads 14,164 miles.

investigations in the San Joaquin Valley preliminary to the acquisition of properties and water rights necessary for the construction of the project.

Highway Bids and Awards for September, 1936

COLUSA COUNTY—Between 5.4 miles west of Williams and Williams, about 5.4 miles to be widened, surfaced with gravel and seal coat applied. District III, Route 15, Section E. Clausen-Embleton Co., Albany, \$34,460; J. A. Casson, Hayward, \$32,455; Union Paving Co., San Francisco, \$43,524; Fredericksen & Westbrook, Lower Lake, \$34,555. Contract awarded to Hanrahan Co., San Francisco, \$29,933.

FRESNO COUNTY—Between Biola Junction and Herndon, 3.3 miles to be graded and paved with asphalt concrete and Portland cement concrete. District VI, Route 4, Section C. United Concrete Pipe Corp., Los Angeles, \$215,034. Hanrahan Co., San Francisco, \$204,898. Griffith Co., Los Angeles, \$237,233. Contract awarded to Union Paving Co., San Francisco, \$196,576.

FRESNO COUNTY—Bridge across Lone Tree Channel, 12.8 miles east of Fresno. District VI, Route 41, Section S. Mid State Const. Co., Fresno, \$6,435. Contract awarded to R. R. Bishop, Long Beach, \$6,085.

FRESNO COUNTY—Between south city limits of Fresno and Floral Avenue, about 8.8 miles crusher run base borders to be constructed, nonskid surface treatment to existing pavement and portion of borders and road-mix surface treatment to shoulders. District VI, Route 125, Section B. Hanrahan Company, San Francisco, \$52,512. Contract awarded to L. A. Brisco, Arroyo Grande, \$46,938.40.

GLENN COUNTY—Between Artois and Orland, about 7.4 miles graded and paved with asphalt concrete. District III, Route 7, Sections B, C. J. A. Casson, Hayward, \$199,113; David H. Ryan, San Diego, \$191,358. Contract awarded to Union Paving Co., San Francisco, \$186,585.

HUMBOLDT COUNTY—Repairs to existing bridge across South Fork Trinity River one mile west of Salyer. District I, Route 20, Section D. E. S. Mackin, Eureka, \$2,934. Contract awarded to Mercer-Fraser Co., Eureka, \$2,745.

IMPERIAL COUNTY—Liquid asphalt furnished and applied to shoulders and road-sides, 32 miles, between Trifolium Canal and Imperial-Riverside county line. District XI, Route 26, Section B C D E. Morgan Bros., \$13,132; Oilfields Trucking Co., \$16,752; Paulsen & March, \$15,756; Gilmore Oil Co., \$15,163. Contract awarded to Square Oil Company, Los Angeles, \$13,026.

IMPERIAL COUNTY—7.6 miles gravel surfacing and liquid asphalt furnished and applied, one mile east of Heber and three miles east of Imperial. District XI, Route 201, Section A, E. V. R. Dennis Constr. Co., \$20,953. Contract awarded to R. E. Hazard & Sons, San Diego, \$14,865.

INYO COUNTY—Between 2 miles east of Lone Pine and 1 mile east of Owens River, about 1.7 miles grading and road mix surfacing and timber bridge. District IX, Route 127, Section C. A. S. Vinnell Co., Los Angeles, \$24,980; Young & Son Co., Ltd., Berkeley, \$32,475. Contract awarded to Basich Bros., Torrance, \$23,314.80.

INYO COUNTY—Between 1.2 miles north of Lone Pine and Big Pine, Portions, 13.6 miles surfaced with plant-mix and penetration oil treatment of shoulders. District IX, Route 23, Sections L, M, A, B, C. A. S. Vinnell Co., Los Angeles, \$72,686; C. O. Sparks & Mundo Eng. Co., Los Angeles, \$72,686. Contract awarded to Oswald Bros., Los Angeles, \$64,896.20.

INYO COUNTY—Place Imported borrow

and apply road-mix treatment and seal coat to about 0.9 mile, Little Lake to Cartago. District IX, Route 23, Sections G, J. Contract awarded to A. S. Vinnell Co., Los Angeles, \$10,225.

INYO COUNTY—Between 2.5 miles and 0.7 mile south of Inyo-Mono county line, 1.7 miles graded and road-mix surface treatment and seal coat applied. District IX, Route 23, Section F. A. S. Vinnell Co., Los Angeles, \$22,529. Contract awarded to Basich Bros., Torrance, \$29,210.70.

INYO COUNTY—Between 4 miles and 1.7 miles S. of Flat Springs, about 2.3 miles to be graded, surfaced with salvaged surfacing and road-mix surface treatment applied. District IX, Route 23, Section B. Oswald Bros., Los Angeles, \$49,223. Contract awarded to Basich Bros., Torrance, \$42,555.

KERN COUNTY—Between Bakersfield and Mt. View school, about 9 miles, construct crusher run base borders, surface roadbed with plant-mix and apply road-mix surface treatment to the shoulders. District VI, Route 58, Sections C, A. J. A. Casson, Hayward, \$39,325; Oswald Bros., Los Angeles, \$90,999; Hanrahan Co., San Francisco, \$98,701; A. S. Vinnell Co., Los Angeles, \$84,962; Union Paving Co., San Francisco, \$86,163. Contract awarded to Griffith Co., Los Angeles, \$84,420.80.

KERN COUNTY—Between Grove Street in Bakersfield and 11.7 miles south, grading and paving with asphalt concrete. District VI, Route 4, Section C & Bld. Southern California Roads Co., Los Angeles, \$310,436; V. R. Dennis Const. Co., San Diego, \$283,270; Union Paving Co., San Francisco, \$284,339; David H. Ryan, San Diego, \$282,055; Gogo & Rados, Los Angeles, \$265,600; Basich Bros., Torrance, \$305,535; United Conc. Pipe Corp., Los Angeles, \$261,152. Contract awarded to Griffith Co., Los Angeles, \$245,573.20.

KINGS COUNTY—Between Route 10 and Hub, about 6 miles crusher run base borders to be constructed, plant mixed surfacing and road mixed surface on shoulders. District VI, Route 125, Section E. Hanrahan Company, San Francisco, \$38,455. Contract awarded to Leo F. Piazza, San Jose, \$36,471.50.

KINGS COUNTY—Timber bridge east branch Cross Creek, two miles east of Corcoran. District VI, Route 135, Section B. R. Hodgson & Sons, Porterville, \$7,022; Wm. C. Horn Co., Pomona, \$8,353; Peter J. McHugh, Sacramento, \$8,735; Mid State Const. Co., Fresno, \$7,285. Contract awarded to F. O. Bohnett Co., Campbell, Calif., \$7,010.

LASSEN COUNTY—Between Termo and Madeline, 14.2 miles to be graded. District II, Route 73, Section F. Fredericksen & Westbrook, Lower Lake, \$32,032; Louisa Biasotti & Son and Claude C. Wood, Stockton, \$36,895; Dunn & Baker, Klamath Falls, Ore., \$38,324; Harms Bros., Doyle, \$38,995; Hemstreet & Bell, Marysville, \$41,703; Daniel Bayles, Biggs, \$41,929; Dodge Construction, Inc., Fallon, Nev., \$48,488; Isbell Construction Co., Reno, Nevada, \$55,917; Union Paving Co., San Francisco, \$84,809. Contract awarded to Poulson & McEwen, Sacramento, \$30,247.80.

LOS ANGELES COUNTY—Sepulveda Boulevard from Lincoln Boulevard (Rte. 60) to Centipela Avenue (Rte. 164), about 3.1 miles graded and paved with Portland cement concrete. District VII, Route 153, Section L.A., B. Basich Bros., Los Angeles,

\$258,151; Griffith Co., Los Angeles, \$225,761; J. E. Haddock Co., Ltd., Pasadena, \$254,545; United Conc. Pipe Co., Los Angeles, \$234,377; Oswald Bros., Los Angeles, \$236,510. Contract awarded to Matich Bros., Elsinore, \$218,501.80.

LOS ANGELES COUNTY—A reinforced concrete girder bridge across Los Angeles River at Atlantic Avenue, about 7 miles north of Long Beach, consisting of thirteen 64-ft. spans and two 13-ft. cantilever spans on concrete piers with pile foundations. District VII, Route 167, Section A. C. W. Caletti & Co., San Rafael, \$215,202; R. R. Bishop, Long Beach \$189,960; Sharp & Fellows Const. Co., Los Angeles, \$186,417; Shofner & Gordon, Los Angeles, \$237,051; Byerts & Dunn, Los Angeles, \$190,900; John Strona, Pomona, \$174,784; Carlo Bongiovanni Const. Co., Los Angeles, \$188,595. Contract awarded to J. F. Knapp, Oakland, \$159,368.

LOS ANGELES COUNTY—Between Azusa and Claremont, about 8 miles graded and paved with asphalt concrete. District VII, Route 9, Section LA 9-H-I-J-LVn-C, Cla. W. E. Hall Co., Alhambra, \$114,858; George Herz Co., San Bernardino, \$116,464; Griffith Co., Los Angeles, \$113,351; United Concrete Pipe Corp., Los Angeles, \$125,248; Oswald Bros., Los Angeles, \$116,427. Contract awarded to Geo. R. Curtis Paving Co., Los Angeles, \$107,283.35.

LOS ANGELES COUNTY—Between Polyhi Court and Stanley Avenue, 1.2 miles graded and paved with asphalt. District VII, Route 60, Section L, Bch. Sig.H. Griffith Co., Los Angeles, \$145,012; United Concrete Pipe Corp., Los Angeles, \$146,211; Oswald Bros., Los Angeles, \$133,462. Contract awarded to Sully-Miller Const. Co., Long Beach, \$128,722.50.

LOS ANGELES COUNTY—Between Brea and Pomona, about 6.5 miles pavement borders of plant-mixed surfacing to be constructed. District VII, Route 13, Section B. Southwest Pave. Co., Roscoe, \$16,887; Geo. R. Curtis Pave. Co., Los Angeles, \$23,603; Griffith Co., Los Angeles, \$21,145; Oswald Bros., Los Angeles, \$18,421. Contract awarded to Sunder Pearson, Santa Monica, \$15,501.20.

LOS ANGELES COUNTY—Washington Boulevard, between Spence Street and Downey Road, about 0.3 mile graded and paved with Portland cement concrete, asphalt concrete and bituminous macadam armor coat on selected material base. District VII, Route Feeder Road. Griffith Company, Los Angeles, \$77,226; C. O. Sparks & Mundo Engineering Co., Los Angeles, \$76,267; Southern California Roads Co., Los Angeles, \$78,887; R. E. Campbell, Los Angeles, \$76,218. Contract awarded to C. F. Robbins, Los Angeles, \$71,434.65.

LOS ANGELES COUNTY—Between Monterey Park and Pomona, 18.7 miles Portland cement concrete pavement widening to be placed. District VII, Route 26, Sections A, E. Mte. E. W. Coy & C. Gogo and Rados, Los Angeles, \$274,750; David H. Ryan, San Diego, \$261,021; United Concrete Pipe Corp., Los Angeles, \$294,639; Oswald Bros., Los Angeles, \$267,670; J. E. Haddock, Ltd., Pasadena, \$288,422; Basich Bros., Torrance, \$283,576. Contract awarded to Griffith Co., Los Angeles, \$249,803.

LOS ANGELES COUNTY—Between Route 19 and Anaheim-Spadra Road, 0.5 mile graded and paved with Portland cement concrete. District VII, Route 172, Section C. Griffith Co., Los Angeles, \$32,045; Dimmitt

& Taylor, Los Angeles, \$28,865; Sander Pearson, Santa Monica, \$28,650. Contract awarded to C. R. Butterfield, San Pedro, \$21,951.50.

LOS ANGELES COUNTY—A reinforced concrete girder bridge across San Gabriel River 3 miles north of Santa Fe Springs, consisting of six 63' spans and two 22' cantilevers and 0.35 mile of approach to be graded and paved with Portland cement concrete and plant-mixed surfacing. District VII, Route 166, Section A. T. A. Allen Const. Co., Los Angeles, \$112,475; J. F. Knapp, Oakland, \$119,382; D. W. Thurston, Los Angeles, \$156,394; J. E. Haddock, Ltd., Pasadena, \$117,325. Contract awarded to John Strona, Pomona, \$108,890.75.

LOS ANGELES COUNTY—Firestone Boulevard through Downey, about 0.3 mile existing roadbed to be widened and widening strips of P. C. C. and plant-mixed surfacing to be placed. District VII, Route 174, Section B. Gogo & Rados, Los Angeles, \$83,491; Griffith Co., Los Angeles, \$80,869; Geo. R. Curtis Paving Co., Los Angeles, \$87,661; United Concrete Pipe Corp., Los Angeles, \$95,152; Oswald Bros., Los Angeles, \$83,173. Contract awarded to Sander Pearson, Santa Monica, \$68,950.75.

MADERA COUNTY—Between 6.6 miles and 7.9 miles north of Madera, about 7.3 miles constructing borders of plant-mix surfacing and applying road-mix surface treatment to shoulders. District VI, Route 4, Section B. Leo F. Piazza, San Jose, \$32,461; Union Paving Co., San Francisco, \$37,510. Contract awarded to Hanrahan Co., San Francisco, \$31,385.

MERCED COUNTY—Between Los Banos and 10.5 miles E., 10.5 miles to be graded with crusher run base and surfaced with plant mix. District X, Route 32, Section C. Union Paving Co., San Francisco, \$226,722; United Concrete Pipe Corp., Los Angeles, \$249,759. Contract awarded to Louis Biasotti & Son and Claude C. Wood, Stockton, \$222,557.50.

MONO COUNTY—Between Convict Creek and Antelope Valley, about 46.7 miles, apply seal coat. District IX, Route 22, Sections D, E, F, G, H, and K. Oilfields Trucking Co., Bakersfield, \$27,606. Contract awarded to A. S. Vinnell Co., Los Angeles, \$25,713.15.

MONO COUNTY—Between Bridgeport and 2.4 miles northerly, 2.4 miles to be graded. District IX, Route 96, Section A. Isbell Construction Co., Reno, Nevada, \$13,833; Basich Brothers, Torrance, \$14,040. Contract awarded to C. A. Baker, North Sacramento, \$8,358.40.

MONTEREY COUNTY—Between San Ardo and King City, about 5.8 miles retread surfacing on portions and seal coat applied to portions. District V, Route 2, Sections G, F, L. A. Brisco, Arroyo Grande, \$29,329. Contract awarded to Granite Construction Co., Watsonville, \$18,646.

MONTEREY COUNTY—Between Big Creek and Anderson Canyon, about 7.1 miles, penetration oil treatment to existing roadbed. District V, Route 56, Section D. A. E. Garcia, Jr., Irvington, \$7,158; L. A. Brisco, Arroyo Grande, \$6,071; Tresslau Bros., Berkeley, \$7,417. Contract awarded to Oilfields Trucking Co., Bakersfield, \$4,881.76.

MONTEREY COUNTY—Between Gonzales and Chualar and between Hilltown and Monterey, about 20.1 miles, shoulders treated with liquid asphalt. District V, Route 2, 117, Section C. A. Oilfields Trucking Co., Bakersfield, \$11,664; L. A. Brisco, Arroyo Grande, \$10,779; Granite Constr. Co., Ltd., Watsonville, \$11,724; A. E. Garcia, Jr., Irvington, \$11,513. Contract awarded to Albert J. Ralsch, San Jose, \$10,566.

NAPA COUNTY—Maintenance station buildings and appurtenances. District IV, Route 43, Section B. John E. Branagh, Piedmont, \$12,489; Empire Construction Co., Ltd., San Francisco, \$11,777; Central California Construction Co., Inc., San Francisco,

\$12,748; Fred J. Early, Jr., San Francisco, \$14,067. Contract awarded to C. G. Langum, Napa, \$10,889.

ORANGE COUNTY—Reinforced concrete bridge across Santa Ana River, on Bolso Avenue, 2.3 miles west of Santa Ana, consisting of seven 57' girder spans and two 19' end spans on concrete piers and approximately 20 miles of grading and plant-mixed surfacing. Griffith Co., Los Angeles, \$67,161; Carlo Bongiovanni Const. Co., Los Angeles, \$69,760. Contract awarded to J. F. Knapp, Oakland, \$62,235.50.

ORANGE COUNTY—On Ocean Ave. at Santa Ana River, 0.5 miles, a reinforced concrete girder bridge, thirteen 44' 6" spans and two 16' end cantilevers on concrete bents to be constructed and approaches to be graded and surfaced with plant mix. District VII, Route 179, Section A. Griffith Co., Los Angeles, \$76,818; Bates and Rogers Const. Co., San Francisco, \$78,812; Byerts and Dunn, Los Angeles, \$71,841; R. R. Bishop, Long Beach, \$74,950; Donald Atkinson, San Francisco, \$72,242. Contract awarded to J. F. Knapp, Oakland, \$66,578.

ORANGE COUNTY—Between Newport Beach and Laguna Beach, about 8.9 miles graded and paved with Portland cement concrete. District VII, Route 69, Section Npt. B & B. Gogo and Rados, Los Angeles, \$171,270; Griffith Co., Los Angeles, \$180,143; Oswald Bros., Los Angeles, \$191,296. Contract awarded to Geo. R. Curtis Paving Co., Los Angeles, \$172,176.40.

RIVERSIDE COUNTY—Between Edom and Riverside-Imperial County line, liquid asphalt furnished and applied to shoulders, about 22 miles. District XI, Route 26, Sections E, F, G. Paulsen & March, \$6,736; Morgan Bros., \$4,259; Gilmore Oil Co., \$6,359. Contract awarded to Square Oil Co., Los Angeles, \$5,741.50.

RIVERSIDE COUNTY—Desert Center to Blythe, liquid asphalt to be furnished and applied to 47.2 miles. District XI, Route 64, Section C, D, & E. Lamb Transfer Co., \$16,548; Paulsen & March, \$15,320; Square Oil Co., \$14,700; Morgan Bros., \$14,950. Contract awarded to Regal Oil Co., Long Beach, \$13,330.

SACRAMENTO COUNTY—Between H Street subway and Auburn Boulevard, 1.2 mile to be surfaced with bituminous treated surfacing (plant-mixed) and 4.1 miles to be surfaced with crusher run base. District III, Route 98, Section A. Heafey-Moore Co., Oakland, \$61,445; A. Telchert & Son, Inc., Sacramento, \$65,760; Geo. Pollock Company, Sacramento, \$63,795. Contract awarded to J. A. Casson, Hayward, \$59,065.

SACRAMENTO, PLACER, YUBA, SUTTER, BUTTE, YOLO, COLUSA, GLENN, EL DORADO AND NEVADA COUNTIES—At various locations, about 425 miles of traffic striping. District III, various routes and sections. S. A. Cummings, San Diego, \$2,762. Contract awarded to Al W. Simmonds, Sacramento, \$2,470.

SAN BENITO, MONTEREY, SAN LUIS OBISPO, SAN BERNARDINO COUNTIES—Traffic stripe at various locations. District V, Route, various. Al W. Simmonds, Sacramento, \$4,296; D. I. Ansie, Inglewood, \$4,604. Contract awarded to S. A. Cummings, San Diego, \$3,874.50.

SAN BERNARDINO COUNTY—Steel stringer bridge with concrete deck across Chino drainage canal about 4 miles south of Pomona, to be constructed and 0.27 mile roadway graded and road mix surface treatment. District VII, Route 77, Section A. Dimmitt & Taylor, Los Angeles, \$32,379; V. R. Dennis Const. Co., San Diego, \$40,290; John Strona, Pomona, \$36,644. Contract awarded to C. F. Robbins, Los Angeles, \$32,269.25.

SAN BERNARDINO COUNTY—In San Bernardino County between Yermo and Baker, about 11.6 miles, asphaltic emulsion furnished and applied for 20 foot average width. District VIII, Route 31, Sections H

and J. Square Oil Co., Los Angeles, \$2,090; American Bitumuls Co., Los Angeles, \$2,280; Lamb Transfer Co., Long Beach, \$2,100; Paulsen & March, Inc., Los Angeles, \$2,155. Contract awarded to Gilmore Oil Co., Los Angeles, \$1,914.25.

SAN DIEGO-IMPERIAL COUNTIES—At various locations between 2 miles east of Alpine and 0.2 mile east of the San Diego-Imperial County line, about 8.4 miles; plant-mix surfacing of existing pavement, constructing shoulders and applying road-mix surface treatment. Daley Corp., San Diego, \$72,569; V. R. Dennis Const. Co., San Diego, \$76,805. Contract awarded to R. E. Hazard & Co., San Diego, \$67,812.

SAN DIEGO COUNTY—North city limits of San Diego to Linda Vista Road, liquid asphalt furnished, applied to shoulders, about 7.1 miles. District XI, Route 77, Section A. Morgan Bros., Huntington Beach, \$2,824; Paulsen & March, Los Angeles, \$2,532. Contract awarded to Regal Oil Company, Long Beach, \$2,309.50.

SAN DIEGO COUNTY—On El Cajon Avenue in San Diego, from Texas Street to Euclid Avenue, 2.7 miles graded and paved with Portland cement concrete. V. R. Dennis Construction Co., San Diego, \$299,873; Griffith Co., Los Angeles, \$304,929; Basich Bros., Torrance, \$285,396. Contract awarded to Daley Corporation, San Diego, \$283,922.45.

SAN MATEO COUNTY—Between Menlo Country Club and Woodside, 1.3 miles to be graded with crusher run base and surfaced with bituminous macadam. District IV, Route 107, Section A. Hanrahan Co., San Francisco, \$82,561; Plombo Brothers & Co., San Francisco, \$68,659; Fredericksen and Westbrook, Lower Lake, \$66,555. Contract awarded to Union Paving Co., San Francisco, \$64,869.80.

SANTA BARBARA COUNTY—Between Puente Drive and Maria Ygnacio Creek, about 1.4 miles, removal and disposal of trees. District V, Route 2, Section K. The Gillum Co., Summerland, \$6,165. Contract awarded to L. A. Brisco, Arroyo Grande, \$4,940.

SANTA BARBARA COUNTY—Between Las Cruces and Lompoc and between Zaca and Painted Caves Road, about 43.8 miles, portions of existing pavement to be surfaced with plant mix and seal coat applied to existing pavement and new surfacing. District V, Route 56 and 80, Section A B and A B C. J. A. Casson, Hayward, \$44,928. Contract awarded to Heafey-Moore Co., Oakland, \$44,899.

SANTA CLARA COUNTY—Between Agnew Underpass and San Jose, about 3.0 miles to be graded and paved with Portland cement concrete. District IV, Route 63, Section B. Union Paving Co., San Francisco, \$263,333; Fredericksen & Westbrook, Lower Lake, \$267,808; Basich Bros., Torrance, \$243,920; Hanrahan Co., San Francisco, \$201,510. Contract awarded to A. J. Ralsch & Earl W. Heple, San Jose, \$225,112.45.

SANTA CLARA COUNTY—Between San Jose and Coyote, 10.4 miles, to be graded and paved with asphalt concrete. District IV, Route 2, Section B. David H. Ryan, San Diego, \$307,364; A. Telchert & Son, Inc., Sacramento, \$343,072.50; A. J. Ralsch, San Jose, \$318,247; Basich Brothers, Torrance, \$299,433; Union Paving Co., San Francisco, \$293,525; Hanrahan Company, San Francisco, \$273,611. Contract awarded to Jones & King, Hayward, \$253,494.

SANTA CLARA COUNTY—Between State Route 68 and the north city limits of San Jose, about 1.2 miles graded and road-mix surface treatment applied. District IV, Route Feeder Road. J. A. Casson, Hayward, \$67,968; Fredericksen & Westbrook, Lower Lake, \$73,374; Basich Brothers, Torrance, \$62,657; Earl W. Heple, San Jose, \$62,976; Hanrahan Co., San Francisco, \$59,515; Union Paving Co., San Francisco, \$71,442. Contract awarded to A. J. Ralsch Co., San Jose, \$42,808.

SANTA CLARA COUNTY—Five bridges across Guadalupe River and overflow channels about 2 miles north of San Jose. District IV, Route 53, Section B. A. J. Ralsch Co., San Jose, \$57,942; F. O. Bohnett Co., Campbell, \$59,575; Earl W. Heple, San Jose, \$59,548; Carl N. Swenson Co., San Jose, \$59,642; Heafey-Moore Co., Oakland, \$60,342; Lindgren & Swinerton, Inc., Oakland, \$63,796; McManus & Chick, Berkeley, \$64,393; Rundsden & Lauritsen & Delta Dredging Co., Pittsburg, \$66,372; A. Soda & Son, Oakland, \$66,478; M. E. McGowan, Inc., San Francisco, \$68,622. Contract awarded to Rocca & Co., San Rafael, \$55,917.

SANTA CRUZ COUNTY—Between Davenport and Santa Cruz-San Mateo county line, a bridge across Scott Creek and a culvert across Mill Creek. District IV, Route 56, Section C. Peter J. McHugh, Sacramento, \$11,919; A. Soda & Son, Oakland, \$11,772; F. O. Bohnett Co., Campbell, \$11,543. Contract awarded to Earl W. Heple, San Jose, \$11,545.68.

SHASTA COUNTY—Between Shasta and Redding, about 4.7 miles graded and surfaced with crusher run base and plant-mix. District II, Route 26, Section B. Hemstreet & Ball, Marysville, \$191,271; Louis Biasotto & Son, Stockton, \$206,663; George Pollock Company, Sacramento, \$229,315; Union Paving Co., San Francisco, \$248,504; P. L. Crooks & Co., Inc., Portland, \$198,778; Guy F. Atkinson Company, San Francisco, \$243,492; A. Telcher & Son, Inc., Sacramento, \$177,891. Contract awarded to D. McDonald, Sacramento, \$163,019.60.

SOLANO COUNTY—Between Denverton and Rio Vista, widening about 11.9 miles existing roadbed, placing untreated crushed gravel or stone borders and armor coating. District X, Route 53, Section B. D. McDonald, Sacramento, \$94,481; Heafey-Moore Co., Oakland, \$85,630; Pacific States Construction Co., San Francisco, \$86,253; A. G. Ralsch, San Francisco, \$76,713; Jones and King, Hayward, \$77,758. Contract awarded to L. C. Seidel, Oakland, \$75,459.

TULARE COUNTY—Between 0.4 and 0.7 miles north of Elida school, bridge and grading. District VI, Route 129, Section F. Contract awarded to Rexroth & Rexroth, Bakersfield, \$12,485.

TULARE COUNTY—Between Kingsburg and 12.2 miles southerly, and between 0.6 miles and 2.4 miles south of Goshen Subway, about 12.8 miles. Constructing borders of plant-mixed surfacing and applying road-mix treatment to shoulders. District VI, Route 4, Section E. F. Union Paving Co., San Francisco, \$63,637. Contract awarded to Hanrahan Co., San Francisco, \$53,448.

TULARE COUNTY—Between 12 mile and 24 mile east of Porterville, 0.14 mile to be graded, road-mix surface treatment applied and constructing a timber bridge with concrete deck. District VI, Route 127, Section B. Peter J. McHugh, Sacramento, \$17,393. Contract awarded to N. M. Ball Sons, Berkeley.

TULARE COUNTY—Between Olive School and one-fourth mile east, reinforced concrete bridge, grading, road-mix surface treatment. District VI, Route 127, Section A. R. R. Bishop, Long Beach, \$16,970; R. Hodgeson & Sons, Porterville, \$9,625; N. M. Ball Sons, Berkeley, \$8,314. Contract awarded to Peter J. McHugh, Sacramento, \$8,912.50.

VENTURA COUNTY—At Teague-McKevett Crossing, about one-half mile east of Santa Paula, 0.3 miles to be graded and surfaced with plant mix. District VII, Route 79, Section B. Southwest Paving Co., Roscoe, \$12,881; A. S. Vinnell Co., Los Angeles, \$13,114; Kovacevich and Price, Inc., South Gate, \$14,418; Orwald Bros., Los Angeles, \$16,347. Contract awarded to Dimmitt and Taylor, Los Angeles, \$11,447.60.

VENTURA COUNTY—One bridge across Todd Barranca, and one across Hopper Creek, both with approaches, at points 8.5 and 27.7 miles east of junction with Route 2.

Don't Cross Double Lines--They Are Your Protection

California's Highway Patrol is giving special attention these days to motorists who cross the painted double lines on the highways. It is a point that should be stressed the year around.

Because there is some leeway for the motorist who becomes stymied on a grade, curve or hillside the tendency is to abuse that privilege. Any Sunday driver is aware of many violations in the course of a typical afternoon.

The double lines are placed at certain places on the highways where engineers, after careful study, have decided that unusual traffic hazards exist. It is unlawful to cross the lines at any time unless it can be seen that the highway ahead is entirely free of traffic. Where the lines are painted on hills or blind curves, motorists are allowed to cross over after the brow of the hill is reached and the oncoming traffic can be seen and on curves where the view is unobstructed and the highway is clear of approaching cars.

The safest plan, however, is to stay on the right hand side of the double lines until you are out of the danger zone so designated. The lines were placed there for your protection, not for your annoyance, as you may sometimes think. Chiseling drivers, to whom the lines mean nothing, should be arrested on sight. The conscientious motorist has had his attention called to the danger of the restricted areas by the announcement of the highway police. He will willingly cooperate.—Exchange.

District VII, Route 79, Section A-C. R. E. Campbell, Long Beach, \$71,259. Contract awarded to R. E. Bishop, Long Beach, \$53,177.

YOLO COUNTY—Between Putah Creek and Davis, about 4.3 miles armor coat. District III, Route 6, 7, Section A. A. Claud C. Wood, Stockton, \$13,166; Heafey-Moore Co., Oakland, \$11,123; E. A. Forbes, San Anselmo, \$10,610. Contract awarded to E. F. Hilliard, Sacramento, \$9,760.

Most Accidents Due to Drivers or Pedestrians

ERNEST Lieberman, chief engineer for the Illinois Division of Highways, excoriated highway design for the largest slice of responsibility for traffic accidents in rural areas and tossed it into the laps of motorists and rural highway pedestrians, in an address at the recent National Safety Council Congress in Atlantic City.

LACK OF STATISTICS

"Only recently," Lieberman said, "have ample statistics permitted authorities to give to the accident situation on rural highways the attention it deserves. Previous lack of statistics prevented realization of the seriousness of the problem, as compared with traffic accident frequency in cities."

Lieberman said that during the first eight months of 1936 about one-third of all traffic accident deaths occurred in "strictly rural areas" and pointed out that in 1935 about two-thirds or 25,000 of the 37,000 total of fatalities were suffered in accidents occurring in cities of less than 10,000 population and in rural areas.

"Statistical studies of conditions that caused these accidents," he said, "show definitely that while some were due to poor road design, the driver and pedestrian were chargeable with responsibility for most of them. Consequently, it is essential that we develop a program directed toward users of the highways."

PRONE TO ACCIDENTS

The auto driver who is prone to accidents is probably the same type of man who falls off a ladder in a factory, who breaks dishes if he is a waiter, and who falls over chairs and stumbles on stairs at home, George W. Barton, of the Chicago Motor Club, told the delegates.

A driver may have as low an average as one serious accident every five years and still be classified as accident-prone, according to Mr. Barton, who contrasted this record with the average noncommercial driver, who has one accident of some severity about once every 50 years.

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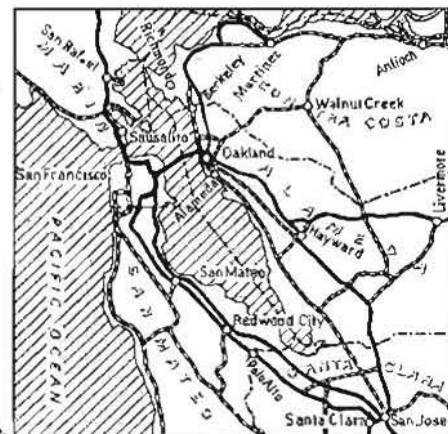
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