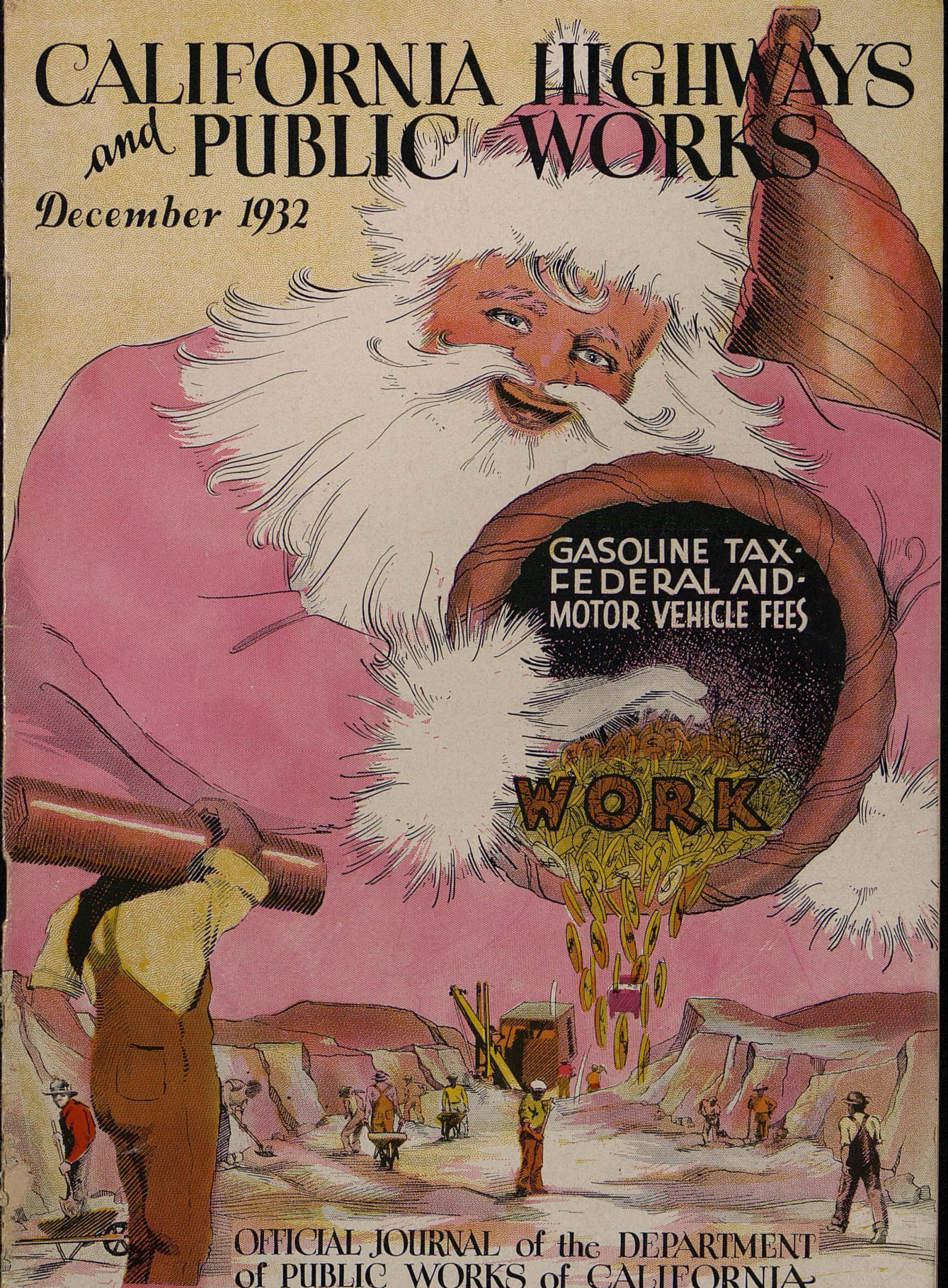


# CALIFORNIA HIGHWAYS and PUBLIC WORKS

December 1932



OFFICIAL JOURNAL of the DEPARTMENT  
of PUBLIC WORKS of CALIFORNIA

D50 Illuminant, 2 degree observer

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38.12	65.43	49.87	44.26	55.56	70.82	63.51	39.92	57.24	97.06	92.02	87.34	82.14	72.06	62.15	
13.24	18.11	-4.34	13.80	9.82	-33.43	34.26	11.81	48.55	-0.40	-0.50	-0.79	-1.06	-1.19	-1.07	
15.07	18.72	-22.29	22.85	-24.49	-0.35	59.60	-48.07	18.51	1.13	0.23	0.21	0.43	0.28	0.19	
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49.25	38.62	28.86	18.19	8.29	3.44	3.14	72.46	72.85	29.37	54.91	43.96	82.74	52.79	50.07
-0.16	-0.15	0.54	-0.05	-0.61	-0.23	20.98	-24.45	16.63	13.06	-34.91	52.00	3.45	50.88	-27.17
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Colors by Munsell Color Services Lab

Dox Williams

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## Table of Contents



	PAGE
State Constructed 464 Miles of Highways in 1932.....	1
Arroyo Seco Employment Relief Camp in Operation.....	2
Illustrations Showing Camp Crews at Work.....	3
Research Highway Built in Testing Portland Cements.....	4
<i>By T. E. Stanton, Materials and Research Engineer</i>	
Pictures of Test Highway Built for Science.....	5
Bixby Creek Bridge Formally Dedicated.....	6
<i>By G. A. Tilton, District Construction Engineer</i>	
Illustrations of Bixby Creek Bridge and Dedication Ceremonies.....	7
Torrey Pines Grade Eliminated by Relocation—Illustrated.....	10-11
<i>By R. C. Myers, Assistant Engineer</i>	
U. S. Engineers Investigate Central Valley Water Plan.....	12
Groups of Engineers and Officials Who Welcomed Them.....	13-15
Governor Rolph Dedicates State Printing Plant Addition—Illustrated	17
Eighteen Major Projects Advertised for Bids.....	18
Tabulation of Work Advertised in November.....	19
State Highway Engineer Purcell Honored by National Body.....	21
Old Bridge Modernized by Turning Upside Down.....	22
<i>By L. C. Hollister, Associate Bridge Designing Engineer</i>	
Pictures Illustrate Bridge Modernizing Method.....	23
Highway Bids and Awards.....	27
Water Resources Reports of State Engineer.....	29
Metal Crib Retaining Walls Built on Oak Flat Road.....	32
Illustrations of Metal Crib Wall Installation.....	33
Vital Statistics on Dam Construction.....	34
Water Applications and Permits.....	35
Widening Yolo Causeway—Illustrated.....	36-37
Old Mormon Trail—Illustrated.....	40

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# 464 Miles of Road Construction, 41 Bridges, Built by State in 1932

## Review of Year's Work by Division of Highways Reveals Quick Turnover of Funds for Extensive Improve- ments and Unemployment Relief

WITH the year 1932 passing into the yesterdays, another record of accomplishment has been set by the California Division of Highways. In the midst of troublous times the millions of dollars paid by the motorists of the State have been quickly returned for labor and materials used in the construction and reconstruction of hundreds of miles of State highways and in maintenance work covering the entire State road system.

At the instance of Governor Rolph and under direction of Earl Lee Kelly employment is being given to hand labor in maintenance work as far as is compatible with reasonable economy.

Figures compiled in the office of C. H. Purcell, State Highway Engineer and Chief of the Division of Highways, show the total of \$26,722,200 allotted for expenditures on State highway improvement in California during 1932. The accompanying tabulation compiled as of December 6th sets forth the general items whose aggregate make up this sum:

Construction and Reconstruction---	\$18,484,900
Maintenance-----	5,449,500
Allotted for Unemployment Relief--	1,650,000
Projects advertised for which bids will be opened prior to December 31st -----	1,187,800
Total -----	\$26,722,200

### DETAIL OF TOTALS

The construction program for the Division which was inaugurated during the year just past is represented by the \$18,484,900 for construction and reconstruction commenced and the \$1,187,800 on advertised projects, the bids for which will be opened before the close of the year, making a total of \$19,672,700.

This amount covers construction work on 464 miles of State highway, oiling on 1350 miles of roads and the construction of 41 bridges. The following tabulation shows the mileage of the various types covered by the year's work:

Type	Miles	Amount
Permanent pavement-----	225	\$8,063,500
Bituminous-treated crushed rock surfacing-----	171	2,817,200
Untreated crushed rock sur- facing -----	10	176,800
Graded roadbed -----	58	2,481,900
Oiling as dust palliative---	1,350	539,800
Bridges -----	(41)	2,605,200
Minor improvements, etc.---	--	2,988,300
Total -----		\$19,672,700

The mileage figures are actual road miles regardless of the width of pavement or surfacing, and never before in the history of State highway construction in California has as much multiple lane pavement been placed. In the metropolitan areas around both Los Angeles and San Francisco the State has contracted for many miles of both 30-foot and 40-foot Portland cement or asphalt concrete paving.

### WIDESPREAD RELIEF

The maintenance work during the year was considerably increased by the necessity of bringing to State highway standards as great a mileage as possible of the seven hundred miles of secondary highways added to the State system by the last Legislature. Many miles of these new roads were greatly improved by shoulder oiling and widening.

The \$1,650,000 allocated by the California Highway Commission for unemployment relief during the present winter is bringing aid to thousands of families throughout the State. Of this amount \$1,230,000 is being used for the expansion of maintenance crews in all of the Division's ten districts. The last reports show that 2613 men had been added to the maintenance forces and were working three days a week at \$4 per day.

In the Arroyo Seco Highway construction camp in Los Angeles County, 244 laborers were at work building construction roads and clearing brush and trees for further construction; \$120,000 was allotted for this camp.

(Continued on page 8)

## Arroyo Seco Emergency Relief Camp Operating Full Quota of Workers

THE relief of unemployment has received the serious consideration of the Department of Public Works for the past two years. During this winter it is planned to furnish employment to as many men as possible with the funds available.

During the winter of 1930-31 only men having families or other dependents were employed on State Highway emergency relief work. When plans were being formulated for relief work for the winter of 1931-32, it was recognized that large numbers of transients without dependents were migrating to California in the hope of finding work and spending the winter in a mild climate.

It was even more difficult for these men to find employment than for married men for the reason that most employers give preference to men with families or other dependents. These itinerants drifted to the larger cities and their number added to the already large unemployed population.

### MET SITUATION

To meet this situation several camps were established under the Division of Highways near the State border where these men could work for their board and lodging away from the congested cities. Places in these camps were eagerly sought by the men and a large amount of useful work was accomplished.

Early this fall it was decided to conduct a camp similar to the ones operated last winter but within easy access from Los Angeles. The State already owned an ideal camp fully equipped in the mountains twelve miles north of Pasadena.

It was established two years ago as an unemployment relief camp where men having families were employed during the winter of 1930-31. From April, 1931, until October, 1932, the camp was occupied by forces of a contractor engaged in grading the third unit of the new Arroyo Seco highway. As this contract was practically completed by October, 1932, the camp and equipment then became available for the relief forces.

The camp is located on what is known as "Firebreak Ridge" high in the mountains in the Angeles National Forest overlooking

Pasadena and adjacent to the new Arroyo Seco highway. Some idea can be gathered of the ruggedness of these mountains by the fact that the camp location is on the crest of a narrow ridge and is the only place in that vicinity having enough reasonable flat ground to accommodate a camp of this size.

Frame buildings of a more or less permanent character had been constructed two years ago consisting of bunkhouses, mess hall, recreation hall, office, etc. The camp had been fully equipped with kitchen utensils and bedding for a capacity of 250 men.

The first consideration in deciding on the location for the camp was that it should provide convenient access to work which either had to be or could be done by hand methods without the use of machinery and with a reasonable degree of economy. This Arroyo Seco camp is in an ideal location for such work.

### CLEARED GRADE

Two years ago the men cleared the area for the new highway of brush and trees for the grading contract which was about to be let. Narrow pioneer roads and trails which were necessary to provide access to the grading work to be done ahead were constructed. There was also a small amount of grading done on the highway section.

Conditions this year are similar in the matter of work to be done to those existing two years ago except that an additional five miles of highway has since been graded so that the new Arroyo Seco highway has been completed as far as Colby Canyon. The next four-mile section from Colby Canyon to Mt. Wilson Road at Red Box will be undertaken when funds are available.

The new right of way is covered by a dense growth of brush and some trees. The clearing of this area is necessarily a job for hand labor and this is the principal part of the work now being done by the Relief Camp forces under Superintendent C. C. Rossi, who was in charge of the camp at Needles last winter.

As the brush will have to be burned during the rainy season in this national forest area, it can be cut and piled during the fall months



**TIP TOP SITE** of Arroyo Seco unemployment relief camp in mountains near Pasadena where 263 single itinerants are housed while engaged in State highway work without pay. Inset is C. C. Rossi, camp superintendent

**STEEP MOUNTAINSIDES** covered with a dense growth of brush must be cleared along the line of the highway project. Crews of men with axes cut down the thick chapparal to be carried away and piled by other crews. It is ideal work for hand labor and the men seem to enjoy it, although the footing is somewhat precarious at places, making the work both more arduous and more interesting.



**PIONEER TRAIL BUILDING** goes hand in hand with the brush clearing operations. These narrow trails and roads are necessary to provide access to the grading work that must be done ahead in certain places. The construction of them affords much work for the pick and shovel gangs.

**OVER RIDGES AND SLOPES,** the course of the cleared right of way is now marked by huge heaps of brush piled in long windrows. These will be burned during the late winter and early spring, when there is no danger of starting a fire in this part of the Angeles National Forest.



# Research Highway Built for Testing Portland Cements in Concrete Paving

By THOS. E. STANTON, Materials and Research Engineer

Seeking answers to many questions concerning the strength, durability, plasticity, curing time and other qualities of the various standard Portland cements used in the construction of concrete pavements an extensive research project has been constructed along the Bayshore Highway near San Francisco. The tests being made with regular and specially installed apparatus supplemented by laboratory investigations to secure data under practical field conditions are described in the following article.

**H**OW SOON after construction can a Portland cement concrete pavement be safely opened to traffic and, if one of the special, high early strength cements on the market is used to expedite opening, will the strength of the concrete decrease with age and will there be greater volumetric changes with a tendency towards shorter crack intervals?

What cements, if any, are of such quality that though early strengths may be low the ultimate long time strength and durability is higher than for other cements which develop strength more rapidly?

Are any of the standard cements more resistant to the destructive action of sea, acid and alkali waters than others?

Have any cements such relatively higher plasticity and workability that it is possible to manufacture denser and consequently stronger concrete with the use of less mixing water?

To what extent, if any, will the shorter curing period in the case of high early strength cements affect the ultimate strength of the concrete?

## UNIVERSITY AIDING

In an effort to secure an answer to these and other perplexing questions which the highway engineer faces in connection with the construction of modern Portland cement concrete highway pavements and structures, an

experimental section of pavement was constructed during August and September, 1932, along a portion of the Bay Shore Highway in San Mateo County just north of South San Francisco.

Even with the greatest of care field studies are difficult to control owing to unavoidable variations in weather and construction processes.

For this reason the Materials and Research Department of the California Division of Highways is conducting a rather extensive laboratory test series of the cements used in the test, supplemented by a special laboratory investigation of the concrete making qualities of these cements, conducted under the direction of Professor Raymond E. Davis at the Materials Laboratory of the University of California, at Berkeley, in cooperation with the State Highway Department and the cement companies.

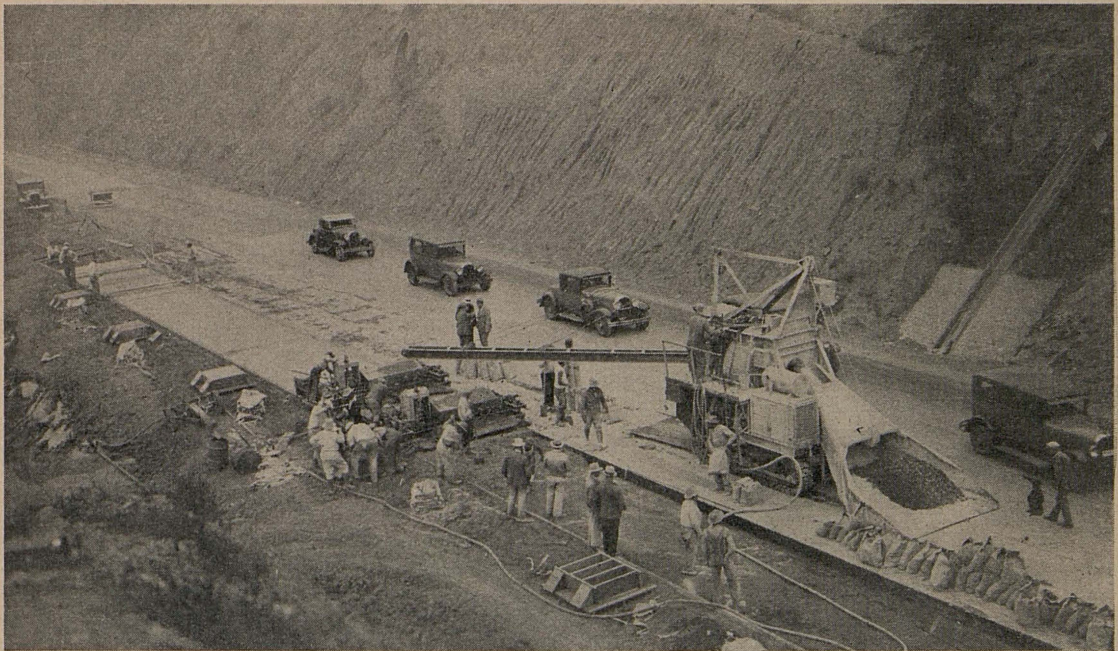


THOS. E. STANTON

This article will not touch in detail on the special laboratory work which is being handled by Professor Davis nor will there be any extensive discussion of the numerous technical details of the field work. Any discussion of such details will be handled in supplemental or special reports which will be issued from time to time.

Intense competition for business has led to the development of numerous brands of cement for special purposes. One cement company

(Continued on page 24)



**BUILT FOR SCIENCE**, this experimental section of a four-lane Portland cement concrete highway, 1200 feet long was recently completed adjoining the Bayshore Highway near South San Francisco. Tests of various qualities claimed for fourteen brands of cement are being made on this and another 1000-foot section by means of special instruments installed in the pavement supplement by specimens and cores taken for laboratory studies.



**Making workability tests during construction**



**Flow test for determining concrete consistency**

and the...  
 GOOD FOR...  
 (SEE PAGE 50 FOR...)

# Spectacular Bixby Creek Bridge

## Dedicated With Ceremony and Fete

By G. A. TILTON, Jr., District Construction Engineer

**M**ORE than one thousand people of the California central coast section gathered November 28, 1932, with prominent State, county and city officials, to appropriately dedicate the already widely heralded Bixby Creek Bridge, located twelve miles south of Carmel, on State Highway No. 56 along the Carmel-San Simeon coast.

At noon, in the center of the structure, 270 feet above the ocean, with State Senator E. H. Tickle of Monterey County presiding, speeches were given, officials introduced, and the traditional ribbon severed. Those participating were Timothy A. Reardon, member of the State Highway Commission, representing Governor James Rolph, Jr.; John W. Howe, Secretary of the State Highway Commission; R. M. Dorton, City Manager of Monterey; L. H. Gibson, State Highway District Engineer; F. W. Panhorst, Acting Bridge Engineer, under whose direction the bridge was designed; L. V. Campbell, Office Engineer; Carmel Martin and W. G. Hudson of Monterey; Supervisors A. A. Caruthers, Harvey Abbott, Carl Stanley, and R. A. Sterling of Monterey County.

Little Audrey Mawdsley, daughter of Mr. and Mrs. Peter Mawdsley of Carmel, assisted Timothy Reardon with the final act of severing the silken barrier that officially opened the bridge.

### BARBECUE FOLLOWED

Immediately following the dedication ceremonies, a barbecue was given at Pfeiffer's Resort on the Big Sur River, under the auspices of the Pacific Riviera Association.

Opening of the Bixby Creek Bridge, 714 feet long, with its concrete arch span of 342 feet (the longest yet constructed in the West) completes the most costly section of highway on the entire road from San Luis Obispo to Carmel. This structure, combined with its smaller companion, the Rocky Creek Bridge, and heavy grading between them, involves an expenditure of \$340,000 in a distance of 3600 feet, slightly less than three-quarters of a mile.

Unit by unit, and mile by mile, California's last virgin coastal wilderness is being pene-

trated by its first highway—a mountainous region in which no roads exist and only pack trails are known. This rugged territory, once inhabited by Indians and infested by outlaws, was reclaimed by a few hardy pioneers fifty years ago.

### HEAVY CONSTRUCTION

Sixty-five miles of the heaviest construction along the most precipitous and roughest part of the Monterey coast, involves the blasting of ten million cubic yards of material to obtain a twenty-foot standard road width; of this amount, seven million cubic yards have already been moved, leaving three million cubic yards yet to be taken out in the remaining 9½-mile gap.

Upon closing of this link within the next 2½ years, 134 miles of State highway will be available for through travel, opening a new field of attractions for the California tourist. From historic Monterey and artistic Carmel, down along the rugged coast to Morro Rock and Pismo Beach, continually varying scenery will greet the traveler.

In Monterey County, unexcelled "Point Lobos" is being acquired for a State park, and in San Luis Obispo County, two miles of coast line near Cambria has already been taken over by the State Park Commission.

There are few who would not find something of interest in the Carmel and San Luis Obispo missions—the Point Sur and Piedra Blanca lighthouses—the spectacular highway structures—the beautiful and irregular coast line—the pounding surf—the redwoods along the Big Sur River—the many deep canyons and streams emptying into the Pacific Ocean, and the extensive flora throughout the length of the road.

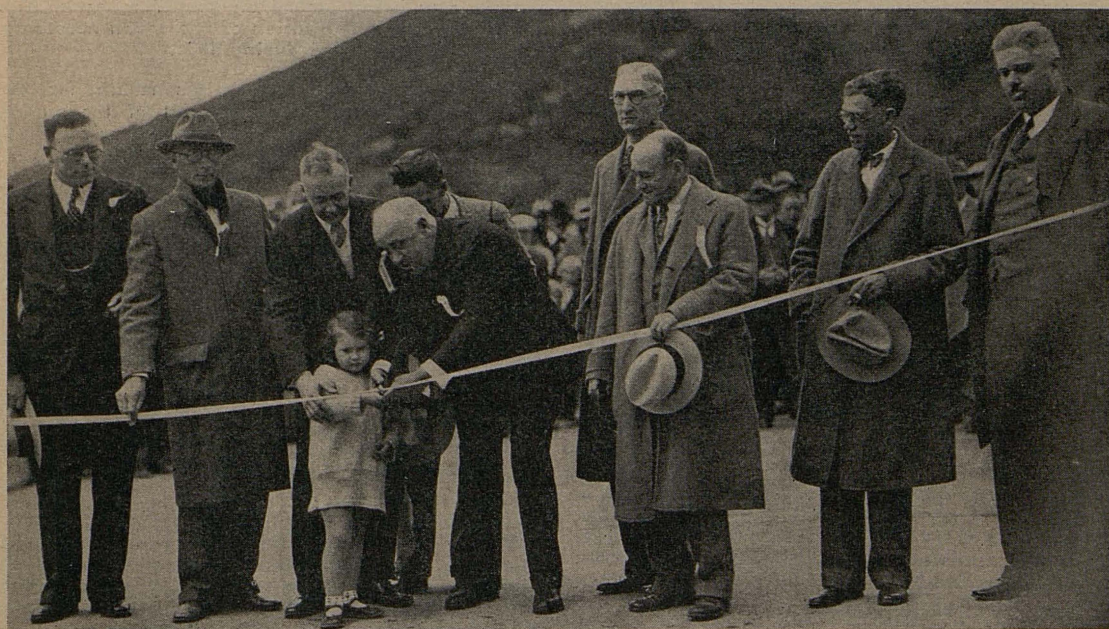
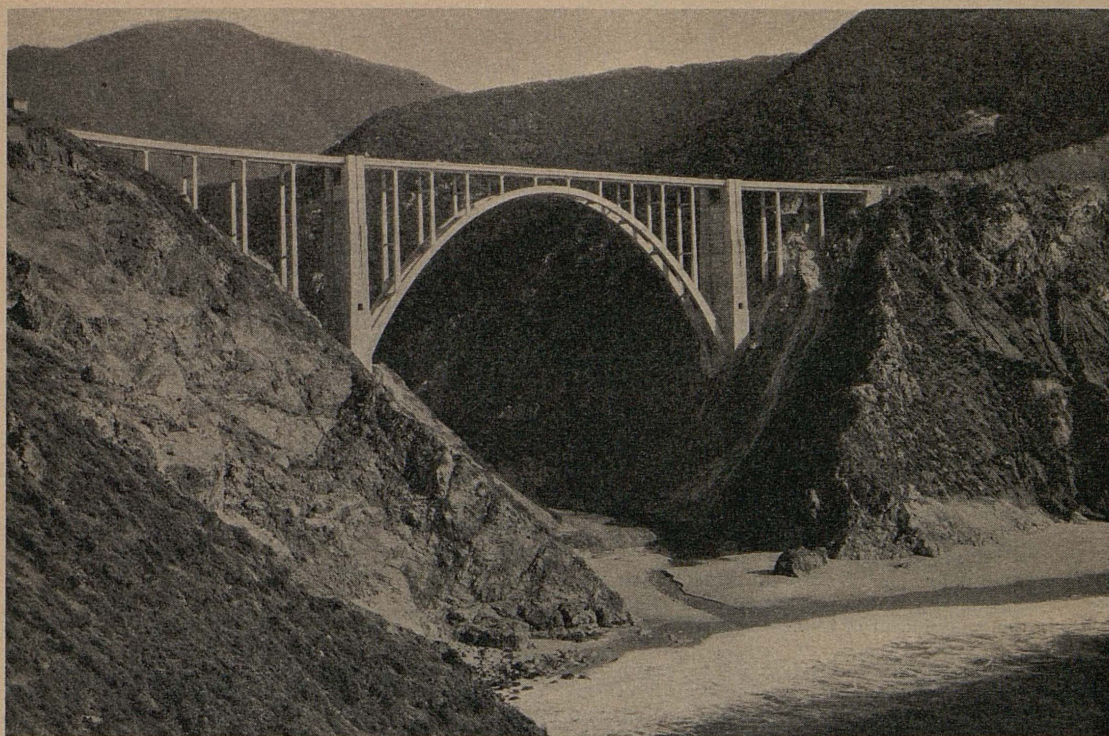
### SPECTACULAR ARCH

The Santa Barbara National Forest, paralleled by the road, preserves a paradise for the hunter, camper and fisherman that will be readily accessible for all time.

The bridge is an outstanding example of modern concrete arch construction. The arch springs from heavy concrete abutments securely anchored in rock on the precipitous slopes of the canyon nearly 140 feet above

(Continued on page 21)





"RAINBOW ARCH," as the engineers have dubbed the beautiful bridge spanning Bixby Creek on the rugged Carmel-San Simeon coast, was dedicated on November 28th with appropriate ceremonies. The official party shown above at the tape-cutting exercises are: left to right, City Manager R. M. Dorton of Monterey; Supervisor A. A. Caruthers; Senator-elect Edward Tickle; little Audrey Mawdsley, whose father, Peter Mawdsley, secretary of the Carmel Business Men's Association, is partially hidden by State Highway Commissioner Timothy A. Reardon engaged in helping Audrey manipulate the scissors; L. V. Campbell, State Highway Office Engineer; John W. Howe, Secretary of the Highway Commission; District Engineer Lester Gibson and Acting Bridge Engineer F. W. Panhorst under whose supervision this bridge, the longest single concrete arch in the West, was designed. The bridge is 714 feet long, crowned with an arch span of 342 feet. The roadway is 270 feet above the ocean, whose waves break at the foot of the slopes.

## 32 Federal Aid Projects Under Way

(Continued from page 1)

Three hundred thousand dollars was allotted to day labor for fire and embankment protection adjacent to State highways; this work is under the direction of the Department of Natural Resources and will provide work for several hundred men during the winter months.

### FEDERAL AID PROJECTS

The Division of Highways speedily took advantage of the Federal aid funds provided by the Emergency Relief and Construction Act passed by Congress last July. California was apportioned \$4,667,000 of the \$120,000,000 provided by this act and on December 1st the Division had under way 27 contracts, totaling \$3,894,300, being financed with the aid of these Federal funds. Bids will be opened during December for five more projects making the total cost of these 32 Federal aid projects \$4,845,200.

During the past months of 1932, construction has been commenced on many notable highway improvements in the development of California's State highway system.

One of the most drastic changes in the routing of a State highway is being effected on the Redwood Highway between Cloverdale and Hopland in Sonoma and Mendocino counties. The relocation of this section of the scenic Redwood Highway crosses to the east side of the Russian River at Preston, about two miles north of Cloverdale, and follows the river bank to a point just south of Hopland where it crosses again to connect with the existing highway.

### ALONG RUSSIAN RIVER

This new alignment will eliminate from this popular recreational highway the eight miles of maximum grade and sharp curvature over the hills between these two towns and opens a new scenic area.

Work now under way on this project involves the grading of a 37-foot roadway throughout the entire distance and the construction of a bridge across Squaw Rock Slide opposite that towering cliff. Construction of the two major bridges across the Russian River and grade separations with the Northwestern Pacific Railroad are involved in the project.

### WIDENING YOLO CAUSEWAY

Another improvement of considerable magnitude in the State highway system near Sacramento involves the widening of the causeway across the Yolo By-pass about five miles west of the Capital City on the main artery to the San Francisco Bay area. The present structure was built some 18 years ago and its roadway width of 20 feet has become inadequate and dangerous.

The improvement now under way consists of widening the structure on the southerly side to a new roadway width of 42 feet with a 3-foot sidewalk. The roadway will be surfaced with asphalt concrete and the present bascule span at the easterly end of the trestle will be replaced with a double-leaf lift span. The total length of this causeway is 16,538 feet and its widening will greatly increase the safety of driving for the thousands of motorists who daily travel this important artery.

On the Redding-Alturas lateral in Shasta County four contracts were let during the past year for the construction of that section of this highway between Burney and Fall River Mills, a distance of 18.5 miles. The work involves the construction of a graded road-bed 36 feet wide surfaced with bituminous-treated crushed rock 20 feet wide or an entirely new alignment. Three steel stringer bridges are under way at Hat Creek, Pit River and Fall River. The new location of this primary highway eliminates one of the worst sections between Redding and Alturas.

### RIDGE ROUTE ALTERNATE

During the year, grading on the Ridge Route Alternate has been completed. This relocation of the central artery of the State highway system in Los Angeles County is the most drastic improvement in alignment and grade ever undertaken.

It eliminates from the State system the notorious Ridge Route across the mountains which separate southern California from the San Joaquin Valley. The new location follows the canyons westerly of the existing route and provides a modern alignment and grade and at the same time shortens the distance between Castaic School and Tejon Pass by nearly ten miles. Contracts for the 30-foot paving now being placed on the 27 miles of this new route and construction of the seven necessary bridges were awarded during 1931.

Bids are to be advertised this month for the reconstruction and 30-foot pavement of the section of this route from Gorman, where the new alternate connects with the present alignment of the highway, to the northerly boundary of Los Angeles County.

Another improvement of major proportions to be started on the Los Angeles-Sacramento arterial is the construction of the new bridge across the Kern River at the northerly edge of Bakersfield. This structure is being placed on the new alignment of the State highway which is to be constructed cooperatively by the State, the city of Bakersfield and Kern County as a revised routing of this arterial through Bakersfield.

The new bridge is to be 2295 feet long and will consist of steel stringer spans and timber trestle, the deck will be concrete and will provide a clear roadway 40 feet wide with two 4-foot sidewalks.

### OLD BRIDGE INADEQUATE

This new river crossing will eliminate from the State highway the existing narrow concrete arch bridge built nineteen years ago by the county and now inadequate for the large volume of traffic carried by this important State highway.

On the new secondary highways which were added to the State road system by the 1931 Legislature, three important contracts were begun on two of these routes in Los Angeles County. On the new State highway lateral which will connect Los Angeles with Pomona, two contracts are under way for grading and paving.

The new highway is being constructed with a 50-foot roadway and a pavement 30 feet wide between Bar-

## Major Improvements to Highway System Constructed in 1932

ranca Street and Pomona and between El Monte and Covina. The completion of this new lateral will provide a modern State highway between Pomona and Los Angeles.

The third contract on these new secondary routes in Los Angeles County is for a similar pavement on the six miles from Pomona to the Brea Canyon Road on the Pomona-Fullerton Highway.

### PAVING ARTERIAL

An improvement of great interest to the San Francisco Bay region is the construction of a new pavement on the ten miles between the town of San Pablo and the Carquinez Straits bridge in Contra Costa County. This highway is the main route from the bay area to the Napa and Sacramento valleys and carries most of the interstate traffic to Oregon and Nevada. The project, now approaching completion, will provide a 30-foot pavement with 8-foot shoulders over the entire section and eliminate the old rough pavement with its high crown and excessive superelevation on curves.

Other important improvements to the State highway system which have been inaugurated during 1932 include such projects as:

Grading and surfacing 8.5 miles of the Sequoia National Park lateral between Lemon Cove and Three Rivers in Tulare County.

Grading and paving 4.8 miles between Newport Beach and Corona del Mar and 4.9 miles between Laguna Beach and Dana Point in Orange County on the Serra-Oxnard highway.

Grading and surfacing of nearly twenty miles on the Mecca-Blythe lateral in Riverside County.

Grading and paving on 16.5 miles of the San Diego-El Centro lateral between Bostonia and Viejas Creek.

Grading and surfacing on the Los Angeles-Salt Lake highway between Halloran Summit and Mountain Pass in San Bernardino County, a distance of 16.5 miles.

Grading and paving 6.4 miles between Cordelia and Fairfield on the San Francisco-Sacramento arterial in Solano County.

### THREE-LEVEL CROSSING

To relieve traffic congestion and increase safety, a three-level highway crossing is in course of construction a short distance outside of Cleveland. Traffic on four routes, East 71st Street, Brecksville, Canal, and Independence Roads, has reached such proportions that the one under-pass constructed a few years ago is insufficient. An elevated crossing will be superimposed.—*Ohio Highways*.

### MAKE 'EM BOOSTERS

It is plain that the tourist business is California's most valuable industry. It gives us much and takes little. It should be the business of every Californian to see that every traveler who crosses our State line goes away a booster.—*Santa Rosa Press Democrat*.

### MOAN OF THE LOW BIDDER

MY lump sum bid is low, you say?  
How much? Five thousand!!! Well,  
I'll lay

A bet with anyone that I  
Forgot and didn't multiply,  
Or else I've left the profit out.  
Great balls of tar! That's it, no doubt!

How did the unit prices run?  
My gosh! I'm low on every one!!!  
I'm low on earth; I'm low on rock;  
I'm low on borrow—that's a shock!  
They've got my check for ten per cent,  
And now I'm stuck, that's evident.

Who's going to inspect the job?  
Oh, I know him, the dirty slob!  
He wouldn't give a guy a break,  
And all he does is bellyache.  
Aw, shucks! Come on, let's move some dirt,  
Here's one more time I lose my shirt.

—SPENCER A. JONES  
in *The Excavating Engineer*.

## Great Basin Stream Flow Records Issued

Water Supply Paper 720 of the U. S. Geological Survey has made its appearance containing the records of cooperative stream flow measurements made by the U. S. Geological Survey, the State Engineer's office, and other agencies in the Great Basin during the period October 1, 1930, to September 30, 1931, and it is reported Water Supply Paper 721 containing similar data for Pacific Slope Basins in California is in galley proof and will appear very shortly. All earlier records of cooperative stream gaging have already been published.

The situation today with Water Supply Papers practically current is in gratifying contrast to that which prevailed two years ago when publication was three years in arrears. The State Engineer's office of California, cooperating with other western State engineers through the Association of Western State Engineers, has been instrumental in bringing about this improvement through representations to administrative heads at Washington and to the Congress that no economies were effected by the delay and much inconvenience was resulting to those having need for the data.

"It takes twenty years for one woman to make a man out of her son, and just twenty minutes for another to make a fool out of him."—*Tennessee Road Builder*.

## Torrey Pines Grade Eliminated in San Diego Coast Road Improvement

By R. C. MYERS, Assistant Engineer, District VII

ONE OF THE important improvements on the State highway system in San Diego County is the recently completed project in the city of San Diego extending from the northerly city limits to the junction of the La Jolla and Rose Canyon routes. This 4.4-mile project is on the Coast Highway and eliminates the old Torrey Pines grade from that route.

One can not realize the benefit of this improvement unless he has traveled over the old Torrey Pines grade which was one of the most tortuous and dangerous grades on any major highway in the State. The grades were steep and the curves so sharp as to make the sharpest curves on the old Ridge Route seem gradual by comparison.

This grade has been used for many years by all traffic entering or leaving San Diego by the Coast Route. It started at Sorrento Creek and ended several hundred feet higher on the mesa toward San Diego. It lies entirely within the city limits of San Diego, which is the reason this portion of the route was not improved sooner by the State.

### COOPERATIVE PROJECT

The project just completed is one of several projects under which the State and the county of San Diego are cooperating with the city of San Diego in improving the northerly entrance to the municipality. The city made the surveys and plans and with county aid handled the contract for the grading work. The plans were made in accordance with modern State highway standards and were approved by the State.

On this roadbed, graded under a city contract, the State is planning a new 30-foot pavement from the northerly city limits to the mesa above the grade where the new line connects with the old.

From this point the old pavement was flanked on either side by a row of trees which it seemed desirable to save. To increase the width of the old pavement to 30 feet would necessitate removing one row of trees. In order to avoid doing this the old pavement was widened from 16 to 20 feet

and a new 20-foot strip of pavement was placed easterly of the old right of way. This results in two 20-foot pavements with a row of trees between and also a row of trees along the westerly side of the west pavement strip. The westerly pavement is used for southbound traffic, while the easterly pavement is reserved for northbound traffic.

The construction work presented no unusual difficulty with the exception of the problem of maintenance of traffic. During paving operations the Olympic games were in progress in Los Angeles and an unusually heavy volume of traffic was carried past the work. It has been estimated by the San Diego Police Department that during the 77-day period during which paving operations were being carried on, 375,000 cars passed along this section of the highway. A number equal to several times the daily average passed on Sundays and holidays, particularly on Labor Day.

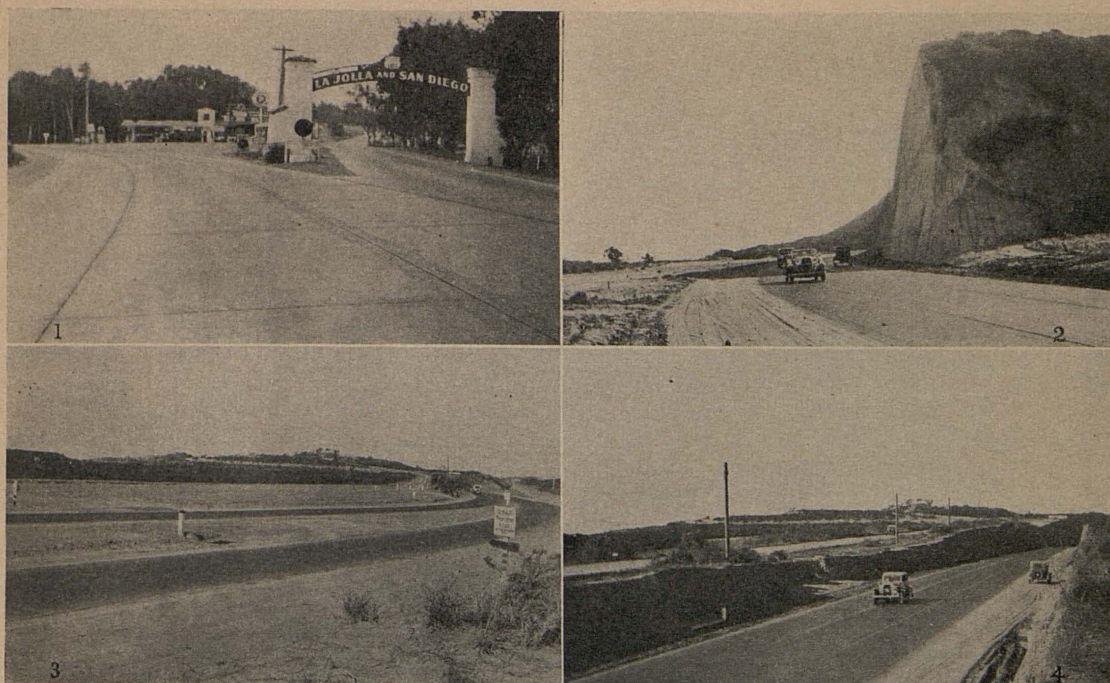
### TRAFFIC MADE SAFE

Construction work was carried out with the thought of providing a maximum degree of safety and a minimum of inconvenience and delay to the motorists using this road. The city of San Diego provided motored road maintainers and water tank trucks which were used to keep the detours in excellent condition at all times. On holidays, traffic was directed by a very efficient squad of motorcycle police of the city of San Diego. In general, the work of maintaining detours and directing traffic was under the supervision of the resident engineer of the State Highway Department, who had charge of this contract.

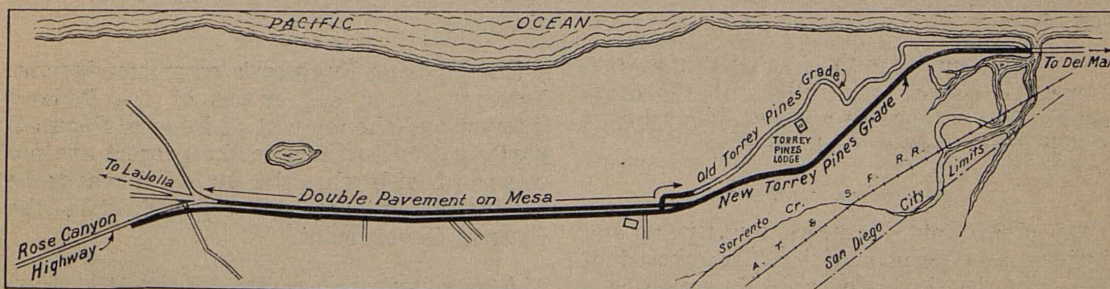
This phase of the work was considered so important that \$4,600 was expended by the State and \$3,200 by the city for the construction and maintenance of detours and the direction and control of traffic. How efficiently this work was carried on is best shown by statistics of the San Diego Police Department.

In 1931, from August 1st to October 15th, before starting the above described work and with traffic estimated at 20 per cent less than for the corresponding period in 1932, 28

(Continued on page 16)



GONE ARE THE CURVES of yesteryear that made the steep climb up the Torrey Pines grade a bugbear to motorists on the Coast Highway at the northern city limits of San Diego. A new, wide highway has replaced the old grade. No. 1 shows the junction of the Rose Canyon and La Jolla routes. No. 2 is a view looking south at the new grade. No. 3 shows the two one-way traffic roads at the top of the grade and No. 4 shows portions of the old and new highways at a point 500 feet north of the top of the new grade.



Map of the Torrey Pines grade relocation within San Diego City.

## C. H. Pope Speaks at Asphalt Conference

"California has contributed a more varied record of highway progress than any other state," said J. E. Pennybacker of New York, on announcing that California's State Highway Engineer, C. H. Purcell, had accepted an invitation to have State Construction Engineer C. H. Pope address the Tenth Annual Asphalt Paving Conference at New Orleans, December 5-9.

"Not only has California pioneered in machine finished asphalt surfaces," said Penny-

backer, "but it has added much toward the development of economical low-cost paving methods. At the same time California can not help but gain from Mr. Pope's discussions with the many other outstanding engineers from progressive road-building states, in attendance at the conference."

### Didn't Take Long

Wife: "You didn't marry a cook!"

He (bitterly): "No, I found that out a long time ago."—*Borrow Pit.*

Policeman—Miss, you were doing 60 miles an hour.  
Fair Motorist—Oh, isn't that splendid, I learned to drive only yesterday.

## *U. S. Engineers Investigate State's Great Central Valley Water Plan*

**T**HE Board of Engineers for Rivers and Harbors of the U. S. War Department spent ten days in California during November for the sole purpose of studying and investigating the Great Central Valley Project of the State Water Plan. The visit of this important engineering board of the Federal Government is a direct result of a special committee dispatched by Governor James Rolph, Jr., to Washington, D. C., in June, 1932, to appear before that board.

This is the third Federal body which has investigated California's water projects during Governor Rolph's incumbency, resulting from the activities of his committees. The House of Representatives Subcommittee on Appropriations for the Department of the Interior made an inspection trip in July, 1931, and the U. S. Senate Committee on Irrigation and Reclamation spent four days in September of this year on the same mission.

It is apparent that the United States Government is cooperating fully with the State agencies in working out a practicable solution to California's water problem.

### ADVISES CONGRESS

The Board of Engineers for Rivers and Harbors is a permanent board composed of officers of the U. S. Corps of Engineers who have had wide and varied experience on engineering work. It is the technical adviser of Congress in matters pertaining to flood control and navigation wherein there is a Federal interest. The recommendations of the board are given very serious consideration by the Congress.

For the past three years the Corps of Engineers of the United States Army, under congressional authorization, has been conducting an investigation of the Sacramento and San Joaquin rivers to formulate plans for the most effective improvement of these streams for navigation; the prosecution of such improvement in combination with the most efficient development of the potential water power; and for control of floods and needs of irrigation.

The investigation was carried out under the able direction of Lieut. Col. Thomas M. Robins, Division Engineer of the Pacific Division, who rendered his report to the Chief of Engineers in March, 1932. The report contains conclusions and recommendations as to the best plans of development and, of particular importance to California, recommendations as to the interest of the Federal Government in the development of these streams and the amount of Federal financial participation which would be warranted.

### PLANS COINCIDE

As far as the physical plans of development are concerned, these recommendations are practically identical with the plans recommended by the State Engineer after over ten years of intensive investigation. The engineers of the War Department have carefully reviewed all studies made by the State and approved the engineering plans and cost estimates.

**The Division Engineer's recommendations, however, as to the extent of the Federal interest and the amount of Federal financial participation justified in the project are not in accord with what the State believes to be the justified interest and responsibility of the Federal Government.**

A special committee was appointed by Governor James Rolph, Jr., to go to Washington to present an appeal from the conclusions of the Division Engineer. A hearing was held on June 27 and 28 before the Board of Engineers for Rivers and Harbors, charged with the duty of reviewing all reports of the War Department before final consideration by the Chief of Engineers in the latter's recommendations to Congress. It developed that the questions involved were of such great importance that the Board of Engineers accepted the suggestion of the State's representatives to make a personal investigation of the Great Central Valley Project before arriving at its final conclusions and recommendations.

The investigation started in Bakersfield on November 9th with an inspection trip through



**AMABASSADORS OF GOOD WILL** from the Government at Washington, these members of the Board of Engineers for Rivers and Harbors of the U. S. War Department, spent ten days in California studying the Great Central Valley Project of the State Water Plan during November. At Sacramento they were guests aboard the Delta King during a trip on the river. In the group are (left to right): Col. George W. Hoffman, Col. William J. Barden, Col. Edward H. Schulz, Lieut. Col. Warren T. Hannum and Col. Thomas M. Robins, Division Engineer, Pacific Division.

the Sacramento and San Joaquin valleys as far north as the Kennett dam site on the Sacramento River, and culminated in a public hearing held in the State Capitol at Sacramento on November 17th. Five out of seven members of the board took part in the investigation, comprising the following:

Col. William J. Barden, senior member of the board; Col. Edward H. Schulz, Col. George M. Hoffman, Col. Thomas H. Jackson, Lieut. Col. Warren T. Hannum.

The board was accompanied by Lieut. Col. Thomas M. Robins, Division Engineer, who sat as a member of the board at the public hearing; Capt. J. C. Drinkwater, District Engineer, Sacramento District; Lieut. Conrad P. Hardy of the San Francisco district office; C. I. Grimm, principal engineer, and Arnold Weeks, senior hydraulic engineer from the office of the Board of Engineers of Washington, D. C. Many Federal and State representatives met with the board.

Congressman Albert E. Carter of Oakland, member of the River and Harbor Committee of the House of Representatives, accompanied the party throughout its trip and attended the public hearing in Sacramento. Senator Bradford S. Crittenden, chairman; Assemblyman Robert L. Patterson, secretary; and Assemblyman Edward Craig, member of the California Joint Legislative Committee, and James M. Burke, A. B. Tarpey and Jesse Poundstone, members of the California Water Resources Commission, met with the board on

its trip. Regional Engineer E. W. Kramer of the U. S. Forest Service, representing the Federal Power Commission in California, accompanied the party.

#### MEETINGS EN ROUTE

Meetings were held en route at Bakersfield, Visalia, Fresno, Stockton, Woodland, Redding and Red Bluff, under the auspices of local chambers of commerce, and were attended by representative citizens in and near these communities.

On November 11, the Stockton Chamber of Commerce conducted the board on a trip of inspection of the Stockton Ship Canal and the delta region on the river steamer *Fort Sutter*. Luncheon was served during the trip. At Sacramento, November 16, the board was entertained by the River Lines at a luncheon served on board the palatial river steamer *Delta King* during a two-hour trip on the Sacramento River.

Following the public hearing at Sacramento on November 17th, the Sacramento Chamber of Commerce gave an informal dinner at the Sutter Club attended by Governor James Rolph, Jr., and Director of Public Works Earl Lee Kelly.

The board inspected the Kennett and Friant dam sites and the lines of the proposed conveyance conduits, studied the plans for improvement of navigation and flood control on the Sacramento and San Joaquin rivers and examined the areas of deficient water supply to be served under this initial Great Central Valley Project.

## Water Plan Stated at Public Hearing

(Continued from page 13)

At the public hearing at Sacramento, the State's contentions as to the importance and need of the Great Central Valley Project and the extent of Federal interest and responsibility justifying the financial participation of the Government was presented at an all-day session. Governor James Rolph, Jr., opened the hearing and extended the board a cordial welcome, expressing the appreciation of the State for the investigation being made. Earl Lee Kelly also addressed the board.

Other speakers at the hearing included: Edward Hyatt, State Engineer; Francis Carr, member of California Water Resources Commission, Redding; Stephen W. Downey, attorney for State Reclamation Board, Sacramento; W. P. Dwyer, president of The River Lines, Sacramento, Stockton and San Francisco; W. G. Stone, manager of transportation, Sacramento Chamber of Commerce; Walter B. Hogan, City Manager of Stockton; George A. Atherton, general manager, California Delta Farms, Inc.; C. W. Schedler, vice president and general manager, Great Western Electro-Chemical Company and president, Association of Industrial Water Users of Contra Costa and Solano Counties, Pittsburg and San Francisco; James M. Burke, member, California Water Resources Commission and Tulare Water Commission, Visalia; Senator Bradford S. Crittenden, chairman, California Joint Legislative Water Committee, Stockton; Arthur B. Tarpey, member, California Water Resources Commission, and president of Fresno Irrigation District.

### ORGANIZATIONS REPRESENTED

Others who appeared to emphasize the importance of the Great Central Valley Project and the Federal interest therein were:

California State Chamber of Commerce, represented by A. E. Roth; Los Angeles Chamber of Commerce, represented by George H. Cecil; San Francisco Chamber of Commerce, represented by H. W. Crozier; Junior Chamber of Commerce of San Francisco, represented by Victor T. Comer; Oakland Chamber of Commerce, represented by Charles H. Lee; San Joaquin Valley Water Committee, represented by M. P. Lohse; Kern County Water Development Commission and Kern County, represented by Hugh S. Jewett, Chairman of Commission; Salt Water Barrier Association, Inc., represented by T. M. Carlson; City of Fresno, represented by Gene Vincenz, Commissioner of Public Works.

Congressman Albert E. Carter of Oakland, Congresswoman Florence P. Kahn of San Francisco, and Congressman-elect Frank H. Buck of Vacaville, attended the public hearing and spoke.

Addresses and statements were made also by prominent citizens and representatives of important interests of the State as follows:

W. H. Kirkbride, chief engineer of Southern Pacific Company; P. M. Downing, vice president and general manager, Pacific Gas and Electric Company; M. M. O'Shaughnessy, consulting engineer, Public Utilities Commission, San Francisco; T. I. Phillips, assistant chief engineer, Western Pacific Railroad Company;

### STATEMENTS MADE ON TRIP BY MEMBERS OF BOARD OF ENGINEERS

The attitude of the Board of Engineers for Rivers and Harbors with respect to California's water plan is well set forth by the following statements of the members of the board which have been quoted during the trip of investigation:

BY COL. WILLIAM J. BARDEN, senior member:

"I believe the water plan that has been worked out is the best plan that could have been devised. The Federal interest in waterways is primarily that of navigation. We will go as far as we can toward bringing a solution of your problems, as far as our responsibility to the Federal Government will permit."

BY COL. EDWARD SCHULZ:

"We are in earnest in coming here. We are approaching this matter with an open mind. You can not idly sit and see this water going to the sea without its beneficial use. There must be some way to work out this problem. Recently we heard much of a slogan, 'Beer by Christmas.' What you need is another slogan, 'Water by New Years!'"

BY COL. GEORGE M. HOFFMAN:

"I don't know of any problem within the past year, the time I have been a member of the board, that received the attention that this one is receiving now. It is proper that California should ask the Federal Government to assist in her water problems."

BY COL. THOMAS H. JACKSON:

"You have a problem of the greatest magnitude and one that is exceedingly interesting to every one of the Board of Engineers. It is of the greatest importance to the future of California and, if and when the project is constructed, it is certain to result in increased prosperity. We have a very sympathetic attitude toward your project. We have, however, a duty to fulfill toward our employer, the United States Government. If we should find your proposed development is one that the United States Government should participate in, we shall be greatly pleased to so recommend."

Lester S. Ready, consulting engineer and former chief engineer of State Railroad Commission; E. W. Kramer, regional engineer, U. S. Forest Service and representative of Federal Power Commission in California.





**WELCOMING THE ENGINEERS** to Sacramento, State officials joined them on a river trip. In the group above, left to right, in the front row, are Lieut. Col. Hannum, State Engineer Edward Hyatt and Deputy Director of Public Works Eric Cullenward. Standing, left to right, are Col Hoffman, E. Raymond Cato, Chief of California Highway Patrol; Congressman-elect Frank H. Buck, Earl Lee Kelly, Director of Public Works; Congressman Albert E. Carter of Oakland, member of the House Committee on Rivers and Harbors; Col. Schulz, Rolland A Vandegrift, Director of Finance; Col. Jackson and Capt. J. G. Drinkwater, Division Engineer, Sacramento District, U. S. War Department.

The hearing was attended by nearly 100 citizens, representing practically all of the important interests in the State.

It is hoped that this personal investigation by the board will result in recommendations to Congress for a more liberal Federal financial participation in the project than heretofore recommended.

Congressman Albert E. Carter made this very significant statement at the public hearing in Sacramento on November 17th:

"I consider it one of the great and important problems here in the West and I have been pleased and delighted that the board has been enabled to come here. I have been gratified at their intense interest in this matter and I am sure that the interests of the State of California are going to be given full consideration by this board."

#### BALANCE AGAINST CALIFORNIA

How much do you really know about the scenic and recreational attractions of your own California?

This is the query put to motorists, following a recent report by the United States Bureau of Public Roads showing that mileage traveled in other states by motorists from California is more than twice as great as the mileage traveled by visiting motorists in this State.

While motor tourists from California were traveling 839,325 miles a day in states other than their own during the period covered by the report, only 411,600 miles were being traveled in California by motorists from other states.

## Road Upkeep Urged to Prevent Losses

**I**N OPENING a campaign to bring to the attention of the nation the risks that lie in too severe contraction in State, county and city budgets, T. H. Cutler, president of the American Road Builders' Association, points out that not only has new highway construction been affected but that destruction of those already built is inevitable if upkeep is neglected.

"The profits of adequate investment in maintenance of present highways are too great to be ignored regardless of the situation of economic stress which unquestionably exists at the present time," says Mr. Cutler.

"The value of sound maintenance to transportation should be sufficiently obvious to require no elaboration. With the cost of traffic accidents estimated at \$900,000,000 yearly, we are in an excellent way to increase it by reducing highway maintenance expenditures which can only mean an increase in operating hazards due to neglected road conditions."

## Coast Road Improved for Ten Miles

(Continued from page 10)

major motor vehicle accidents occurred within the limits of this contract with no highway work under way.

### ONLY ONE ACCIDENT

During the corresponding period in 1932, though construction work was in progress, only one accident occurred at a total cost of \$305. Statistics indicate that the average cost of major highway traffic accidents is \$301. On this basis, a saving of \$8,127 has been effected by the careful control of traffic on this contract, which is \$327 more than the cost of traffic maintenance, without attempting to place a monetary value on the inconvenience and possible loss of life which would have resulted if a considerable number of accidents had occurred.

On entering San Diego from the north, one now notices a vast improvement, starting from Del Mar where a 0.75 mile contract has recently been completed for widening the pavement to a 30-foot width and improving alignment. This extends to the new Sorrento overhead crossing of the A. T. & S. F. Railway which is now under construction and which will be completed about June, 1933. At the southerly end of this overhead railroad crossing the new improvement, previously described, which eliminates the old Torrey Pines grade from the route, extends for 4.4 miles to the junction of La Jolla and Rose Canyon highways.

At this point one has the choice of two routes—the La Jolla or scenic route, and the Rose Canyon or commercial route. The latter is the shorter and more direct route and extends for 5.42 miles to Balboa Avenue. This was a cooperative project in which the city and State cooperated and was completed in December, 1930. The scenic route, although somewhat longer, affords the opportunity of seeing La Jolla, one of the most beautiful suburbs of San Diego, with its picturesque homes and cliffs fronting on the ocean.

### TEN MILES IMPROVED

The State has spent \$372,000 on the three projects already completed and is spending \$108,000 on the Sorrento overhead railroad crossing now under construction, making a total of approximately \$480,000 which the State has allocated up to the present time

for the improvement of the northerly gateway to San Diego. These improvements form a continuous stretch of modern highway, 10.57 miles in length, from Del Mar to Balboa Avenue in San Diego. Plans are being prepared for still another project, extending from Balboa Avenue along the easterly end of Misison Bay to Atlantic Street, which will further improve this entrance to San Diego.

One of the most interesting features of this entrance to San Diego is the proposed roadside beautification being sponsored by the San Diego Conservation Society, the San Diego Chamber of Commerce and the San Diego City Park Department. This development is to start at the north city limits and extend to Lindbergh Airport, a distance of 14 miles. From the north city limits to the foot of the new Torrey Pines grade, the shore line is to be maintained as a public bathing beach, while the low flat land to the east is to be developed into a noncommercial auto parking and recreational area.

### EXTENSIVE PLANTING PLAN

From the foot of the new grade to the mesa above, native shrubs, ice plant, Torrey Pines and wild flowers are to be planted. On the mesa the two rows of trees are to be preserved and a third row planted along the east side of the east pavement. The areas between the trees are to be planted to native shrubs and flowers.

This plan of planting is to be carried out along the Rose Canyon route and across Mission Bay to Lindbergh Field on the proposed Atlantic Boulevard extension. The alternate scenic route through La Jolla needs no additional beautification. This planting plan, when completed, will give a well-groomed appearance to the roadsides, with a profusion of trees and shrubs. San Diego will have an entrance which will be a source of pride not only to the city but to the entire State as well.

All that most foreign countries ask of Uncle Sam is to be left a loan.—*Dallas News*.

Mrs. Lewis—You say you can't stop the car! Good heavens!

Lewis—It doesn't make any difference—there's no place to park, anyway.—*National Motorist*.

## New Print Shop Building Dedicated to Taxpayers by Governor Rolph

“IF I could find a job for every man out of work in the State it would be the happiest thing in my life.”

This was the declaration made by Governor James Rolph, Jr., in his speech at the dedication of the new addition to the State Printing Plant at Sacramento on November 15th, in referring to the unemployment situation and the relief being given by State construction activities.

“Sixty per cent of the money spent on this building went to Sacramento workmen,” he added. “Probably nowhere else in the Union are people witnessing such a ceremony as this. It is a heartening thought that California has confidence. I dedicate this building to the taxpayers who made its erection possible.”

An audience of more than a thousand persons filled the second floor of the new building at the dedication exercises. Brief addresses were made by Director of Public Works Earl Lee Kelly, Rolland A Vandegrift, director of finance, and J. M. Welsh, superintendent of the printing plant, who acted as chairman in place of State

Printer Harry Hammond, absent through illness.

Others on the speakers' platform included James Cremin of Marysville, former State Printer; Harry Orman, foreman of the composing room; Daniel Sullivan, oldest member of the plant staff, about to be retired on pension as press room foreman; Mayor C. H. S. Bidwell of Sacramento; R. E. Golway, Sacramento County Superintendent of Schools; Russell Bevin, Registrar of Motor Vehicles; Eric Cullenward, Deputy Director of Public Works, and William Arnold, foreman of the bindery.

Musical numbers were furnished by State Employees Association Orchestra and glee club quartette and the De Molay Band.

The new building is a three-story

steel and concrete structure erected at a cost of \$132,000 and so constructed that an additional story may be added. It is 50 by 160 feet in dimensions and makes the State Printing Plant the largest of its kind west of Chicago, employing approximately 265 workers.



LEARNING HIS LETTERS on a linotype machine, Governor James Rolph, Jr., picked out a line assisted by Miss Laura Hammond, daughter of State Printer Harry Hammond, and J. M. Welsh, plant superintendent, at the dedication of the new \$132,000 addition to the State Printing Plant in Sacramento.

## *Eighteen Major Projects Advertised With Estimated Cost of \$2,400,000*

**H**IGHWAY construction projects estimated to cost \$2,400,000 were planned for advertising during the month of November by C. H. Purcell, State Highway Engineer and Chief of the Division of Highways, according to his monthly report to Earl Lee Kelly, Director of Public Works.

This advertising program included 18 major projects composed of 15 road projects and three bridge projects. The road improvements cover work on approximately 56 miles of State highway and amount to an estimated cost of \$2,232,000. The three proposed bridge projects will involve the construction of five structures, estimated to cost approximately \$168,000. The work is distributed well over the State and will involve construction in 14 counties.

Mr. Purcell reported rapid progress in getting under way projects to be financed with the assistance of the \$4,600,000 Federal aid funds allotted to California from the money provided by the Emergency Relief and Construction Act, 19 of these relief projects having been advertised, or let to contract.

Fourteen emergency projects estimated to cost \$2,040,500 were included in the 18 projects prepared for November advertising. These 14 projects are indicated on the accompanying detailed tabulation.

#### PROGRAM UNDER WAY

The Division of Highway's program for direct unemployment relief is now well under way. This program is being financed from funds allocated by the California Highway Commission in the sum of \$1,350,000. Of this amount \$120,000 was set aside for the operation of a labor camp for 250 itinerant laborers in the Arroyo Seco in Los Angeles County and \$1,230,000 has been distributed among the 10 districts for the expansion of maintenance crews to give work to 3000 family men for a six months' period.

Following are brief descriptions of a few of the important projects advanced to November advertising. They cover work in 14 counties.

In Lassen County it is proposed to construct a new graded roadway section easterly of

Susanville on the Susanville lateral. The work on this small project will be performed largely by hand labor methods and will provide employment for a considerable number of men. The work will commence at a point 2.5 miles easterly of the city limits of Susanville and will extend for nearly two miles to Johnstonville. The improvement plans the widening of roadbed from 22 feet to 30 feet and importing and placing more suitable material for the grade than is available on the roadway. Alignment, grade line and drainage will also be greatly improved.

#### ARTERIAL IMPROVEMENT

From the Glenn-Tehama County line it is proposed to reconstruct the West-Side Pacific Highway over the 8.9 miles to Corning. This section of the main State route from Sacramento to the north was constructed some 17 years ago and the 4-inch concrete pavement, without reinforcing, has disintegrated under the impact of present day traffic. It is now proposed to reconstruct the grade to a 36-foot roadbed width and place an asphalt concrete pavement 20 feet wide. The improvement will smooth out the grade line and will connect at both ends with modern pavements. The project will mark another step in the modernization of California's arterial highways.

That short link of State highway in San Joaquin County which connects the Los Angeles-Sacramento arterial at Manteca with the Oakland-Stockton lateral at the Mossdale bridge is to be reconstructed and paved with Portland cement concrete pavement. The present old bituminous treated surfacing will be salvaged for the construction of adequate 8-foot shoulders on each side of the proposed 20-foot pavement. While this route is only about five miles long, it carries most of the traffic using the Valley route from the south to the San Francisco Bay area, thereby forming an important link in the State highway system.

#### ENDS GRADE CROSSINGS

An important improvement to the Los Angeles-Sacramento arterial is to be made to this heavily traveled highway at the southerly

(Continued on page 28)

## Work Advanced to Bids in November

Major highway improvements advertised by the Division of Highways during the month of November included 18 projects in 14 counties carrying an estimated total cost of \$2,400,200. These projects include 15 road jobs covering some 56 miles and 5 bridges. In the list were 14 projects financed with the aid of Federal Emergency Relief funds.

### DETAILED LIST OF PROJECTS

County	Location	Miles	Type
*San Diego	Alpine to Viejas Creek	4.4	Port. Cem. Con. Pave.
*Alameda	Dublin to Castro Hill	6.7	Port. Cem. Con. Pave.
San Joaquin	Manteca to Mossdale	4.3	Port. Cem. Con. Pave.
*Merced	Merced to Merced Airport	0.6	Port. Cem. Con. Pave.
*Stanislaus	Hatch Crossing to Modesto	1.4	Port. Cem. Con. Pave.
*Los Angeles	Gorman to Northerly Boundary	3.8	Port. Cem. Con. Pave.
*Los Angeles	Oaks to Vasquez Rock Road	1.5	Port. Cem. Con. Pave.
*Los Angeles	Tajunga to La Canada	4.0	Asphalt Conc. Pave.
*Marin	Waldo to Sausalito	2.1	Asphalt Conc. Pave.
*Ventura	Santa Clara River to Ventura	4.0	P. C. C. widening and Asphalt Conc. Pave.
*Tehama	Southerly Boundary to Corning	8.9	Asphalt Conc. Pave.
*Mono	Whiskey Creek to Convict Creek	4.3	Bit. Tr. Cr. Rk. Surf.
Lassen	Susanville to Johnstonville	1.9	Graded Roadbed
*Inyo	Keoughs Hot Springs to Bishop	6.3	Graded Roadbed
Los Angeles	Santa Ynez Canyon to Santa Monica Canyon	1.5	Removing earth slides
*Kern	Between Union Ave. and Oil Junction	2	Reinf. Conc. Bridges and 5 R. C. Box Cul- verts
Kern	Across Caliente Creek and Walker Basin	2	Timber Bridges
*San Bernardino	Across Mojave River at Barstow		Steel Bridge

\*Federal Emergency Relief Fund Project.

### SUMMARY

Type	Miles	Amount
Portland Cement Concrete Pavement.....	22.7	\$1,212,500
Asphalt Concrete Pavement.....	19.0	711,000
Bituminous Treated Crushed Rock Surfacing.....	4.3	52,000
Graded Roadbed.....	9.7	256,500
Bridges .....	(5)	168,200
Totals .....	55.7	\$2,400,200

## Many Skilled Men Seek Relief Camp

(Continued from page 2)

in readiness to be burned during the late winter or early spring. This will fit in nicely with plans for the future grading contract as the new right of way will have been completely cleared of brush by the time this contract is awarded.

### DOING PIONEER WORK

In addition to the clearing work, some pioneer roads and trails are being built by hand labor. After the clearing has been done and the necessary pioneer roads and trails built, any further time will be devoted to grading work on the highway section proper. This grading work will be confined to such portions as can be done with hand-shovels and wheelbarrows.

In October, 1932, the present organization was started with a skeleton force of paid employees, consisting of one superintendent, one senior foreman, four junior foremen, one commissary man and one cook. The bulk of the personnel is furnished by the Welfare Department of the City of Los Angeles and is composed of single transients who have no dependents.

The first contingent, composed of nineteen men, arrived in camp October 14th. They were put to work cleaning, scrubbing and burning rubbish. Simultaneously a group of carpenters was put to work repairing the bunkhouses which had been damaged to some extent by the heavy winds of the last two winters. Additional contingents of men were taken in as rapidly as they could be accommodated until, by the last of October the camp was occupied to capacity. Its population on November 12th was 263 men.

### MANY SKILLED MEN

In this group are men skilled in nearly every trade imaginable. A competent nurse was found and a small first aid hospital was established. There are a few capable assistant cooks, a barber who cuts the men's hair, a cobbler to repair their shoes, a tailor to repair and clean their clothes, and a laundry-man to wash bedding. In addition to this there are carpenters, blacksmiths, plumbers, electricians and men skilled in clerical work.

As men are admitted to the camp they are required to pass a medical examination and bathe. Each man is furnished underwear,

two pairs of socks, work shoes, overalls, jumper, towel and bedding consisting of one woolen blanket, one cotton blanket and pillow slip. The clothes which the men wear into camp are checked in, cleaned and repaired when necessary so that in most cases the men leave camp with their clothes in better condition than when they enter. The sleeping quarters are rooms twenty feet square, well ventilated, and accommodate from eight to ten men. Recreation in camp consists of the radio, cards, horseshoes and reading.

### ENJOY THE WORK

In spite of the hard character of the work, the men seem to enjoy it. They are quartered and are working in one of the most scenic sections of mountainous territory in southern California. Excellent meals are served of an abundance of well cooked, wholesome food. Tobacco is issued. Working hours are short, being six hours per day, six days per week.

It has been hoped that the capacity of the camp could be increased to 350 men, but as yet this matter has not been definitely decided on. Funds for the work are limited, the appropriation to date being \$50,000. The money is being expended in a manner to insure the greatest good being done to as many individuals as possible as well as to the State as a whole.

Superintendent Rossi reports under date of November 12th that the men had cleared about 16 acres and built 12,000 feet of trails in a total of 4443 men-days.

## 29,000,000 MOTORISTS VISITED NATIONAL PARKS

More than one-fourth of the population of the United States was represented in the grand total of recreational visitors to National forests in the United States last year, reports the California State Automobile Association. Recreation seekers and transient travelers to the forest areas totalled 32,228,613 persons and of this huge number 92 per cent were motorists using the State highways to reach the parks.

Mother—"Mary, come upstairs immediately."

Mary—"But I'm all wrapt up in my problem."

Mother—"Tell him to go home."

"Pop," said son, "how soon will I be old enough to do as I please?" Pop replied, "I don't know. Nobody has ever lived that long yet."—*Santa Cruz Sentinel.*

## U. S. Survey Shows 45 to 60 Per Cent Traffic Gain by 1940

**T**RAFFIC on the Federal-aid highway system in 11 western states, will, in general, increase by 45 to 60 per cent in the period 1930 to 1940, according to a report issued by the U. S. Bureau of Public Roads. The Federal-aid system is approximately 7 per cent of the total rural road mileage in each of these states and is made up of the important State and interstate routes.

This report is the result of a traffic survey conducted from September, 1929, to October, 1930, in cooperation with the highway departments of Arizona, California, Colorado, Idaho, Nebraska, New Mexico, Nevada, Oregon, Utah, Washington and Wyoming. The investigation was undertaken to obtain essential facts about the present density, type, capacity and distribution of traffic units as a basis for planning highway development to serve present and future traffic.

The data presented in the report may be used by each of the states as the basis for the preparation of a program of road construction, reconstruction and maintenance consistent with traffic requirements for each year up to 1940.

### ROUTES CLASSIFIED

The routes of the Federal-aid system are classified as having light traffic when there are less than 600 vehicles per day; as having intermediate traffic when there are between 600 and 1500 vehicles per day; and as having heavy traffic when there are more than 1500 vehicles per day. In 1930, 11.3 per cent of the mileage carried heavy traffic, 18 per cent carried intermediate traffic, and 65.9 per cent carried light traffic.

For 1935 the indicated figures are 14.0 per cent, 22.1 per cent and 59.1 per cent. For 1940 they are 16.0 per cent, 25.0 per cent and 54.2 per cent. During the 10-year period the heavy traffic roads will increase by 1670 miles, the intermediate traffic roads by 2534 miles, and the light traffic roads of the Federal-aid highway system will decrease by 4204 miles.

### BIXBY CREEK BRIDGE DEDICATED

(Continued from page 6)

the creek, and rises another 120 feet to span the 342 feet from center to center of abutments. The arch ribs, which appear in the picture to be thin and rather fragile, are actually five feet thick at the crown, nine feet at the springing line, and each four and one-half feet wide. The three 40-foot approach spans on the south and the six 40-foot spans on the north bring the total length of bridge to 714 feet. Over 6600 cubic yards of concrete—860 in the arch ribs alone—600,000 pounds of reinforcing steel and 4700 cubic yards of excavation were the principal items in the contract.



CHARLES H. PURCELL  
State Highway Engineer

## National Organization Again Picks Purcell

**A**T THE eighteenth annual meeting of the American Association of State Highway Officials held in Washington, D. C., from November 14th to 19th, California's State Highway Engineer was honored by being reelected to the Executive Committee of the Association.

The Executive Committee of the American Association of State Highway Officials is composed of only 11 members. It directs and conducts the business of this active organization which is the vitalizing influence in promoting uniform standards of highway procedure and construction throughout the entire United States.

In view of the great responsibility that is invested in this Executive Committee, the reelection of Mr. Purcell to another four-year term is significant of the esteem in which he is held by this national body for his ability and leadership.

"Before he married he said he would be the boss or know the reason why."

"And now?"

"He knows the reason why."

# Old Bridge Transformed Into Modern Structure by Turning It Upside Down

By L. C. HOLLISTER, Associate Bridge Designing Engineer

**M**ORE than ever before, economy has become the watchword of the Bridge Department. This is true from the Bridge Engineer on down to the designers and field men. The designers are extending themselves to see that the most useful and serviceable structure can be built with the most economy, while field men are sending in schemes and ideas for cutting down costs.

An interesting example of how a substantial saving was made, is one in which an old and abandoned bridge was moved to a new location, turned upside down, and a new 34-foot concrete floor placed on what was once the bottom of six 80-foot plate girders.

On the relocation of the Ridge Route between Los Angeles and Bakersfield, where many steep grades and sharp curves have been eliminated, there are seven bridges, four across Piru Creek, one across Gorman Creek, and two across Los Alamos Creek. At Los Alamos Creek, Station 83, it appeared from the field data submitted, that a structure about 220 feet long, consisting of approximately one 80-foot and two 70-foot spans would be required.

## SALVAGED OLD GIRDERS

At Castiac Creek on the Los Angeles end of the line change there were thrown out of use, due to improved alignment and grades, three 80-foot steel girder spans. These girders were of the "thru" type, that is, the narrow 21-foot roadway passed through the girders, the girders taking the place of a railing.

The girders, however, were in excellent condition and being of practically the same length as those required at Los Alamos Creek, it was conceived that these girders might in some way be made use of at the new location.

Accordingly, preliminary investigations were made to see if such a thing would be feasible and practical, and preliminary estimates were made to see if it would be more economical to move the old girders than to build entirely new ones. These investigations and estimates showed that it was both practical and economical to move the old girders and refabricate them to meet the new conditions.

The work consisted of the following:

1. Removing old concrete floor.
2. Dismantling and removing old girders, floor beams and bracing.
3. Transporting old structural steel to the new location.
4. Fabricating the old steel to meet the new requirements and conditions.
5. Erecting the steel on the new piers and abutments.

## BIG WRECKING JOB

Removing the old concrete floor was done with air drills and hammers, care being taken not to injure the structural steel.

Dismantling the structural steel was more of a job, as about 4500 steel rivets had to be removed in order to disconnect the floor beams and bracing and to divide each girder into two parts so that they could be transported.

Transporting the steel to the new location was done by trucks and trailers. The traffic law requires that no vehicle plus the load shall exceed a length of 75 feet. This meant that the 80-foot girders had to be cut at the splices and hauled in separate pieces.

After the old steel arrived at the new location, the fabrication was started. New steel plates and angles were added to form new brackets and new bracing and 1300 holes were drilled through the old steel to form connections for the new steel. The old bearing shoes were removed from the bottoms of the girders and put on the tops.

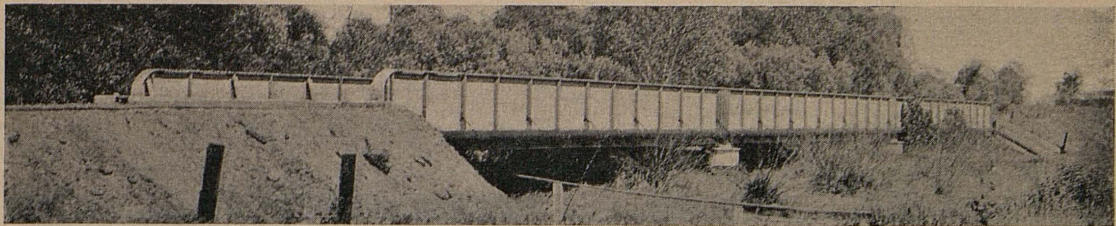
## NOW UPSIDE DOWN

Erecting the refabricated girders on the new piers and abutments followed. This time they were erected completely upside down compared to their original position. Following the erection the steel was thoroughly cleaned, sand blasted, and given three new coats of paint.

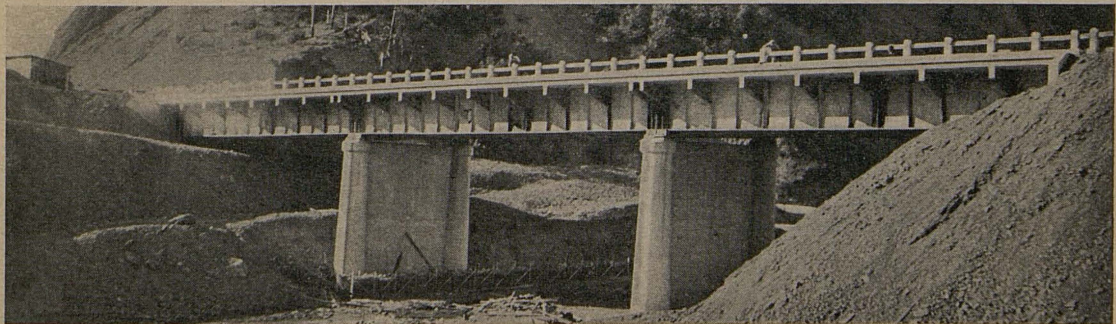
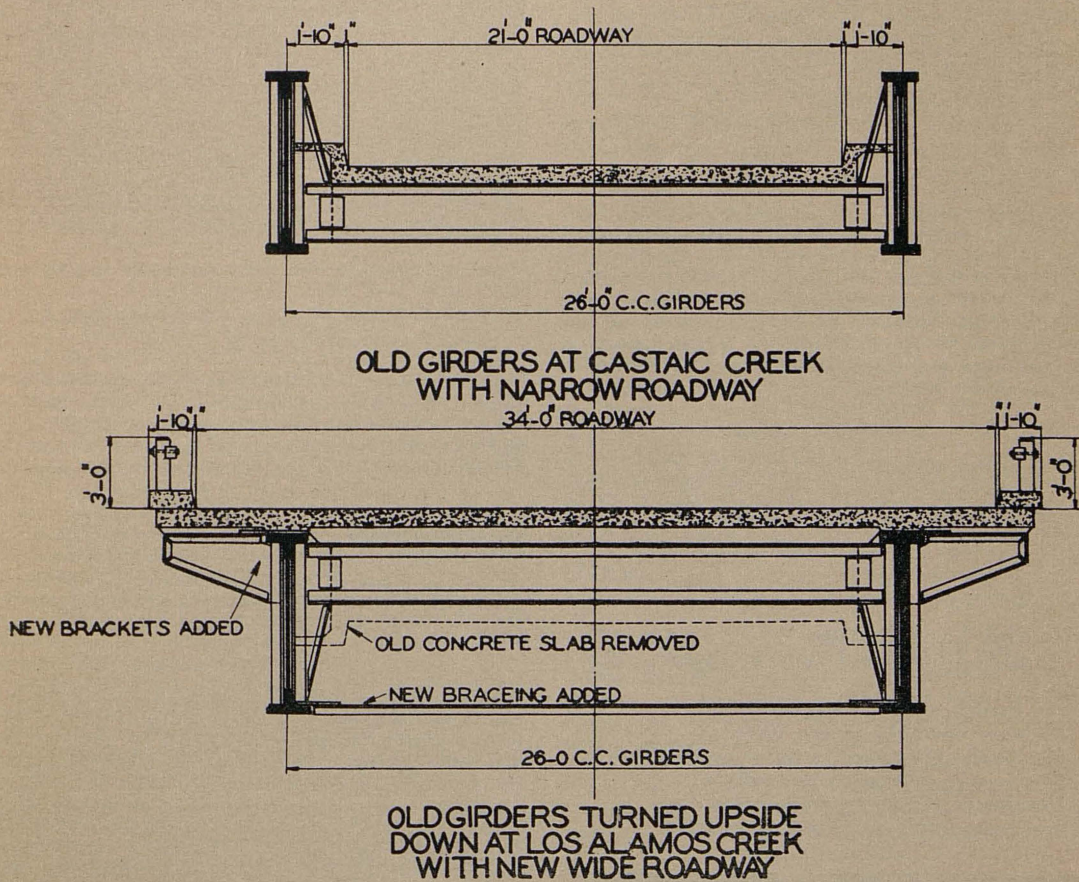
The new roadway consists of a 34-foot wide concrete floor with concrete curbs and redwood timber rails.

Those assigned to the design were A. B. Willett, E. H. McBroom, and M. Palmieri, with A. K. Gilbert, Resident Engineer for the State.





BEFORE TAKING the upside-down treatment, the old Castaic Creek Bridge had been relegated to the limbo of the forgotten past by the progress of road engineering. Improved alignment and grades left it an abandoned, obsolete structure with an old type 21-foot roadway.



AFTER TAKING the surgical treatment that dismembered it and turned the 80-foot steel girders bottom-side up, behold the old bridge changed to a new one! It is now the perfectly modern structure with 34-foot roadway spanning Los Alamos Creek on the new Ridge Route alternate.

## Highway Experiment Used 14 Cements

(Continued from page 4)

now manufactures eight or nine special brands. There are cements which will harden rapidly and produce concrete which it is claimed can be opened to traffic in from one to three days; other cements are designed for greater workability; less volumetric changes; lower temperature at setting; greater durability and resistance to the destructive action of sea water and other active agents; special color cements to suit the fastidious taste of the purchaser or to be used where the architectural and aesthetic requirements demand special treatment; for this purpose we have the white, grey, tan and pink cements.

Color is not of such vital importance in pavement construction as strength, durability and volumetric change characteristics.

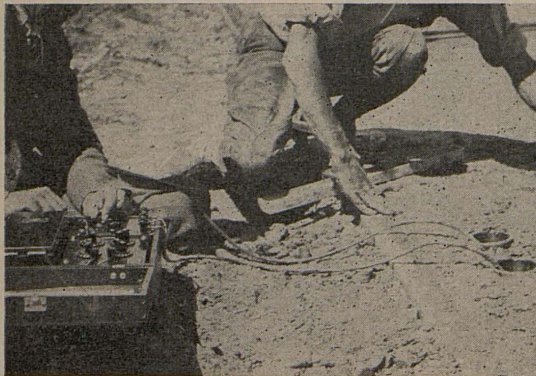
An ideal cement would be one from which concrete could be manufactured sufficiently strong to open to traffic in 24 hours and which, at the same time, would possess the greatest possible ultimate strength and durability and such low volumetric change characteristics as to cause none of the intermediate shrinkage cracks which tend to unsightliness and possible increased roughness of the pavement with age.

### QUALITIES CLAIMED

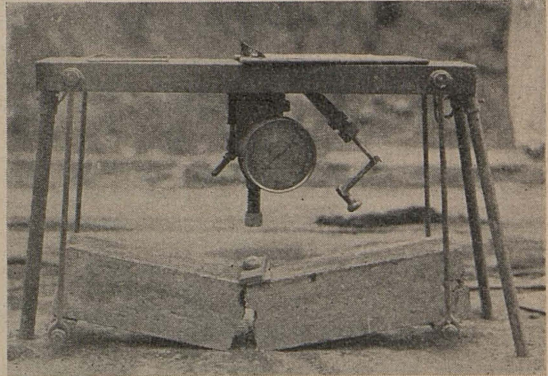
Experienced engineers know that no cement so far manufactured possesses all of these characteristics, nor is there any evidence that such a cement can be made. To attain one desired result, it is usually necessary to sacrifice some other desirable quality.

The following superior qualities are claimed for some cements:

- 1—High early strength.
- 2—Strength increase over a longer period of time.
- 3—Greater ultimate strength.
- 4—More resistant to sea water.
- 5—Greater resistance to water permeability.
- 6—Resistance to acids and alkalis.
- 7—Greater plasticity and workability.
- 8—Greater sand carrying capacity.



Measuring strain and temperature with strain meters and temperature coil.



Testing beams in the field for bending strength.

- 9—More flexible in neat mortar and concrete.
- 10—Lower specific gravity.

Because there have been few, if any, practical field tests to determine the relative value of the different brands of local California cement covering all of the characteristics outlined above, and because several cement producers are manufacturing special brands of cement for which one or all of these desirable characteristics are claimed, the State Highway Commission, upon recommendation of State Highway Engineer C. H. Purcell, approved the construction of a special test section in which all of the cements on the market in the northern part of the State for which any of these characteristics were claimed could be tried out.

### FOURTEEN BRANDS USED

Inasmuch as several of these qualities, such as durability and strength with age, require time for a satisfactory determination, accompanied by the fact that high early strength, durability and volumetric change characteristics are of considerable importance it was decided to make comparative tests of all brands on the market for which any special characteristics of the above nature are claimed, comparing these special brands with the standard cements from the same companies. Fourteen brands of cement were used in the test.

In order that there might be at least three check tests of each cement at each test period, both in compression and flexure, it was necessary to cast hundreds of test specimens in the field and in the laboratory during the progress of the work.

In addition to the test specimens cast during the progress of the work, cores were likewise cut from the finished pavement for the short time tests and additional cores will be cut from year to year for the long time tests.

Very complete specifications were written for the project, setting up rigid control over all features, including quality and grading of aggregate, design of mix, water control, construction operations, etc., to the end that the concrete might be cast on each section under comparable conditions, the only variable being the cement and such modifications in the

## Measuring Devices Cast Into Pavement for Highway Tests

design of the mix as were necessitated by the special characteristics of the different cements.

### METERS INSTALLED

Concrete specimens were cast for breaking in bending and compression at one, three, five, seven, ten and twenty-eight days. Additional specimens were cast for modulus of elasticity determination at long periods. Cores were cut for breaking to compare at all ages with the test cylinders and beams and, as previously stated, additional cores will be cut and tested whenever occasion demands in the future.

Strain meters and temperature measuring devices were cast into the pavement so that internal stress and temperature measurements could be made. The usual atmospheric temperature and humidity records were kept.

The work is in two parts of four ten-foot lanes each, or a total pavement width of forty feet. One part adjoins the city of South San Francisco on the north, and is approximately 1200 feet long. The second part is approximately one-half mile north of the first and has a length of 1000 feet.

Each portion was divided into two sections of equal length with a two-inch expansion joint between the abutting sections. The entire project was, therefore, divided into sixteen sections. As there were but fourteen brands of cement, it was possible to make a duplicate run of two of the low-temperature cements.

### SECTIONS SEPARATED

The concrete in each lane has a cross-section with a nine-inch center thickness and an eleven-inch thickened edge and is separated from the concrete in the preceding lane by painting the edge of the older concrete with asphalt and grease so as to provide as complete separation as possible with minimum friction between the adjacent strips.

Bronze plugs for measuring overall expansion and contraction were set in the ends of each section.

The contract for the work was let on June 30, 1932. The contractor commenced laying concrete on August 5, 1932, and finished the last section on September 13, 1932.

The sections contained from 144 to 172 cubic yards of concrete, depending on the length. When there was no breakdown in equipment it was found possible to pour two sections per day. Construction difficulties were encountered on several days with the result that two of the sections unfortunately have an intermediate construction joint.

### CURING METHODS

No reinforcing of any kind, intermediate weakened planes or expansion joints were used except the expansion joint between the abutting sections and the two unavoidable intermediate construction joints.

The high early strength cements were cured by sprinkling and covering with burlap for three days only. All other concrete was cured with earth and water for the standard period of eight days.

A complete report is now in preparation giving all details of the work. This report will be supplemented from time to time by additional data as it becomes available.

All control and test features were handled by the Materials and Research Department.

## New Highway Signs Reducing Accidents By Speed Warnings

THEY can't say they didn't know the speed limit, anymore! And thus, declares E. Raymond Cato, chief of the California Highway Patrol, have the new 45-mile speed limit signs placed along the highways of the State robbed the speeding motorist of his favorite alibi.

The signs were designed by the Division of Highways and erected with the cooperation of the Automobile Club of Southern California and the California State Automobile Association. Approximately 150 were placed on the roads at locations where long, smooth stretches of highway offered the temptation to "step on her."

### SIGNS SAVING LIVES

Once, says Chief Cato, when a highway patrolman arrested a speeder a frequent alibi was:

"Well I didn't know how fast you could go in this State."

But now with a speed limit sign staring him in the face every time he comes to a smooth stretch he has been compelled to fall back on all the old ones such as the aching tooth and the dead grandmother.

Moreover, the highway signs are performing a much more important function for they are saving lives by giving warning to the motorist to refrain from excessive speed.

"Our records of fatal accidents show 90 per cent of them involve speed in some way," said Cato. "It is almost axiomatic that the hazard of accident increases in the same ratio that the speed of the vehicle increases.

### REPORTING "DANGER SPOTS"

"We can't keep the speeders from killing themselves. But the 45-mile speed signs help."

Members of the patrol are cooperating with the Division of Highways in locating "danger spots" along the highways that experience shows are traffic hazards.

Patrolmen have instructions to keep a record of accidents and their locations occurring on their beats. They also have instructions to report any unusual traffic hazard to the maintenance men.

### THEY LAST LONGER NOW

Automobiles, like the human race, gradually are increasing their span of life, according to studies reported to the California State Automobile Association. The average life of a car is now estimated at seven years and three months, while only a few years ago the average period of usefulness was six years. Improved materials and engineering are credited with the increase.

Mistress—"Clara, give the goldfish a few more ants' eggs—it is my birthday and I want to see happy faces around me."—*Passing Show.*

"I've been terribly worried, Herbert."

"What about, dear?"

"I wonder whether I'm really the only girl whose money you've ever loved."—*National Motorist.*

## CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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

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

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

Address communications to California Highways and Public Works, P. O. Box 1103, Sacramento, California.

Vol. 10                      DECEMBER, 1932                      No. 12

### ROADSIDE TREES

With thousands of trees being planted in the State to enhance the beauty of the roadside and provide shade and color for the highways, it will be necessary for motorists and the public in general to aid in the protection of these if they are to reach maturity, it is pointed out by the outing bureau of the Automobile Club of Southern California.

In this connection attention is called to the wording of posters in the public parks of Spain, which apply equally well to America. These posters read as follows:

"Ye who pass by \* \* \* and would raise your hand against me, harken ere you harm me. I am the heat of your hearth on the cold winter nights; the friendly shade screening you from the summer sun; and my fruits are refreshing draughts quenching your thirst as you journey on. I am the beam that holds your house, the board of your table, the bed on which you lie, and the lumber that builds your boat. I am the handle of your hoe, the door of your homestead, the wood of your cradle and the shell of your coffin. I am the bread of kindness and the flower of purity. Ye who pass by listen to my prayer—**HARM ME NOT.**"

### LARGE SIGNS ERECTED

That the motorist may read his direction without slackening speed by day or night, huge reflectorized signs as large as eight feet high and ten feet long are now being placed at more important intersections of State highways.

These markers, the largest in history, carry the name of one or two principal cities in either direction and an indicating arrow. The letters in white on a black background are outlined with glass reflector buttons.

## Bureau Recommends Cut of Contractors' Fee for Registration

WITH a balance of \$179,319 in the State contractors' license fund anticipated at the close of the current fiscal year, a reduction in the registration fee of contractors may be sought in the 1933 Legislature.

This was indicated in a report filed with Governor James Rolph, Jr., by Col. Carlos W. Huntington, registrar of contractors and director of professional and vocational standards in the Governor's cabinet.

### LIMITATIONS ASKED

The registration fee paid by contractors is \$10 annually, and the report asserted that Governor Rolph would be asked to recommend to the Legislature that the fee be set at a minimum of \$5 and a maximum of \$10. Power to set the fee, within these limitations and providing circumstances justify a reduction, would be vested in the registrar of contractors, subject to approval of the Governor and director of finance, it was announced.

The contractors' bureau has now been in operation for four years. The original fee was \$5, but this was raised to \$10 by the 1931 Legislature in order to provide the bureau with sufficient funds with which to carry on its work of protecting the public from unscrupulous contractors and at the same time raise the standards and ethics in the contracting industry, Col. Huntington said.

The report also branded reports that the fee is to be raised above the present \$10 rate as "entirely without foundation, and, in fact, gross misrepresentations."

### BALANCE IN FUND

"We now have a balance of approximately \$100,000 in the contractors' license fund," Col. Huntington said, "and at the close of the fiscal year, June 30, 1933, we expect to have a balance of \$179,319, after deducting all expenditures.

"However, it is our opinion that at no time should we have a surplus of less than \$50,000. This is necessary, in accordance with sound business practices, in order to enable the registrar's office to continue to operate at all times.

"As a result of this fund balance, it is likely that we shall ask Governor Rolph to recommend a reduction in the fee to the 1933 Legislature."

## November Highway Bids and Awards

**EL DORADO COUNTY**—About 0.4 mile to be graded and surfaced with crusher run base and bituminous treated crushed gravel or stone (road mixed). District III, Route 11, Section C. Larsen Bros., Galt, \$37,648; S. M. McGaw, Stockton, \$37,988; J. R. Reeves, Sacramento \$42,001; Bundesen & Lauritzen & Delta Dredging Co., Pittsburg, \$39,528; Clyde W. Wood, Stockton, \$42,920. Contract awarded to M. J. Bevanda, Stockton, \$36,213.

**KERN COUNTY**—Between Union Avenue and Oil Junction, two reinforced concrete bridges, five reinforced box culverts, and extension of one reinforced culvert. District VI, Route 4, Section G. R. H. Travers, Los Angeles, \$25,988; The Valley Constructors Inc., Modesto \$22,321; Franklin B. Gridley, Pasadena, \$22,984; Hartman Const. Co., Bakersfield, \$21,522; Fredrickson & Watson, Oakland, \$22,296; Sam Sciarrino, San Jose, \$22,648; Stroud Bros. and Seabrook, Bakersfield, \$28,970. Contract awarded to J. F. Shepherd Stockton, \$21,139.

**LASSEN COUNTY**—About 1.9 miles to be graded between 2.6 miles east of Susanville and Johnstonville. District II, Route 29, Section C. Harms Bros., Galt, \$10,379; California Const. Co., San Francisco, \$14,339; J. P. Brenna, Redding, \$16,861. Contract awarded to Hemstreet & Bell, Marysville, \$9,549.

**LOS ANGELES COUNTY**—About 12.1 miles to be paved with Portland cement concrete. District VII, Route 4, Section I, J. Basich Brothers, Torrance, \$285,288; E. H. Bashaw, Los Angeles, \$290,758; Griffith Co. Los Angeles, \$294,515; C. W. Wood Stockton, \$317,458. Contract awarded to Jahn & Bressi Construction Co., Inc., Los Angeles, \$280,169.

**LOS ANGELES COUNTY**—Under Culver Boulevard and Pacific Electric Railway, two structures, each having one 76-foot plate girder span with concrete deck and two 35-foot reinforced concrete approach spans, approaches to be graded and paved with asphaltic concrete. District VII, Route 60, Section C. Oberg Bros., Los Angeles, \$83,835; Herbert M. Baruch Corp., Ltd., Los Angeles, \$88,105; Lynch-Cannon Engineering Co., Los Angeles, \$83,952; Clinton Const. Co., Los Angeles, \$77,797; Robinson-Roberts Co., Los Angeles, \$85,211; Sharp & Fellows Contracting Co., Los Angeles, \$84,270; Weymouth Crowell Co., Los Angeles, \$83,880; R. A. Wattson, Los Angeles, \$91,407; Dimmitt & Taylor, Los Angeles, \$99,361; J. E. Haddock, Ltd., and Franklin B. Gridley, Pasadena, \$86,076. Contract awarded to Artukovich Bros., Hynes, \$71,564.

**MARIN COUNTY**—Between Waldo and Sausalito, 1.3 miles grading and paving with asphaltic concrete. District IV, Route 1, Section C. Union Paving Company, \$164,767; Hanrahan Company, San Francisco, \$177,678; Clark & Henery Const. Co., San Francisco, \$202,119; M. J. Bevanda, Stockton, \$239,140; Fredrickson & Watson Const. Co., Oakland, \$187,487; Clyde W. Wood, Stockton, \$197,838; A. Teichert & Son, Sacramento, \$210,721; Vincent Maggiora & Piombo Bros., San Francisco, \$206,574; MacDonald & Kahn, San Francisco \$209,427; Weymouth Crowell Co. and E. Penn Watson, Jr., Los Angeles, \$202,409; Healy-Tibbitts Co., San Francisco, \$148,175; Granfield, Farrar & Carlin, \$165,323. Contract awarded to Peninsula Paving Company, \$147,234.

**SACRAMENTO COUNTY**—Near North Sacramento constructing structural steel flood gates with reinforced concrete abutments and wing walls on pile foundations. District III, Route 3, Section B. Holdener Const. Co., Sacramento, \$8,731; M. A. Jenkins, Sacramento, \$9,218; A. Frederick Anderson, Auburn, \$8,211; P. F. Bender, North Sacramento, \$9,756. Contract awarded to Lord and Bishop, Sacramento, \$8,046.

**SAN DIEGO COUNTY**—About 4.4 miles to be graded and paved with Portland cement concrete between Alpine and Viejas Creek. District VII, Route 12, Section D. Walter Trepte, San Diego, \$101,056; Weymouth Crowell Co., and E. Penn Watson, Jr., Los Angeles, \$107,422; Sander Pearson, Santa Monica, \$104,230; Daley Corp., San Diego, \$98,658; Griffith Co., Los Angeles, \$111,103. Contract awarded to T. M. Morgan Paving Co., Los Angeles, \$94,446.

**SAN DIEGO COUNTY**—Bridge across Viejas Creek near Alpine consisting of ten 40-foot steel stringer spans with concrete deck on concrete bents. District VII, Route 12, Section D. Oberg Bros., Los Angeles, \$34,591; Bodenhamer Const. Co., Oakland, \$34,878; Walter Trepte San Diego, \$33,050; T. M. Morgan

Paving Co., Los Angeles \$39,955; Johnson Const. Co., Los Angeles, \$31,021; J. A. Hunt, San Diego, \$34,094; Frank Doran, San Diego, \$32,661; Lynch Cannon Engineering Co., Los Angeles \$36,507; R. H. Travers, Los Angeles, \$31,012. Contract awarded to B. O. Larsen, San Diego, \$30,191.

**SAN DIEGO COUNTY**—About 3.4 miles to be graded and paved with Portland cement concrete between Chocolate Creek and Alpine. District VII, Route 12, Section C. Bodenhamer Construction Co., Oakland, \$207,965; Merritt-Chapman & Scott Corporation, San Pedro, \$262,319; Walter Trepte, San Diego, \$259,845; Griffith Co., Los Angeles, \$197,935; Peninsula Paving Co., and J. P. Holland, Inc., San Francisco, \$204,613; Weymouth, Crowell Co., and E. Penn Watson, Jr., Los Angeles, \$201,289. Contract awarded to T. M. Morgan Paving Co., Los Angeles, \$184,040.

**SAN LUIS OBISPO COUNTY**—Bridges across Pico and Little Pico creeks; one steel stringer bridge of eight 55-foot spans, four 38-foot spans and four 20-foot spans, and one steel stringer bridge of six 48-foot spans, four 34-foot spans and two 20-foot spans. District V, Route 56, Section B. Kuckenbergt-Wittman Co., Inc., Yosemite, \$99,609; Oberg Bros., Los Angeles, \$99,649; Hartman Const. Co., and G. A. Graham, Bakersfield, \$93,322; Rocca and Caletti, San Rafael, \$90,191; J. F. Shepherd, Stockton, \$94,639; M. B. McGowan, Inc., San Francisco, \$91,684; Theo. M. Maino, San Luis Obispo, \$95,372; Herbert M. Baruch Corp., Ltd., and Robinson-Roberts Co., Los Angeles, \$91,447. Contract awarded to Carl N. Swenson Co., San Jose, \$84,295.

**SANTA CLARA COUNTY**—About 4.7 miles to be graded and paved with Portland cement concrete between Oregon Avenue and Whisman Road. District IV, Route 68, Section A. D. McDonald and N. M. Ball, Sacramento, \$387,367; Clyde W. Wood, Stockton, \$330,752; Fredrickson & Watson Construction Company and Fredrickson Bros., Oakland, \$362,760; Union Paving Co., San Francisco, \$357,239; M. J. Bevanda, Stockton, \$413,388; Peninsula Paving Co., \$353,825; Hanrahan Co., San Francisco, \$342,758. Contract awarded to Basich Brothers, Torrance, \$328,956.

**SANTA CLARA COUNTY**—About 3.5 miles to be graded and paved with Portland cement concrete between Whisman Road and Lawrence Station Road. District IV, Route 68, Section A. B. Fredrickson & Watson Const. Co., and Fredrickson Bros., Oakland, \$195,830; M. J. Bevanda, Stockton, \$213,252; Clyde W. Wood, Stockton, \$197,414; Peninsula Paving Co., San Francisco, \$199,375. Contract awarded to Basich Bros. Torrance, \$181,271.

**SHASTA COUNTY**—About 0.6 miles grading at westerly city limits of Redding. District II, Route 20, Section B. Hemstreet & Bell, Marysville, \$13,312; S. M. McGaw, Stockton, \$15,571. Contract awarded to M. A. Purdy, San Francisco, \$11,668.

**STANISLAUS COUNTY**—Bridge across Tuolumne River near Modesto, consisting of three 80-foot deck plate girder spans, one 55-foot 6-inch steel stringer span, thirty-nine 44-foot steel stringer spans and one 36-foot 2-inch steel stringer span on concrete bents with pile foundations. District X, Route 4, Section B. M. B. McGowan, Inc., San Francisco, \$234,981; Mercer-Fraser Co., Eureka, \$242,306; Oberg Bros. Los Angeles, \$268,407; Sharp & Fellows Contracting Co., Los Angeles, \$238, 533; Healy-Tibbitts Construction Co., San Francisco, \$242,211; Mithry Bros. Construction Co., Los Angeles, \$237,977; Rocca and Caletti, San Rafael, \$230,655; Ward Engineering Co., San Francisco, \$256,062; MacDonald & Kahn Co., Ltd., San Francisco, \$259,520; Hartman Construction Co., & G. A. Graham, Bakersfield, \$234,275; Herbert M. Baruch Corporation, Ltd., & Robinson-Roberts Co., Los Angeles, \$240,560; Bodenhamer Construction Co., Oakland, \$244,959; Peninsula Paving Co. San Francisco, \$241,193; George Pollock Co., Sacramento, \$248,439; Lord & Bishop, Sacramento, \$255,171. Contract awarded to J. F. Knapp, Oakland, \$229,960.

**VENTURA COUNTY**—About 10.9 miles to be paved with Portland cement concrete between Hueneme Road and Little Sycamore Creek. District VII, Route 60, Section A. United Concrete Pipe Corp., Los Angeles, \$127,127; Fredrickson & Watson Const. Co. and Fredrickson Bros., Oakland, \$143,799; J. E. Haddock, Ltd., Pasadena, \$125,442; Griffith Co., Los Angeles, \$121,498; Kovacevich & Price, Inc., South Gate, \$123,320; Oswald Bros., Los Angeles, \$139,677.

## Mint Canyon Realignment Planned

(Continued from page 18)

approach to the city of Modesto. Bids were opened on October 26th for the construction of a new bridge across the Tuolumne River at Modesto and the present road improvement involves the construction of the State highway on an improved alignment which will connect with the existing highway on the easterly side of the railroad at Hatch crossing and enter the city over the new bridge at Ninth Street.

This new alignment will eliminate from the State routing two grade crossings over the main line of the Southern Pacific Railroad and several dangerous right angle turns. It marks another step towards the complete modernization of this main artery of the State highway system. The new road will be constructed to a roadway width of 46 feet and the Portland cement concrete pavement will be 30 feet wide.

Two highway improvement projects are proposed for the State highway which connects southern California with Reno via the Owens Valley. The one project involves the construction of a graded roadbed 24 feet wide and placing a bituminous treated crushed rock surfacing 20 feet wide and crusher run base from Whiskey Creek to Convict Creek between Bishop and Bridgeport in Mono County.

The second project consists of reconstructing the graded roadbed and placing an oil treated selected material surfacing 24 feet wide from one-half mile south of Keough's Hot Springs to one mile south of Bishop. These two construction projects will be decided improvements to this important highway leading to the "East of the Sierra" section of California.

### BAD CURVES DOOMED

A project of interest to southern California motorists is the proposed improvement to the worst section of the existing State highway through Mint Canyon between Saugus and Palmdale in Los Angeles County. The section to be covered by this project is the mile and a half between the Oaks and Vasquez Rock road.

It is here that the notorious "Seven Sisters" curves have for long been a hazard to traffic traveling this road from Los Angeles to Mojave. The work will involve complete revision of alignment and grade and the construction of a 40-foot graded roadbed and modern Portland cement concrete pavement 20 feet wide. The project marks the first step in the reconstruction of the State highway through the entire length of Mint Canyon.

On the Mojave-Barstow lateral a new bridge is to be constructed at the westerly entrance of Barstow across the Mojave River. This structure will be a 745-foot deck plate girder and steel stringer bridge on concrete piers and abutments with a concrete deck providing a clear roadway 24 feet wide and two 3-foot sidewalks. This improvement to this desert highway will replace the old steel truss and timber trestle with its narrow 17-foot roadway which has served traffic since the days when the old 20-mule freighters trudged along the sandy ways of the great Mojave Desert.

### CONNECTS RIDGE ALTERNATE

In Los Angeles County complete reconstruction of the northerly section of the Ridge Route is to be

## GASOLINE TAX DECREASE DUE TO 1,000,000 CAR SHORTAGE

Early returns indicate that income from motor taxes will be reduced for the first time since the highway transportation industry swung into full stride, says a report from an authoritative source. The statement continues:

"A decrease in both license fee and gasoline tax income is anticipated because of economic pressure which has materially curtailed car sales.

"While the total 1932 automobile registrations will not be known until early next year, evidence shows that there will be 1,000,000 fewer cars than in 1931, or a total of 25,000,000. The reduced registration will account for a loss of some \$14,000,000 in license fee income to the States.

"This drop in registration is resulting in lessened gasoline consumption, although such was not the case in 1931 when car sales fell nearly 3 per cent while gasoline usage increased by more than 5 per cent. The disappearance of 1,000,000 cars from the roads can be expected to bring a reduction of nearly 500,000,000 gallons in gasoline consumption.

"A serious problem, therefore, confronts State highway departments faced with lowered motor tax incomes."

## TOPOGRAPHIC SHEETS COMPLETED FOR TWO MALIBU QUADRANGLES

The final lithographed sheets of the Dume Point and Solstice Canyon quadrangles in the Malibu area of western Los Angeles County are now available. These quadrangles were surveyed in 1929 by the U. S. Geological Survey in cooperation with Los Angeles County. The sheets are published on a scale of 1:24000 with contour intervals of 25 feet.

undertaken between Gorman and the Kern County line. By this improvement the alignment and grade throughout the entire 3.8 miles of the project will be revised to meet the requirements of present day standards of arterial highway construction. The new roadbed will be 46 feet wide and the pavement will be Portland cement concrete 30 feet wide. This project will connect with the northerly end of the 30-foot pavement now being placed on the Ridge Route Alternate and will carry the same high standards of highway construction to the Kern County line.

Between the new Santa Clara River bridge and the city of Ventura it is proposed to widen the existing 20-foot Portland cement concrete pavement to 30 feet. This improvement to the Coast Route in this section of southern California will connect with the proposed new routing of the State highway through the city of Ventura which is to be constructed cooperatively by the city and State this year.



The employment of 570 men as day laborers in clearing operations on the Sacramento Flood Control and Reclamation projects and an additional 650 men in similar work on the overflow area of the Feather River was a contribution to unemployment relief in November reported by State Engineer Edward Hyatt in his statement of the activities of the Division of Water Resources for that month. Increased flowage of the Sacramento and San Joaquin rivers, completion of preliminary work for snow surveys, details of dam improvements and water applications are other matters covered in the report as follows:

An investigation and report of findings was made to the Superior Court of Riverside County by the State Engineer in connection with proceedings for the dissolution of the Ladera Irrigation District of that county.

An inspection was made of the construction work proposed by the La Mesa, Lemon Grove and Spring Valley Irrigation District, San Diego County. This work consists of the replacing with pipe lines of 17½ miles of the Cuyamaca flume, at a cost of \$500,000. This flume has been in use since 1888 and is the main transmission line of the district from its diversion dam on the San Diego River.

For the purpose of conference or investigation the following districts were visited: Hemet Irrigation District, Riverside County; Terra Bella Irrigation District, Tulare County; Oakdale Irrigation District, Stanislaus County; and Merced Irrigation District, Merced County.

#### DISTRICTS SECURITIES COMMISSION

Meetings of the Commission were held on October 21 and 31. Both meetings were given mostly to the receiving of progress reports on and to the discussion of the refinancing plans of several irrigation districts which have advanced refunding proposals.

The following matters were approved by the Commission:

Lindsay-Strathmore Irrigation District—Purchase of 222 shares of the Consolidated Peoples Ditch Company for \$10,740.

Corcoran Irrigation District—Purchase of one share of Peoples Ditch Company for \$10,000.

La Mesa, Lemon Grove and Spring Valley Irrigation District—Plan to use \$500,000 of its unsold bonds for replacing 17½ miles of Cuyamaca flume with concrete and steel pipe lines.

#### FLOOD CONTROL AND RECLAMATION

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

A force of 80 men has been continuously engaged in the clearing operations in the Sutter and Tisdale by-passes, the laborers working on a five-day shift basis at \$4 per day. This involves a labor turnover of about 125 men per week.

The canals of the drainage system are being cleaned by the removal of tule, grass and brush by hand labor with a crew of eight men. Incidental work on the pumping plants and miscellaneous structures to prepare them for the winter season has been continued with a force of five men.

##### *Sacramento Flood Control Project—Bank Protection*

The California Debris Commission is now actively at work on several units of the program for permanent bank protection in cooperation with the State, namely, at Chicory Bend, Russell Bend and the Rosebury ranch, on the Sacramento River.

Arrangements have been made for a small repair job to the revetment at Oak Hall Bend in cooperation with Reclamation District No. 537, involving the placement of approximately 70 tons of rock.

##### *Sacramento Flood Control Project—Construction*

Reports have been rendered on several applications before the Reclamation Board and work done under various applications has been inspected.

Clearing construction in the American River By-pass in connection with the construction of the North Sacramento flood control project was commenced on September 26th and completed on November 1st, at a cost of \$10,000. The area cleared was approximately 116 acres. About 450 men were employed in all on this work.

On November 3d construction clearing was commenced in the overflow area of the Feather River on the east side between Bear River and Starr Bend, with a force of 60 men. This force will be increased to 80 men on November 19th. The Reclamation Board on November 16th made available \$8,000 additional for this work, making \$14,000 in all. The men are employed for five-day shifts at \$4 per day, and this work will make it possible to give employment to about 650 men.

##### *Russian River Jetty*

A crew of 11 men has been engaged in quarrying and placing rock in the jetty. This will continue until about December 10th, when the available funds will be exhausted.

# Irrigation Field Work Completed

(Continued from page 29)

## Flood Measurements and Gages

The annual servicing of all gaging stations maintained by this Division, to be operated during the flood season, is now in progress. In the office the collection of data for the past seasons, from 1914 to date, has been completed and reports have been prepared.

## WATER RIGHTS

### Applications to Appropriate

Twenty applications to appropriate water were received during the month of October; sixteen were denied; eighteen were approved and three passed to license.

Among the applications received were two of considerable magnitude for mining purposes; one by C. H. Munro, Hobart Building, San Francisco, seeking to appropriate 200 cubic feet per second from Deer Creek, a tributary of Yuba River, to be used in the vicinity of Smartsville, and the other by H. G. Stibbs, Trustee, 234 Holbrook Building, San Francisco, seeking to appropriate 250 cubic feet per second from tributaries of the Middle Fork of American River.

Among the more important permits issued were one to the Oswald Water District allowing the diversion of 10 cubic feet per second from Feather River for the irrigation of 832.42 acres in Sutter County and one to the North Fork Ditch Company of Sacramento, allowing the diversion of 35 cubic feet per second from North Fork of American River for the irrigation of 7020 acres in Sacramento County at an estimated cost of \$50,000.

Inspection of projects under permit for the field season of 1932 was completed during October. A total of 195 projects were inspected and reports of the investigations will be prepared.

Notices to 1257 permittees went forward on October 1st requesting reports of progress and 520 responses were received during the month. These are in process of study and will form the basis for appropriate action in the way of extensions, or listing for permit inspection.

## ADJUDICATIONS

*Shasta River (Siskiyou County)*. Case pending in the Superior Court of Siskiyou County awaiting entry of the judgment and decree which is being prepared by the Division at the request of the court.

*Whitewater River (San Bernardino and Riverside counties)*. Case pending in the Superior Court of Riverside County awaiting developments in regard to the proposed All American Canal from Colorado River.

*Clover Creek (Shasta County)*. The Clover Creek case is pending in the Superior Court of Shasta County awaiting the court's pleasure in setting a date for hearing.

*Butte Creek (Siskiyou County)*. Case pending in

the Superior Court of Siskiyou County awaiting action by the parties involved.

*Eagle Creek (Modoc County)*. The report covering the distribution of the waters of Eagle Creek in accordance with the trial schedule of allotments adopted for the 1932 season is 50 per cent completed.

*South Fork Pit River (Modoc County)*. The report covering the field work on the investigation of the water supply and use of water on the South Fork Pit River is 25 per cent completed.

*Hat Creek (Shasta County)*. A stipulation for judgment has been prepared by the Division and submitted to counsel for their approval.

*Deep Creek, Franklin Creek, Cottonwood Creek and Pine Creek in Surprise Valley (Modoc County)*. Reports on these court reference cases will be prepared following completion of the Eagle Creek and South Fork of Pit River reports.

*Little Shasta River and Lower Shasta River (Siskiyou County)*. Reports covering water master service on these streams for the 1932 season have been completed.

*Pit River in Big Valley (Modoc and Lassen counties)*. The report covering supervision of diversions from Pit River in Big Valley for the 1932 season is 50 per cent completed.

## SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

The field work for the 1932 irrigation season, including measurements of all diversions, return flow, use of water, salinity, etc., throughout the Sacramento-San Joaquin territory, was completed during the past month, except for the maintenance of the permanent salinity stations and the eight Delta tide gages. Office work is now in progress in computing the diversions and compiling all data for the 1932 report. The Sacramento River at Sacramento is now flowing about 4200 second-feet and due chiefly to increased power releases on the Tuolumne River the flow of the San Joaquin River near Vernalis has increased to 2200 second-feet. With but little change during the past month in the flow reaching the Delta, the salinity conditions have remained practically constant with the 100-part line near the point of Sherman Island. In the following tabulation the salinity on November 6, 1932, at some of the Delta stations is compared to the corresponding salinity on November 6, 1931.

Station—	Salinity in parts of chlorine per 100,000 parts of water	
	11/6/32	11/6/31
Point Orient.....	1660	1755
Point Davis.....	1240	1490
Bullshead.....	960	1300
Bay Point.....	760	1095
Collinsville.....	350	510
Emmaton.....	40	253
Three Mile Slough Bridge.....	42	202
Rio Vista.....	3	128
Antioch.....	230	485



# All Ready for 1933 Snow Surveys

(Continued from preceding page)

Station—	Salinity in parts of chlorine per 100,000 parts of water	
	11/6/32	11/6/31
Jersey .....	30	360
Central Landing .....	4	71
Middle River P. O. ....	8	205

## CALIFORNIA COOPERATIVE SNOW SURVEYS

With the completion of a trip to stock shelter cabins and make final arrangements for surveys in the Mokelumne-Carson basins, all field work in readiness for the snow surveys in the spring of 1933 has been completed. Until time for the first surveys at key snow courses at the end of January, work on this project is now in the office computing the 1931-32 natural flow at the various stream gaging stations. The data on the measured flow at these stations are just becoming available since the close of the water year on September 30th. These computations of the natural flow for the seasonal and the April-July run-off furnish a check on the forecasts made on April 1st based on the snow surveys. Other office work includes routine maintenance to date of precipitation tabulations, etc.

## DAMS

To date 816 applications have been received for approval of dams built prior to August 14, 1929; 105 for approval of plans for construction or enlargement and 373 for approval of plans for repair or alteration.

Fifteen dams are under construction and 150 dams are under repair.

### Applications for Approval of Plans for Construction or Enlargement of Dams

Dam	Owner	County
Devils Canyon Dyke No. 1	City of San Bernardino	San Bernardino
Devils Canyon Dyke No. 2	City of San Bernardino	San Bernardino
Devils Canyon Dyke No. 3	City of San Bernardino	San Bernardino
Ditch Creek Crib	Heiser Crusade Placers, Ltd.	Tehama
Desilting Basin No. 3	Cucamonga Basin Protective Assoc.	San Bernardino
Dry Canyon *	City of Los Angeles	Los Angeles

\* Enlargement

The Devils Canyon dams are to be built jointly by the city, county and State for the purpose of diverting and spreading the flood waters of Devils Canyon and allowing them to sink into the gravels of Devils Canyon Cone.

The Ditch Creek Crib Dam is to store debris from proposed mining operations on Ditch Creek, a tributary of Deer Creek.

Desilting Basin No. 3, to be built by the Cucamonga Basin Protective Association, is to be for the same purpose as those at Devils Canyon. It will spread the flood waters of Cucamonga Creek.

The city of Los Angeles plans to raise their Dry Canyon Dam five feet, thereby increasing the storage

capacity by 143 acre-feet. This dam is located in Dry Canyon, tributary to the Santa Clara River, and is for storage and equalization purposes for municipal, domestic, irrigation and power uses.

### Applications Received for Approval of Plans for Repair or Alteration of Dam

Dam	Owner	County
Morning Star	McGeachin Placer Gold Mining Co.	Placer
Buena Vista	Kern Co. Land Co. and Buena Vista Assoc.	Kern
Malibu	Marblehead Land Company	Los Angeles
Combie	Nevada Irrigation District	Placer-Nevada
Seiad Valley	H. H. Schmitt	Lassen
Slate Creek	H. H. Schmitt	Lassen
Sharp Park	City and County of San Francisco	San Mateo

### Plans Approved for Construction

Dam	Owner	County
Devils Canyon Dyke No. 1	City of San Bernardino	San Bernardino
Devils Canyon Dyke No. 2	City of San Bernardino	San Bernardino
Devils Canyon Dyke No. 3	City of San Bernardino	San Bernardino
Desilting Basin No. 3	Cucamonga Basin Protective Assn.	San Bernardino

### Plans Approved for Repairs or Alterations

Dam	Owner	County
Upper San Leandro	East Bay Municipal Utility Dist.	Alameda
Morning Star	McGeachin Placer Gold Mining Co.	Placer
Hole	W. J. Hole	Riverside
Buena Vista Waste Weir	Kern Co. Land Co. and Buena Vista Assoc.	Kern
Combie	Nevada Irrigation District	Placer-Nevada
Malibu	Marblehead Land Company	Los Angeles
Seiad Valley	H. H. Schmitt	Lassen
Slate Creek	H. H. Schmitt	Lassen
Sierra Madre	Los Angeles Co. Flood Control Dist.	Los Angeles

## WATER RESOURCES

### Pit River Investigation (Modoc and Lassen Counties)

Work on the report covering the three years' investigation was continued during the month. Studies of various storage possibilities have been completed and the text of the report is in course of preparation.

### Salinas Valley, Mojave River, Ventura County and South Coastal Basin Investigations

Progress is being made on these investigations and they have proceeded along routine lines during the present month.

## STATE WATER PLAN

The Board of Engineers for Rivers and Harbors of the United States War Department has just completed a ten-day investigation of the Great Central Valley Project of the State's Water Plan. This investigation started at Bakersfield on November 9th with a trip of inspection throughout the Sacramento and San Joaquin valleys to Kennett dam site on the Sacramento River. At the conclusion of the trip of inspection, a public

(Continued on page 39)

## *Metal Crib Walls Installed as an Experiment on Big Oak Flat Road*

By CLARENCE E. BOVEY, Maintenance Engineer, District X

**M**ODERN metal crib wall construction, the first of its type in California, has brought to an end a serious hazard which existed for years at a point 14 miles above Groveland on the Big Oak Flat Road to Yosemite National Park. At this point route 40 of the California State Highway system passes above the tracks of the Hetch-Hetchy spur of the Yosemite Railroad, being cut in on the steep hillside and located horizontally not more than 20 feet from the railroad tracks. Since the highway is also approximately 20 feet above the railway a rock wall was required to prevent slides and washouts from depositing upon the tracks.

However, the storms of every year brought down much debris and frequently washed out portions of the rock wall creating an almost continuous expense for slide removal and prevention. The storms of the winter of 1931-1932 determined that a more stable wall than a rock wall was required at the location and after a careful study of the situation, it was determined that a crib wall should be constructed.

### METAL CRIBBING CHOSEN

A careful estimate was made of concrete cribbing and of wood cribbing and of the relative ease of transportation and installation, and it was found advisable to make an experimental installation of a new metal cribbing manufactured of iron, which had recently been brought to the coast. It was quite apparent that such a cribbing would have great strength and durability and that unlike solid cribbing it would have a marked degree of flexibility due to its interlocking construction.

It was very desirable that both the highway and the railroad track be kept open for traffic during the installation of these walls, and because of the ease and speed with which a metal crib wall may be erected, this type of construction was deemed very suitable.

The site of installation being approximately 30 miles from Chinese Camp, the nearest public railroad siding, it was necessary to haul

the cribbing from that point in trucks. The economies in transporting this material were well demonstrated in that because of its weight it required only about six truck loads to deliver the material to the site, whereas, it was estimated, about 30 loads would have been necessary with the other types.

### SUBSTANTIAL SAVING

There was also a substantial saving in the time required for loading and unloading of this material. It required only two men to load and unload these light units, none of which weigh more than 50 pounds.

This job was located below the highway level, making it necessary to lower the units in some manner. Cranes are usually required for this operation, but in this instance no such equipment was necessary. To deliver the crib units to the lower level, a wooden chute was constructed and one man was able to slide the sections down to the crew without fear of damage or breakage. Carrying the units from the chute to their proper place took but little time since a man can easily carry two units at a time.

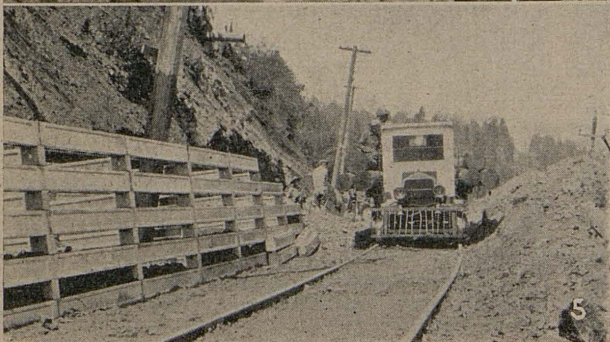
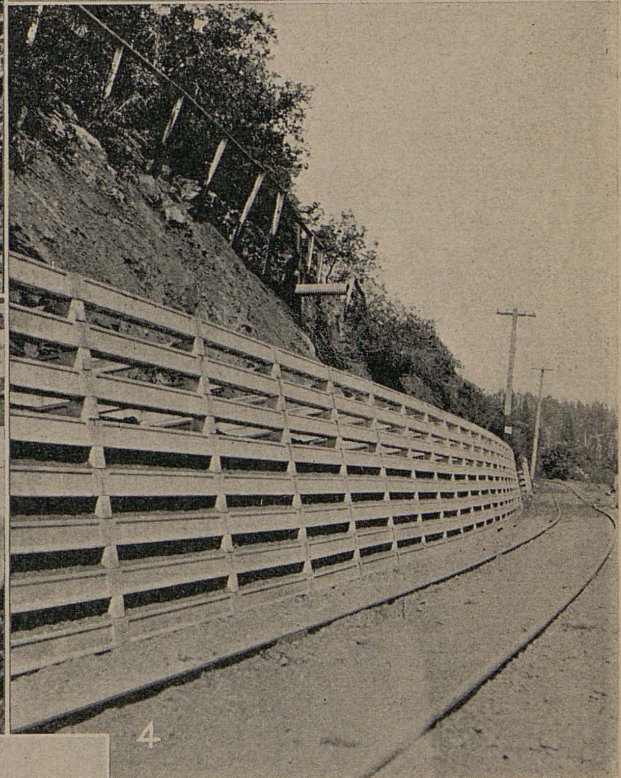
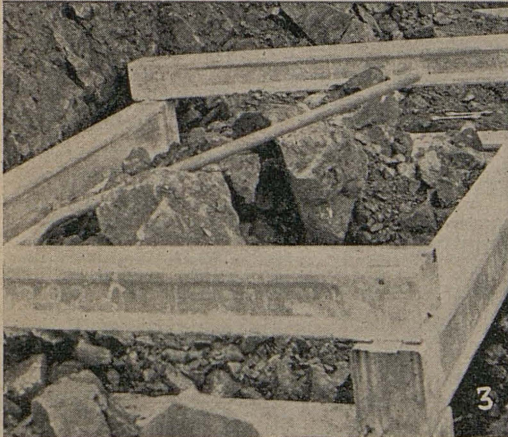
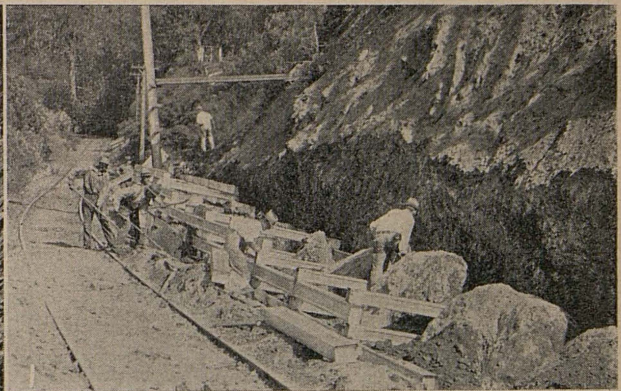
These metal units are made of a special iron, similar to culverts bearing the same brand, and are protected with a standard coat of galvanizing. All units are uniform; this insures perfect bearing, eliminating the use of shims. Expansion joints are provided for and interlocking is accomplished by means of bolts and other simple devices.

### MANY ADVANTAGES

The units are so designed as to permit stepping up or down to meet highway or slope elevations and are designed to withstand a 30-ton compression load.

It is believed that this form of cribbing also has a definite advantage in its ability to withstand extreme temperature changes and moderate fill settlement without damage.

The finished walls in this location were installed by common labor under the supervision of an experienced cribbing man. A minimum of excavation was required. The units were installed and locked together with ease, and the finished job is very pleasing to the eye.



IN THE CRIB lies the secret of the successful termination of slide removal grief and expense on the Big Oak Flat road where the 20-foot embankment of the State highway borders the Hetch Hetchy spur of the Yosemite Railroad. No. 1 shows the economical method of excavation employed in installation, made possible by the sectional construction of the crib wall units. No. 2 is a picture of the steep embankment topped by the highway guard rail, taken before the improvement. No. 4 shows a section of the completed metal crib retaining wall before the fill material had been entirely

placed. No. 3 is a close-up view of a unit of metal cribbing showing the detail of interlocking construction. No traffic delay was caused to the railroad or any interference with the free passage of trains during the metal crib installation. No. 5 shows a motor engine hauling cars heavily laden with big projecting logs passing with plenty of clearance while crib installation was in progress.

# Vital Statistics on Dam Construction

## APPLICATIONS FILED

Applications for approval of dams built prior to August 14, 1929, filed with the State Department of Public Works, Division of Water Resources during the month of November, 1932.

**TULARE COUNTY**—Elk Bayou Dam No. 711. Elk Bayou Ditch Company, Tulare, owner; buttress, 25 feet above streambed with a storage capacity of 60 acre-feet, situated on Elk Bayou tributary to Kaweah in Sec. 36, T. 20 S., R. 24 E., M. D. B. and M., for diversion purposes for irrigation use.

**SAN MATEO COUNTY**—Sharp Park Dam No. 10-20. City and County of San Francisco, owner; earth, 20 feet above streambed with a storage capacity of 15 acre-feet, situated on Salt Creek in Sec. 36, T. 3 S., R. 6 W., M. D. B. and M.

Applications for approval of plans and specifications for construction or enlargement of dams filed with the State Department of Public Works, Division of Water Resources, during the month of November, 1932.

**SANTA CLARA COUNTY**—Grant Co. Lake Dam No. 621-2. J. D. Grant Co., San Francisco, owner; earth, 24 feet above streambed with a storage capacity of 700 acre-feet, situated on Arroyo Aguague tributary to Penetencia Creek in Sec. 12, T. 7 S., R. 2 E., M. D. B. and M., for storage purposes for irrigation use. Estimated cost of enlargement \$2,500; fee paid \$25.

**MODOC COUNTY**—Payne Dam No. 143. Frank McArthur, Alturas, owner; earth, 9 feet above streambed with a storage capacity of 2849 acre-feet, situated on Payne Creek tributary to Pit River in Sec. 16, T. 41 N., R. 14 W., M. D. B. and M. For storage purposes for irrigation use. Estimated cost \$2,000; fee paid \$20.

Applications for approval of plans and specifications for repair or alteration of dams filed with the State Department of Public Works, Division of Water Resources, during the month of November, 1932.

**SAN MATEO COUNTY**—Sharp Park Dam No. 10-20. City and County of San Francisco, San Francisco, owner; earth, situated on Salt Creek in Sec. 36, T. 3 S., R. 6 W., M. D. B. and M.

## PLANS APPROVED

Plans and specifications for the construction or enlargement of dams approved by the State Department of Public Works, Division of Water Resources, during the month of November, 1932.

**SAN BERNARDINO COUNTY**—Devils Canyon Dyke No. 1, 17-2. City of San Bernardino, San Bernardino, owner; earth, 3 feet above streambed with a storage capacity of 58 acre-feet, situated on Devils Canyon Cone tributary to Santa Ana River in Sec. 7, T. 1 N., R. 4 W., S. B. B. and M. For storage and diversion purposes.

**SAN BERNARDINO COUNTY**—Devils Canyon Dyke No. 2, 17-3. City of San Bernardino, San Bernardino, owner; earth, 3 feet above streambed with a storage capacity of 27 acre-feet, situated on Devils Canyon Cone tributary to Santa Ana River in Sec. 7, T. 1 N., R. 4 W., S. B. B. and M. For storage and diversion purposes.

**SAN BERNARDINO COUNTY**—Devils Canyon Dyke No. 3, 17-4. City of San Bernardino, San Bernardino, owner; earth, 3 feet above streambed with a storage capacity of 16 acre-feet, situated on Devils Canyon Cone tributary to Santa Ana River in Sec. 6, T. 1 N., R. 4 W., S. B. B. and M. For storage purposes and also diversion.

**SAN BERNARDINO COUNTY**—Desilting Basin No. 3-76. Cucamonga Basin Protective Association, Cucamonga, owner; earth, 22 feet above streambed with a storage capacity of 80 acre-feet, situated on Cucamonga Creek tributary to Santa Ana River in Sec. 29, T. 1 N., R. 7 W., S. B. B. and M. For storage purposes, for domestic and irrigation use.

**EL DORADO COUNTY**—Williamson Dam No. 464. Hector Williamson, Placerville, owner; earth, 41 feet

above streambed with a storage capacity of 200 acre-feet, situated on a creek tributary to Webber Creek in Sec. 35, T. 11 N., R. 9 E., M. D. B. and M. For storage purposes for irrigation and recreation use.

**LOS ANGELES COUNTY**—Dry Canyon Dam No. 6-5. City of Los Angeles, Los Angeles, owner; earth, 59½ feet above streambed with a storage capacity of 800 acre-feet, situated on Dry Canyon Creek tributary to Santa Clara River in Sec. 35, T. 5 N., R. 16 W., S. B. B. and M. For storage purposes for municipal, domestic and irrigation use.

Plans for the repair or alteration of dams approved by the State Department of Public Works, Division of Water Resources, during the month of November, 1932.

**PLACER COUNTY**—Morning Star Dam No. 325. McGeachin Placer Gold Mining Company, Sacramento, owner; earth, situated on Shirltail Creek tributary to American River in Sec. 17, T. 15 N., R. 11 E., M. D. B. and M.

**RIVERSIDE COUNTY**—Hole Dam No. 813. W. J. Hole, Arlington, owner; earth, situated on Arroyo tributary to Santa Ana River in Sec. 36, T. 2 S., R. 6 W., S. B. B. and M.

**KERN COUNTY**—Buena Vista (Kern R. Waste Weir) No. 732. Kern County Land Company and Buena Vista Associate, Bakersfield and San Francisco, owners; concrete and flashboards, situated on Kern River in Sec. 32, T. 30 S., R. 25 E., M. D. B. and M.

**PLACER AND NEVADA COUNTIES**. Combie Dam No. 61-9. Nevada Irrigation District, Grass Valley, owner; situated on Bear River tributary to Yuba River in Sec. 2, T. 13 N., R. 8 E., M. D. B. and M.

**LOS ANGELES COUNTY**—Malibu Dam No. 773. Marblehead Land Company, Los Angeles, owner; arch, situated on Malibu Creek in Sec. 19, T. 1 S., R. 17 W., S. B. B. and M.

**LASSEN COUNTY**—Said Valley Dam No. 250. H. H. Schmitt, Susanville, owner; earth, situated on unnamed drainage tributary to Grasshopper Valley in Sec. 31, T. 36 N., R. 11 E., M. D. B. and M.

**LASSEN COUNTY**—Slate Creek Dam No. 250-3. H. H. Schmitt, Susanville, owner; earth, situated on unnamed drainage tributary to Slate Creek in Sec. 1, T. 34 N., R. 10 E., M. D. B. and M.

**LOS ANGELES COUNTY**—Sierra Madre Dam No. 32-13. Los Angeles County Flood Control District, Los Angeles, owner; arch, situated on Little Santa Anita River tributary to Big Santa Anita River in Sec. 16, T. 1 N., R. 11 W., S. B. B. and M.

**SAN MATEO COUNTY**—Sharp Park Dam No. 10-20. City and County of San Francisco, San Francisco, owner; earth, situated on Salt Creek in Sec. 36, T. 3 S., R. 6 W., M. D. B. and M.

**MONO COUNTY**—Lower Twin Lakes Dam No. 531-2. S. H. Hunewill, W. F. Dressler, F. W. Simpson, Bridgeport, owners; rockfill, situated on Robinson Creek tributary to East Walker River in Sec. 33, T. 4 N., R. 24 E., M. D. B. and M.

Nearly twenty-seven per cent of drivers involved in fatal accidents last year and twenty-four per cent of those in nonfatal accidents were under twenty-five years old.

“Are you sure this is the man who stole your car?”  
“I was until your cross-examination. Now I don’t know if I ever possessed a car.”—*Georgia Highways*.

A little city boy was visiting his country cousin.  
“What do you know about cows?” quizzed the country lad. “You don’t even know if that’s a Jersey cow.”

“I don’t know from here, ‘cause I can’t see its license.”—*Motor Land*.

# Water Applications and Permits

## APPLICATIONS FILED

Applications for permit to appropriate water filed with the Department of Public Works, Division of Water Resources, during the month of November, 1932.

**DEL NORTE COUNTY**—Application 7417. F. C. Foote, 2149 W. 80th Street, Los Angeles, for 50 c.f.s. from Craig's Creek tributary to Smith River to be diverted in Sec. 36, T. 17 N., R. 2 E., H. B. and M. For mining and domestic purposes. Estimated cost \$20,000.

**TUOLUMNE COUNTY**—Application 7418. L. L. Stayton, Ida Henry, John A. Russi, Joe Shaska and Geo. Bowen, c/o L. L. Stayton, Columbia, for 3 miners' inches from Deadman Creek tributary to Rose Creek; thence Stanislaus River to be diverted in Sec. 30, T. 3 N., R. 15 E., M. D. B. and M. For mining and domestic purposes. Estimated cost \$500.

**HUMBOLDT COUNTY**—Application 7419. W. V. Hunt, c/o Arthur W. Hill, attorney, Eureka, for 3.0 c.f.s. from Mad River tributary to Pacific Ocean to be diverted in Sec. 16, T. 6 N., R. 1 E., H. B. and M. For irrigation and domestic purposes (65 acres). Estimated cost \$2,500.

**TRINITY COUNTY**—Application 7420. Norris R. Ferguson, Junction City, for 0.1 c.f.s. from unnamed stream tributary to Canyon Creek; thence Trinity River to be diverted in Sec. 36, T. 34 N., R. 11 W., M. D. B. and M. For irrigation and domestic purposes. Estimated cost \$200.

**EL DORADO COUNTY**—Application 7421. C. M. Carter, R. D. Nicol and W. P. Austin, 1733 Jefferson Street, Oakland, for 614,000 acre-feet per annum from South Fork American River tributary to American River to be diverted in Sec. 21, T. 11 N., R. 9 E., M. D. B. and M. For irrigation purposes (450,000 acres). Estimated cost \$9,000,000.

**EL DORADO COUNTY**—Application 7422. C. M. Carter, R. D. Nicol and W. P. Austin, 1733 Jefferson Street, Oakland, for 100,000 acre-feet per annum from South Fork American River tributary to American River to be diverted in Sec. 21, T. 11 N., R. 9 E., M. D. B. and M. For municipal purposes. Estimated cost \$9,000,000.

**SISKIYOU COUNTY**—Application 7423. Horace A. Cook, Happy Camp, for 3 c.f.s. from Twin Gulch tributary to Indian Creek; thence Klamath River to be diverted in Sec. 22, T. 17 N., R. 7 E., H. B. and M. For mining purposes. Estimated cost \$500.

**TRINITY COUNTY**—Application 7424. W. J. Gear, Hayfork, for 3 c.f.s. from Bear Creek tributary to Hayfork of Trinity River to be diverted in Sec. 28, T. 3 N., R. 8 E., H. B. and M. For mining purposes.

**TRINITY COUNTY**—Application 7425. W. J. Gear, Hayfork, for 3 c.f.s. from Jud Creek tributary to Hayfork of Trinity River to be diverted in Sec. 33, T. 3 N., R. 8 E., H. B. and M. For mining purposes.

**EL DORADO COUNTY**—Application 7426. B. W. Stone, 161 Ellis Street, San Francisco, for 500 c.f.s. and 125,000 acre-feet per annum from Rubicon River, Pilot Creek, Gerle Creek, Loon Lake, Buck Island Lake, Rockbound Lake, Little South Fork of Rubicon River, tributary to American River drainage area to be diverted in Sec. 9, T. 13 N., R. 16 E., in Sec. 11, T. 12 N., R. 12 E., in Sec. 24, T. 13 N., R. 13 E., in Secs. 11, 31, and 34, T. 14 N., R. 14 E., in Sec. 4, T. 13 N., R. 15 E., in Sec. 2, T. 13 N., R. 14 E., M. D. B. and M. For municipal purposes.

**EL DORADO COUNTY**—Application 7427. Mr. John Davidson, agent, c/o Wm. M. Kearney, attorney, Reno, Nev., for 600 acre-feet per annum from Star Lake tributary to Cold Creek to be diverted in Sec. 30, T. 12 N., R. 19 E., M. D. B. and M. For irrigation purposes (1400 acres). Estimated cost \$2,000.

**SAN BERNARDINO COUNTY**—Application 7428. L. M. Bailey, Vidal, for 1 c.f.s. from underground flow of Big Dry Dunkirk Wash tributary to Colorado River drainage area to be diverted in Sec. 24, T. 2 N., R. 23 E., S. B. B. and M. For mining and domestic purposes. Estimated cost \$2,000.

**SAN BERNARDINO COUNTY**—Application 7429. L. M. Bailey, Vidal, for 2 c.f.s. from underground flow in Big Dry Dunkirk Wash tributary to Colorado River drainage area to be diverted in Sec. 24, T. 2 N., R. 23 E., S. B. B. and M. For industrial and domestic purposes. Estimated cost \$3,000.

**MARIPOSA COUNTY**—Application 7430. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, for 3 gallons per minute from unnamed spring tributary to Merced River to be diverted in Sec. 2, T. 4 S., R. 13 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$25.

**FRESNO COUNTY**—Application 7431. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, for 5 gallons per minute from unnamed spring in Indian Basin tributary to Indian Creek to be diverted in Sec. 9, T. 13 S., R. 28 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$50.

**FRESNO COUNTY**—Application 7432. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, for 5 gallons per minute from spring 1, for 20 gallons per minute from spring 2, for 5 gallons per minute from spring 3, total 30 gallons per minute from group of 3 unnamed springs tributary to Indian Creek to be diverted in Sec. 10, T. 13 S., R. 28 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$100.

**FRESNO COUNTY**—Application 7433. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, Cal., for 5 gallons per minute from unnamed spring in Indian Basin tributary to Indian Creek to be diverted in Sec. 10, T. 13 S., R. 28 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$50.

**FRESNO COUNTY**—Application 7434. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, Cal., for 10 gallons per minute from unnamed spring in Indian Basin tributary to Indian Creek to be diverted in Sec. 3, T. 13 S., R. 28 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$175.

**FRESNO COUNTY**—Application 7435. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, for 10 gallons per minute from source 1, Sacramento, for 10 gallons per minute from source 2, for 10 gallons per minute from source 3, total 70 gallons per minute from (1) Rock Spring, (2) Jackass Creek, (3) unnamed spring tributary to (1) and (3) Jackass Creek and (4) Ten Mile Creek to be diverted in Sec. (1) 7 T. 13 S., R. 29 E., (2) Sec. 1, T. 13 S., R. 28 E., (3) Sec. 6, T. 13 S., R. 29 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$5,500.

**FRESNO COUNTY**—Application 7436. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, for 5 gallons per minute from unnamed spring tributary to Ten Mile Creek to be diverted in Sec. 1, T. 13 S., R. 28 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$25.

**FRESNO COUNTY**—Application 7437. Div. of Highways, Dept. of Public Works, State of Cal., c/o C. H. Purcell, State Highway Engr., Public Works Bldg., Sacramento, for 5 gallons per minute from unnamed spring tributary to Ten Mile Creek to be diverted in Sec. 1, T. 13 S., R. 28 E., M. D. B. and M. For industrial and recreational purposes. Estimated cost \$25.

**SANTA CLARA COUNTY**—Application 7438. J. D. Grant Co., Mt. Hamilton Road, San Jose, for 700 acre-feet per annum from headwaters of Arroyo Aguague tributary to Penetencia Creek, thence Cayote River to be diverted in Sec. 12, T. 7 S., R. 2 E., M. D. B. and M. For irrigation purposes (200 acres). Estimated cost \$2,500.

**MONO COUNTY**—Application 7439. Ruby H. Cunningham, c/o Brobeck, Phleger and Harrison, attorneys, Crocker Bldg., San Francisco, for 2 c.f.s. from Wilson Springs tributary to Mono Lake to be diverted in Secs. 35 and 36, T. 2 N., R. 25 E., M. D. B. and M. For power purposes (152.3 h.p.). Estimated cost \$1,000.

**MONO COUNTY**—Application 7440. Ruby H. Cunningham, c/o Brobeck, Phleger and Harrison, attorneys

(Continued on page 38)

## Widening of Yolo Causeway, Largest Bridge Project, Provides Many Jobs

**W**ORK has started on the Yolo Causeway widening. Men, equipment and materials have been rapidly assembled for the construction of the twenty feet additional width on the three-mile trestle over the Yolo By-pass west of Sacramento to provide a wide, safe crossing for the heavy automobile traffic between the Bay District and the Capital City.

Hugh K. McKeivitt, attorney for the Highway Commission, removed the last legal barrier on November 7 by approving the half million dollar contract of the successful Sacramento bidders and Superintendent Bohnett immediately began preparations for driving test piles and removing portions of the present concrete piers at the east channel.

Field offices, tool houses and equipment yards have been established on the east levee and within a few days the construction of this, the largest bridge project on the State Highway System to date, will be well under way.

### WIDESPREAD BENEFIT

For weeks hundreds of men in the mills and woods of the Redwood Empire have been employed in getting out piling and timbers for the bridge. Carload and truckload shipments are now arriving daily and will continue for several months. Bolt manufacturers, steel fabricators and foundries will soon be called upon to furnish hundreds of tons of metal. A quarter million feet of fir timber will be used in addition to the redwood. Several hundred cubic yards of Portland cement concrete for the lift span piers and literally trainloads of asphalt concrete for the riding surface will be required.

One of the pile driving rigs has already driven the test piles and several bents of four piles each. Additional drivers will be added to handle the piling as it is delivered. It is also planned to place the timber caps, stringers and flooring as soon as possible after delivery. Careful planning and execution of the work under this contract are necessary in order to complete within the 180-day limit.

The funds to finance this and a number of other projects has been advanced as an emergency relief measure from Federal Aid

allotments. The objective of this measure is temporary relief during the coming winter and spring by advancing the dates of highway construction work to a period when employment is sorely needed.

Hence with immediate and widespread relief within the State as a primary consideration, the choice of materials was logically directed to those, the production of which would involve the greatest percentage of labor and afford the widest distribution of the expenditure. For this reason, timber and more specifically, redwood was specified for the majority of the piling and superstructure lumber. With this material practically every dollar will be spent within the State and of every dollar probably ninety-five cents will go to labor either directly or indirectly.

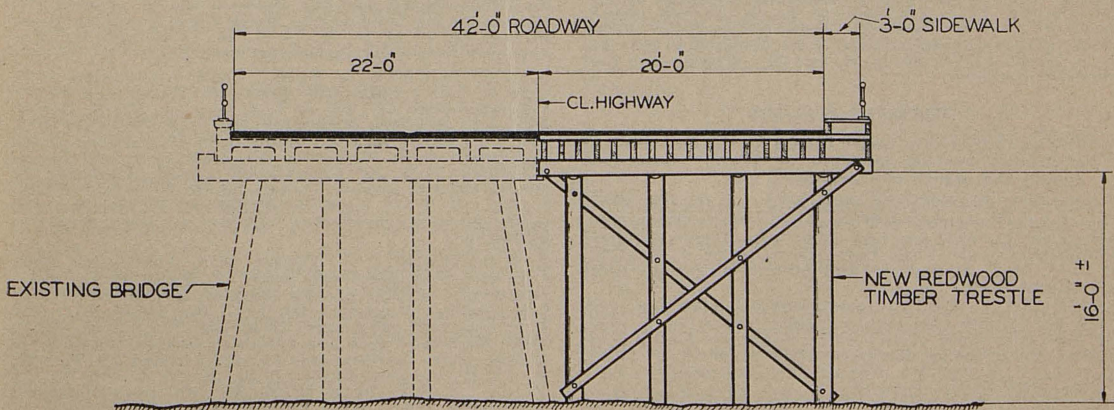
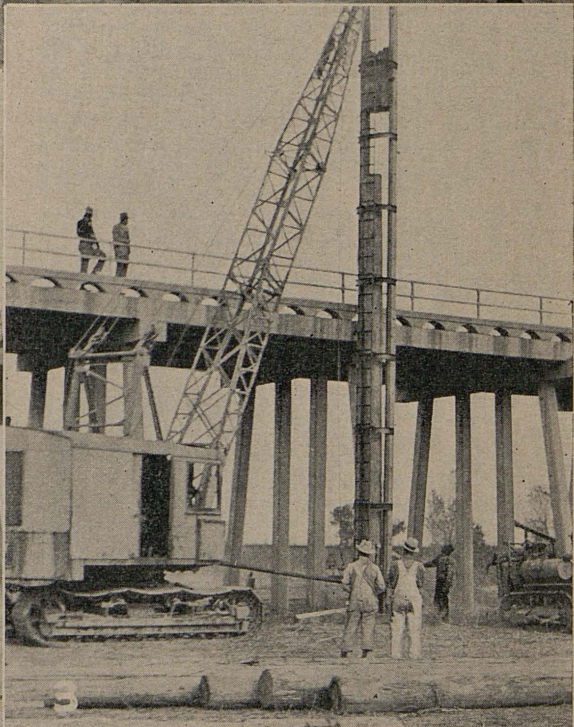
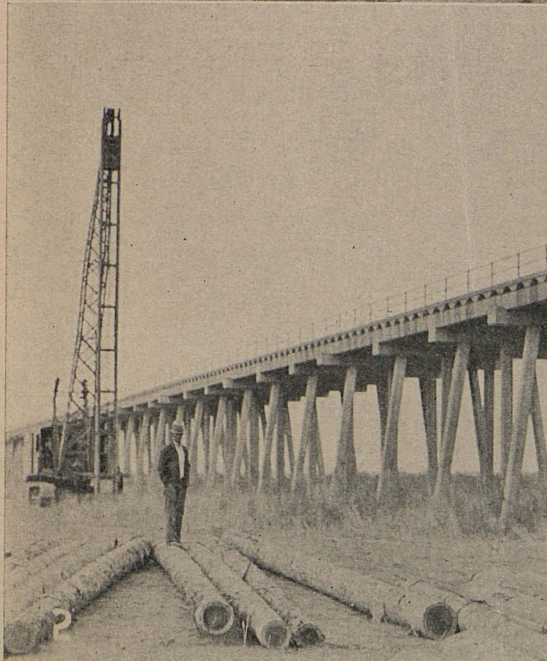
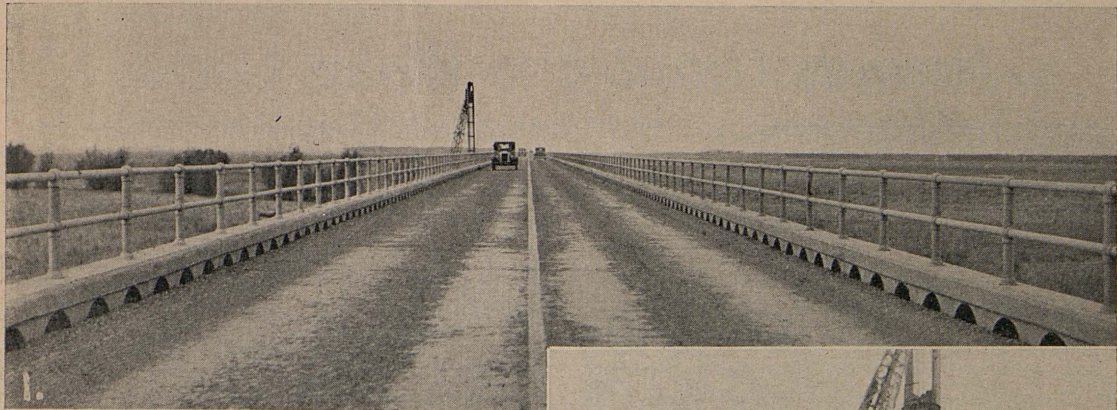
### INDUSTRY STIMULATED

While the labor required at the bridge site and the direct labor benefit in the adjacent territory will be relatively small, the project provides a tremendous stimulus to the timber industry in the northern counties, the effect of which will be felt throughout the State. Mills which have been idle or running at only part capacity are now running full blast to furnish the six million feet of structural lumber to be used on the causeway and incidentally, as a necessary by-product, many times that amount of lumber of lower grades not suitable for bridge work.

Literally thousands of workers in the mills, the woods and on the logging railroads are being employed in producing this order, thus spreading unemployment relief to the entire redwood belt. That area is also being scoured for piling available for immediate delivery and the purchasing of small lots from individual ranchers is further extending the distribution of funds to small property owners, local teamsters, truckmen, and laborers. More effective and general distribution would be difficult.

Manager: "A customer has made a complaint that the coffee tastes like mud."

Cook (facetiously): "Tell him it was ground this morning."—*San Joaquin Power Magazine*.



HUNDREDS OF JOBS throughout the State have already been provided by the Yolo Causeway widening project now under way. No. 1 shows the 22-foot roadway 3 miles long, scene of numerous accidents. Nos. 2 and 3 were snapped as the pile drivers started work. The cross-section sketch explains how the roadway will be widened 20 feet and a 3-foot sidewalk added.

# Permits Granted to Water Users

(Continued from page 35)

Crocker Bldg., San Francisco, for 0.125 c.f.s. from Wilson Springs tributary to Mono Lake to be diverted in Secs. 35 and 36 T. 2 N., R. 25 E., M. D. B. and M. For recreational and domestic purposes. Estimated cost \$1,000.

MONO COUNTY—Application 7441. Ruby H. Cunningham, c/o Brobeck, Phleger and Harrison, attorneys, Crocker Bldg., San Francisco, for 0.25 c.f.s. from Wilson Springs tributary to Mono Lake to be diverted in Secs. 35 and 36 T. 2 N., R. 25 E., M. D. B. and M. For irrigation purposes (20 acres). Estimated cost \$1,000.

SAN BERNARDINO COUNTY—Application 7442. George W. Spencer, 1452 Sunset Blvd., Los Angeles, for 6 c.f.s. from Rattlesnake Canyon tributary to Mojave Desert to be diverted in Sec. 27, T. 3 N., R. 3 E., S. B. B. and M. For irrigation purposes (1280 acres). Estimated cost \$60,000.

SAN BERNARDINO COUNTY—Application 7443. George W. Spencer, 1452 Sunset Blvd., Los Angeles, for 10 c.f.s. from Baldwin Lake to be diverted in Sec. 5, T. 2 N., R. 2 E., S. B. B. and M. For irrigation purposes (1280 acres). Estimated cost \$75,000.

SAN BERNARDINO COUNTY—Application 7444. George W. Spencer, 1452 Sunset Blvd., Los Angeles, for 8 c.f.s. from Arrastra Creek tributary to Mojave Desert to be diverted in Sec. 27, T. 3 N., R. 2 E., S. B. B. and M. For irrigation purposes (1280 acres). Estimated cost \$60,000.

SHASTA COUNTY—Application 7445. Lovina E. Hull, Big Bend, for 3 c.f.s. from Pit River tributary to Sacramento River to be diverted in Sec. 36, T. 37 N., R. 1 W., M. D. B. & M. For power purposes (3 h.p.). Estimated cost \$25.

LOS ANGELES COUNTY—Application 7446. Mrs. Flora Stewart, 4037 W. Eighth Street, Los Angeles, for 0.10 c.f.s. from unnamed spring tributary to Boneyard Canyon; thence Mojave Desert to be diverted in Sec. 25, T. 4 N., R. 8 W., S. B. B. and M. For irrigation and domestic purposes (5 acres).

MONO COUNTY—Application 7447. Champion Silliman, Inc., c/o Preston and Brauch, attorneys, 309 Bank of America Bldg., Merced, for 1 c.f.s. from Iron Springs tributary to Milner Creek, thence Owens River to be diverted in Sec. 13, T. 4 S., R. 33 E., M. D. B. and M. For power purposes (250 h.p.). Estimated cost \$100.

TUOLUMNE COUNTY—Application 7448. Mrs. Emma Schmidt, c/o M. H. Schnapp, 80 San Andreas Way, San Francisco, for 1 miners' inch from springs tributary to Matelot Gulch, thence South Fork Stanislaus River to be diverted in Sec. 11, T. 2 N., R. 14 E., M. D. B. and M. For irrigation and domestic purposes (1 acre).

SISKIYOU COUNTY—Application 7449. L. H. Cornell and A. J. Phillips, c/o L. H. Cornell, Seiad, for 3 c.f.s. from Sawmill Creek tributary to Seiad Creek, thence Klamath River to be diverted in Sec. 32, T. 47 N., R. 11 W., M. D. B. and M. For mining and domestic purposes.

## PERMITS ISSUED

Permits to appropriate water issued by the Department of Public Works, Division of Water Resources, during the month of November, 1932

NEVADA COUNTY—Permit 4016, Application 6776. Blue Lead Consolidated Mining Co., North Bloomfield, November 7, 1932, for 2.00 c.f.s. from Logan Canyon, tributary to South Fork Yuba River, in Sec. 4, T. 17 N., R. 10 E., M. D. B. and M. For mining purposes. Estimated cost \$500.

SISKIYOU COUNTY—Permit 4017, Application 7313. Gearhart Mining Co., Happy Camp, November 7, 1932, for 3.00 c.f.s. from Coon Creek, tributary South Fork Indian Creek, thence Klamath River in Sec. 4, T. 17 N., R. 6 E., H. B. and M. For mining purposes.

LOS ANGELES COUNTY—Permit 4018, Application 7107. H. H. Townsend, 6039 Hollywood Blvd., Los Angeles, November 9, 1932, for 0.001 c.f.s. from Fisher Spring, tributary to Piru Creek watershed in Sec. 19, T. 6 N., R. 17 W., S. B. B. and M. For domestic and stockwatering purposes.

LOS ANGELES COUNTY—Permit 4019, Application 7256. U. S. Angeles National Forest, 501 Brownstein-Louis Bldg., Los Angeles, November 9, 1932, for 0.003

c.f.s. from Fisher Creek tributary to Piru Creek watershed in Sec. 19, T. 6 N., R. 17 W., S. B. B. and M. For fire protection and recreational purposes. Estimated cost \$100.

EL DORADO, ALPINE and AMADOR COUNTIES—Permit 4020, Application 5618. Pacific Gas and Electric Company, 245 Market Street, San Francisco, November 22, 1932, for 43,500 acre-feet per annum from South Fork American River and tributaries tributary to American River in Sec. 1, T. 11 N., R. 17 E., in Sec. 30, T. 12 N., R. 17 E., in Sec. 18, T. 10 N., R. 18 E., in Sec. 32, T. 10 N., R. 17 E., in Sec. 16, T. 11 N., R. 11 E., M. D. B. and M. For power purposes, developing 1750 h.p.

SISKIYOU COUNTY—Permit 4021, Application 7262. George H. Cory, Callahan, November 22, 1932, for 3.00 c.f.s. from Little Carmen Creek, tributary to Grouse Creek, thence East Fork Scott River in Sec. 29, T. 40 N., R. 7 W., M. D. B. and M. For power and domestic purposes, developing 25.56 h.p.

SISKIYOU COUNTY—Permit 4022, Application 7263. George H. Cory, Callahan, November 22, 1932, for 3.00 c.f.s. from Little Carmen Creek, tributary to Grouse Creek, thence East Fork Scott River in Sec. 29, T. 40 N., R. 7 W., M. D. B. and M. For mining and domestic purposes.

MONTEREY COUNTY—Permit 4023, Application 7324. Louise Matter, Box 528, North San Diego, November 22, 1932, for 0.025 c.f.s. from unnamed spring, tributary to San Clemente Creek, thence Carmel River in Sec. 30, T. 17 S., R. 2 E., M. D. B. and M. For domestic purposes. Estimated cost \$25.

FRESNO COUNTY—Permit 4024, Application 7184. Div. of Fish and Game, State of Cal., November 23, 1932, for 3.00 c.f.s. and 20 acre-feet per annum from San Joaquin River, tributary to San Francisco Bay in Sec. 7, T. 11 S., R. 21 E., M. D. B. and M. For recreational (fish culture) and domestic purposes. Estimated cost \$5,000.

PLACER COUNTY—Permit 4025, Application 7360. A. A. Gorman, Michigan Bluff, November 23, 1932, for 3.00 c.f.s. from Peavine Creek, tributary North Fork Middle Fork American River in Sec. 14, T. 14 N., R. 12 E., M. D. B. and M. For mining and domestic purposes, estimated cost \$3,000.

EL DORADO COUNTY—Permit 4026, Application 7340. R. A. Easley, Antioch, November 23, 1932, for 200 gallons per day from unnamed spring tributary to South Fork American River in Section 24, T. 11 N., R. 16 E., M. D. B. and M. For domestic purposes. Estimated cost \$250.

EL DORADO COUNTY—Permit 4027, Application 7341. L. W. Mehaffey, Antioch, November 23, 1932, for 200 gallons per day from overflow of Geo. W. Harter Spring tributary to South Fork American River in Sec. 24, T. 11 N., R. 16 E., M. D. B. and M. For domestic purposes. Estimated cost \$250.

INYO COUNTY—Permit 4028, Application 3381. City of Los Angeles and Board of Water and Power Commissioners of City of Los Angeles, 207 S. Broadway, Los Angeles, November 29, 1932, for 47.00 c.f.s. and 8554 acre-feet per annum from Cottonwood Creek and South Fork Horseshoe Meadows Fork and Round Meadows Fork of Cottonwood Creek, tributary to Owens Lake in Secs. 9, 11, 14, and 15, T. 17 S., R. 35 E., in Sec. 18, T. 17 S., R. 36 E., M. D. B. and M. For power purposes developing 11,338 h.p. Estimated cost \$1,936,300.

INYO COUNTY—Permit 4029, Application 3382. City of Los Angeles and Board of Water Power Commissioners of City of Los Angeles, 207 S. Broadway, Los Angeles, November 29, 1932, for 105.00 c.f.s. and 8177 acre-feet per annum from Big Pine Creek, South Fork Big Pine Creek and unnamed stream, tributary to Owens River in Secs. 26, 32, 33, 34, and 36 T. 9 S., R. 32 E., in Sec. 34, T. 9 S., R. 33 E., in Sec. 3, T. 10 S., R. 32 E., M. D. B. and M. For power purposes developing 27,915 h.p. Estimated cost \$3,188,000.

INYO COUNTY—Permit 4030, Application 3734. City of Los Angeles and Board of Public Service Commissioners of City of Los Angeles, 207 S. Broadway, Los Angeles, November 29, 1932, for 5.00 c.f.s. from Symmes Creek in Sec. 9, T. 14 S., R. 34 E., M. D. B. and M. For municipal purposes. Estimated cost \$49,000.



## Geyserville Bridge Officially Opened at Dedication Ceremony

UNDER smiling skies, Sonoma County's new 1000-foot "Geyserville Bridge" on the Geysier Highway between Napa and Sonoma counties, was formally dedicated to public use Sunday, November 6th, with colorful ceremonies, under the direction of the Redwood Empire Association, in cooperation with the Napa and Sonoma County Boards of Supervisors, the Geyserville Chamber of Commerce and fire department and Calistoga Chamber of Commerce.

Several thousand persons participated in the celebration, including Federal, State, county and city officials, chambers of commerce, Farm Bureau and Grange representatives, newspaper publishers and others.

Andrew Rocca, Mayor of Calistoga, and director of the Redwood Empire Association, officiated as master of ceremonies.

Highway Commissioner Timothy A. Reardon of San Francisco officially represented Governor James Rolph, Jr., at Sunday's fete.

### OFFICIALS ON PROGRAM

Dr. Joseph M. Toner, Director State Department of Institutions, delivered an address as part of the dedicatory program.

Other State officials included in the speaking list were: L. V. Campbell, office engineer, California State Highway Commission, of Sacramento; Harold McCurdy, district office engineer, California Highway Commission, San Francisco. Brief addresses were also delivered by: Everett Lampson and Ray Brackett of the Geyserville Chamber of Commerce; Mayor Andrew Rocca of Calistoga; L. J. Peterson, president Associated Chambers of Commerce of Sonoma County; Supervisor Ed Enzenauer, chairman, Sonoma County Board of Supervisors; Ralph Minahan, supervisor from Napa County; Ed Peugh, county engineer of Sonoma County; J. A. McMinn, highway committeeman for Sonoma County, Redwood Empire Association; M. W. Moody, California State Automobile Association; Assemblyman Hubert Scudder of Sonoma and Marin counties; Judge J. A. Ellis, whose father, as chairman of the Sonoma County Board of Supervisors, built the first bridge in Geyserville in 1885, and Rodney Messner, county engineer of Marin County.

### MUSIC AND DANCING

Entertainment features were presented by the Lytton Industrial Home and Calistoga High School bands; dance by Miss Marian Rocca of Calistoga; singing by Miss Eliza Banta Crane of Geyserville, accompanied by Mrs. Helen Bessa.

The dedicatory address was delivered by Senator Herbert Slater of Sonoma County, following which the bridge was christened by "Miss Redwood Empire"—Miss Florence Buchignani of Geyserville.

Geysier girls from Calistoga (Jane Lee, Susanna Bernard and Ruth McClure) and Redwood girls from Geyserville (Ruth Rose, Rosie Stefani and Vivian Hunt) then held the ribbon barrier which was cut by Miss Redwood Empire as the official cars drove across the bridge for the first time, thereby opening the bridge to traffic.

Traffic is only as dense as the folks who drive the autos.

## Cordelia-Fairfield Relocation Reduces Curves and Mileage

THE new section of State Highway on the Oakland-Sacramento route between Cordelia and Fairfield was opened to traffic the day before Thanksgiving, thus giving the holiday traffic the advantage of a new 20-foot cement concrete pavement making a shorter, straighter and smoother road between these points.

This is one unit of the ultimate direct route proposed between Oakland and Sacramento. It was selected for construction at this time ahead of other portions of this route because it included one and one-half miles of old 15-foot pavement and a hazard to traffic in the old bridge over Suisun Creek. This was the only piece of 15-foot pavement left on the entire route and was expensive to maintain as well as hazardous.

The new location beginning on the old road northeast of Cordelia and extending to the present road at the County Hospital west of Fairfield saves three-quarters of a mile in distance, besides having only three curves with radii of 4000 feet and over with a total angle for the three of  $41^{\circ} 18\frac{1}{2}'$ . The old line had fourteen curves with radii as short as 300' and a total angle for all of  $280^{\circ} 28'$ .

The contract included about 5.65 miles of 20' Portland cement concrete pavement, with oiled rock borders 2' wide, and three-quarters of a mile of grading to improve the section on the present location west of Fairfield; 0.35 of a mile of the above pavement is in a curve change just east of Fairfield, which replaces a 300' radii curve with one of 800' radius.

The total cost of the job was approximately \$206,400.

## ALL READY FOR 1933 SNOW SURVEYS

(Continued from page 31)

hearing was held at the State Capitol at Sacramento on November 17th.

The members of the Board of Engineers on this investigation included the following: Col. William J. Barden, Col. Edward H. Schulz, Col. George M. Hoffman, Col. Thomas H. Jackson, Lieut. Col. Warren T. Hannum.

The Board was accompanied by Lieut. Col. Thomas M. Robins, Division Engineer of the Pacific Division; Capt. J. C. Drinkwater, District Engineer, Sacramento District of the Pacific Division; Lieut. Conrad P. Hardy of the San Francisco District Office; Mr. C. I. Grimm, Principal Engineer; and Arnold Weeks, Senior Hydraulic Engineer from the office of the Board of Engineers of Washington, D. C.

The Board was conducted on this trip of investigation by Edward Hyatt, State Engineer, and his staff. Congressman Albert E. Carter of the Sixth District, accompanied the party throughout the trip.

The Federal interest and responsibility on practically all phases of the Great Central Valley Project were particularly stressed before the Board. It is hoped that this personal investigation of the project by the Board of Engineers will result in recommendations to Congress for liberal Federal participation in the project in a greater amount than that recommended heretofore.

## State Road Crews Praised for Quick Repairs After Flood

**I**N A RECENT letter forwarded to State Highway Engineer C. H. Purcell, by E. E. East, Chief Engineer of the Automobile Club of Southern California, enclosing a report by Don Doig, head of the club's touring bureau, on the damage done by the recent Tehachapi flood, some complimentary references are made to the quick work of the State maintenance forces in repairing and getting the highway open to traffic.

After describing in detail the course of the flood waters unleashed by cloudbursts in the mountains and the extensive damage inflicted on property and highway in Woodford Canyon Mr. Doig says:

"The water when striking the mountain was immediately caromed off and scoured out for about an eighth of a mile the entire automobile road. Imagine, if you can, the State Highway Department, less than seventy-two hours after the flood, having built out of the granite wall a road sufficiently wide to permit automobile travel, and in place of keeping the road blocked to all traffic, they were, at the time the writer made his observations, allowing traffic to pass over this road every twenty minutes.

"I would judge there were at least forty men working on that one short stretch with compressors, drills and pick and shovel and the evidence of efficiency was most refreshing. There was not a lost motion and while practically all of it was hand work, not an arm came up from the ground but it carried a rock to be deposited in the truck and later carried forward to the edge of the road and there dumped.

"The remaining road down the Tehachapi to Bena Station was undamaged but here the flood dissipated itself due to the low area and spread out over a mile wide, losing itself eventually in the Kern Mesa near Arvin. The railroad bridge and highway bridges naturally collapsed but the State highway again immediately had in scrapers and tractors and constructed a very good detour around both obstacles. In fact there was but one 50-foot section through a small low spot that any mud was encountered on the entire trip.

"All in all, the rapidity and efficiency of the State Highway Department was most refreshing and the good natured superintendent of construction on the job went untold lengths toward creating a very friendly feeling on the part of the touring public."

### TIMING QUARRELS

Magistrate (to woman involved in matrimonial dispute)—Did you and your husband quarrel on Friday night?

Wife—And the next day pay day? Certainly not!  
—*Wall Street Journal.*

Since the first automobile was sold in 1898 more than 53,000,000 motor vehicles have been built.



**PIONEER WOMEN** who traveled the old Mormon Trail in the San Bernardino Mountains are commemorated by this monument surmounted by a replica of a covered wagon wheel. It marks a place where the trail crossed the Waterman Canyon State highway.

## Old Mormon Trail Marked by Monument

**I**N 1852 the only road into the western portion of the San Bernardino Mountains was known as the Mormon Trail. It was a very steep, narrow road over which the early pioneers hauled logs and lumber from the San Bernardino Mountains to build their homes in the valley below and over which they traveled in summer to camp in the San Bernardino forests.

Traces of the old road, almost obliterated by time, are still visible in places. At a point where this old Mormon road crossed the present State highway through Waterman Canyon to the Rim o' the World, a monument has been erected of native granite rock surmounted by the cement cast of a wheel taken from one of the pioneer wagons. Embedded in the monument is a bronze plaque which reads:

Mormon Road  
Built By the Pioneers  
Dedicated to  
the Pioneer Women  
of 1852  
By the Women of 1932

The monument was erected by a women's organization of Crest Forest, the Thursday Club, under the presidency of Mrs. Sara M. Switzer and dedicated October 10th, with appropriate ceremonies, attended by representatives of the San Bernardino Chamber of Commerce, and other organizations.

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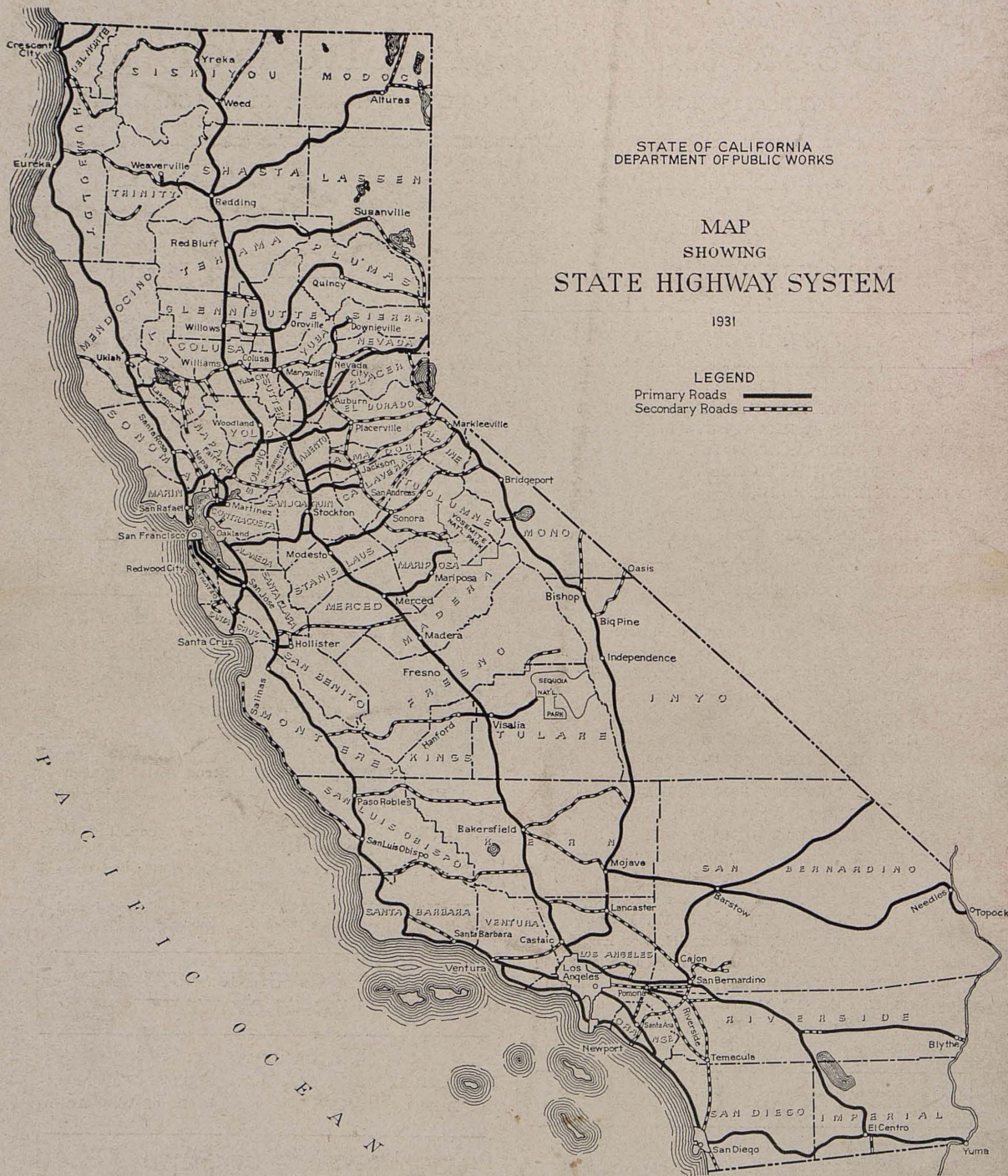
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**DIVISION OF PORTS**

Port of Eureka—William Clark, Sr., Surveyor

Port of San Jose—Not appointed

Port of San Diego—Edwin P. Sample



STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS

MAP  
SHOWING  
STATE HIGHWAY SYSTEM

1931

LEGEND  
Primary Roads   
Secondary Roads

inches

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

0.04 0.09 0.15 0.22 0.36 0.51

D50 Illuminant, 2 degree observer

L*	38.12	65.43	49.87	44.26	55.56	70.82	63.51	39.92	52.24	97.06	92.02	87.34	82.14	72.05	62.15
a*	13.24	18.11	-4.34	-13.80	9.82	-33.43	34.26	11.81	-48.55	-0.40	-0.80	-0.75	-1.06	-1.19	-1.07
b*	15.07	18.72	-22.29	22.85	-24.49	-0.35	59.80	-46.07	18.51	1.13	0.23	0.21	0.43	0.28	0.19
Density															

Golden Thread

16 (M)	17	18 (B)	19	20	21	22	23	24	25	26	27	28	29	30
49.25	38.62	28.86	16.19	8.29	3.44	11.41	72.46	72.95	29.37	54.51	43.96	82.74	52.79	50.87
-0.16	-0.18	0.54	-0.05	-0.61	0.19	0.49	-24.45	-24.45	13.06	-38.91	82.00	3.45	50.88	-27.17
0.01	-0.04	0.60	0.73	0.19	0.49	19.43	55.93	68.80	48.49	30.77	30.01	81.29	-12.72	79.46

Centimeters

0 1 2 3 4 5 6 7 8 9 10

Colors by Munsell Color Services Lab

Don Williams