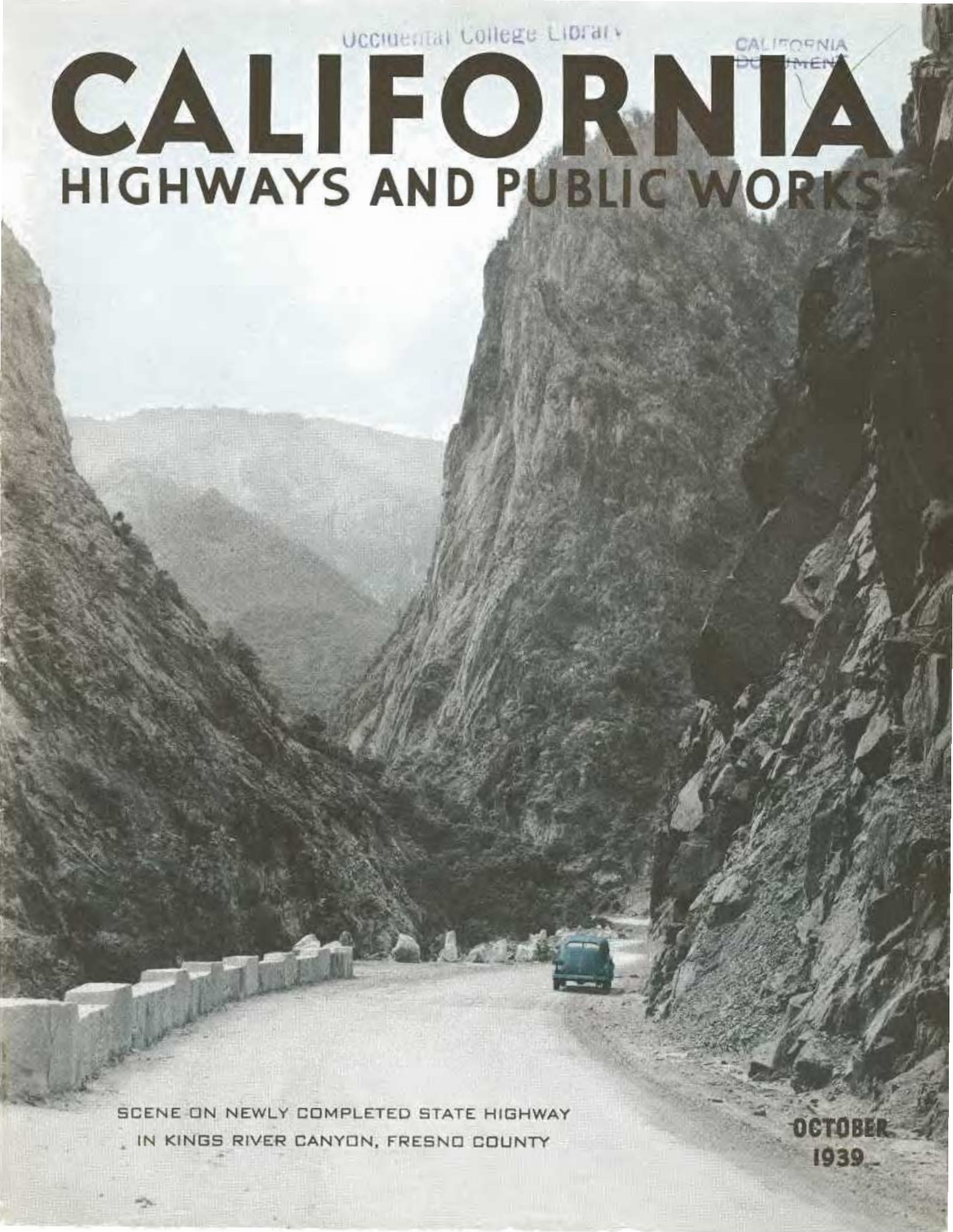


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HIGHWAYS AND PUBLIC WORKS



SCENE ON NEWLY COMPLETED STATE HIGHWAY
IN KINGS RIVER CANYON, FRESNO COUNTY

OCTOBER
1939

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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

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

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\$8,715,358 Low Bid Offer to Construct Friant Dam Wins the Contract Award

THE awarding on October 9th of the contract for construction of the \$16,000,000 Friant Dam by Secretary of the Interior Harold C. Ickes to the Griffith Company and Bent Company of Los Angeles, joint low bidders, is the most important event to agriculture and industry in the Great Central Valley of California since the contracts were let for construction of Shasta Dam.

Friant Dam is the second major unit of the Central Valley Project, which is classed as the largest reclamation enterprise in history. The bid was opened in Sacramento by the United States Bureau of Reclamation September 14th, and brings well above the \$60,000,000 mark the contracts which have been already awarded by the Federal Government for construction of this project.

Ground breaking ceremonies at the dam site have been set for November 5, 1939. Awarding of the contract will bring a step nearer fruition the plan of the Central Valley Project developed under the direction of State Engineer Edward Hyatt, Department of Public Works, to provide a supplemental water supply for 1,200,000 acres of farm lands in the southern San Joaquin Valley.

This vitally needed unit of the Central Valley Project is located on the San Joaquin River about twenty miles north of Fresno. When completed it will provide storage capacity for 520,500 acre-feet of water, 316,500 acre-feet of which will be available for storage regulation of waters for delivery into the Friant-Kern Canal and the Madera Canal.

These canals, when constructed, will have an aggregate length of nearly 200 miles, one extending north from Friant Dam to the Chowchilla River north of Madera and the other south to a point near Bakersfield. They will carry a new water supply to parts of Fresno, Kern, Madera, Tulare and Kings counties. Surface waters in these sections long have

Friant Dam Bids

Five bids for the construction of Friant Dam, varying from a low of \$8,715,358.50 to a high of \$12,483,173.50, were taken under consideration by the United States Bureau of Reclamation which announced that a contract would probably be awarded before the end of October.

Walker R. Young, supervising engineer of the Central Valley Project, said work can be started on the big dam on the upper San Joaquin River by early November, provided the bids were found to be regular and satisfactory to the Government.

The proposals, opened Thursday, September 14, in Sacramento, were as follows:

Griffith Co. and Bent Co., 418 S. Pecan St., Los Angeles...	\$8,715,358.50
Shasta Construction Co., San Francisco	9,105,760.00
West Coast Constructors, Inc., Los Angeles...	9,197,169.50
Winston Bros. Co., The Arundel Corp., D. W. Thurston, American Concrete & Steel Pipe Corp., and L. E. Dixon Co., Los Angeles	12,368,660.00
Friant Construction Co., San Francisco	12,483,173.50

The contractor will be allowed 1,200 calendar days, or about 3 years and 3 months.

been appropriated for irrigation purposes and pumping from thousands of wells has seriously depleted the underground supply. More than 40,000 acres of once producing farm land has been abandoned for lack of adequate water.

Due to the fact that the water supply naturally available to the San Joaquin Valley is insufficient to meet even present water requirements, and, in addition, that the waters now available are practically all utilized under rights established for many years, the furnishing of additional water needed to supply areas of deficiency in the southern San Joaquin Valley offered one of the knottiest problems which the State engineers had to solve in connection with the planning of the Central Valley Project.

When engineers of the State Division of Water Resources first began their studies of the state-wide water problem in 1921 they were faced with seemingly insurmountable climatic and geographic barriers. They found that roughly three-quarters of the State's water supply was in the northerly one-third of the State, whereas three-quarters of the ultimate demand was in the southerly two-thirds of the State.

To equalize this distribution is one of the primary objects of the Central Valley Project. By storing the waters of the Sacramento River watershed, which previously have run off into the Pacific Ocean as flood waters, a surplus will be made available for use in the San Joaquin Valley. This water, boosted up the valley by a series of pumping plants to Mendota, will serve to irrigate the lands which now draw on the San Joaquin River for water, thus releasing the stored water in the Friant Reservoir for distribution through the Friant-Kern and Madera canals.

Before such rearrangement of the existing water supplies could be brought about, however, many legal and water-right problems had to be



Diagram Sketch of Friant Dam on Photograph of Dam Site Showing Span

solved. During the last two years the U. S. Bureau of Reclamation has been negotiating with interested parties in the solution of these problems and the awarding of the contracts for construction of Friant Dam is a signal that satisfactory agreements have been negotiated.

The Friant Dam, which engineers have estimated will cost approximately \$16,000,000, will provide employment for 2500 men during the three years necessary to complete the unit. It will be 3430 feet long, 300 feet high and have a bottom width of 250 feet. In top length it compares favorably with the 3500 feet of Shasta Dam, now under construction on the Sacramento River at Kennett. However, Shasta Dam, with its 560 feet of height, is nearly twice that of Friant Dam. In plan, cross-sections, height and length it does not differ greatly from the Norris Dam in Tennessee or the Madden Dam in the Panama Canal Zone.

The dam will be of the gravity type and contain 1,850,000 cubic yards of concrete. It will be 250 feet thick at the base and 20 feet at the crest, with drum gates controlling an overflow spillway in the river section. This spillway will



provide three 100 by 18-foot outlets separated by 12-foot piers in which the operating mechanism for the drum gates will be housed.

The spillway design, which was tested by model studies, provides for a 90,000 second-foot capacity with an 18-foot depth of water on the crest of the dam.

Originally Friant Dam was planned as a 285-foot high structure, but studies made subsequent to the record-breaking floods of March, 1938, resulted in the addition of 15 feet to the structure, thereby adding 70,000 acre-feet of storage for flood control purposes. Of the gross reservoir storage capacity of 520,000 acre-feet, the upper 15 feet, with a capacity of 70,000 acre-feet, will be for flood control. The next lower 316,000 acre-feet of capacity will be used for irrigation purposes and the remaining 134,000 acre-feet will be dead storage to permit diversion into the high line canals.

Diversion for the Friant-Kern Canal, which will eventually extend south about 160 miles to the Kern River west of Bakersfield, will be accomplished by four conduits through the left abutment section. These canal outlets will be controlled

River
Outlet

Friant Kern
Canal Outlet



Across San Joaquin River and Locations of Spillway and the Canal Outlets

by four 96-inch hydraulically operated needle valves with a canal head capacity of 3500 second-feet. Diversion of 1000 second-feet for the Madera Canal, which will supply the Madera Irrigation District, will be provided by two conduits through the right abutment of the dam controlled by two 78-inch hydraulically operated needle valves.

All outlets are provided with semi-circular trash rack structures on the upstream face of the dam, designed for velocities varying from two to four feet per second through the racks.

The site of the dam is in typical foothill country, and the San Joaquin River Canyon is broad at this point, as indicated by the 3430-foot crest length of the dam. First exploration of the site by core drilling and test pits was carried out by the Madera Irrigation District from 1918 to 1924. Investigations carried on at the site by the U. S. Bureau of Reclamation have included about 1000 feet of tunnels, 300 feet of shafts, nearly 4000 feet of diamond drill boring, and about 400 feet of 36-inch diameter core drilling.

The rock at the site is classified as schist, which in the unweathered state is relied upon for adequate

Construction Data on Friant Dam

Stripping Gravel Pit	600,000 cu. yds.
Excavation at Dam	770,200 cu. yds.
Concrete in Dam	1,850,000 cu. yds.
Concrete, Miscellaneous	57,280 cu. yds.
Drain Tile and Pipe	64,470 lin. ft.
Metal Tubing and Fittings	2,645,000 lbs.
Reinforcing Steel	3,300,000 lbs.
Gates and Conduit Lining	1,022,000 lbs.
Outlet Pipes	679,000 lbs.
Gate Frames and Trucks	497,000 lbs.
Trash Racks	646,700 lbs.
Needle Valves	1,087,000 lbs.

All materials are furnished by the Federal Government except small quantities incidental to installation work.

support. This rock is reasonably tight. The schist at the site rests upon a granite which extends to a depth and area beyond the boundaries affected by the dam. Bedrock is exposed, or near the surface, over the entire site. Sound rock will probably be reached by excavation

ranging from a minimum of about 10 feet to a maximum of nearly 80 feet. It is estimated that 770,200 cubic yards of excavation of all classes will be necessary.

Specifications provide that the contractor produce and process aggregate for the concrete in Friant Dam. The aggregate is to be produced from pits already purchased by the government about two miles downstream from the dam site.

Extra precautions have been taken in the preparation of plans for Friant Dam to insure that cracking, weathering and other disintegration of the concrete be minimized. They affect the temperature, composition and curing of the concrete.

In addition to the use of low-heat Portland cement, it is required that pumicite in the amount of about 20 per cent by weight of the cement be used for the mass concrete of the dam, except the outer six feet of the crest and the downstream slope of the spillway section.

Much emphasis is placed on temperature control to prevent cracking and other weaknesses. The limitations placed on the maximum allowable temperature of the mass concrete when deposited vary from a low of 58 degrees F. during Decem-

Governor Olson "Will Carry on Fight to Bring People Water and Power at Cost"

IN CONNECTION with the awarding of the contract for the dam construction, Governor Culbert L. Olson issued the following statement:

"The award of contract for construction of Friant Dam by the United States Bureau of Reclamation is another step forward in the construction of the great Central Valley Project.

It should be understood by the citizens of this state, that the administration in Washington which is making possible the construction of the Central Valley Project, has called upon us to be prepared to participate in the benefits of the project.

Both President Roosevelt and Secretary Ickes have urged the adoption by the state of a program which would provide public outlets for the water and power developed by the project.

At the last session of the Legislature my administration sponsored the bill which would have made this cooperation with the federal government possible.



GOVERNOR CULBERT L. OLSON

President Roosevelt and Secretary Ickes urged the passage of this measure so that they could be assured of full cooperation by the state in the future development of the project for the maximum benefit of consumers and the people of the Central Valleys.

The measure was bitterly opposed by the power trust representatives and finally defeated by a reactionary minority in the Assembly.

This can be considered only a temporary defeat.

The duty of the state to provide adequate outlets for water and power to be developed, will, I am sure, be responded to by the people by electing a Legislature that will perform that duty instead of obeying the behests of the power trust.

I expect to carry on the fight pledged in my party platform and in my inaugural address to bring to the people, at cost, through public agencies, water and power, which as natural resources, are their birth-right."

ber and January, to a high of 70 degrees F. during the months of June to September, inclusive.

The designs call for cooling pipes, through which river water may be circulated, to be embedded on foundation rock and on top of each five-foot lift of concrete, with the horizontal spacing varying from two and one-half feet at the base to five feet at the top. It will require 578 miles of one-inch pipe to supply this cooling system.

Other conditions at the dam are particularly favorable for the control of temperature due to the relatively high mean annual air temperature, low humidity in summer and low river water tempera-

ture. Cooling is to be continued until the mean temperature of the concrete is within 8 degrees of the mean daily temperature of the river water.

The Friant Dam feature of the Central Valley Project is being constructed by the Bureau of Reclamation. John C. Page is Commissioner of Reclamation, and R. F. Walter, chief engineer. Walker R. Young is supervising engineer in charge of all field activities of the project, with headquarters at Sacramento. Roy B. Williams will be construction engineer in direct charge of the Friant division of the project, with headquarters at Friant.

Plans for a public celebration of the

start of construction of Friant Dam are being completed by Chairman James R. Fauver of the program committee of the Central Valley Project association working in conjunction with state officials and the United States Bureau of Reclamation.

General Patrick Farrell, adjutant general of the California national guard, has approved the dispatch of an artillery battery to Friant. The guns will be used to pay honor to Governor Culbert L. Olson and to the flag and to salute the start of construction by firing a salvo from the north abutment of the dam site. It is expected the construction contract will be awarded and work started by the date selected for the celebration.



Friant Camp Scenes: Left—View of headquarters office and dormitory No. 1. Right—Duplex cottages on Second Avenue.

Communities Must Organize to Get Water and Power

By FRANK W. CLARK, Director of Public Works

THE awarding of the contract for construction of Friant Dam by Secretary Harold C. Ickes is a step forward in the development of the Central Valley Project of prime importance to the people of California.

It should serve to spur business, municipal and agricultural interests to immediate action in preparing to receive the water and power which will be developed by the project.

The Federal government, through the Bureau of Reclamation, already has committed itself to expenditures of more than \$60,000,000 and approximately 3000 men are now employed in actual construction work. The contract for construction of Friant Dam as awarded will bring the government's obligation to well above the \$75,000,000 mark and increase the number of those employed to 5000.

The completed Central Valley Project will make available over 2,000,000 acre-feet annually of new water supplies for industrial, municipal and irrigation uses in the Sacramento and San Joaquin Valleys, enhance navigation, control flood waters, and develop from one billion to



FRANK W. CLARK

one and a half billion kilowatt hours of electric energy for use in the Cen-

tral Valley project system.

Although the primary object of the project is the solution of California's pressing water shortage problems, the hydro-electric development is of vital importance to future users of that water. The sale of this power through public agencies will not only save many millions of dollars to the general public but will also provide sufficient revenue to make cheap water available for irrigation and industrial purposes.

Funds advanced by the Federal government for construction of the project must be met with revenues received from the sale of water and power. The Federal government, however, makes no provision for the distribution of these facilities. It therefore devolves upon state and local agencies to take the necessary steps to provide these facilities and have them ready when the main units of the project are completed.

Local agencies can, and should, start now to prepare the way to receive this cheap water and power through the formation of the necessary districts.

The backbone of these organizations should be the municipalities, farm districts and industries that will

(Continued on page 19)

\$500,000 Expenditure Entailed by Storm Damage to Highways in South

By E. E. WALLACE, District Engineer

THE desert country in Riverside and Imperial counties is ordinarily thought of as a land of continual sunshine and drought, but as demonstrated during the storms of September this same country occasionally encounters even more severe rain storms and storm damage than other sections of the State.

But torrential rains last month washed out 35 miles of highway, approaches to six bridges and a number

The estimated cost of placing the damaged highways in condition to again carry traffic, without any improvement or additional protection, is \$120,000 alone.

In order to meet the emergency, Director of Public Works Frank W. Clark has requested the U. S. Bureau of Public Roads for Federal Aid funds in the sum of \$250,000, promising that the State will appropriate a like amount.

that extended throughout all of the northerly end of the Colorado Desert from Indio to Arizona. This was followed with steady rain all of the remainder of September 4th, 5th and 6th, during which time concentration of considerable intensity occurred at Shavers Summit and easterly from Desert Center to and along the Colorado River. This storm shifted south through Imperial Valley on the 5th and 6th, resulting in a general rain of



Cloudburst flood scene on Jackson Street in City of Indio, Riverside County, during storm of September 4th

of protective dykes between Indio and Blythe on U. S. 60 and 70 (State Route 64). Extensive damage was also done on U. S. 95 and 99 and State routes 111 and 195.

Restoration work, urgently needed protection construction and rebuilding of the damaged highway to a standard that will safeguard it against future storms of the intensity of those which wrought destruction in September will cost approximately \$500,000.

The torrential rains in the desert region usually occur during the late summer months, in August and the early part of September, and quite frequently follow a very oppressive hot period. When such rains occur, they are usually of cloudburst proportions, covering only localized areas.

But on September 4th an exceedingly heavy rainfall occurred in the Coachella Valley, centering near Indio,

such intensity as has not heretofore been recorded.

The heaviest rainfall for this storm was reported in Brawley, where a total of 6.43 inches of rain fell in approximately 24 hours. This is three times the average annual rainfall for that vicinity.

The agricultural section of Imperial Valley is not benefited by any rainfall as it is entirely dependent upon

irrigation and a storm such as occurred in Imperial Valley on September 5th and 6th causes an immense amount of damage in the destruction of many structures and canals, as well as injury to crops. It has been estimated that this single storm damaged the irrigation system of the Imperial Irrigation District to the extent of approximately a quarter of a million dollars.

A great deal of damage also occurred to the Southern Pacific Railroad, which travels both Riverside and Imperial counties diagonally on the north side of the Salton Sea. Many washouts occurred on the Southern Pacific main line between Indio and Ogilby and train service was completely stopped for two or three days, and seriously interrupted for a longer period of time.

ALL HIGHWAYS DAMAGED

The breaks in the canal system and in the railroad embankments, in addition to the heavy rains, poured large volumes of water onto the State and county highways at various locations and resulted in considerable damage to all of the highway systems in both Riverside and Imperial counties. Though portions of all of the main State highways in these counties were flooded at times, traffic was not seriously delayed on either U. S. 80 or on U. S. 99.

Southern Pacific passengers were transferred to busses at Indio and taken to El Centro or other railroad points where they were again transferred to the trains.

Traffic was completely stopped on State Route 111 along the north shore of the Salton Sea and adjacent to the Southern Pacific tracks, and on U. S. 60 and U. S. 70 between Indio and Blythe, where traffic was completely stopped for a period of five days, due to at least half a dozen serious washouts.

COMPLETELY WASHED OUT

State Highway 195 from Mecca through Box Canyon to Shavers Summit was completely washed out, following repairs which had just been completed on storm damage that had occurred in July.

U. S. 95, extending northerly from Blythe along the Colorado River, was completely closed to traffic for two weeks, due to loss of embankments through all of the major arroyos.



Have to roadways on U. S. 195 extending north from Blythe to Needles along Colorado River closed it to traffic for 2 weeks.



The most serious damage occurred on U. S. Highways 60 and 70 between Desert Center and Blythe. Through this area exceptionally heavy rainfall occurred, resulting in great sheets of water flowing to the north across the highway into old dry lake areas. The soil in that vicinity is of a silty and sandy nature which erodes very rapidly and the huge volumes of water destroyed the ditch and dyke system which had been constructed to lead water to the several bridges, releasing water across the highway and depositing volumes of mud and debris.

MAINTENANCE CREWS MAROONED

State maintenance crews were on the job early Monday morning as soon as the storms started, and though several State tractors and graders were marooned in the storm-swept areas, all available State equipment and 43 pieces of rented equipment, including 12 large tractors with bulldozers, 11 power shovels, 16 large trucks and other miscellaneous equipment, were immediately assembled and put to work cleaning off the highways, filling in the washed-out areas and making repairs as rapidly as possible in order to restore the highways to a condition where they could again carry traffic.



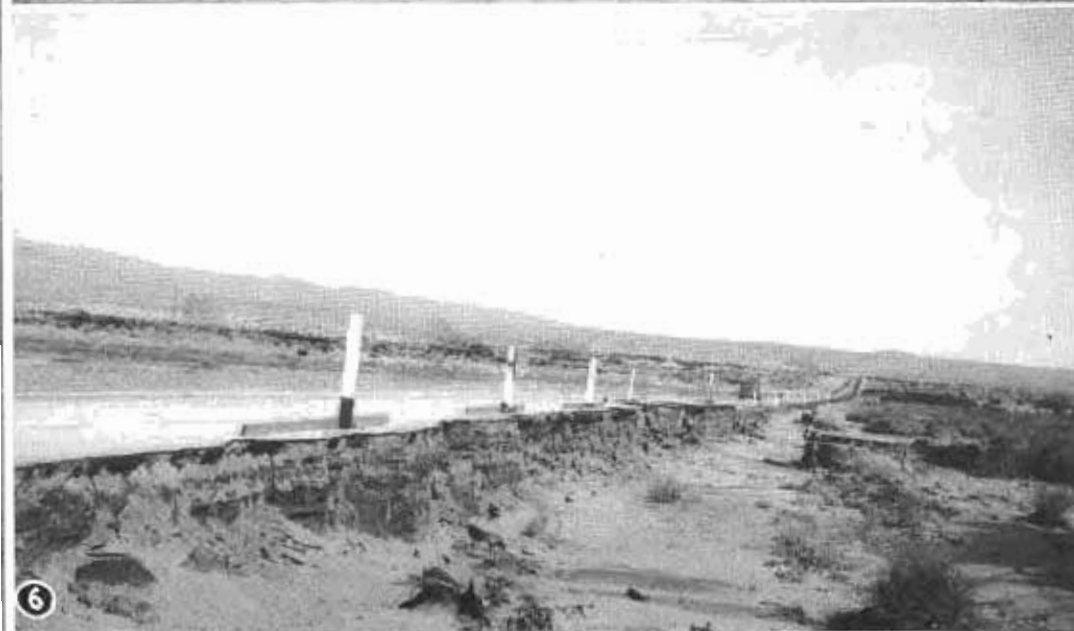
Detours were constructed around all of the destroyed bridge approaches, and the traffic which had been marooned at Blythe and Desert Center was permitted to pass through as soon as a one-way road could be opened.

On the morning of September 25th, while repairs to the highway were still intensively under way, another storm of cloudburst intensity hit in the Coachella Valley just south of the highway. Water one and a half feet deep flowed through Indio and along the railroad and highway through Coachella and Thermal. The Southern Pacific tracks were again washed out south of Indio and train service was interrupted temporarily.

Considerable damage occurred on U. S. 99 by erosion of the embankment shoulders between Indio and Oasis, and some damage occurred on the Palms-to-Pines Highway west of Indio.

A rainfall of over 6 inches occurred within a few hours during the storm

(Continued on page 19)



No. 4—State maintenance equipment marooned by flood. 5—Auto washed down stream off highway. 6—Long stretch of U. S. 60 carried away.



Three and a half mile stretch of four-lane divided highway recently opened with appropriate ceremonies on Foothill Boulevard in Alameda County has 23 feet of roadways on each side of 24-foot, planted division strip

New Divided Highway Unit Completed

ADDING another unit of four-lane divided highway to State Route 5, the main traffic artery between the East Bay area and the San Joaquin Valley, the realigned highway between San Leandro and Castro Valley on the Foothill Boulevard in Alameda County was formally dedicated to public service on Saturday morning, September 16.

The improvement cost \$309,500 and will greatly facilitate motor vehicle transportation between Alameda County and the San Joaquin Valley and south to Los Angeles.

Dedication ceremonies were held under the direction of community leaders from Hayward, Oakland, San Leandro and Castro Valley, and were followed by a luncheon at the Green Shutter Hotel in Hayward.

Official opening of the new highway was signaled when State Highway Commissioner L. G. Hitchcock of Santa Rosa and Supervisor Tom E. Caldecott cut a ribbon stretched

across the roadway at the junction of Foothill Boulevard and the Castro Valley Cutoff. City Councilman Robert A. Kolze of Hayward was master of ceremonies at the luncheon.

The new stretch of highway is 3.5 miles in length with two lanes on each side of a 24-foot dividing strip. The lanes adjacent to the dividing strip are of asphalt concrete, twelve feet wide, and the outside lanes are 11 feet wide, of Portland cement concrete with 8-foot, oil treated shoulders.

Speakers for the dedication ceremonies and luncheon in addition to State Highway Commissioner L. G. Hitchcock included I. B. Parsons of Hayward, of the State Chamber of Commerce Central Coast Highway Committee; John Deadrich, member of the San Leandro Chamber; Ralph H. Anderson, Hayward Chamber, president; Supervisor Caldecott, Mayor Arthur E. Manter of Hayward.

Col. Jno. Skeggs, District Highway

Engineer, representing Frank W. Clark, Director of the State Department of Public Works; Dave Kidd, Castro Valley; A. J. Olivera, San Leandro Chamber, president; Claude Faw, of the State Chamber; Earl Leonard of the Oakland Chamber; Irvin B. Wright, assistant manager, State Chamber.

Joseph King of Hayward was the contractor.

43,819,929 Automobiles on World's Roads

World automobile registrations, as of January 1, 1939, totaled 43,819,929 units. The gain over the previous year was 741,299 units, or 1.7 per cent, according to the U. S. Department of Commerce. Sixty-eight per cent of all the motor vehicles in use are registered in the United States, but last year's advance was in other countries, which gained 13 per cent in passenger cars and six per cent in trucks.

Ocean Shore Highway Realignment Eliminates 133 Curves in 10 Miles

WITH officials and citizens of three counties participating, dedicatory ceremonies celebrating the opening of the Davenport-Waddell link of the Ocean Shore Highway connecting Santa Cruz with San Francisco were held in Davenport on Sunday, September 15.

Directors of Joint District No. 9, composed of San Francisco, San Mateo and Santa Cruz counties, joined with State and local dignitaries in hailing completion of the new stretch of highway which, with projects completed between Rockaway Beach and Half Moon Bay and

the shore of the Pacific Ocean along nearly one-half the coast line of California. In Santa Cruz County the route follows the ocean shore from Watsonville through Santa Cruz, thence northerly through Davenport into San Mateo County at Point Ano Nuevo and through the towns of Pescadero, Half Moon Bay and Rockaway Beach.

The portion of the route in Santa Cruz and San Mateo counties is destined to become a most important recreational, and to a large extent commercial, highway for the San Francisco Bay area. The Depart-

the bluffs along the ocean shore. From these bluffs, rising to heights of 50 to 200 feet above the water, may be had magnificent views of the Pacific and its rugged coast.

The old road was built by Santa Cruz County in 1852 and conformed to the standards of that day. Even with maintenance and some improvement the roadbed, at the time construction on the present contract was begun, was from 20 to 24 feet wide and the width of the traveled way was only 14 feet to 16 feet. The alignment consisted of many sharp curves and the grade line rose and



Heavy black line shows direct route of new unit of Ocean Shore Highway north of Santa Cruz compared with winding old road.

over Pedro Mountain, constitutes the third major unit of what ultimately will be one of California's most scenic routes.

Supervisor John Ratto of San Francisco, as chairman of Joint Highway District No. 9, was master of ceremonies at Davenport, where a luncheon at the Ocean View Hotel was a feature of the celebration.

A contract for construction of the Davenport-Waddell link of the Ocean Shore Highway, State Sign Route 1, was awarded by the Department of Public Works on November 14, 1938.

The Ocean Shore Highway skirts

ment of Public Works has for the past several years been advancing major construction projects along portions of the road near San Francisco, such as that between Half Moon Bay and Rockaway Beach and the construction of the road over Pedro Mountain. Major improvement of the portions of the route in Santa Cruz County has begun with the contract now completed between Davenport and Waddell Creek.

The location of the highway between these two points lies for the most part along the bench of Monterey shale which extends from the base of the Santa Cruz Mountains to

fell from elevations of 15 feet to 510 feet.

The new road as laid out and constructed by the Division of Highways is based on modern standards adequate for the demands of present day traffic.

Comparison of these standards to those of the old road gives striking evidence of the progress in highway construction during the past 85 years.

The length of section just completed is 8.2 miles and the old road wound for 10.3 miles between the two points limiting the contract.

(Continued on page 17)



Two views of sections of new State highway along the ocean north of Santa Cruz between Davenport and Waddell Creek.

Laws Passed by 1939 Legislature Affecting State Highway System

By C. C. CARLETON, Chief Attorney Department of Public Works

THE 1939 session of the California Legislature continued the general policies indicated in previous sessions, of carrying on the State highway program in substantially the same manner as has been practiced for a number of years.

The complete absence of legislation of a type inimical to the carrying forward of the State highway program and the passage by the legislature and approval by Governor Culbert L. Olson of the measures hereinafter described, indicate the extremely favorable consideration accorded to all of those who are interested in progressive State highway legislation.

The 1939 legislation, unless otherwise specifically provided in a particular chapter, took effect on September 19, 1939.

The limitations upon the length of an article of this kind prevent discussion of every bill of interest to the Division of Highways, as a great many measures which affect State government generally apply to the work carried on by the Division of Highways. There was a considerable volume of such legislation but in this article reference will be made only to that legislation which is of primary relationship to the highway program.

HIGH-TYPE HIGHWAYS ENCOURAGED

There were three laws enacted which should prove of inestimable value in carrying on California's program of developing high-type highways adequate to care for the ever increasing volume of traffic, particularly on our main line routes and in and around the metropolitan centers of the State.

CHAPTER 687.—This statute is a definite step forward, placing this State among the highway leaders of the states in the Union. This chapter recognizes a freeway as a new type of highway to which abutting property shall have no right of access. Under the new law, the department



C. C. CARLETON

is authorized to acquire the necessary rights of way and rights of access from private property to construct and maintain such freeways. The intersections of local city streets or county roads with such freeways can be regulated or eliminated by agreement with the local authorities. New intersections of local streets or highways with freeways can not be made without the consent of the California Highway Commission.

While Chapter 687 authorizes the State, in connection with State highways, to construct such freeways, Chapter 359 authorizes cities likewise to construct freeways. State highways can not be affected by such freeways without the consent of the Highway Commission.

CHAPTER 268.—Authorizes the construction of divided highways either on existing roads or on new

openings. In addition, this law authorizes the construction of service roads along the sides of existing State highways or new highways to be constructed. Crossing the central dividing strip or the physical barrier between the service road and the main portion of the divided highway will be prohibited except at such locations as are provided.

CHAPTER 684.—Authorizes the Department of Public Works with relation to State highways to adopt a distinctive marking to be placed in the center of State highways over which it will be unlawful to cross. The department by an order of the Director of Public Works, Frank W. Clark, has adopted the double line now in use as such distinctive marking under the authority of this law.

While a freeway divided in the center into two distinct roadways for traffic traveling in opposite directions constitutes development of the highest type, it is recognized that the cost of constructing such highways over any considerable mileage would be prohibitive, and the other two measures are designed to permit the building of highways approaching that principle without incurring the heavy cost involved in the construction of an absolute freeway.

STATE HIGHWAY ROUTES

The legislature continued its policy of the last three sessions of refusing to permit any wholesale additions to the State highway system. Only those highways, the inclusion of which was acceptable to the department, were included within the system.

CHAPTER 473. Makes many minor changes in the descriptions of the various routes. This bill was introduced and passed at the request of the department to take care of those necessary changes in descriptions caused by relocations.



Sunken section of Arroyo Seco Parkway a 6-lane freeway with parallel service roads and no grade intersections as authorized by legislature, now under construction between Los Angeles and Pasadena.

CHAPTER 794. Adds some four miles from the Pacific Highway to the site of the new Shasta Dam. Due to the immense amount of interest being displayed by the public generally in the Central Valley Project, it was deemed necessary to provide an adequate highway to the site of the dam.

CHAPTER 338. Adds a new route from Canby to Merrill in Modoc County, to take effect only when the highway between these two points has been constructed to an adequate standard by the Federal Government.

HIGHWAY WORK GENERALLY

No major change was made in the method of performing highway work. The practice of doing major construction work by contract after competitive bidding remains unchanged. Certain minor changes, however, affecting construction work were made.

CHAPTER 224. Amends the State Contract Act to permit the doing of work by day labor in cases of emergency due to the failure of bridges or other structures without the necessity of first preparing complete plans, specifications and estimates of cost. This chapter also

makes it clear that the other divisions of the department (Architecture and Water Resources) may use unit basis contracts in performing their work. The Division of Highways has used this type of contract for many years.

CHAPTER 315. Clarifies the relationship between the State Reclamation Board and the Division of Highways in so far as highway structures across waterways under the control of the Reclamation Board are concerned. Under the bill plans for all highway structures across streams, channels or basins under the jurisdiction of the Reclamation Board will be submitted to that board for approval. When such plans have been approved by the Reclamation Board and the project completed in accordance therewith, the Reclamation Board can not force a change in design without being ready to bear the expense thereof.

CHAPTER 264. Covers a number of matters. It clarifies the authority to construct and maintain stock trails. Minor changes are made in the procedure to be followed in renting equipment. Minor changes in our system of accounting are authorized which should greatly simplify that work. Changes are also made

in clarifying the rights and obligations of the State in so far as changing the grade of State highways is concerned.

CHAPTER 595. Authorizes permission to be granted to the State Highway Engineer to take outside employment from local governmental agencies.

CHAPTER 1121. Makes a number of minor amendments to the Outdoor Advertising Act, all designed to clarify the provisions of the act, and to render its enforcement more efficient.

FISCAL AFFAIRS

No major changes were made either in the revenues available for highway purposes nor in the apportionment of available funds.

CHAPTER 681. Permits a slightly broader use of the revenue from the Diesel fuel tax.

CHAPTER 1042. Provides for the escheat to the State Highway Fund of the unclaimed excess tolls collected by the Carquinez Bridge pending the litigation which followed the order of the Railroad Commission reducing tolls on the bridge.

CHAPTER 897. Authorizes the disbursing officers of the various de-

(Continued on page 24)



Realignment of Russian River-Gravenstein highway between Guerneville and Monte Rio in redwood recreational area of Sonoma County provides a beautiful drive along the river.

Realignment of Russian River Highway Opened With Ceremony

OPENING a new scenic region in the Russian River recreational area, the \$250,000 unit of the Gravenstein-Russian River Highway from Guerneville to Northwood was dedicated on Sunday, September 17, with appropriate and picturesque ceremonies.

State officials joined with Sonoma County and representatives of the Redwood Empire Association and the Russian River Recreational Region, Inc., in celebrating the occasion.

The new highway, 3.23 miles in length with a 36-foot pavement and wide, sweeping, safe curves, replaces an old, obsolete and dangerous road. There are long, straight-away stretches through groves of redwood on the new roadway, portions of which skirt the Russian River, affording motorists a clear view of the stream with its bathing beaches on one side and sum-



Supervisor Guidotti (left) hands axe to Highway Commissioner Hitchcock to sever redwood barrier.

mer homes among shaded forests on the other side.

The realigned highway follows the old roadbed of the Northwestern Pacific railroad. Sturdy retaining walls constructed of 12-inch "H" steel beams lagged with 6 by 12-inch timbers and anchored with steel rods provide secure embankments for the highway fills that replace some 1230 feet of abandoned railway trestles.

Other construction features are two concrete deck bridges. One is across Hulbert Creek at the entrance to Guerneville Park. It adjoins a concrete bridge, making a two-way divided structure 177 feet long. A second bridge is across Fife Creek and is 127 feet long.

For many years the region through which the new highway runs was devoted to commercial lumber activities on a huge scale. Gradual development of the area

as a playground and summer home and resort section increased motor traffic which rapidly outgrew the highway facilities.

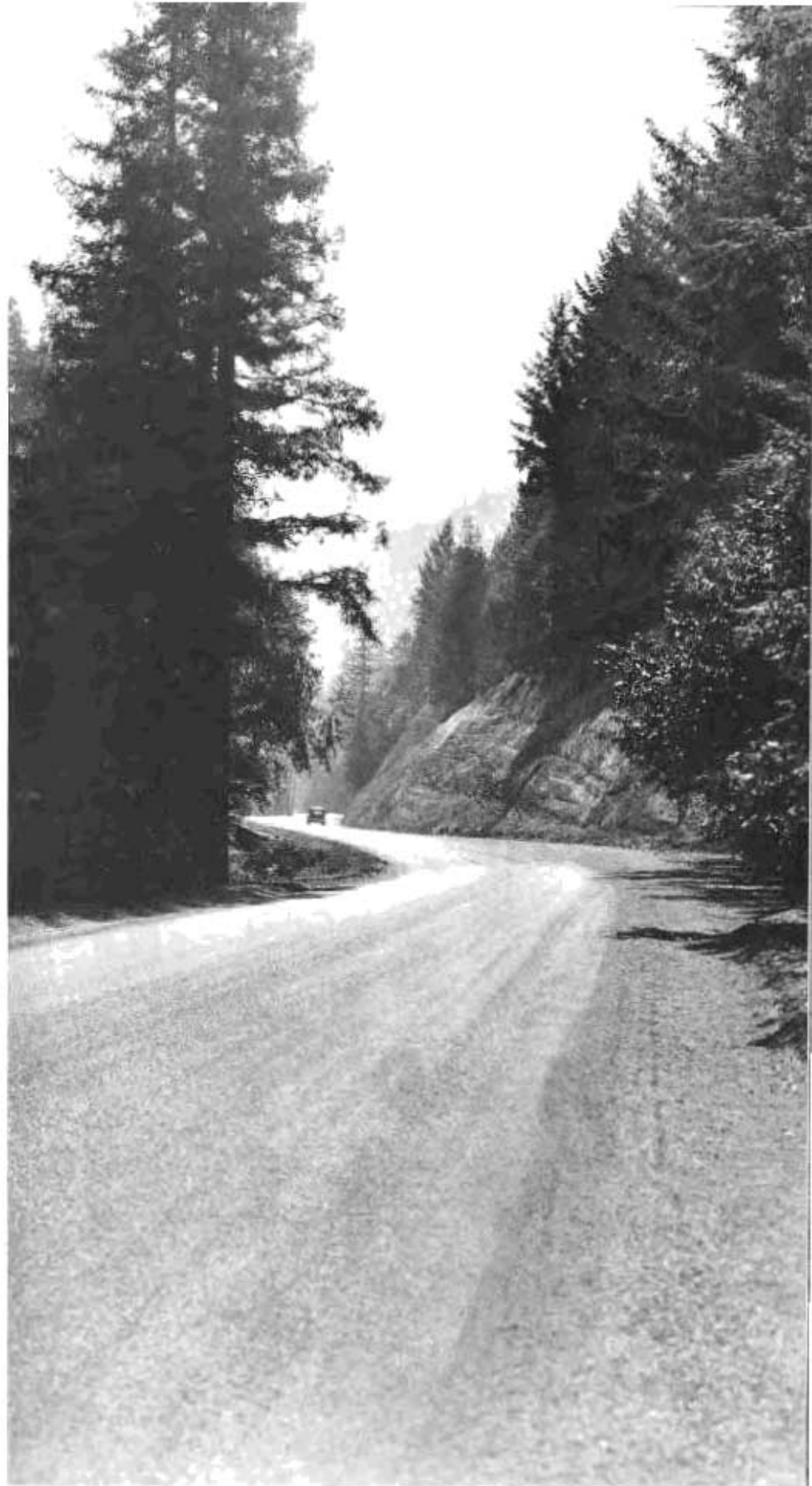
To meet this situation, the Russian River Recreation Region, Inc., and the Sonoma County board of supervisors, led by Chairman E. J. Guidotti, worked out a program with the California Highway Commission under which Sonoma contributed \$20,000 to help pay construction costs of the Guerneville-Northwood project.

Dedication ceremonies began in Guerneville at 10.15 Sunday morning with the assembling of a motor caravan which proceeded over the old road to Monte Rio and then returned to Northwood where a barrier of redwood tree trunks and boughs was cut away by Highway Commissioner L. G. Hitchcock of Santa Rosa, signaling the official opening of the new highway. A luncheon was served in Guerneville Park.

Officiating for the State at the dedication were Commissioner Hitchcock, representing Governor Culbert L. Olson and Director of Public Works Frank W. Clark; Amerigo Bozzani of Los Angeles, member, and Byron N. Scott, secretary, of the Highway Commission; District Highway Engineer John H. Skeggs and Assistant District Engineer Paul Harding, San Francisco; and Senator Herbert W. Slater of Santa Rosa.

The Redwood Empire Association was represented by President Paul E. Mudgett, Vice-President Harold B. Rosenberg, M. Goldman and other officials. President Harry Harris and Secretary R. W. Miller of the Russian River Recreational Region, Inc., together with other officials of that organization, participated.

Civic groups were represented by Carl Hess, president, and Lee Torrs, secretary, Monte Rio Chamber of Commerce; Ernest Johnson, president, and Henry Brown, secretary, Guerneville Chamber of Commerce; Henry Laws, president, Marguerite Fuller, secretary, and J. P. Kelly, chairman of the Highways Committee, Associated Chambers of Commerce of Sonoma County. The Golden Gate Bridge District was represented by two of its directors, Frank P. Doyle and Joseph Berry. Interesting, informative talks were made by several luncheon speakers.



Beautiful vistas through the redwoods greet the eye on new highway

Pomona Grade Separations Involve Channelized Ramp Approach System

By J. H. OBERMULLER, Assistant Engineer of Surveys and Plans

CONSTRUCTION has started on a grade separation project on State Highway Route 77, west of Pomona in Los Angeles County wherein the roadway approaches to the structures over two adjacent railroad lines consist almost wholly of interconnected channelized ramps and interseptions.

The project is not long. Its termini each side of the railroad crossings bring the entire length of the project within the limits eligible for Federal grade separation funds. Nevertheless its design assumed importance be-

State Highway 77 as an extension of the Los Angeles-San Diego Inland Route crosses these rail and road facilities and although the West Pomona grade separation project is temporarily an isolated unit of the eventual development of Route 77, it does define the permanent location for this part of the route and does fulfill a requirement of long standing for connecting other highways and the alternative street routings through Pomona. It eliminates the necessity of through traffic crossing the railroad tracks in Pomona by substituting

Pomona on the south side of the railroads after collecting the traffic on the Valley Boulevard from Los Angeles and the traffic from the southeasterly metropolitan areas. Route 19 continues east past Ontario and Riverside to join Route 26 at Beaumont.

Topographic features west of Pomona are responsible for the convergence of rail and highway locations and they also influence the takeoff of Route 77 in the latter's southeasterly course to meet available routing toward San Diego. The selection of the site of the current project estab-



Grade separations over adjacent railroads and a city street on State Route 77 connected by channelized ramp approach system.

cause of the significance of highways correlated by this single unit of an ultimate relocation of Route 77 through the city of Pomona.

Two railroad crossings are involved over lines of the Southern Pacific and Union Pacific. With tracks not widely separated the railroads constitute definite highway control in that vicinity and the effect extends through and on each side of Pomona by splitting the city development and highway traffic. As a consequence major east-west traffic and interchange between important highway routes has been discouraged.

a separation for one grade crossing and permitting the closure of another one.

The principal east and west routings through the city are Route 26, Route 19 and the Second Street routing to and from the business section of Pomona. Route 26, locally called Holt Avenue, lies north of the railroads and is being developed on freeway principles to serve as one of the heaviest traveled direct arterials between Los Angeles and the Imperial Valley via Pomona and Colton.

Route 19 (Fifth Street) and the Second Street routing pass through

lishes connections at a point and in a manner that will greatly facilitate traffic movement without prejudice to existing conditions and with relief to through traffic and local requirements.

The plan separates crossing of the railroads by overheads on each line. An existing overhead structure of the Union Pacific is utilized by widening it and determines the structure crossing the nearby Southern Pacific tracks. Subway construction would be less satisfactory because of adverse drainage conditions and the danger of flooding from low adjacent territory.

The existing Union Pacific struc-

ture is 115 feet long with 40-foot roadway. Widening will provide two 35-foot roadways with four-foot dividing strip and sidewalks. In widening, the existing walks are to be removed and a slab section added carried on three continuous reinforced girders which frame into two column bents.

Columns are set on individual spread footings and bents are keyed into top of the original structure. The widened portion has three spans with cantilever extensions. The structure is on 30 degree skew and provides for two railroad tracks.

The structure over the Southern Pacific railroad will be reinforced concrete 233 feet long with two 25-foot roadways each side of a 4-foot dividing strip and with sidewalks. It will provide for four railroad tracks and one of the highway ramps. Due to track location and highway ramp, interior spans have unequal length. The structure has seven girders and is of the stiff frame type except that girders are set on rockers at end bents. The girders frame into columns set on spread footings. Collision walls connect columns along the tracks and extend to a height of seven feet.

The roadway approaches and connections are almost entirely on fill sections. On main routing the roadways are separated by curbed dividing strip or by widened islands at intersection channelization. These roadways have a 23-foot pavement plus gutters where adjacent to curbs. Seven-foot shoulders and berms are provided on normal sections.

Between the two structures outside curbs connect structure curbs with shoulders extended for walkways. Extra lanes each side have been provided as extensions of the ramp connections giving six-lane width for an appreciable distance to facilitate traffic movement.

The connections to Second Street on both sides of Route 77 are made by ramps on which 26-foot width of roadway between curbs will carry one-way traffic. The westbound ramp from Route 77 passes under one of the overhead structures.

The connection to Fifth Street (Route 19) is made near ground level. Each roadway for one-way traffic has 23-foot pavement width and standard shoulders. Part of the Fifth Street intersection design is subject to future revision when Route 77 is extended by construction south of Route

Ocean Shore Highway Realignment Eliminates 133 Curves in 10 Miles

(Continued from page 10)

While a saving of 2.1 miles may not seem particularly significant, it is nevertheless approximately 25 per cent of the distance.

On the old route there were 150 curves in the ten miles with a total curvatures of 5300 degrees and the minimum radius of the curves, which determines their sharpness, was 55 feet. On the new alignment there are only 17 curves with a total curvature of 270 degrees. This reduction of 133 in the number of curves carries with it a reduction of 5030 degrees of curvature.

The minimum radius for curves used on this project is 2000 feet, which is the state standard for modern alignment.

19. For the present there is required provision only for traffic to and from Route 19 with most of the movement to and from the east. The design was planned to give freedom to this major current movement but curbs have been omitted where future changes may be made.

At intersection points or connections a system of island channelization has been laid out. Recessed curbs are used and a full complement of reflector buttons, flasher lights and electroliers are provided at essential sites. Several minor separation points will temporarily have painted islands pending observation studies of traffic for decision on the advisability of constructing small additional islands. Proposed signing for the various traffic movements became, as usual, an important factor in laying out the channelization.

When this improvement is completed there will be removed or greatly improved the existing difficulties and hazards for both through and local traffic passing into or through Pomona vicinity on north and south sides of the railroads. All movements on the State routes, the several county laterals and the local city streets are consistently served.

The construction contract has been awarded to John Strona, Pomona, California. The construction cost is \$214,000.

As on all new construction the grade line is smooth and the steep pitches and rolling grades have been eliminated. The highest point reached by the new road is only 213 feet as against the former 510 feet.

Construction operations on the project required the excavation of over 500,000 cubic yards of earth in the roadway prism. As the native material had been found unsuited for mixing with liquid asphalt for surfacing it was necessary to place 9500 cubic yards of imported surfacing material. This material was placed 22 feet wide and 1.17 feet deep on the 36-foot graded roadbed. The road-mix surface treatment required 1850 tons of liquid asphalt.

Provision for adequate drainage required the placing of 6000 lineal feet of corrugated metal pipe culverts and 4300 lineal feet of perforated metal pipe underdrains.

At the crossing of Scott Creek, the State has built a reinforced concrete bridge. This structure is placed on 50 precast concrete piles and a total of 1012 cubic yards of concrete were used in its construction and that of box culverts, headwalls and other minor structures. A total of 154,200 pounds of bar reinforcing steel was required.

To prevent scour and washing around the footings of the Scott Creek bridge nearly 5000 cubic yards of heavy rock rip rap was placed.

It is estimated the improvement will cost approximately \$296,030. Financing was made partially possible by the contribution of \$150,000 by Joint Highway District No. 9, formed in 1928 by Santa Cruz, San Mateo and San Francisco counties. The remainder was provided from the State highway fund, 58 per cent from federal apportionments for Federal Aid secondary roads and 42 per cent from State money.

N. M. Ball Sons of Berkeley were the contractors on the work and the Resident Engineer for the State was H. A. Simard.

"Hey, what's the big idea, painting your car red on one side and blue on the other?"

"It's a great idea. You should hear the witnesses contradicting each other."

Traffic on State Highways Shows Increase of 9.1 per cent over 1938

By C. H. PURCELL, State Highway Engineer

THE annual state-wide traffic count on State highways for the current year was taken on Sunday and Monday, July 16 and 17, at approximately 1300 stations throughout the State and reveals an increase of approximately 9 per cent over the corresponding period in 1938.

This marks a definite change in the trend which has been noted since 1935 wherein the annual summer counts, while showing increases over previous years, nevertheless indicated that the rate of increase was steadily declining. The Division of Highways was greatly concerned over the trend and the consequent decrease in gasoline consumption. The traffic count of 1938 showed a less than one per cent increase over that of 1937.

UPTURN IN JULY

From our records it appears that the marked upturn in traffic began last June and further accelerated in July. Comparing the number of out-of-State cars recorded during the annual July counts in 1938 and 1939, we discovered that this type of traffic, due in some measure to the San Francisco Exposition, has increased approximately 80 per cent over last year.

This increase accounted for approximately 3.4 per cent of the over-all increase of 9.1 per cent, which still leaves us with an intrastate traffic which is approximately a 6 per cent increase over that of 1938, when traffic had flattened out to a point where it remained almost at a standstill with the traffic of 1937.

The count this year showed a total of 11,548,024 vehicles passing the 1300 stations as compared with 10,442,659 vehicles for the Sunday and Monday count of July, 1938, an increase of approximately 9.1 per cent.

The count of out-of-State cars on these same dates this year showed a total of 742,702 as against 422,023 in the 1938 count, an increase of about 80 per cent.

It is a source of satisfaction to us that a comparison of the seven months' period, January to July, 1939, with the same period in 1938, based on monthly counts which show an increase of 4.7 per cent in traffic on State highways, is substantiated by the fact that a similar comparison for the same periods of monthly gasoline tax sales for the entire State, as reported by the Board of Equalization, shows an increase of 4.5 per cent.

Increases were quite similar for both Sunday and Monday in the 1939 count; and while there was some variation in the rate all route groups participated in the general increase.

The State total is very naturally greatly influenced by whatever record is set by the main north and south routes. It is to be noted that all of these show a marked increase, the smallest percentage being on Route 4, U. S. 99 between Los Angeles and Sacramento, a circumstance readily accounted for by the fact that this route recorded a notable increase over the previous year in July, 1938, when most of the other main routes were showing only very moderate gains or even losses.

LOSSES ON MINOR ROUTES

The number of routes showing losses either in Sunday or Monday traffic is very much smaller than during the 1938 count, and in most instances these were comparatively minor routes and the losses were moderate or merely nominal.

The regular procedure of previous years was again followed in taking this year's count. Actual recording covers the 16-hour period from 6 a.m. to 10 p.m. for both Sunday and Monday. Traffic was segregated by hourly periods into the following vehicle classifications:

California passenger cars, out-of-state passenger cars, buses, light trucks, heavy trucks, trailers drawn by trucks, trailer coaches, and other passenger-car trailers.

Each year some minor changes in the census become necessary, such as the relocation, addition, or discontinuance of individual stations; but in every instance these are excluded when determining comparisons with the previous year, only those stations that were identical during both years being taken into consideration.

These comparisons for the various route groups are as follows:

PER CENT GAIN OR LOSS FOR 1939 COUNT AS COMPARED WITH 1938

	Sunday	Monday
All Routes	+ 9.64	+ 8.86
Main North and South Routes	+ 13.30	+ 11.43
Interstate Connections	+ 2.79	+ 1.75
Laterals Between Inland and Coast	+ 6.19	+ 5.92
Recreational Routes	+ 9.81	+ 11.68

The gain or loss of traffic volume for State Highway Routes 1 to 80 inclusive, which constitute the basis for the foregoing summary, is shown in the following tabulation:

Route	Termini	1939		Per cent. gain or loss	
		Gain	Loss	Sunday	Monday
1.	Sausalito-Oregon Line	21.18		21.05	
2.	Mexico Line-San Francisco	13.85		12.62	
3.	Sacramento-Oregon Line	8.54		13.83	
4.	Los Angeles-Sacramento	5.46		3.33	
5.	Santa Cruz Jc. Rt. 65 near Mokelumne Hill	11.22		8.86	
6.	Napa-Sacramento via Winters	20.65		17.86	
7.	Crockett-Red Bluff	21.51		16.93	
8.	Ignacio-Cordelia via Napa	2.73		2.56	
9.	Rt. 2 near Mantalvo-San Bernar- dino	2.12		0.86	
10.	Rt. 2 at San Lucas-Sequoia National Park	1.80		4.99	
11.	Rt. 75 near Antioch-Nevada Line via Placerville	3.55		2.95	
12.	San Diego-El Centro	1.18		3.29	
13.	Rt. 4 at Salida-Rt. 23 at Senora Jc.	7.93		14.31	
14.	Alhambra-Martinez	22.12		22.93	
15.	Rt. 1 near Calipatria-Rt. 37 near Cisco	7.15		0.97	
16.	Hopland-Lakeport	1.20		5.81	
17.	Rt. 3 at Roseville-Rt. 15, Nevada City	11.64		4.87	
18.	Rt. 4 at Merced-Rt. 40 near Yosemite	10.41		7.96	
19.	Rt. 2 at Fullerton-Rt. 26 at Bennington		7.45		4.87
20.	Rt. 1 near Arcata-Rt. 83 at Park Boundary	6.06		4.28	
21.	Rt. 3 near Richvale-Rt. 29 near Chilcoat via Quincy	1.12		3.68	
22.	Rt. 56, Castroville-Rt. 29 via Hollister	29.07		11.01	
23.	Rt. 4 at Tunnel Sta.-Rt. 11, Alpine Jc.	8.22		11.09	
24.	Rt. 4 near Logi-Nevada State Line	9.85		10.38	
25.	Rt. 37 at Colfax-Rt. 83 near Sattley		8.18		5.21
26.	Los Angeles-Mexico via San Bernardino	2.40		0.48	
27.	El Centro-Yuma		17.87		17.86
28.	Redding-Nevada Line via Al- turas	21.52		31.42	

Route	Termini	1939			
		Per cent, gain or loss		Monday	
		Gain	Loss	Gain	Loss
29. Peanut-Nevada Line near Purdy's		11.00			8.85
31. Colton-Nevada State Line			1.19	2.77	
32. Rt. 56, Watsonville-Rt. 4 near Califa		16.98			0.52
33. Rt. 56 near Cambria-Rt. 4 near Famosa			5.42		3.04
34. Rt. 4 at Galt-Rt. 23 at Pickett's Jc.		28.73		16.23	
35. Rt. 1 at Alton-Rt. 20 at Douglas City			2.25		13.90
37. Auburn-Truckee		24.23		23.72	
38. Rt. 11 at Mays-Nevada Line via Truckee River		18.71		16.78	
39. Rt. 38 at Tahoe City-Nevada State Line			4.64	5.23	
40. Rt. 13 near Montezuma-Rt. 76 at Benton		35.00		51.50	
41. Rt. 5 near Tracy-Kings River Canyon via Fresno		4.16		4.81	
42. Redwood Park-Los Gatos		1.00		7.00	
43. Rt. 60 at Newport Beach-Rt. 51 near Victorville		9.72		5.13	
44. Boulder Creek-Redwood Park		14.87		6.27	
45. Rt. 7, Willows-Rt. 3 near Biggs			5.06		1.38
46. Rt. 1 near Klamath-Rt. 3 near Cray		No change		11.91	
47. Rt. 7, Orland-Rt. 29 near Merjan			0.88	6.44	
48. Rt. 1 N. of Cloverdale-Rt. 56 near Albion		64.27		31.09	
49. Napa-Rt. 15 near Sweet Hollow Summit			0.37	2.60	
50. Sacramento-Rt. 15 near Willow Springs		8.44		1.74	
51. Rt. 8 at Schellville-Sebastopol		22.85		11.06	
52. Alto-Tiburon		4.47			29.50
53. Rt. 7 at Fairfield-Rt. 4 at Lodi via Rio Vista			9.30		2.91
54. Rt. 11 at Perkins-Rt. 65 at Central House			5.05	7.43	
55. Rt. 5 near Glenwood-San Francisco		21.97		8.74	
56. Rt. 2 at Las Cruces-Rt. 1 Fernbridge		13.81		16.36	
57. Rt. 2 near Santa Maria-Rt. 23 near Freeman via Bakerfield			8.04		0.44
58. Rt. 2 near Santa Margarita-Arizona Line near Topock Mohave and Barstow		9.41	1.80		
59. Rt. 4 at Gorman-Rt. 43 at Lake Arrowhead		15.59		2.23	
60. Rt. 2 at Serra-Rt. 2 at El Rio		16.25		18.29	
61. Rt. 4 S. of Glendale-Rt. 59 near Phelan			3.07	3.12	
62. Rt. 171 at Northam-Rt. 61 near Crystal Lake		0.45		8.12	
63. Big Pine-Nevada State Line		25.29		9.86	
64. Rt. 2 at San Juan Capistrano-Blythe		7.67		2.10	
65. Rt. 18 near Mariposa-Auburn		1.69		1.77	
66. Rt. 5 near Mossdale-Rt. 13 near Oakdale		8.31		16.67	
67. Pajaro River-Rt. 2 near San Benito River Bridge		6.89		14.69	
68. San Jose-San Francisco		16.39		12.04	
69. Rt. 5 at Warm Springs-Rt. 1, San Rafael		9.91		16.11	
70. Ukiah-Talmage		28.03		9.69	
71. Crescent City-Oregon Line		28.39		20.35	
72. Weed-Oregon Line		41.61		7.58	
73. Rt. 29 near Johnstonville-Oregon Line		2.84		10.25	
74. Napa Wye-Cordelia via Vallejo and Benicia		0.43		6.63	
75. Oakland-Jc. Rt. 65 at Altaville		1.67		10.71	
76. Rt. 125 at Shaw Ave.-Nevada State Line near Benton		9.82		21.92	
77. San Diego-Los Angeles via Pomona		6.41		13.73	
78. Rt. 12 near Descanso-Rt. 19 near March Field		6.89		9.81	
79. Rt. 2, Ventura-Rt. 4 at Castaic		0.76	10.55		
80. Rt. 51, Rincon Creek-Rt. 2 near Zaca		4.35	5.55		

"I'm in a terrible spot. My wife doesn't know anything but one-syllable words."

"Mmm. That's almost unbelievable for a wife."

"Why?"

"'Money' has two syllables."



Approaches to bridge washed away by desert torrents on U. S. 60.

\$500,000 Damage to Desert Highways in South by Rains

(Continued from page 8)

of September 25th, bringing the total rainfall in Coachella Valley to approximately 11 inches for the storm period during September.

The September 25th storm also covered practically the entire northerly end of the Colorado Desert, gathering considerable intensity along the Colorado River, where all of the repair work which had been done on U. S. Highway 95 was destroyed and considerable additional damage occurred.

Traffic is now routed through on all of the highways but it will not be possible to complete all of the repairs on the storm damaged highways for several weeks.

The estimated cost of placing the damaged highways in condition to again carry traffic, without any improvement or additional protection, is approximately \$120,000.

The ditch and dyke system on that portion of the highway west of Blythe was one of the earlier constructed systems on which the ditches and levees are somewhat too flat and bridges too far apart and inadequate to carry any such storm as has just occurred. It is hoped that some Federal assistance may be secured which may permit more adequate protection work, enlargement of structures and

Communities Must Organize to Receive Water and Power

(Continued from page 5)

become consumers and are directly interested in obtaining water and power at the lowest possible cost.

Business generally also has a vital interest in the creation of these outlets so water and power will be available to the greatest number of users at the lowest possible cost. Money saved on irrigation and power bills will be spent on farm machinery, industrial expansion, household furnishings and a higher living standard.

For this reason, if none other, the disposition of water and power from the Central Valley Project is of prime importance to every businessman in the state.

Governor Culbert L. Olson has pledged himself and his administration to the assurance of means for public ownership and operation of plants and distributive facilities through which this water and power may be obtained at cost.

With the backing of those who are to benefit by this program—agriculture, industry, municipalities and business—he can and will fulfill this pledge to the people of California.

reconstruction of the highway to a standard that will avoid to a large extent the recurrence of such storm damage.



Scenic view on new "Industrial Highway" across Diablo Valley in Contra Costa County showing Mount Diablo in background.

First Unit of 'Industrial Highway'

TAPPING the cities of Martinez, Pittsburg, Antioch and other centers along deep water, the first unit of the Industrial Highway in Contra Costa County which ultimately will provide for smooth traffic flow from the rich farm lands of the San Joaquin Valley was completed by the Division of Highways last month. The new route entailed construc-

tion on a direct alignment from the easterly end of Franklin Canyon at Muir Station across the lower end of the Diablo Valley to a connection with the Concord-Pittsburg highway near the westerly end of Willow Pass. The next projected improvement will be reconstruction on modern standards of the route through Willow Pass.

The recently completed stretch of

roadway is eight miles in length and constitutes a two-lane highway paved 22 feet wide with heavy plant-mixed surfacing. Each traffic lane is 11 feet in width to conform to latest standards of the Division of Highways. Adequate bituminous treated shoulders are on both sides of the pavement.

Plans for future development of

(Continued on page 28)





At top—Section of new 22-foot "Industrial Highway" between Willow Pass and Franklin Canyon in Contra Costa County. Center—Grade separation structures carrying county road and railway. Bottom—View looking westerly through deep cut near east end of Willow Pass.

Evolution of the Striping Machine

WITH the growing importance of properly striping thousands of miles of California State highways, the engineering staff of Headquarters Shop of the Division of Highways in Sacramento is constantly striving to improve the traffic stripe marking machines used by the Division.

A new stripe marking outfit has been turned out at the shops for use in District III. While it is substantially the same in design as the machine now operated by the Division, a number of changes in construction have been made.

It was found advisable to increase the carrying capacity of the truck used with the stripe marking units to allow the hauling of a larger supply of paint. Also, on the larger trucks with the conventional type cab, the truck hood interfered with the truck driver's view of the marking machine and its operator. On the new machine the cab-over-engine type of truck is used. This affords a much wider range of vision for the truck driver and makes it possible to secure sufficient floor space on the truck body with the use of a comparatively short wheel base truck.

MORE PAINT CAPACITY

The new units are equipped with an additional paint tank for carrying yellow paint for use on double-line work. The valves and fittings have been rearranged for convenience in handling.

On the late type divided highways it was decided to place a white line next to the dividing curb or center strip, and it was necessary to improvise some means of doing this. It was not feasible to straddle the desired position of the white line, as the center strip on most of these roads is not finished, and it would be impossible to put down a straight line. The shops therefore devised an outrigger attachment for these machines, permitting the striping assembly to be set far enough out to clear the wheels both of the marking carriage and the propelling truck. When this is done it is necessary to put down an offset guide line, or pilot stripe, and the truck and marking machine follow this offset line.

By R. H. STALNAKER
Equipment Engineer



It is a far cry from the striping machine created in the early 20's by engineers of District IV to the improved outfit now being produced at the Division of Highways Shop. This first machine was pushed by hand, the paint being deposited in a reservoir attached to the frame and flowing by gravity through a rubber tubing to the pavement immediately ahead of a paint brush which spread the paint on the road. (See Photo No. 1 on this page.)

In the late 20's, the hand-powered machine followed. (Photo No. 2.)

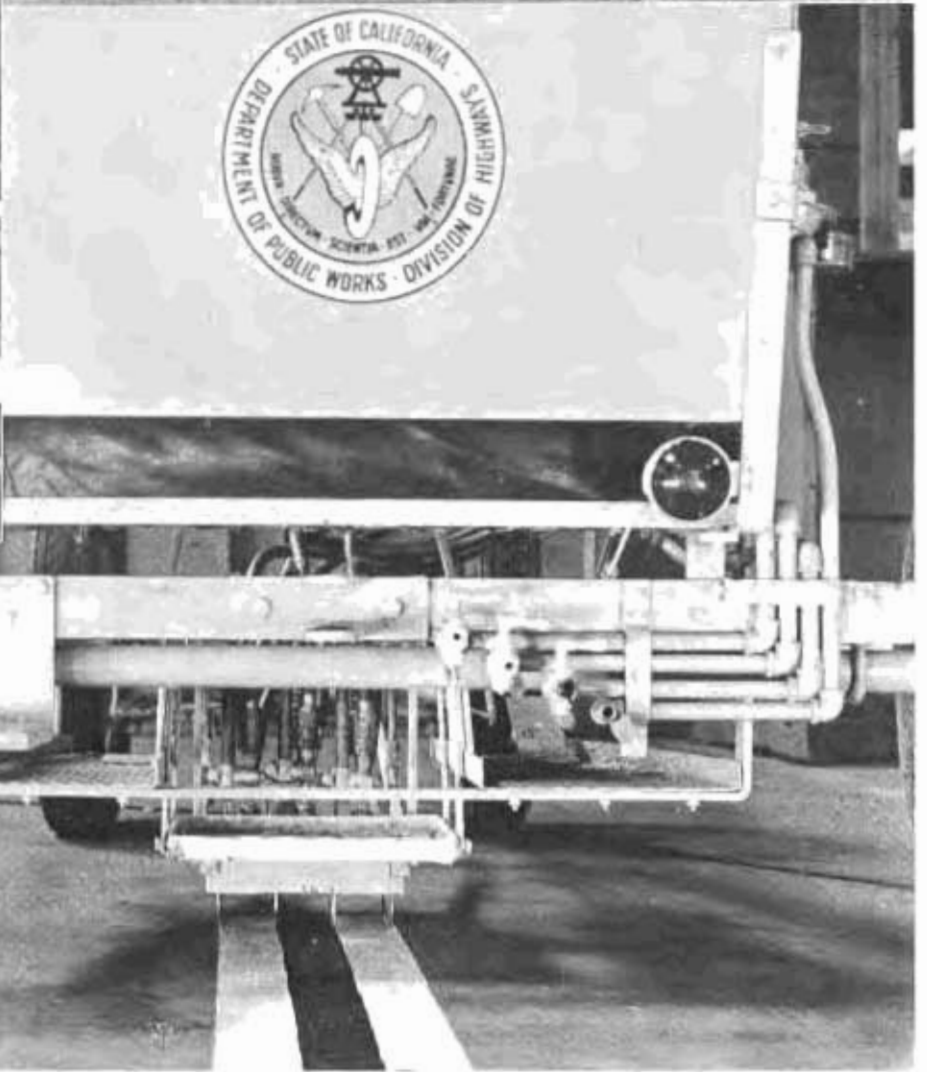
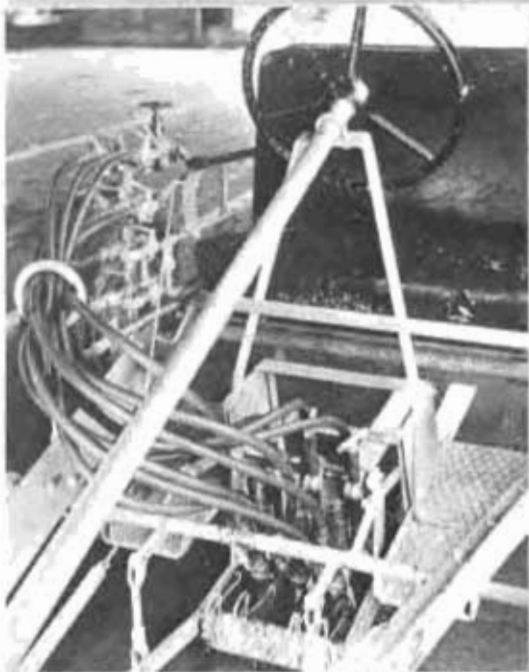
SAT ON THE BUMPER

The first unit on which the paint supply and compressor were mounted on a truck was used in the early 30's. A seat for the operator was arranged on the bumper of the truck and the marking machine was propelled by a push bar from the truck. (Photo No. 3.)

Next came the chassis type marker which provided a seat for the operator and was constructed with a longer wheel base which only painted a single 4-inch line. On this unit also the paint supply tank and air compressor were mounted on the truck propelling the unit. This machine was used until about 1937. (Photo No. 4.)

In 1937 District IV designed a machine which laid the three-stripe centerline on pavements in one operation. The paint and air controls were mounted on the chassis of the striper, which was propelled ahead of the truck by a push bar. The truck also carried the air compressor unit and mixing tank equipped with an agitator where the paint was prepared for filling the supply tanks. The supply tanks were filled by pumping the paint from the mixing tank. (Photo No. 5.)

This is the type of machine on which improvements have been made by Headquarters Shop.



At top—Complete striping outfit in operation restriping triple line. Man on truck mixing paint with hand agitator. Center—Close-up showing paint and air lines to each spray gun and controls. Bottom—Rear view of striping unit laying triple stripes.

Legislation of 1939 Session Affecting State Highways

(Continued from page 13)

partments to endorse warrants issued by the controller when for some reason the claimant should not receive the warrant directly, as, for example, when the claim has previously been paid through a revolving fund.

CHAPTER 961. Provides for the proration among the various special funds in the State treasury of the cost of administering the civil service laws. The State highway fund will bear its proportion.

CHAPTER 595. Makes it easier from an accounting standpoint to handle work for counties on a co-operative basis.

The acquisition of rights of way needed for State highways is, year by year, assuming greater importance. It becomes a major consideration whenever one of the new type highways above mentioned is contemplated. The legislature, realizing this situation, granted additional authority to the Department of Public Works in connection with right of way matters.

CHAPTER 686. Considerably broadens the scope of the activities of the department in connection with the acquisition of rights of way. The authority to acquire for future needs is expressly given. The leasing out of property acquired for future needs so that revenue can be obtained therefrom is authorized. Full authority is granted to acquire all rights of way needed for freeways.

CHAPTER 292. Authorizes the conveyance of property controlled for highway purposes to the federal government for inclusion in national parks. This chapter also authorizes agreements with the federal government concerning State highways passing through national monuments.

CHAPTERS 146 AND 147. Authorize the City of Oakland to convey certain tidelands back to the State for State highway purposes.

CHAPTER 86 OF RESOLUTIONS. Addressed to Congress, it asks for a receding of jurisdiction over the area required for the Funston Avenue approach to the Golden Gate

Bridge through the Presidio in San Francisco.

Basically highways are built for the use of traffic, and while the Division of Highways is not primarily concerned with the enforcement of traffic laws, it is concerned with the provisions of those laws as they must be taken into consideration in determining the type of highway that should be built. Due to the fact that the responsibility for placing and maintaining all official traffic signs and signals, including directional and warning signs, is assigned to the Division of Highways, legislation affecting these matters is of particular interest.

Several years ago there was established within the Division of Highways a Safety Department designed to coordinate the actual construction and maintenance work with the efforts of traffic enforcement agencies and accident prevention activities. This department makes intensive studies of all accidents occurring on the State highway system to determine whether a different method of construction is necessary or whether the fault lies in the traffic laws or regulations applicable to the particular highway. Many of the changes made in the vehicle laws were due to the suggestions or approval of the Division of Highways acting through the Maintenance Department and the Safety Department.

CHAPTER 311—Makes it clear that all accident reports received by the Department of Motor Vehicles under the Vehicle Code are open to the confidential use of the Department of Public Works. While the department in the past has received the utmost cooperation in this connection from the Department of Motor Vehicles, there has been some doubt as to the legality of the procedure followed, due to the provisions of law to the effect that accident reports were for the confidential use of the Department of Motor Vehicles. This enactment removes all such doubts.

As above mentioned, Chapter 684 writes into law the prohibition against crossing the double line now in use on State highways.

CHAPTER 658. Abolishes the 20-mile speed limit zone, making the 25-mile speed limit applicable in all of the former 20-mile zones. This chapter also will eliminate many of the unnecessary restricted speed zones. It also authorizes traffic signals in cities to be timed so that some variance from the 25-mile prima facie speed limit will be permitted. Permissive speed of trucks is raised in some instances.

CHAPTER 320. Regulates the use of certain colors in traffic signals so that the use of these colors will have a uniform meaning throughout the State. This chapter also clarifies the provisions of the Vehicle Code so as to more clearly indicate the position at which a stop must be made at "STOP" intersections.

CHAPTER 188. Authorizes the placing and maintenance of "Cattle Crossing" and "Open Range" signs.

CHAPTER 788. Among other things, abolishes as of December 31, 1942, certain preferences given to some of the older trucks in so far as width and permissive weight are concerned. The permissive length of single vehicles is increased to 35 feet. The department is authorized to issue permits for the use of booster trucks in the event such units are considered safe for operation in specific locations.

CHAPTER 653. Recognizes a new type of vehicle consisting of a semi-trailer with a dolly attachment and prescribes weight limitations and registration fees for such vehicles.

General requirements as to lamps and brakes on all vehicles are changed.

CHAPTER 248. Makes a minor change in the present provision prohibiting angle parking on State highways within business districts.

CHAPTER 612. Gives the department full authority to regulate parking on State highways in areas where snow removal operations are necessary. In some snow sports areas considerable confusion has resulted in the past because no regulation of parking could be enforced.



Learns of Stupendous Task

San Francisco

Editor California Highways
and Public Works
Sacramento, California

Dear Sir:

Please let me congratulate you on putting out such an interesting and informative little magazine. I have been reading it for the past year and enjoy it very much.

There is no doubt but what a knowledge of the stupendous task of building modern highways makes one more appreciative of the fine public roads we of California have. I never realized what a scientific problem a highway was until I started reading your little journal.

Thank you very much.

CARL I. NELSON.

Doing Great Job

Editor California Highways
and Public Works
Sacramento, California

Dear Sir:

A recent issue of the above-named publication just came into my hands and after partly perusing same I think it is just what I and every red-blooded Californian needs to keep us reminded that we have a great State and that the Department of Public Works, Division of Highways is doing a big job.

Having been born in Woodland, just over your shoulder and my father having been one of Fremont's men in 1846, when he and others acquired this glorious domain, I think your placing me on your mailing list will about fill out my desires.

Sincerely yours,

WM. T. W. CURL.

"Best Highway Magazine"

Federal Works Agency
Work Projects Administration in Ohio

127 Brevoort Road
Columbus, Ohio
August 25, 1939

California Highway and Public Works
Sacramento, Calif.
Gentlemen:

Have been recently located in Washington, D. C., and do not recall whether your magazines were sent there to me or forwarded from Columbus. Have been transferred to Columbus and will be at above address until further notice.

Your magazine is by far the best highway magazine published by any state in the union and I only hope the time will come when we can publish as good a magazine here in Ohio. Thanking you for courtesies extended in the past.

Very truly,

HARRY T. FLASHER,
Engineer Highway Dept.,
127 Brevoort Rd.,
Columbus, Ohio.

Educational Reading

Los Angeles, California

Editor California Highways
and Public Works
Sacramento, California

Gentlemen:

It has indeed been a pleasure to read some borrowed issues of the California Highways and Public Works magazine. I think them extremely instructive and educational and know they would be very helpful in my present position.

Will you kindly place my name on your mailing list.

Thanking you in advance, I am

Cordially yours,

VICTOR L. WESLEY,
Los Angeles, Calif.

Request from Honolulu

Territory of Hawaii, Honolulu

August 17, 1939.

Editor California Highways
and Public Works
Sacramento, California

Dear Sir:

Will you please put my name on the mailing list for your publication "California Highways and Public Works." I have seen copies of this publication in the office of the Public Roads Administration here in Honolulu and find it to be very interesting and instructive.

Very truly yours,

J. C. MYATT,
Highway Engineer.

COMPTON JUNIOR COLLEGE

Compton, California

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

Dear Sir:

Through the courtesy of our local Chamber of Commerce, I have made occasional

use during the course of the past school year of your official journal "California Highways and Public Works"; having found it to be of service in connection with the work of our social studies classes in this institution.

If possible, I should appreciate having my name placed on your mailing list to receive a copy of this publication for use in our classes. I consider it of sufficient value to desire a regular file of all issues.

Cordially yours,

Signed:

ROBERT C. GILLINGHAM,
Chairman, Social Studies.

Library Values It

Colton Public Library

Colton, California

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

Dear Sir:

The patrons of Colton Public Library value the magazine "California Highways and Public Works" very highly and we find the material contained therein is the answer to many questions that arise.

We should like to have a second copy if it is available as that would allow us one for binding and one for circulation. Thanking you for your courtesy.

Very truly yours,

MRS. ANNA E. SPRAGINS,
Librarian.

Appreciation from Navy

Editor California Highways
and Public Works,
Sacramento, California.

Dear Sir:

Permit me to express my appreciation for receiving "California Highways and Public Works" and to congratulate you on its general excellence. I have been receiving it for about four years and find the design and construction features of improvements and relocations of particular interest. The character of your publication is in keeping with the fine highways of California.

Very truly yours,

C. C. SEABURY,
Lt. (CEC), U. S. N.,
Bureau of Yards and Docks,
Navy Department,
Washington, D. C.

Highway Bids and Awards for the Month of September, 1939

ALAMEDA COUNTY—Between 1.2 and 8.3 miles east of Mission San Jose, about 1.8 miles, surface with crusher-run base and armor coat. District IV, Route 108, Section A. Independent Construction Co., Ltd., Oakland, \$12,679; A. A. Tieslau, Berkeley, \$12,816; Pacific Truck Service, Inc., San Jose, \$12,987; Lee J. Immel, Berkeley, \$13,361; A. J. Clausen, Berkeley, \$13,470. Contract awarded to Jones & King, Hayward, \$12,311.50.

AMADOR, CALAVERAS AND TUOLUMNE COUNTIES—Between Amador City and Long Barn, about 23.6 miles seal coat to be applied. District X, Routes 65 and 13, Sections BC, ABC, A, CD. Lee J. Immel, Berkeley, \$14,828; Oranges Bros. Construction Dept., Stockton, \$14,715; Granite Construction Co., Ltd., Watsonville, \$13,897. Contract awarded to Close Building Supply, Hayward, \$12,972.

AMADOR COUNTY—At Jackson Creek, about 1.4 miles to be graded. District X, Route 97, Section A. Poulos & McEwen, Sacramento, \$17,071; Anderson & France, Visalia, \$17,138; Louis Biasotti & Son, Stockton, \$18,128; M. J. B. Construction Co., Stockton, \$19,339; Hemstreet & Bell, Marysville, \$19,787; Harms Bros., Sacramento, \$20,360; Shea & Beebe, Los Angeles, \$21,312; Claude C. Wood, Lodi, \$23,645; A. Teichert & Son, Inc., Sacramento, \$24,947. Contract awarded to Parish Bros., Los Angeles, \$16,662.

BUTTE COUNTY—Between 0.4 mile south of Fagan and Biggs Road, about 5.9 miles to be graded and surfaced with plant-mix surfacing. District III, Route 3, Sections A, Grd., B. Poulos & McEwen, Sacramento, \$73,306; Hemstreet & Bell, Marysville, \$74,909; Independent Construction Co., Ltd., Oakland, \$76,755; A. Teichert & Son, Inc., Sacramento, \$78,821; Marshall Hanrahan, Redwood City, \$79,292. Contract awarded to Piazza and Huntley, San Jose, \$68,349.

CALAVERAS COUNTY—Between 1.7 and 2.5 miles east of Valley Springs, about 0.8 mile to be graded and surfaced with imported gravel. District X, Route 24, Section B. Hemstreet & Bell, Marysville, \$19,687; Caputo & Keeble, San Jose, \$19,881; Harms Bros., Sacramento, \$21,321; Fredrickson Bros., Emeryville, \$22,516; Marshall Hanrahan, Redwood City, \$23,126; M. J. B. Construction, Stockton, \$23,845; Parish Bros., Los Angeles, \$24,041; Oranges Bros. Construction Dept., Stockton, \$26,313. Contract awarded to Claude C. Wood, Lodi, \$19,531.80.

CONTRA COSTA COUNTY—Between Broadway Tunnel and Concord and between 3.0 and 1.5 miles north of Byron, about 12.6 miles, crusher run borders to be constructed and retread surfacing and non-skid surface treatment to be applied. District IV, Route 75, Sections A, B, D. Heafey-Moore Co., Oakland, \$38,569. Contract awarded to Lee J. Immel, Berkeley, \$32,062.

FRESNO COUNTY—Between Kings River Bridge and Deer Cove Creek, about 6.5 miles, road-mix surface treatment to be applied. District VI, Route 41, Sections E, F. Basich Bros., Torrance, \$10,795; Oilfields Trucking Co., Bakersfield, \$10,807. Contract awarded to Ruddy & Corfield, Modesto, \$9,860.

GLENN AND BUTTE COUNTIES—Between $\frac{1}{2}$ mile east of Butte City and Cherokee Canal, about 11.8 miles, roadbed to be shaped and surfaced with gravel base. Dis-

trict III, Route 45, Sections C, A. Louis Biasotti & Son, Stockton, \$48,990; Fredrickson & Westbrook, Sacramento, \$49,922; Heafey-Moore Co.-Fredrickson & Watson Construction Co., Oakland, \$56,550; Harms Bros., Sacramento, \$57,425; A. Teichert & Son, Inc., Sacramento, \$59,170; Poulos & McEwen, Sacramento, \$59,625; Hemstreet & Bell, Marysville, \$66,325; Marshall Hanrahan, Redwood City, \$66,655. Contract awarded to N. M. Ball Sons, Berkeley, \$44,291.25.

HUMBOLDT COUNTY—Across Elk Creek, about 19 miles north of Garberville, a reinforced slab bridge to be constructed and about 0.25 mile of approach to be graded and finished. District I, Route 1, Section C. A. A. Tieslau, Berkeley, \$27,146; Scheumann and Johnson, Eureka, \$33,243. Contract awarded to E. E. Smith, Eureka, \$23,797.80.

KERN COUNTY—Between Rosamond and Mojave, about 7.8 miles to be graded and surfaced with plant-mix surfacing. District IX, Route 23, Section A. Basich Bros., Torrance, \$64,120; Claude C. Wood, Lodi, \$65,347; Griffith Co., Los Angeles, \$68,013; G. W. Ellis, North Hollywood, \$69,897; Fredrickson & Westbrook, Sacramento, \$71,832; Jones & King, Hayward, \$73,599; United Concrete Pipe Corporation, Los Angeles, \$81,910; Oswald Bros., Los Angeles, \$83,741; A. S. Vinnell Co., Alhambra, \$88,741. Contract awarded to R. E. Hazard & Sons, San Diego, \$62,672.50.

LOS ANGELES COUNTY—Between Placerita Canyon and Solamint, about 3.4 miles to be graded and surfaced with plant-mix surfacing. District VII, Route 23, Section I. Griffith Co., Los Angeles, \$226,099; Fredrickson & Westbrook, Sacramento, \$227,465; J. E. Haddock, Ltd., Pasadena, \$241,744; Claude Fisher Co., Ltd., Los Angeles, \$244,054; Clarence Crow, Los Angeles, \$245,263; Radich & Brown, Burbank, \$253,551; Eaton & Smith, San Francisco, \$254,341; United Concrete Pipe Corp., Los Angeles, \$255,482; Daley Corp., San Diego, \$259,767; Maceo Construction Co., Clearwater, \$259,916; Clyde W. Wood, Los Angeles, \$261,168; Utah Construction Co., San Francisco, \$272,416; Basich Bros., Torrance, \$272,496; W. E. Hall Co., Alhambra, \$273,048; Oswald Bros., Los Angeles, \$273,824; Gibbons & Reed Co., Burbank, \$317,776. Contract awarded to N. M. Ball Sons, Berkeley, \$222,596.50.

LOS ANGELES COUNTY—Across Arroyo Seco Parkway at Avenue 26, a reinforced concrete bridge to be constructed as an extension to an existing bridge and the northerly approach thereto reconstructed. District VII, Route 205, Section L. A. Oberg Bros., Los Angeles, \$45,162; United Concrete Pipe Corp., Los Angeles, \$49,873; Byerts & Dunn, Los Angeles, \$52,698. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$43,236.20.

MARIPOSA COUNTY—Between Cathay and Briceburg, about 7.4 miles, seal coat to be applied. District X, Route 18, Sections D, E, I, J. H. Sykes, Patterson, \$8,235. Contract awarded to Hayward Building Material Co., Hayward, \$6,408.

MENDOCINO COUNTY—Across Russian River, about $\frac{1}{2}$ mile east of Hopland, a bridge consisting of 3 main steel girder spans, one at 108 feet and 2 at 84 feet, with seven 38-foot and two 29-foot steel stringer approach spans to be constructed

and about 0.3 mile to be graded and surfaced with plant mixed surfacing and Class "C" seal coat. District I, Route 16, Section A. C. W. Caletti & Co., San Rafael, \$98,052; Union Paving Co., San Francisco, \$98,822; R. G. Clifford, San Francisco, \$107,017; E. E. Smith, Eureka, \$108,181; A. Soda & Son, Oakland, \$108,587; A. G. Ralsch, San Francisco, \$109,394; Paul J. Tyler, Oroville, \$112,567; Joseph Shaw, Deer Creek Lodge, \$114,266; Campbell Construction Co., Sacramento, \$116,552; John Rocca, San Rafael, \$122,320; Fred J. Maurer & Son, Eureka, \$122,589. Contract awarded to Trewhitt-Shields & Fisher, Fresno, \$97,389.20.

MENDOCINO COUNTY—At Russian Gulch, about 9 miles south of Fort Bragg, a reinforced concrete bridge consisting of 29 slab spans having a total length of 526 feet 9 inches supported on an open spandrel arch and concrete bents to be constructed and about 0.6 mile of approaches to be graded and a Class "C" seal coat applied thereto. District I, Route 56, Section E. John Rocca, San Rafael, \$108,318; Joseph Shaw, Mill Creek, \$109,735; Poulos & McEwen & M. A. Jenkins, Sacramento, \$113,834; Paul J. Tyler, Oroville, \$118,958; Fred J. Maurer & Son, Eureka, \$120,141; E. E. Smith, Eureka, \$122,735; C. W. Caletti & Co., San Rafael, \$124,107; Union Paving Co., San Francisco, \$126,730; United Concrete Pipe Corp., Los Angeles, \$133,618. Contract awarded to R. G. Clifford, San Francisco, \$104,510.60.

MENDOCINO COUNTY—Between Crawford Ranch and Ukiah, about 7 miles to be graded, plant-mix surfacing to be placed on gravel base and a bridge to be constructed. District I, Route 1, Section B. Chas. L. Harney, San Francisco, \$367,878; Heafey-Moore Co.-Fredrickson & Watson Construction Co., Oakland, \$327,112; Hemstreet & Bell, Marysville, \$283,595; The Utah Construction Co., San Francisco, \$329,757; Maceo Construction Co., Clearwater, \$335,513; Marshall Hanrahan, Redwood City, \$289,298; A. Teichert & Son, Inc., Sacramento, \$292,537; United Concrete Pipe Corp. & N. M. Ball Sons, Berkeley, \$316,386; Granfield, Farrar & Carlin, San Francisco, \$334,283; A. G. Ralsch, San Francisco, \$346,973; Eaton & Smith, San Francisco, \$351,035. Contract awarded to Fredrickson & Westbrook, Sacramento, \$279,578.80.

MONO COUNTY—Grading and surfacing between 9.1 miles south and Mono Lake and between Route 23 and June Lake. District IX, Routes 23, 111, Sections GH, A. A. S. Vinnell Co., Alhambra, \$16,537. Contract awarded to Basich Bros., Torrance, \$14,555.

MONO COUNTY—At Grant Lake, about 4.0 miles to be graded and imported surfacing material placed on portions. District IX, Route 111, Section A. Parish Bros., Los Angeles, \$39,581; Basich Bros., Torrance, \$55,089; Gibbons & Reed Co., Burbank, \$58,171; A. S. Vinnell Co., Alhambra, \$59,067; Nevada Rock & Sand Co., Inc., Reno, \$59,974. Contract awarded to Shea & Beebe, Los Angeles, \$31,064.50.

MONTEREY COUNTY—On San Juan Road between 2.2 miles and 4.9 miles east of Pajaro, about 2.7 miles to be graded and surfaced with plant-mix surfacing on crusher run base. District V, Feeder road, L. C. Karstedt, Watsonville, \$29,500.10. Contract awarded to Granite Construction Co., Ltd., Watsonville, \$26,398.

MONTEREY COUNTY—Between San Lucas and 1.3 miles south, about 1 mile to

be surfaced with plant-mixed surfacing. District V, Route 2, Section G. Contract awarded to Granite Construction Co., Ltd., Watsonville, \$9,826.

NAPA AND SONOMA COUNTIES—Between Napa County Line and Napa Wye, between Santa Rosa and Belane, and between Sears Point and Sonoma County line, about 14.6 miles plant-mixed surfacing seal coat, and retreat surfacing to be placed. District IV, Routes 8, 51, 208, Sections A, B, A. A. Chas. L. Harney, San Francisco, \$39,377; A. A. Tieslau, Berkeley, \$33,895. Contract awarded to A. G. Raisch, San Francisco, \$33,467.80.

ORANGE COUNTY—In the City of Santa Ana, about 0.25 mile of approaches to Santa Ana River bridge to be graded and paved with portland cement concrete. District VII, Route 174. Griffith Co., Los Angeles, \$22,132; J. E. Haddock, Ltd., Pasadena, \$22,196; W. E. Hall Co., Alhambra, \$28,047. Contract awarded to Vido Kovacevich, South Gate, \$20,404.

RIVERSIDE COUNTY—At Norco, about 1.4 miles to be graded, roadmix surface treatment to be applied, plantmix surfacing to be placed and drainage structures to be constructed. District VIII, Route 193, Section A. Clyde W. Wood, Los Angeles, \$46,008; E. L. Yeager, Riverside, \$46,580; Dimmitt & Taylor, Los Angeles, \$47,429; Oswald Bros., Los Angeles, \$47,768; Griffith Co., Los Angeles, \$48,914; V. R. Dennis Construction Co., San Diego, \$49,876; W. E. Hall Co., Alhambra, \$49,879; A. S. Vinnell Co., Alhambra, \$52,717; J. E. Haddock, Ltd., Pasadena, \$53,258; United Concrete Pipe Corp., Los Angeles, \$53,981; Claude Fisher Co., Los Angeles, \$55,043. Contract awarded to Match Bros., Elsinore, \$44,758.70.

SACRAMENTO COUNTY—Between 1 mile south of Arno and 1½ miles north of Elk Grove, about 5 miles of pit run gravel borders and Class "B" seal coat to be constructed. District III, Route 4, Sections A, B. A. Teichert & Son, Inc., Sacramento, \$10,546; Lee J. Immel, Berkeley, \$10,477; J. R. Reeves, Sacramento, \$12,071. Contract awarded to Hemstreet and Bell, Marysville, \$10,187.

SAN BENITO COUNTY—Across San Benito River, about 1 mile west of Hollister, existing bridge to be redecked. District V, Route 22, Section A. E. W. Peterson, San Francisco, \$9,658; Geo. Renz, Gilroy, \$11,420; Engineers, Ltd., Oakland, \$11,834; Albert H. Siemer & John Carcano, San Anselmo, \$12,055; L. C. Seidel, Oakland, \$12,390. Contract awarded to C. C. Gildersleeve, Berkeley, \$8,998.

SAN JOAQUIN, STANISLAUS AND CALAVERAS COUNTIES—Between Stockton and Altaville, Lodi and 4.5 miles east, about 24 miles, seal coat to be applied. District X, Routes 75 and 24. Close Building Supply, Hayward, \$14,957; Oranges Bros. Construction Dept., Stockton, \$12,552; Elmer J. Warner, Stockton, \$10,630. Contract awarded to A. A. Tieslau, Berkeley, \$10,445.50.

SAN LUIS OBISPO AND SANTA BARBARA COUNTIES—At various locations, about 11.7 miles plant-mixed surfacing and non-skid surfacing to be placed. Frederickson & Westbrook, Sacramento, \$22,089. Contract awarded to Basich Brothers, Torrance, \$20,532.75.

SANTA BARBARA COUNTY—Between Las Cruces and Santa Ynez River, and between Orcutt and Guadalupe, about 4.5 miles to be surfaced with plant-mixed surfacing, road-mix surface treatment, crusher run base, and armor coat. District V, Route 56, Sections A, B, C, E. Frederickson & Westbrook, Sacramento, \$29,001. Contract awarded to Basich Bros., Torrance, \$26,611.

SANTA BARBARA COUNTY—Across Santa Maria River Overflow, about 2 miles north of Santa Maria, existing bridge to be redecked. District V, Route 2, Section A. C. W. Caletti & Co., San Rafael, \$8,546; C. C. Gildersleeve, Berkeley, \$8,827; John Fesler, Santa Maria, \$8,875; Theo. Maino, San Luis Obispo, \$10,119; J. S. Metzger & Son, Los Angeles, \$10,409. Contract awarded to Stanley P. Cooley, Palo Alto, \$7,418.47.

SANTA BARBARA COUNTY—Between Lompoc and La Salle Road, and between 1st and 2d crossings of Cuyama River, about 3.3 miles to be surfaced with plant-mixed surfacing. District V, Routes 149 and 57, Sections A-A, B. Frederickson & Westbrook, Sacramento, \$21,000. Contract awarded to Basich Bros., Torrance, \$20,470.75.

SANTA CLARA COUNTY—Between Route 5 and Santa Clara Street, about 1.9 miles to be graded and paved with portland cement concrete and asphalt concrete. District IV, Route 68, Section B, SJs. Louis Biasotti & Son, Stockton, \$123,167; Jones & King, Hayward, \$124,547; Union Paving Co., San Francisco, \$127,207; Frederickson & Westbrook, Sacramento, \$129,337. Contract awarded to A. J. Raisch & Earl W. Heple, San Jose, \$118,431.60.

SHASTA COUNTY—At Central Valley, about 6.5 miles north of Redding, about 0.5 mile to be graded and surfaced with crusher run base and plant-mix surfacing. District II, Route 3, Section B. A. Teichert & Son, Inc., Sacramento, \$18,660. Contract awarded to Grandfield, Farrar & Carlin, San Francisco, \$16,921.90.

SIERRA COUNTY—Between 1.0 mile south of Sierraville and Calpine, about 0.6 miles, penetration oil treatment and road-mix surfacing to be placed. C. F. Frederick & Sons, Lower Lake, \$9,525. Contract awarded to Lee J. Immel, Berkeley, \$7,135.

SOLANO COUNTY—Between 0.6 mile south and 1.0 mile north of Vallejo, about 1.8 miles to be blanketed with imported material and surfaced with plant-mixed surfacing. District X, Route 74, Sections A, D, A. Granzotto & L. Angelus, Walnut Creek, \$25,612; Union Paving Co., San Francisco, \$19,827; Chas. L. Harney, San Francisco, \$22,548; M. J. B. Construction Co., Stockton, \$22,607. Contract awarded to A. G. Raisch, San Francisco, \$17,947.95.

SONOMA COUNTY—At various locations between Jenner and Stewarts Point, about 2.0 miles to be graded, drainage structures and a reinforced concrete bridge to be constructed and penetration oil treatment to be applied. District IV, Route 56, Sections C, D. Parish Bros., Los Angeles, \$99,414; Claude C. Wood, Lodi, \$109,502; Henley-Moore Co.-Frederickson & Watson Construction Co., Oakland, \$111,001; Louis Biasotti & Son, \$118,012; Pionbo Bros. & Co., San Francisco, \$124,851; Chas. L. Harney, San Francisco, \$144,509. Contract awarded to Guerin Bros., San Francisco, \$89,735.90.

TUOLUMNE AND MARIPOSA COUNTIES—Between Mountain Pass and Route 18, and between Moccasin and Coulterville, about 24.9 miles seal coat to be applied. District X, Routes 40, 65, various sections. Pacific Truck Service, Inc., San Jose, \$14,477; Lee J. Immel, Berkeley, \$13,982. Contract awarded to Hayward Building Material Co., Hayward, \$11,163.

VENTURA COUNTY—Across Conejo Creek, about 10 miles south of Moor Park, reinforced concrete slab bridge to be constructed. District VII, Route 155, Section B. Carl Hallin, Los Angeles, \$6,982; Jacobson & Jacobson, Los Angeles, \$7,064; A. S. Vinnell Co., Alhambra, \$7,387; J. E. Haddock, Ltd., Pasadena, \$7,395; Byerts

& Dunn, Los Angeles, \$7,481; C. R. Butterfield-Kennedy Co., San Pedro, \$7,499; J. S. Metzger & Son, Los Angeles, \$7,641; Gibbons & Reed Co., Burbank, \$8,285; W. J. Distell, Los Angeles, \$8,368; Geo. J. Bock Co., Los Angeles, \$8,772; Werner & Webb, Los Angeles, \$9,482; John Higgins, Huntington Park, \$10,195. Contract awarded to Oberg Bros., Los Angeles, \$8,931.50.

VENTURA COUNTY—At Santa Paula Creek near Santa Paula, a reinforced concrete box girder bridge to be constructed and about 0.4 mile of roadway to be graded and surfaced with plant-mixed surfacing. District VII, Route 79, Section SPa., B. J. S. Metzger & Son, Los Angeles, \$85,553; Macco Construction Co., Clearwater, \$87,522; A. S. Vinnell Co., Alhambra, \$88,579; Paul J. Tyler, Oroville, \$89,902; United Concrete Pipe Corp., Los Angeles, \$93,842; J. E. Haddock, Ltd., Pasadena, \$95,034; Clyde W. Wood, Los Angeles, \$96,359. Contract awarded to Byerts & Dunn, Los Angeles, \$82,624.50.

YOLO AND COLUSA COUNTIES—Between ¼ mile north of Cache Creek Bridge and Bear Creek Bridge, about 6 miles, a graded roadbed to be constructed on portions thereof, gravel base to be placed and penetration oil treatment to be applied. District III, Route 50, Sections A, A. Harold Smith, St. Helena, \$70,487; Harms Brothers, Sacramento, \$73,350; Hemstreet & Bell, Marysville, \$74,739; Henley-Moore Co. & Frederickson & Watson Construction Co., Oakland, \$75,712; Claude C. Wood, Lodi, \$76,628; The Utah Construction Co., San Francisco, \$76,700; Lee J. Immel, Berkeley, \$76,820; Guerin Bros., San Francisco, \$80,682; A. Teichert & Son, Inc., Sacramento, \$81,702. Contract awarded to Young & Son Co., Ltd., Berkeley, \$97,821.60.

YOLO COUNTY—Between 7 miles north of Madison and 2.5 miles south of Dunnigan, about 5.7 miles to be graded and treated with penetration oil treatment. District III, Route 90, Section B. N. M. Ball Sons, Berkeley, \$69,661; Harms Bros., Sacramento, \$69,697; Hemstreet & Bell, Marysville, \$69,892; Louis Biasotti & Son & H. Earl Parker, Marysville, \$73,729; Parish Bros., Los Angeles, \$77,175; A. Teichert & Son, Inc., Sacramento, \$79,073; J. R. Reeves, Sacramento, \$80,552; M. J. B. Construction Co., Stockton, \$82,409; Claude C. Wood, Lodi, \$80,894; Valley Construction Co., San Jose, \$81,512. Contract awarded to Frederickson Bros., Emeryville, \$65,501.50.

C. R. Gallagher Wins Scholarship

C. R. Gallagher, Structural Engineering Office Aid in the Safety Department of the Division of Highways, has been awarded one of the Alfred P. Sloane, Jr. fellowships in Traffic Engineering in the Bureau of Street Traffic Research at Yale University, for the current academic year. He is one of seven engineers chosen from State Highway Departments as recipients of awards.

Mr. Gallagher was graduated from the University of California, College of Civil Engineering, in 1937. He formerly worked for the Bridge Department and for the last year has been with the Safety Department.

He recently left for New Haven, Connecticut, where he will be in residence for the school year.

First Unit of 'Industrial Highway'

(Continued from page 26)

this section of the route include provisions for a four-lane pavement and the new unit was so constructed that when the traffic volume requires the additional width the highway may be transformed into a four-lane roadway with no loss of the present investment and a minimum interruption of traffic.

The pavement of the new unit was placed upon a crushed rock base and at certain locations across the floor of Diablo Valley the earth sub-base was stabilized by mixing Portland cement with the native material to insure the roadbed against distortions.

About 50,000 square yards of soil base which were stabilized required 4000 barrels of cement. Approximately 500,000 cubic yards of material were moved.

Cross-drains and underdrains which were placed in the roadway prism to provide sufficient drainage facilities included nearly 9000 linear feet of corrugated pipe. Approximately 38,000 tons of rock and over 1000 tons of liquid asphalt were used in construction of the crushed rock base and plant-mixed surfacing.

Three reinforced concrete slab bridges, one across Walnut Creek and the others across Grayson Creek and Grayson Creek overflow channel were built.

The bridge across Walnut Creek has a total length of 203 feet, consisting of four spans of 36 feet 4 inches and two spans of 27 feet 4 inches, reinforced concrete slabs supported on concrete pile bents. Grayson Creek bridge is 81 feet long, consisting of three spans each 22 feet long with a 7-foot 6-inch cantilever span at the ends.

The bridge over Grayson Creek Overflow is 147 feet long, consisting of six 22-foot spans with 7-foot 6-inch cantilever spans at each end. All of the bridges are continuous reinforced concrete slab type of structures supported on reinforced concrete pile bents. The Walnut Creek Bridge has two expansion joints located at the quarter point of the second span from each end. Grayson Creek Bridge is

In Memoriam

Eli Dallas, Associate Highway Engineer employed at Redding in District II, Division of Highways, passed away on August 9, 1939, after a protracted illness.

Eli Dallas was born at Auburn, Kansas, on November 14, 1880. During his early life he devoted his attention to railroad engineering in the middle west and southwestern states, principally on construction and location projects. In 1914 he came to Southern California and in April the following year entered the employ of the State in District II as a draftsman. During his twenty-four years in the district he rose to the position of chief draftsman, in which capacity he rendered conscientious and valuable service to the State until his death.

In 1905 Mr. Dallas, at Topeka, Kansas, married Auta Pearl McWhinney, who with a daughter Frances Lucille, and twin son and daughter John Paul and Auta Pauline, survive him.

The many friends and fellow employees of Eli Dallas who were associated with him during his long service with the Division of Highways deeply regret his passing.

W. W. PATCH

W. W. Patch, one of the first division engineers of the State Division of Highways, died August 9 in Los Angeles of a heart attack.

He entered the service of the State in 1914 as Division Engineer of Division VII, succeeding Division Engineer W. L. Clark in charge of the Los Angeles metropolitan area with headquarters in Los Angeles, and continued in that office for nine years.

He resigned January 1, 1924, to enter the real estate business and at the same time continue engineering work in a consulting capacity.

He was succeeded by Spencer V. Cortelyou, present District Engineer of District VII, who had been his assistant for many years.

Mr. Patch later entered the employ of the Los Angeles Flood Control District, with which he was connected up to the time of his death. During recent months in that service he was on sick leave.

Before coming to the Division of Highways Mr. Patch worked for the Federal government as engineer on reclamation projects in the eastern States. During the period in which he was in charge of the Los Angeles office, he supervised the expenditure of more than twelve million dollars in primary construction work on State highways in the south.

Notable work done under his supervision included the grading and paving of the original Ridge Route.

continuous from end to end without expansion joint and the Overflow Bridge has an expansion joint in the third span of the west end.

The bridges have 27-foot clear roadway between curbs with 2-foot 6-inch sidewalks on each side. When traffic requires construction of a four-lane highway the additional lane will be provided by the construction of a similar bridge alongside without disturbing the existing structures.

Within the limits of this road project a separate contract was let for the construction of a grade separation under the tracks of the Sacramento Northern Railway at Ohmer Station. The grade separation includes a steel and concrete bridge 103 feet long to carry the railroad over the highway and, in addition, a reinforced concrete slab bridge 110 feet long located about 90 feet west of the railroad structure, to carry the Concord-Port Chicago County Road over the new highway.

The railroad structure consists of three spans each approximately 34 feet long, the center span being over the new two-lane highway and its one 4-foot sidewalk. The north span is constructed to permit extension of the structure at such time as two additional lanes are added to the highway. Six lines of 24-foot steel beams support the single track railway. The ballast deck is supported on wrought iron plates. The structure has reinforced concrete fascia girders.

The county road bridge has three spans with provision for spanning the future four-lane highway similar to the railroad structure. The grade separation project was financed from Federal Aid Grade Crossing Funds. Macco Construction Co. were the contractors for this work, as well as for the major highway project.

Trucking Operation Contrasts

Wide contrasts are shown in motor trucking operations, with most truck runs relatively short, but major mileages returned by trucks in long-haul duty, according to the Automobile Manufacturers Association.

Studies show that more than 80 per cent of all one-way truck trips extended less than 20 miles but accounted for less than 34 per cent of the total truck mileage reported.

By contrast, only 6.4 per cent of trips were 50 to 500 miles in length, but they accounted for 41.2 per cent of total vehicle mileage.

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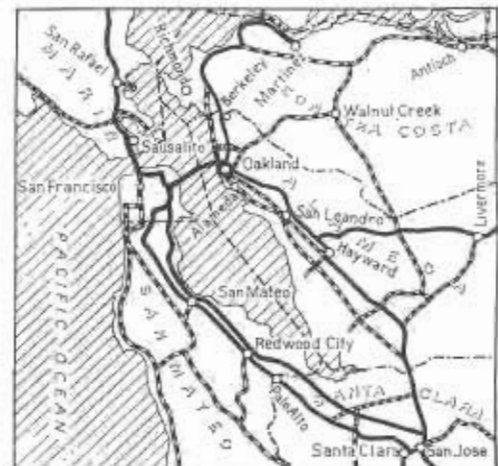
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MAP
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LEGEND

- Primary Roads
- Secondary Roads
- Proposed Roads



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