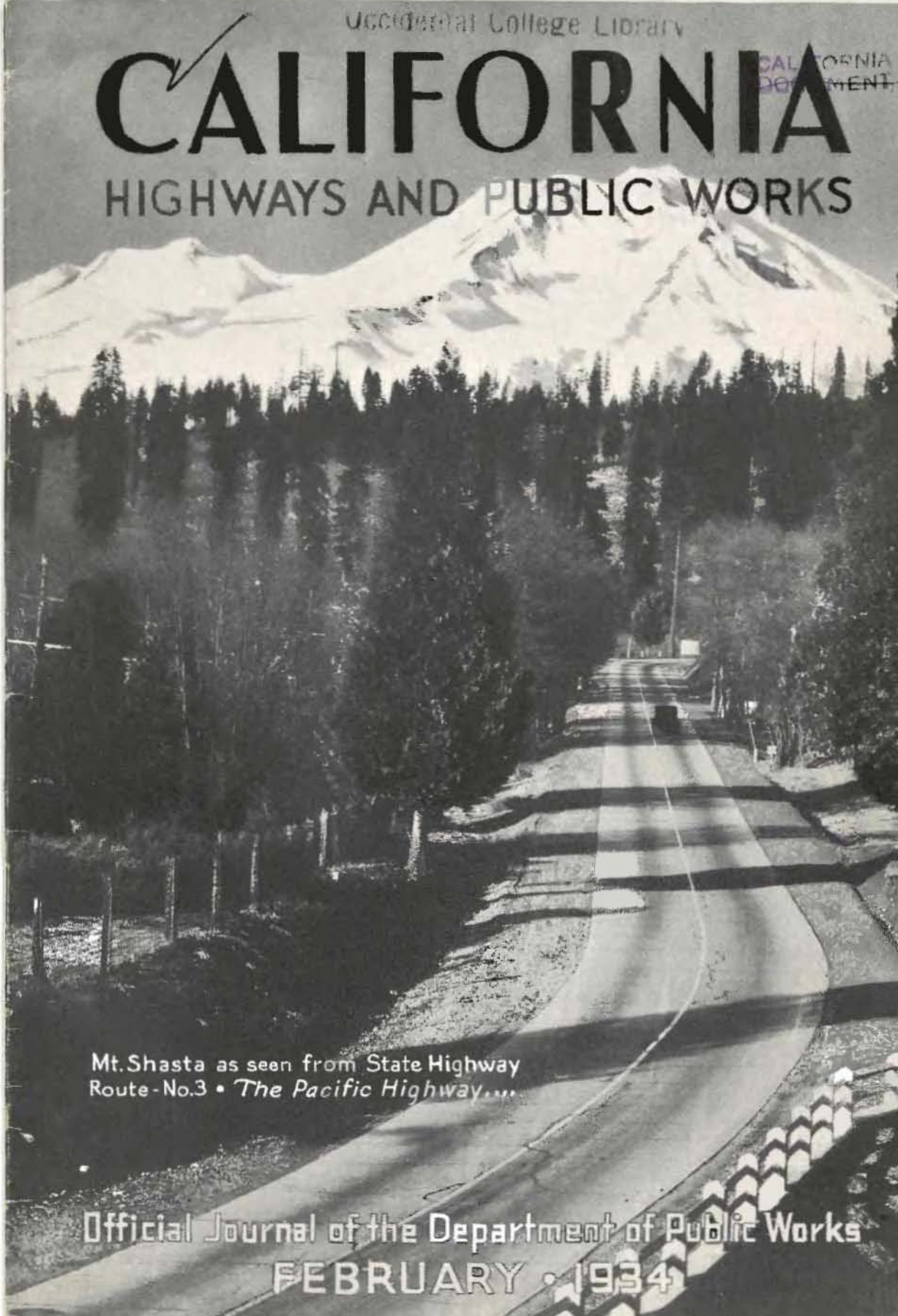


Occidental College Library

CALIFORNIA

CALIFORNIA
DEPARTMENT


HIGHWAYS AND PUBLIC WORKS



Mt. Shasta as seen from State Highway
Route-No.3 • *The Pacific Highway*...

Official Journal of the Department of Public Works
FEBRUARY • 1934

Table of Contents



	PAGE
Congress Urged to Renew \$125,000,000 Federal Aid.....	1
<i>By Harry A. Hopkins, Chairman, California Highway Commission</i>	
State Highways Defy Worst Flood in 15 Years.....	2
<i>By R. C. Myers, Assistant Engineer</i>	
Illustrations of Havoc Wrought by Wild Torrents.....	3
Dublin Canyon Multi-lane Arterial Realignment.....	4
<i>By Jno. H. Skeggs, District Engineer</i>	
Pictures of New Highway in Dublin Canyon.....	5
U. S. Funds Build Mileage Equaling Six Transcontinentals.....	6
Redwood Highway Realignment Reduces 32 Curves to 9.....	8
<i>By E. M. Cameron, District Construction Engineer</i>	
Clearing Redwood Highway Right of Way. Illustrated.....	9
Highway Sign Law Enforcement Campaign Begins.....	12
<i>By Morgan Keaton, Assistant Deputy Director of Public Works</i>	
Sign Removal Operations. Illustrated.....	13
Gold Run-Airport Improvement on Victory Highway.....	16
<i>By C. H. Whitmore, District Engineer</i>	
Victory Highway Improvements Pictured.....	17
Gasoline Tax Loss for 1933, \$863,941.....	18
Work Begun on Cajon-Lancaster Desert Link.....	20
<i>By E. Q. Sullivan, District Engineer</i>	
Clearing Right of Way Across Desert. Illustrated.....	21
Beautification Projects on Victory Highway.....	22
Water Resources Report of State Engineer.....	23
Car Tracks Removed from San Pablo Arterial.....	24
Pictures of San Pablo Avenue Improvement.....	25
Perpetual Fog Maintained in Concrete Curing Room.....	26
Fog Room Illustrations.....	27
Donner Summit Crew Carry on Service Traditions.....	29
Bids and Awards for January.....	30
Hard Rock Miners Boring Bay Bridge Tunnels. Illustrated.....	31

Congress Urged to Renew \$125,000,000 Annual Federal Aid for Highways

Unless Granted, California Faces Necessity of Eliminating Budget Projects Owing to Rising Costs of Materials, Increased Maintenance and Relief Employment, Says Commission Head

By HARRY A. HOPKINS, Chairman, California Highway Commission

THERE has been introduced in the Seventy-third Congress by Mr. Hayden of Arizona a bill providing for Federal Aid to the States in the sum of \$125,000,000 for the fiscal year ending June 30, 1935, and the same amount for the fiscal year ending June 30, 1936. The bill provides for other appropriations of \$12,500,000 for the same periods for forest highways, roads and trails as well as sums for roads in Reservations, Parks, etc.

It behooves the people of California to use every influence at their command toward urging the present Congress to act favorably on this bill.

How much is \$125,000,000? In terms of the NRA, PWA and CWA we find it a sum placed in the lower brackets of the vast amounts of money the Federal Government is providing to keep the wheels of progress moving and bring back a normal condition to the country. To the layman the vast sums of money appropriated and expended by the cities, counties, States and Federal Government are far beyond his conception and yet appropriations by our government reach such large figures

that all of us could honestly admit we are acting the part of little "Alice in Wonderland."

In all our modern civilization there never was a period like the present.

In all the history of the world chronicling the operations of governments through the ages the storehouses of Montezuma, the vaults of ancient Rome, or even the fabulous caves of Aladdin, never held such wealth as we now find being spent in the interests of humanity and the future security of this nation. And through all the necessary hurrying and scurrying to accomplish something; the setting up of tremendously large dispersing organizations, bringing into action the brains of the country through efficiency experts, technical advisers and financial wizards, there stands forth—I won't say tranquil and serene but steadfast in their purpose—a group of citizens who are engaged in



HARRY A. HOPKINS

the largest activity tending towards the relief of human distress and the making of permanent investments that have in the past, and will continue to have a very necessary part in the social and economic life of the people and probably mold their future destinies. This

(Continued on page 10)

State Highways Defy Worst Flood in 50 Years—\$270,000 Damage in 1070 Miles

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

FROM December 28, 1933, to January 2, 1934, Los Angeles and the adjacent foothill area was visited by the heaviest rainfall within the memory of the oldest resident. Starting with a steady downpour on December 28th the precipitation increased in volume until on New Year's Eve it reached and maintained the intensity of a cloudburst for several hours in succession.

Approximately fourteen inches of rain fell within fifty hours, whereas the total normal rainfall for the entire season is about fifteen inches.

In the mountainous area northerly of the suburban towns of La Crescenta, Tujunga, La Canada, Montrose and Glendale, a brush fire last fall had burned over and denuded about three thousand acres of steep hillside country from which the most intense run-off occurred. An avalanche of water, silt, boulders and debris swept across Foothill Boulevard from each of five canyons, leaving a path of desolation and destruction through the town of Montrose and the adjoining territory.

VAST SHEET EROSION

In this vicinity alone 363 houses were totally ruined and 478 so badly damaged that it is doubtful if they can be repaired. Flood control engineers estimated that the sheet erosion was approximately 50,000 cubic yards of material per square mile over the burned-off area in the watersheds of Cooks Canyon, Dunsmuir Canyon, Shields-Eagle-Goss Canyon, Pickens Canyon and Halls Canyon.

Although the precipitation was equally intense in the watershed of Haines Canyon, just westerly of these five canyons, the run-off was much less. Easterly of Haines Canyon the watershed had been denuded by fire but the debris basin at the mouth of the canyon protected the densely settled Tujunga district from destruction of life and property such as occurred in the Montrose area.

Water from these canyons north of Foothill Boulevard converged in Verdugo Wash in the Montrose area and that normally dry creek bed temporarily became a river more than 100 feet wide and 15 feet deep. So

great was this torrent that bridges which had stood through the heaviest storms for a great many years past were swept away like so much straw. One of these bridges lodged against the Southern Pacific Railroad bridge near Glendale, placing the main line of the Southern Pacific out of commission for more than one week.

\$5,000,000 PROPERTY DAMAGE

Los Angeles River, ordinarily a dry stream bed, fed by a number of tributaries during this storm and particularly by the immense rush of water from Verdugo Wash, was changed into a torrent which cut deeply into the banks and revetment work on each side, doing heavy damage.

Press accounts indicate that more than \$5,000,000 in property damage resulted from this storm and other reports are that upwards of 50 people lost their lives, either directly by drowning or indirectly through exposure caused from the flood.

Governor Rolph, on receiving reports of the disaster, rushed to Los Angeles by airplane and made a tour of inspection of the devastated areas of Glendale, La Crescenta, Montrose and Tujunga. This personal trip of inspection was made in order that the Governor could learn first-hand the actual conditions in the stricken area. Both on January 2d and 3d Governor Rolph toured this area, collecting as rapidly as possible information which would guide him in the State relief and rehabilitation work which he promptly inaugurated.

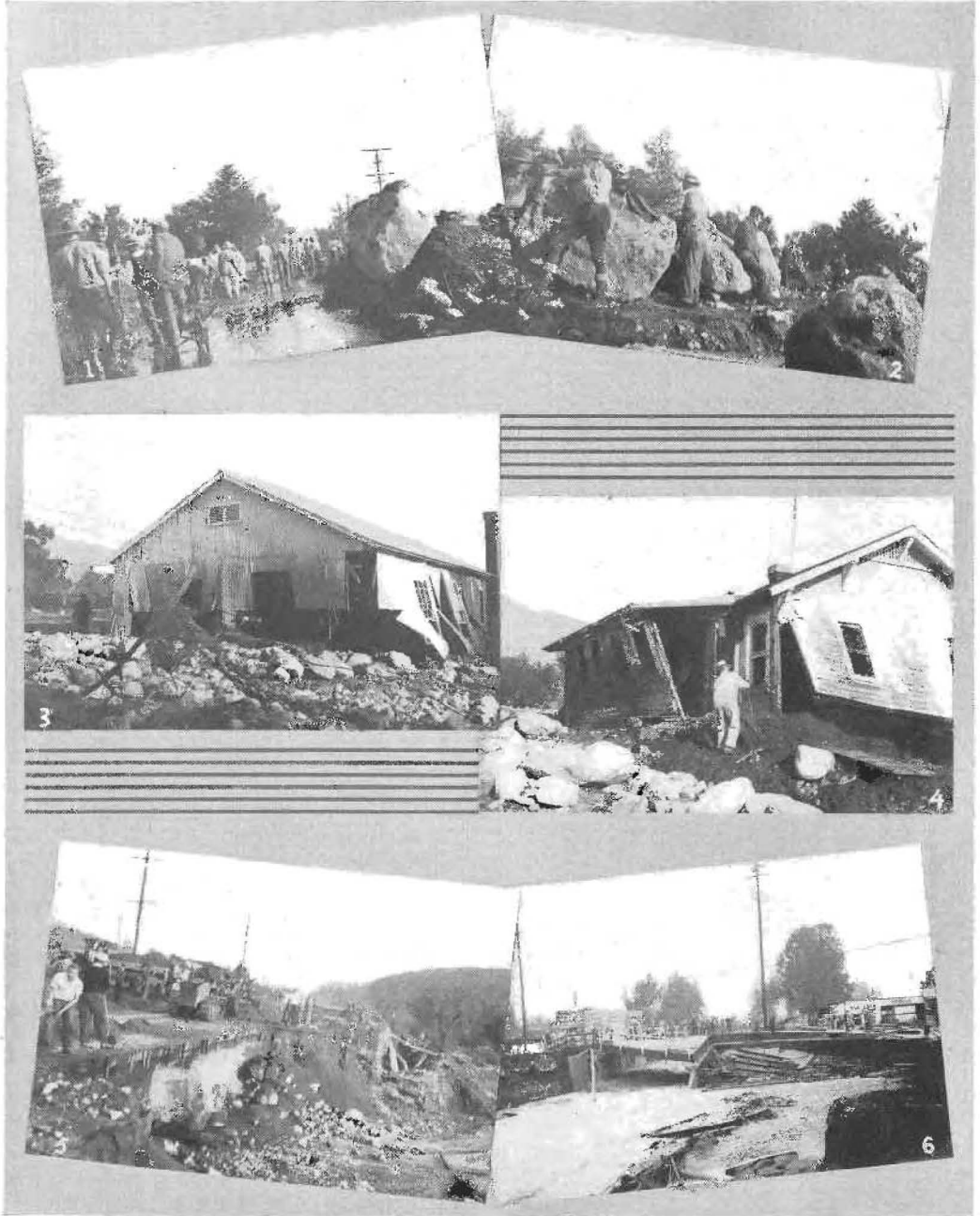
PROMPT AID BY GOVERNOR

It was with great difficulty that the gubernatorial party made its way through the stricken area on account of washed-out bridges, pavements covered with silt and boulders, and the debris which blocked traffic at nearly every point. On obtaining first-hand a complete picture of the destruction wrought, the Governor pledged the full resources of the State government in men and equipment to aid the stricken area.

Earl Lee Kelly, Director of Public Works, was put in direct charge of the State's relief

(Continued on page 14)

Havoc Wrought by Wild Torrents



BOUNCING BOULDERS weighing 15 to 25 tons hurtled down the hillsides of the Montrose area during the Los Angeles County flood and were deposited with 25,000 cubic yards of silt and debris on the Foothill Boulevard as shown in pictures 1 and 2. No. 3—Maintenance station at La Crescenta practically demolished. No. 4—Wreckage of superintendent's cottage. No. 5—Foothill Boulevard at Pickens Wash culvert. No. 6—Wrecked bridge on Garvey Avenue.

Dublin Canyon Multi-Lane Arterial

An Outstanding Highway Achievement

By JNO. H. SKEGGS, District Engineer, District IV

ONE of the most important State highways connecting the great Bay Region with the inland is that known locally as the "Dublin Canyon Road." Thousands traverse it daily between the bay cities and the San Joaquin Valley; and many who have passed that way have recently asked us the question "Where is Dublin Canyon?"

Dublin Canyon is one of the few passes favorable for highways through the chain of hills separating the populous centers about the bay from the San Joaquin Valley, and it cuts directly through the chain from Castro Valley, near Hayward, to the little town of Dublin at the edge of Livermore Valley—a wing of the San Joaquin.

The Dublin Canyon Road is a link in the State Highway Route Number 5 from Oakland to the great State Highway Route Num-

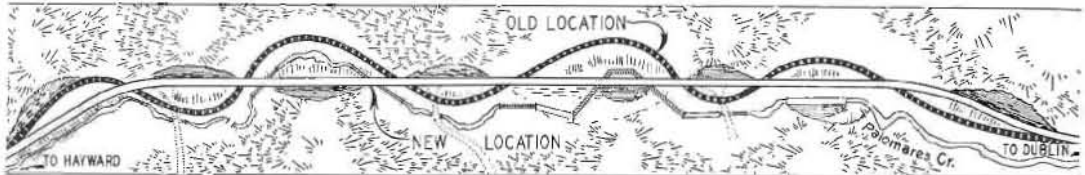
alignment. The sharpest curve has a radius of 1000 feet as compared with 500 feet on old line. The sharpest summits provide clear sight distance of 600 feet or more. Shoulders are covered with oil treated crushed rock and protected with substantial berms or guard rail.

The new alignment does away with all bridges, and makes the necessary traveled distance three-tenths mile shorter than the line it displaced.

Traffic, even through the depression years, has grown to great volume and comprises a large number of heavy freighting units.

SAVINGS EXCEED INVESTMENT

On a basis of capital values the recent improvement shows savings in road service more than sufficient to pay the construction



THE OLD ROAD made a snake's trail through Dublin Canyon

ber 4 traversing the middle empire between Sacramento and Los Angeles.

MULTI-LANE PAVEMENT

This link is 6.7 miles long. It is graded to a width of 46 feet. It is paved to a width of 40 feet with Portland cement concrete to the summit of the grade leading out of Castro Valley. Thence on to Dublin the pavement is 30 feet wide in Portland cement concrete excepting certain sections which were paved with an intermediate type of bituminous surfacing for economy in restorations after any shrinkage produced by fill settlement.

The maximum grade rate is 6 per cent and only 13 per cent of total distance is at this rate. The highest and lowest elevations reached are respectively 750 feet and 296 feet. In the entire 6.7 miles there are 16 curves with a total of but $376^{\circ} 39'$ curvature as against $998^{\circ} 02'$ curvature on the old

costs of this latest improvement, which amounted to \$386,578.

Preliminary studies compared the costs of improving along the present line by cutting back the points on blind curves. These curves were so numerous and the reverses so sharp that the volume of earth to be moved was greater than that involved in reconstructing the road along the comparatively straight lines as adopted. This feature of the analysis is clearly brought out in the pictures which show the road as built, and in the sketch representing the new location in relation to the old.

With a summer traffic running over 9000 cars on Sundays and 5000 cars on week days; and in winter over 6000 cars on Sundays and 4000 on week days it is obvious that the new location provides safety and convenience for such heavy traffic that would be impossible to secure by any practical improvement along

(Continued on page 19)



STRAIGHT THROUGH THE HILLS runs the new, shorter Dublin Canyon Boulevard on a high standard of alignment with a minimum of curves and a maximum of sight distance and 6 per cent grade. No. 1—General view of three-lane highway through central part of canyon showing elimination of many curves. Nos. 2 and 3—Comparative views of new and old highway taken at same location. Below—The broad curve on Castro Hill with three lanes widening to four-lane 40-foot pavement.

Mileage Equaling Six Transcontinental Highways Built by Public Works Funds

CONSTRUCTION actually has been undertaken in the last six months under the Federal Public Works appropriation on a road mileage sufficient to build six great transcontinental highways across the United States. This striking comparison was made by Thos. H. MacDonald, Chief of the Bureau of Public Roads, U. S. Department of Agriculture, which has the highway building in charge, in addressing the thirty-first annual convention of the American Road Builders' Association recently held in Chicago.

"For those who desire a wide highway from coast to coast, if the six lines equivalent to the last six months of nation-wide road building were brought together in one great highway, construction would now be under way to provide a surfacing upwards of 110 feet wide on a roadbed about 200 feet wide over a right of way 400 feet wide," declared Mr. MacDonald.

"Or if a highway from the United States to the Panama Canal is wanted, the highway construction now in progress is equivalent to six first class highways to span the 3000 miles distance. Assuming that the program continues in the same proportion, this single program will produce a mileage equal to a highway around the world.

WORK WIDELY DISTRIBUTED

"Actually, this work has not been concentrated upon any single line or class of highways, but has been distributed widely to reach into nearly every county of every State," he continued. "There are included mileages of both secondary or farm roads as well as municipal streets which are a part of important highway routes, thus distributing work where work is needed to reduce unemployment. This would not be accomplished easily by a single line construction.

"The previous principle of the Federal highway legislation to hold the Federal appropriations on a limited system of highways was modified by the new Public Works Law to permit the improvement of the major routes into and through the municipalities. While this slowed down the immediate beginning of the work, because of projecting the highway

departments into an almost entirely new field, it does place the construction work in the vicinity of greatest need for employment, and has the advantage of not dislocating labor from its established environment.

DIFFICULTIES INCREASED

"This work is also directed toward the improvement of unquestionably one of the worst conditions affecting traffic that now exists, and the bureau is very much in sympathy with the work in the municipalities, although it has increased the difficulties of administration both for the State highway departments and for the bureau.

"Out of this program, however, will come some notable improvements in traffic conditions all over the country, and when the depression shall have passed there will remain tangible benefits more than justifying the expenditures. Also, the use of Federal funds for the improvement of secondary roads has brought opportunities for employment most seriously needed and is leaving behind facilities amply justifying the expenditures.

"Another principle that has been emphasized is that of more adequate rights of way and intelligent and extensive landscaping consistent with the purposes of the utility which is being provided.

BEAUTIFICATION NEGLECTED

"Roadside improvement has been too long neglected. While there may be those who are reluctant to undertake any considerable amount of this work until we shall have more adequately improved the roadways themselves, an analysis of the necessary cost of more beautiful highways will not support a longer deferment of this type of work. The bureau is not only in sympathy with this character of improvement but is a very insistent exponent.

"It has long been recognized that the social and recreational use of the highways accounts for a large part of the traffic upon them. Complete analysis of the taxes and imposts indicates that highway users are paying heavily for their privileges.

Cities Present Worst of Traffic Conditions Says U. S. Road Chief

(Continued from preceding page)

"The total income from all kinds of taxes paid in 1932 by highway users approximated \$1,000,000,000.

"As a matter of simple fairness the highway user should not be denied appropriate roadside improvements generally. The selfish interest of the road builder who desires to increase the highway earnings, should prompt him to provide attractive highways that will lead to their greater use.

MUST MEET COMPETITION

"In the future it will not be sufficient for States to supply good roadways. They will necessarily have to meet the competition of States that are providing beautiful highways."

In summarizing the work undertaken to the end of 1933 on public works highways by the States under the supervision of the Bureau of Public Roads, which covers two-thirds of the program, Mr. MacDonald reported a total of 17,647 miles of construction at an estimated cost of \$273,849,184. Of these roads, 9822 miles are on the Federal-aid system outside of municipalities, 964 miles are extension of such roads into and through cities, and 6861 miles are secondary or feeder roads. Included in the new ideas discussed by Mr. MacDonald were the payment for railroad grade crossing eliminations, thereby relieving the railroads of expense heretofore required under State laws, the discouragement of State purchases of Portland cement for highway building and the improvement of secondary roads.

"Hello, Hayseed," said the facetious youth. "How's it for a lift to Centerville?"

He jumped into the car without waiting for an answer.

Twenty minutes passed.

"Quite a distance to Centerville, isn't it?"

Twenty minutes more.

"Say, how far is it to Centerville?"

"Few thousand miles if you go this way; 'bout twenty if you get off and walk back."

It is estimated by the Interstate Commerce Commission that 45,000 of the 125,000 outlying communities of the country, containing one-tenth of the nation's population, are without railroad connections, and rely wholly upon the motor vehicle for transportation.

ROADSIDE BEAUTIFICATION NOW SOUND PUBLIC POLICY

Yet another field is roadside improvement, consisting largely of finishing the roadsides to heal the scars of construction operations by the addition of seeding and well designed planting. A prominent place has been given improvements of this kind in the rules issued for the conduct of the recovery highway program. It is universally recognized that a very large percentage of the total use made of the highways is for recreational and social pursuits. Reasonable expenditures for providing pleasant and beautiful roadsides are wholly consistent with sound public policy. As highway executives, we will fail to realize the changed sentiment if we are longer content to build roadways only and neglect to improve and to plant the roadsides. We can confidently expect that in the near future communities which have been relying upon well improved roadways to attract outside traffic, will be placing greater reliance upon beautiful highways.—From address of Thomas H. MacDonald, Chief of Bureau of Public Roads.

Auto Sales in State Increase 36 Per Cent

New car sales throughout California during 1933 increased 36 per cent over the previous year with a total of 110,642 new passenger cars and trucks sold last year as against 81,340 in 1932.

Los Angeles led other principal cities of the State in new passenger car sales during 1933 with a total of 21,624. San Francisco was next with a total of 10,202, and Oakland third with 3845.

New passenger car sales for the 11 counties in southern California totaled 57,349 last year, a 45 per cent increase over the 39,481 total for 1932. Northern California had an increase of 29 per cent.

TRUCKS CARRY 4.2 PER CENT OF COUNTRY'S INLAND TRAFFIC

The Interstate Commerce Commission in its investigation known as Docket No. 23400 found that trucks carry 4.2 per cent of the inland traffic of the country and a volume equal to 6 per cent of the railroad traffic.

If the railroads had all of the competitive truck traffic it would not materially help them in this depression according to Roy F. Britton, Director, National Highway Users Conference.

Redwood Highway Realignment Reduces 32 Curves to 9 on Dangerous Stretch

By E. M. CAMERON, District Construction Engineer

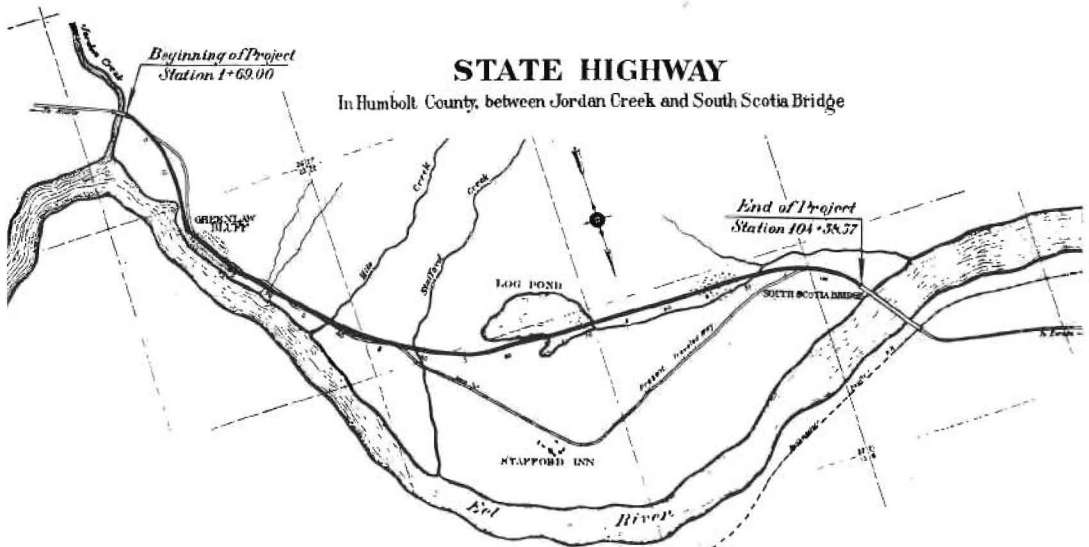
THE realignment of the State highway between Jordan Creek and South Scotia Bridge in Humboldt County, a distance of 1.9 miles, will eliminate a short stretch of the Redwood Highway which has been a source of worry to the public for many years, due to the poor alignment and narrow roadway both through the cut-over area on the north end of the project, and the 1000-foot stretch of bluff at the south.

At the time of the original location of this stretch of highway, there was being operated a large saw mill on the logical location, and it would have been very expensive to have attempted to purchase right of way through this operating mill. Consequently the road

and justifiable requests that the road be reconstructed on the more direct route.

The new construction provides for a minimum roadway width of 30 feet and a minimum radius of 450 feet. The following comparative table indicates in general the difference in alignment and grade between the present road and the proposed improvement:

	Present	Proposed
Minimum radius.....	100'	450'
Maximum radius.....	900'	5000'
Total curvature.....	810°	215°
Number of curves.....	32	9
Length in miles.....	2.140	1.946
Maximum grade.....	5.00%	4.56%



NEW ROAD shown by heavy black line saves 1.94 miles in distance.

was located around the mill and around many of the larger trees, resulting in a very poor alignment as the 32 curves in a distance of 2.1 miles would indicate.

FIRE CLEARED WAY

Several years ago, and soon after all the timber on the flat had been logged off, the mill was completely destroyed by fire. Each year subsequently there have been insistent

While the grading on the cut-over area was very light, the clearing was exceptionally heavy, being a mass of large stumps and fallen logs.

The accompanying pictures give a good idea of the extent of this item, there being eight of such piles of stumps, logs and lumbering debris within a distance of 2500 feet. The new construction also eliminates, to a great extent, another hazard to the public on

(Continued on page 15)



ROUGH GOING for highway builders was encountered on this portion of the Redwood Highway realignment between Jordan Creek and South Scotia Bridge where the debris of old logging days including many huge stumps covered the right of way.



DYNAMITING OPERATIONS were necessary to remove ancient stumps of great redwoods left by the logging crews when the lumber companies were busy in this locality. The stump in the foreground measured over 13 feet in diameter as shown by the 13-foot rod held by the man.



FLAMES LEAPED HIGH when these towering piles of stumps and roots were put to the torch after the clearing operations. There were eight such piles in a distance of 2500 feet.

State Faces Elimination of Projects

(Continued from page 1)

group activity is the building of the nation's highways.

STATES HAVE COMMON INTEREST

The experiences of the States and their political subdivisions have made it apparent to all conversant with highway development that their interests are common. Neither the State nor the political subdivision can divorce from the other this vital part of their government. The States are now so closely allied through our national transportation system that their interests, at least so far as their economic life is concerned, are largely common. The development of our existing highway system throughout the nation has become a necessary factor in the operation of many departments of our Federal Government. As far back as 1916 the Congress recognized the necessity of a national system of transportation lanes for vehicular use and caused financial assistance to be given the States that the requirements of the necessity might be well taken care of.

With the rapid increase in population and the development of new commerce and trade, it is more evident than ever that the Federal Government should continue its assistance and carry out the implied obligation assumed in 1916. In California we find increased population greatly beyond what was prophesied twenty years ago. In 1910 the urban population comprised 61.8 per cent of the total and twenty years later in 1930 it comprised 73.3 per cent.

STATE PROBLEMS INCREASED

In an address by Charles H. Purcell, State Highway Engineer of California, given before the annual meeting of the State Chamber of Commerce on November 9, 1933, in Los Angeles, he made this pertinent statement: "Improved transportation facilities as reflected in improved roads have unquestionably had no small part in this changing ratio which emphasizes the fact that the modern highway system in conjunction with improved modern vehicles has resulted in a much closer relationship of the various political subdivisions of the State, making State problems out of many things that were formerly of local interest only."

Again we find that in the development of

the highway system in the State of Nevada, through appropriations of the Federal Government, a pioneer people by constructing the connecting link between Nevada and California, eliminated the last remaining highway barrier between the Atlantic and Pacific oceans.

Through the use of Federal money many of the Western States have been able to keep their rightful relationship, not only with their sister States, but with the very seat of government itself. Without this Federal assistance very few miles of highways could have been constructed in those States with small population and whose area is largely in the public domain.

STATES EXPECTED CONTINUANCE

Congress, through the Federal Aid Bill enacted July 11, 1916, when \$5,000,000 was appropriated for the following year, has, up to the present time, paid to the States to apply on the Federal Aid System a total of \$1,206,758,841. During 1931 and 1932 there was appropriated of this amount \$125,000,000 per year. California had received out of these appropriations to be used in making up our biennium budgets better than \$8,000,000. The expectancy of the continuance of this Federal Aid that was engendered in the minds of the legislators of the several States was not brought about through any thought of a rightful heritage, but because the States as good and faithful servants had acted as agents at the request of the government in wisely expending Federal Aid money to cover the requirements of proper transportation facilities for both Federal and State governments.

Federal Aid had become such an important part of the revenue of the States in highway development that the action of the Congress just passed has not only caused California to rewrite its budget but to be placed in a position where the mental faculties of those constructing our highway system will be taxed to the utmost.

MAY ELIMINATE PROJECTS

Rising costs of highway material, increased maintenance cost and the desire to comply with the present Federal Government activity directed towards the relief of unemployment together with the loss of the

Western Conference Urges Federal Aid for Next Biennium

(Continued from preceding page)

expected \$8,000,000 as our part of the Federal Aid appropriation may make it necessary to further adjust the budget for the present biennium by the elimination of projects. We sincerely trust other adjustments may be made that will render this latter course unnecessary.

Other States are likewise affected by the loss of revenue expected from the Federal Aid appropriation. Arizona is depending almost exclusively on Federal Aid and is not doing highway work on anything but the Federal Aid System. Montana depends upon Federal Aid money and has no funds for non-Federal Aid roads.

Nevada for the most part depends on the Federal Aid appropriation. Out of 4000 miles on her highway system, 1675 miles are on her Federal Aid roads. Only 600 miles have ever been built with other funds.

New Mexico depends on the Federal Aid System and in this system has 3678 miles. Incidentally 361 miles of them are in the Federal Reservation. At the present time the States of Arkansas, Mississippi and North Carolina are largely depending on Federal Aid and doing most of their present work with CWA funds.

WESTERN CONFERENCE FORMED

Recently there was held in the city of Reno, Nevada, a meeting sponsored by the California State Automobile Association and which organized as the Western Inter-State Highways Conference. Five western States were represented. The most important resolution adopted was a declaration in favor of continued Federal Aid appropriations.

The American Association of State Highway Officials at their annual meeting in Milwaukee in October last year adopted a similar resolution. The Board of Directors of the American Automobile Association held in New York City on January 9th, this year, passed a resolution which in substance favors a continuation of Federal Aid for inter-State highways including the customary special aid for roads through the unappropriated public domain, the forest, national parks and Indian reservations. The situation can be summarized as follows:

\$250,000,000 EXCISE TAXES PAID BY MOTORISTS IN 1933

Following is a table of the total collections from federal excise taxes borne by motorists up to December 1, 1933. The addition of the December collections to this sum will bring the total to approximately \$250,000,000.

U. S. Internal Revenue collections for first 11 months of 1933:

Commodity	Amt. collected
Gasoline	\$158,415,550 78
Lubricating oil.....	20,006,631 48
Tires and tubes.....	22,276,037 27
Automobile trucks.....	2,802,790 34
Automobiles and motor cycles	21,062,363 23
Auto parts and accessories.....	3,886,167 78
Total collections.....	\$228,449,540 93

TRAFFIC OF 675,000 VEHICLES PAYS ANNUAL COST OF HIGHWAY

A study of costs on various types of highways attributed to the National Research Council shows that an annual traffic of 675,000 vehicles apparently contributes enough through taxes on the average to pay the annual cost of a high type road.

Grandpa—Don't cry sonny. Grandpa will play Indian with you.

Sonny—But y-y-you won't do any good. Y-y-you're scalped already.—*Mississippi Highways.*

RESOLUTIONS ADOPTED

1. The American Association of State Highway Officials has adopted a resolution favoring Federal Aid on the old basis for the two years of 1935 and 1936 in order that the States might proceed with their regular programs.

2. At the Western Inter-State Highway Conference at Reno, Nevada, many of the leading road officials, engineers, experts of the far west, including former Senator Tasker L. Oddie of Nevada caused a similar resolution to be passed and requested the AAA to fight aggressively for it.

3. The belief is growing that the \$450,000,000 appropriation carried in the National Industrial Recovery Act is being expended largely on the basis of unemployed relief; that it has not furnished a substitute for Federal Aid; that as a result, the development of the Federal Aid System as such is in danger of languishing; and that many other States are advocating the functions of NIRA because it is not necessary for the States to match Federal funds under the emergency grants.

Advertising Sign Removal Campaign Begins Along all State Highways

By MORGAN KEATON, Assistant Deputy Director of Public Works

THE six months period of grace allowed by the Outdoor Advertising Act ended February 22, 1934. That act, known as Chapter 341, Statutes of 1933, became a law August 21, 1933. Section 16 of the act reads as follows:



MORGAN KEATON

"All advertising structures or signs which are placed and/or maintained or which exist in violation of the provisions of this act at a time more than six months from and after the date this act becomes effective, shall be deemed and considered to be public nuisances and may be removed by any public employee as further provided in this act without doing unnecessary injury and the same shall not constitute a breach of the peace."

Therefore, February 22, 1934, was named the "deadline" when all signs and structures must conform to the provisions of the law or be removed by the Maintenance Department of the Division of Highways.

REMOVAL OPERATIONS BEGIN

The first effective enforcement of the act will be the removal of all signs, structures and advertising devices that tend to increase the dangers incident to traveling, particularly when the boards are located in the vicinity of curves, intersections, underpasses, bridges and railroad crossings, or within drainage channels where flood menace may occur.

Following the deadline of Washington's Birthday upon ten days written notice all signs and structures will be removed which violate the following provisions of the law:

1. If within 300 feet of an intersecting or intercepting highway, except subdivided areas and in cases where buildings already obscure the view of the motorists.
2. If within 300 feet of an intersecting highway and railroad right of way.
3. If obstructing clear view of the approach of vehicles on highway for a distance of 500 feet.
4. If within the highway right of way.
5. If imitating warning, stop or danger signals.

6. If with red light or blinking lights likely to be mistaken for a danger signal.
7. If in a drainage channel.
8. If unsafe from storms and wind.

SAFETY PRIME FACTOR

All of the above prohibitions are regarded in the light of being a direct benefit to the peace and security of the motorist and come directly under the police powers of the State. There is no question that advertising signs along the highways tend to increase the dangers of traveling because they attract the attention of the motorist, which, of course, is the prime reason for their existence. Such dangers are considered greatest where the traffic is the greatest and at the points where prohibited locations are specified in this new outdoor advertising law.

RECORD OF REVENUES

License and permit fees have been paid into the Director of Public Works up to and including January 31, 1934, in the amount of \$9,942.98. The tabulation below gives in detail these revenues by the month from September 1, 1933, to January 31, 1934.

LICENSES				
Month	Collec- tions	Refunds	Net Revenue	Total
Sept. ---	\$454.24		\$454.24	
Oct. ----	779.28		779.28	
Nov. ----	660.46		660.46	
Dec. ----	739.77		739.77	
Jan. ----	429.22	\$4.16	425.06	
Totals	\$3,062.97	\$4.16	\$3,058.81	
*Jan.				
30-31	116.67		116.67	
	\$3,179.64	\$4.16	\$3,175.48	\$3,175.48
PERMITS				
Oct. ----	\$912.75		\$912.75	
Nov. ----	1,323.50	\$1.00	1,322.50	
Dec. ----	1,010.00	5.00	1,005.00	
Jan. ----	3,044.50	4.50	3,040.00	
Totals	\$6,290.75	\$10.50	\$6,280.25	
*Jan.				
30-31	489.00	1.75	487.25	
	\$6,779.75	\$12.25	\$6,767.50	6,767.50
				\$9,942.98

(*) Collections for January 30 and 31 entered in highways books in February.

(Continued on page 21)



VIOLATING THE LAW

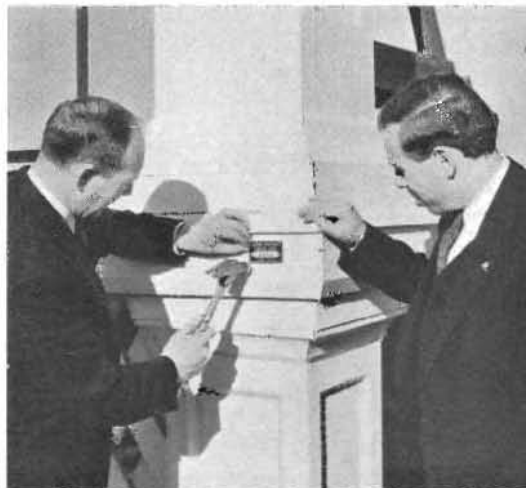
which became effective February 22d, governing the location of outdoor advertising signs along highways, the large billboard in the top picture is being removed. The law forbids any advertising sign structure within 300 feet of an intersection or intercepting highway.

DOWN COMES THE SIGN

as illustrated in the lower scene where workmen are removing the offending billboard under the direction of Morgan Keaton, Assistant Deputy Director of Public Works, and his assistant, James M. Call.

SILENT TESTIMONY

that the sign is legally located and has complied with all the terms of the law is given by a small metal license plate.



Governor Gave Quick Aid in Flood Area

(Continued from page 2)

work, as personal representative of the Governor, and proceeded immediately to organize all agencies of the State Department of Public Works which could lawfully be used in providing relief to people rendered homeless by the flood and in general rehabilitation of the devastated area.

Mr. Kelly pledged on behalf of the State the immediate repairing and reopening of the State highways through this section and the construction of seven or more temporary bridges over Verdugo Wash in Glendale. Relief crews were promptly organized with several power shovels and a fleet of trucks to clear Foothill Boulevard and San Fernando Road.

PROVIDED WATER SUPPLY

In addition the Department of Public Works sent tank trucks of clean drinking water, from the North Hollywood shop of the Division of Highways, to the Montrose district. Several thousand C.W.A. relief workers were rushed to the flooded area to render aid to the population and salvage as much property as possible.

It was to be expected that a storm such as this which destroyed property over a wide area in southern California would do considerable damage to the State highways which are the backbone of the highway transportation system in this area. In the aggregate a large amount of damage was done to the State Highway System, but it was over widely scattered areas and in most places not serious enough in any one location to permanently put the highways out of commission or even seriously damage them.

With the exception of Foothill Boulevard near Montrose, which was covered by a thick blanket of boulders and mud, none of the primary highways in Los Angeles, Ventura or Orange counties were closed for any considerable length of time.

RIDGE ALTERNATE SUFFERED LITTLE

The Ridge Route Alternate, one of the newer of the major State highways, suffered much less damage than would have been expected. One slide just north of Whittaker Ridge Summit closed this route for twenty hours but, aside from this temporary blocking of the road, traffic was able to move continuously over the route.

The concrete-lined channel change at French Flat handled the unusual run-off from Piru Creek as expected and there was considerable satisfaction in having this design, which is unique in highway construction, function so well. Aside from the slide at Whittaker Ridge Summit, and a few minor slides, damage was confined to erosion of embankment slopes and to some of the highway shoulders which had not yet been oiled.

The territory where the heaviest deposits were left on the State highways was the Montrose-La Crescenta district. Immense boulders were brought down, many ranging in size from 15 to 25 tons. One of these, weighing more than 25 tons, lodged in the inlet of the new Pickens Wash bridge and had to be blasted to pieces in order to remove it.

Another boulder, at least 20 tons in weight, was lodged on the southerly edge of the highway near this same bridge; and plans are now on foot to make of this a Memorial Rock, permanently recording on a bronze tablet affixed thereto, a record of the disaster.

MAINTENANCE STATION DEMOLISHED

The State Highway Maintenance Station at La Crescenta was practically demolished, the foreman and his family barely escaping with their lives. The maintenance foreman and his men, living up to the traditions of the force, had been working almost continuously since the beginning of the storm trying to turn the flood with sand bag revetments.

When the crest of the flood came, he and his wife were swept through the garage but fortunately lodged against a tree and made their way to safety. The maintenance yard was left with a new rock-strewn channel winding its way from one end to the other, and extending back to the mountains.

Approximately 25,000 cubic yards of silt and boulders were deposited on the traveled way on this portion of Foothill Boulevard alone, and culvert inlets were blocked by silt and debris, and wing walls of several culverts and bridges were broken. The estimated cost of repairs on this section is approximately \$19,000.

\$270,000 HIGHWAY DAMAGE

The total damage to the 1060 miles of highway under State maintenance in Los Angeles, Ventura and Orange counties was approximately \$270,000. With the exception of the La Crescenta-Montrose area, the damage to the primary highways was so widely scattered as not to seriously inconvenience traffic. It is worthy of note that the only highways, with this one exception, which were put out of use by the storm for any considerable length of time, were the Maricopa-Ventura, the San Gabriel Canyon and the Topanga Canyon highways, which are secondary roads through mountainous country. These roads were taken into the State Highway System within the last year, have comparatively light traffic and are not built to the standards of our primary roads.

It is also worthy of note that only two bridges were washed out on the State highways in Los Angeles, Orange and Ventura counties, both of which were old wooden structures over Alhambra Wash only a short distance apart, one on San Gabriel Boulevard and the other on Garvey Avenue. Garvey Avenue was taken into the State Highway System about 2½ years ago and San Gabriel Boulevard only last August. These bridges were located a short distance east of Monterey Park.

CANYON ROADS BLOCKED

The San Gabriel Canyon highway was entirely blocked by slides, there being probably 120,000 cubic yards of silt and slide material deposited on the roadway and gutters but it was opened to one-way traffic within a week. The Topanga Canyon highway was

All Primary Routes in Flood Area Soon Opened to Traffic

(Continued from preceding page)

badly washed out, in the neighborhood of 84,000 cubic yards of material being washed away.

The new Maricopa-Ventura highway which was built by the joint highway district of Ventura, Santa Barbara and Kern counties with State and Federal aid and was taken over by the State only a few months ago, was badly damaged by washouts and slides but it will be opened to traffic by the middle of this month.

Studies are being made by engineers of the State Highway Department to determine the extent of the storm damage and what lessons, if any, can be learned from this storm, in the design of our future highways.

In reviewing the storm damage it seems apparent that modern standards of construction are adequate for nearly all conditions with respect to drainage structures; that although the aggregate damage was high, it would be uneconomical to provide drainage facilities which would be entirely adequate for such an unprecedented storm, which, in all probability, will not occur again within the next fifty years.

Since Director Kelly took charge of the relief and rehabilitation work on January 3d, much has been accomplished. All of the primary routes are now open to traffic, the major portion of the work remaining to be done being the clearing of slides on some of the mountainous secondary roads.

On the whole, it is felt that the State Highway System has weathered this storm in a very creditable manner.

Probably the most valuable lessons gained by experience from the storm were the usefulness of vegetation on mountainous country to check run-off and prevent erosion and the value of debris basins in checking boulders and debris which would otherwise be carried downstream to endanger lives and property.

ORTEGA HILL PAVEMENT BEING WIDENED WITH 10-FOOT STRIP

In Santa Barbara County on the Coast Highway between Summerland and Sheffield Drive, locally known as Ortega Hill, the 30-foot pavement is being widened for a distance of 0.6 of a mile with a 10-foot cement concrete pavement strip on a 56-foot roadbed.

This project comes under the provisions of the National Industrial Recovery Act of 1933. It is expected the work will be completed in February.

A metropolitan contractor's son, in the country for the first time, saw a cow being milked.

"Now you know where the milk comes from, don't you?" he was asked.

"Sure," he replied. "You give the cow some breakfast food and water and then drain the crankcase."

"My wife always gets historical when I stay out late at night."

"Hysterical, you mean."

"No, historical. She digs up all my past."

N. I. R. A. HIGHWAY PROGRAM 64.4 PER CENT UNDER WAY

Progress made on emergency construction of public works highways to January 6 under the supervision of the U. S. Bureau of Public Roads shows a total of 5337 projects, estimated to cost \$276,197,000, had been advertised for contract or begun by day labor employed directly by the highway authorities. The cost of the day labor projects included in the above is estimated at \$20,207,000.

Of the 4587 projects awarded for construction, 2865 were under construction on January 6, and 500 were completed. The work under construction, which is estimated to cost \$166,576,000, was giving regular employment to 130,045 men.

In the whole country, work advertised for contract or started by day labor employed directly by the highway authorities involved 64.4 per cent of the \$400,000,000 provided for public works highways under section 204 of the National Industrial Recovery Act.

REDWOOD HIGHWAY REALIGNMENT

(Continued from page 8)

what is known as the Greenlaw Bluffs near the south end of the project.

SLIDE TRAGEDIES

The latter terrain is composed of a loose ravelling sandstone, becoming particularly active with slides during the severe storms characteristic of this locality, causing many accidents both to the public, and men engaged on maintenance operations.

About four years ago one of the maintenance men in attempting to keep the road open to travel was trapped in one of the slides, being carried down to the river below, his body not being recovered for several hours afterwards. Another near tragedy occurred on the present construction when a man engaged on the high slopes was carried down to the roadway in a slide. He was almost completely buried, only the back of his head serving as a guide to fellow workmen as to his whereabouts. He was extricated however, suffering nothing more serious than some quite painful bruises as the result of the accident.

The tourist rushed into the village shop.

"I want a quart of oil, some gasoline, a couple of spark plugs, a five-gallon can, and four pie tins."

"All right," replied the enterprising clerk, "and you can assemble 'er in the back room if you want to."—*Illinois Central.*

Travel Time Halved, 3 R.R. Crossings Eliminated on Victory Highway Link

By C. H. WHITMORE, District Engineer

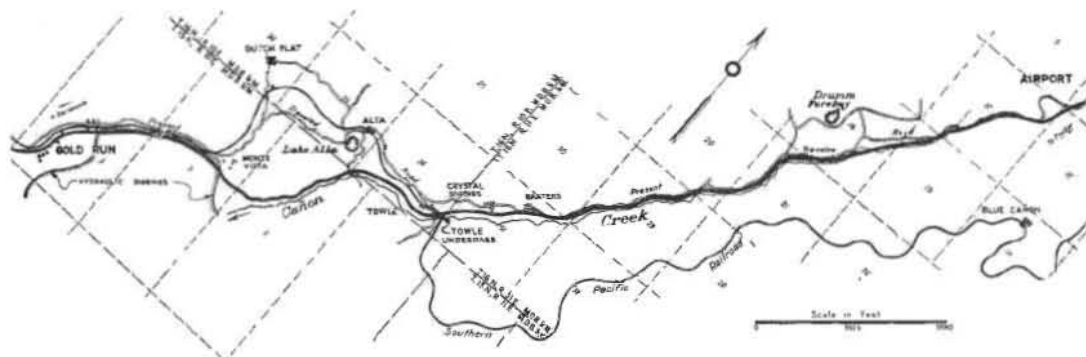
THE closing of 1933 saw the completion of the last unimproved portion of the Auburn-Truckee highway, except for the portion along the shore of Donner Lake.

Since January, 1932, grading and surfacing operations have been in progress on the road between Gold Run and Airport, a portion of State Highway Route 37, to replace what was merely a wagon trail, improved only sufficiently for the barest of traffic needs.

The country through which the new road is projected is rich in historic value. Located either along the route, or short distances away and served by this road, are Gold Run, Emigrant Gap, Donner Summit, Donner Lake, and Lake Tahoe, names that conjure memories of early California history.

by hydraulic mining operations. These banks are as high as 100 and 150 feet above the floor of the diggings. In the early days these diggings were the scene of much gold mining activities from which many thousands of dollars worth of "yellow dust" were obtained.

State Highway Route 37, of which this portion of road is a part, in addition to serving recreational traffic, is the only year-round east-west trunk road leading out of northern California, and is becoming, ever increasingly, one of the main transportation highways between California and eastward points. Of the peak traffic (2000 units daily, expected to reach 4000 in a short time), a considerable portion consists, par-



NEW HIGHWAY between Gold Run and Airport shown by heavy black line.

HISTORIC LANDMARKS

The first-mentioned name is of a settlement intimately connected with the early gold mining days of the State. The Gap, Donner Summit, and Donner Lake are landmarks of the route taken by the ill-fated Donner Party and other less unfortunate of the early settlers bound for land occupancy of northern California and lower Oregon.

Lake Tahoe, the center of one of the largest recreational areas in the country, is world-famed for the beauty of its setting, its boating, fishing and bathing facilities in the summer, and the snow sports that are held nearby its shores in the winter time.

About one mile of the new road near the westerly end is benched into the banks left

ticularly in the summer, of interstate and transcontinental travel.

The old road, which new construction supplants, is narrow and steep, poorly aligned, and crosses at grade the Southern Pacific Railroad at three points within its length. As a consequence, travel was slow, hazardous, and subject to delays caused by train crossings.

DRIVING TIME HALVED

New construction not only shortens the distance between the termini common to both the old and new roads, but encounters no grade crossings, is of adequate width, and of high-standard curvature and easy grades to permit vehicles to travel the 11½ miles at the



OLD GOLD DIGGINGS are traversed by this portion of the Victory Highway realignment between Gold Run and Airport where hydraulic monitors washed down thousands of dollars worth of "yellow dust."



SPEEDY, SAFE TRAVELING for motorists is provided by the 11.5 miles of new highway on the Donner Summit route affording the only year-round trunk road leading out of northern California.

legal speed limit in comfort and safety. The driving time between these limits is practically halved.

The entire construction consisted of three distinct phases: one for the grading work, one for the surfacing, and another for a reinforced concrete underpass of the Southern Pacific Railroad at Towle, approximately one-third of the way along the project. The underpass, constructed during the life of the grading contract, is the only crossing of the railroad by the new highway.

The roadbed was graded to a width of 30 feet. A 6-inch thick subbase of crushed stone was placed for the full width of the roadbed. On the central 20-foot width of the road,

which provides the traveled way, premixed asphalt-treated crushed stone was placed to a thickness of 3 inches. Of equal thickness, bordering the traveled way, shoulders of crushed stone were placed.

CONSTRUCTION METHODS

The crushed stone was produced by the contractor from a local quarry. Material for the base and for the shoulders was crushed and graded to the specified size, mixed with water in a pugmill mixer (slurry mix), and then hauled to placement on the roadbed. Two objects are obtained by this method of construction: one is the retention, instead of a certain loss where the crushed stone is not

(Continued on page 22)

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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

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

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

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

Vol. 12 FEBRUARY, 1934 No. 2

Imperative Planning

There is convincing proof in the present situation to any open minded person that the time to declare a holiday in highway construction, so frequently suggested, is not even near. The country's highway program is not half completed. However, it has reached a stage where planning along new lines is imperative. The first railroads were built without thought of permanency or their future development. Preemption of traffic territory was chief objective of pioneer railroad builders. Those lines which were logically located have been rebuilt again and again to meet demands for traffic. And so it is with the highways. Realignment and reconstruction have become the order of the day on logical routes of travel.

To meet the demands of the present and the future the highways must be made safe for fast traffic and must also be designed for the economical operation of motor vehicles if they are to satisfy those who pay through taxation for their improvement and maintenance. At one period in the development of railroads vast sums were spent in reducing grades and building cut-offs to reduce cost of operation. Many lines that were maintained at a loss were thus made profitable to stockholders. Highways have now reached a similar stage in their development. Cutting down grades and building cut-offs on the highways has just begun. Grade separation and by-passing of through traffic have scarcely been started and present probably the greatest problems of the future.—*Southwest Builder and Contractor.*

A small boy had taken his mother's powder puff and was in the act of powdering his face when his small sister, aged five, snatched it from him.

"You musn't do that," she exclaimed. "Only ladies use powder—gentlemen wash themselves."—*Automobile Bulletin.*

State Gasoline Tax Revenue Shows Loss of \$863,941 for 1933

GASOLINE tax assessments for the calendar year 1933 amounted to \$39,307,388.96, a drop from 1932 of \$863,949.91 or 2.15 per cent, and a drop from 1931 of \$2,318,502.55 or 5.57 per cent. The encouraging conclusion to be drawn from these figures is that the rate of decrease in the gasoline tax revenue having been substantially reduced during the past year from that of the preceding year there is a reasonable probability that the revenue for 1934 will equal that of 1933.

Any material improvement in business conditions during 1934 is likely to produce a substantial increase in the revenue for 1934 as compared with 1933.

The November, 1933, assessment which exceeded that of 1932 by 28 per cent appeared to indicate a decided improvement in business conditions. It now appears that such a conclusion was not warranted or at least if business conditions were improved during December the public spent its money for other things than gasoline, as the revenue for December, 1933, dropped \$211,722 from that of December, 1932, or 6.87 per cent.

Apportionment of \$5,102,867.06 to the State Department of Public Works and the counties of California is announced by Registrar Russell Bevans of the Department of Motor Vehicles.

This sum represents the State's and counties' share of motor vehicle registration fees collected in 1933 after deductions are made for handling all registration matters and for operation of the California Highway Patrol.

Half of the amount collected, \$2,551,433.53, will go to the Department of Public Works to carry on the road-building program approved by Governor James Rolph, Jr., for the relief of unemployment.

The counties will be apportioned the other half on the bases of motor vehicle registration from each.

The total fee-paid registration for the year, 2,036,918, was paid on 1,850,608 automobiles, 5794 solid tire trucks, 102,395 pneumatic tire trucks, 8134 motorcycles, 6151 solid tire trailers and 63,836 pneumatic tire trailers.

Los Angeles County, with its huge motor vehicle registration, receives the largest amount, \$1,042,283.14; San Francisco's share is \$185,632.09.

Traffic Savings Will Write Off Cost

(Continued from page 4)

the old alignment, regardless of the additional factor of savings to traffic.

SAFETY FACTOR IMPERATIVE

The extremely heavy trucking on this highway, many of the trucks hauling trailers, emphasizes the vital need of frequent and long stretches of straight line or very slight curvature to permit safely passing slow moving vehicles, and this great advantage has been fully provided in the new construction. The importance of this feature of the design is of such value that the reconstruction cost would have been justified on that basis alone and it became imperative when analysis revealed that the project as constructed involved less expense than would have attached to improvement along the old line.

In addition to these important advantages, the direct money savings due to avoiding bridge construction and maintenance and to shortening the length of line to be constructed and maintained, capitalize to a value sufficient to write off the entire cost of the improvement within a period of 30 years—even on a basis of present traffic volume. The three-tenths mile saved in length of line is in this case particularly subject to capitalization, because the road is primarily a through route for traffic seeking to save time and distance.

TRAFFIC INCREASINGLY HEAVY

The development and importance of this highway as an arterial route will grow in proportion as industry and population increase in the Bay Region and in the great interior valleys for it occupies one of the few natural passes through the long chain of hills in the Coast Range.

The development of this road traces back through many years. It has been under heavy traffic from the inception of highway development in central California. By the close of the first decade of this century the automobile had become such a problem in highway requirements that this important arterial of travel had to be improved; and the local county authorities made extensive efforts in this direction through the years 1911 to 1914.

The net result was a winding undulating grade with asphalt treated surface which was

fondly called the Hayward-Dublin Boulevard. These improvements, although designed with no faintest anticipation of the swiftly increasing highway requirements, were immediately invaded by the growing swarms of automobiles, and the horse and buggy "boulevard" soon became simply another inadequate road.

AN OUTSTANDING ACHIEVEMENT

In 1915 the State adopted the Dublin Canyon Road as a State highway and began to put the entire section through a series of stage improvement, culminating in complete reconstruction during the past year; so that today this road is an outstanding achievement in highway construction.

The project is outstanding, not because of extremely heavy construction; for there have been many projects in our recent highway developments where more material was moved to make a half mile of road than was required to construct this entire six miles of 46-foot highway. The striking feature of the finished work is the impression one has of its nice balance, its graceful sweep of line and grade, its apparently easy mastery of difficulties in the terrain.

PROVISION FOR EXTRA LANE

From any point along the line the vision commands long vistas of the road, and ingenuity would be hard pressed to find where further improvement could be made in the essentials except at extreme expense.

As time passes and need requires, the present three lanes for traffic can be increased to four, for which the new road was designed. Pavement surfaces will be repaired or replaced, but it is probable that the basic design will satisfy requirements for many years to come.

The strategic position of this canyon and the village of Dublin at one end of it have combined to give this great State highway "a local habitation and a name," both of which are destined to grow in fame and useful service.

"Uncle Mose, your first wife tells me you are three months behind with your alimony."

"Yes, Jedge, Ah reckon dat am so, but you see it's jes dis way. Dat second wife of mine ain't turned out to be the worker Ah thought she was gwine to be."

Work Begun on \$240,000 Highway to Link North and South Via Desert

By E. Q. SULLIVAN, District Engineer

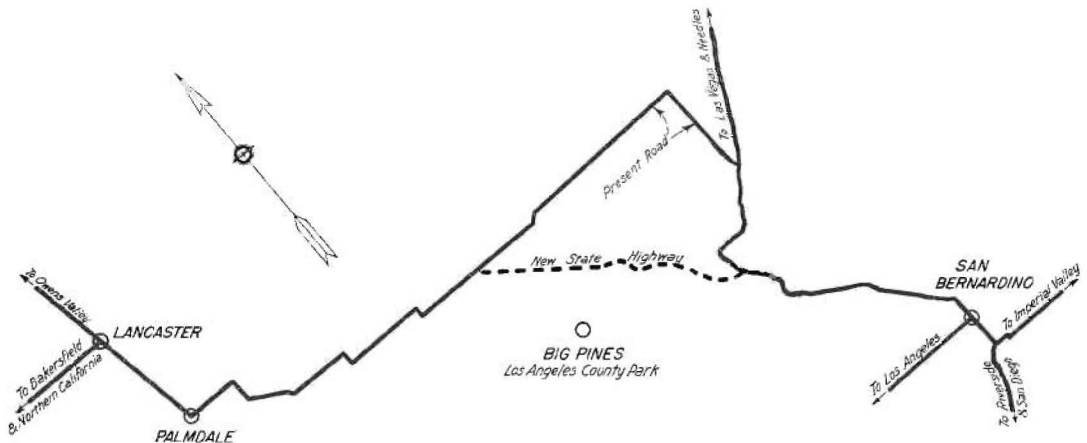
THE dream of the people of the eastern portion of southern California for a direct highway connection with northern California is at last coming true in the construction of the first link of the Cajon-Lancaster route connecting San Bernardino with the Owens Valley and San Joaquin Valley highways.

With \$240,000 provided in the budget, the first contract has been awarded and work has started. About 300,000 population of the southeastern part of California will at last

completed. The new route will also have the advantage of much easier grades and better alignment than the existing road.

The new route leaves the present State highway near Camp Cajon, 18 miles north of San Bernardino, and swings northwest up the gently rising Cajon Valley on easy grades to the head of the valley. At the head of Cajon Valley there is only the one summit to climb over. The alignment in crossing this summit is direct; the grades are light.

It will be possible sometime in the future



Sketch map of Cajon-Lancaster highway project.

be offered a good direct connection to northern California by this new route crossing the southern end of the Mojave Desert.

This route will serve as a direct highway on easy grades for Imperial County and the Riverside-San Bernardino area. Winter vegetables, citrus fruits, and other products of this area can be delivered to the San Francisco Bay Region over this new State highway. People from the San Francisco Bay Region can come direct to the desert resorts to enjoy winter sunshine.

SAVES FIFTEEN MILES

There will be a saving of 15½ miles in distance by the construction of this first link of the new highway, compared with the length of the existing road. Other savings in distance will be possible when the route is

to make a connection from this summit to the Los Angeles County Park at Big Pines. The new road with this possible connection lends itself to an approach via both Palmdale and San Bernardino that will be high gear all the way from Los Angeles.

This new route will also offer a delightful 5-hour round trip pleasure drive for Los Angeles people, out to the desert via Mint Canyon, and home to Los Angeles through the Cajon Pass. The trip up Mint Canyon to Palmdale and along the base of the Sierra Madre Mountains to the head of Cajon Valley offers magnificent desert views with a striking contrast of the beautiful tree-lined avenues on the way home to Los Angeles via San Bernardino and Riverside.

Cajon Valley and the desert area north of Big Pines has a particular fascination to all



DESERT HILLS SHAVEN AND SHORN of shrubbery by unemployment relief quotas of highway workers mark the route of the Cajon-Lancaster link across the southern end of the Mojave Desert that will establish a new connection between northern and southern California via San Bernardino, Cajon Valley, Lancaster and Bakersfield. The clearing and grubbing is being done largely by hand labor.

those who have yielded to its spell. There is an abundant growth of pinon pines, joshua trees, junipers, and yuccas. When spring rains come at the right time, the desert flowers of this region are a sea of bright colors across the great stretches of desert plains to the north.

This new highway will skirt the north base of the Sierra Madres, with the slopes of Cucamonga Mountain, Mt. San Antonio, and North Baldy, and other high peaks rising in snow-capped majesty as a continuous panorama. Even in years of light snowfall, the north slopes of these mountain peaks are completely snow covered all winter and until late in the spring.

This first link of the new highway will be completed for next winter's travel.

ADVERTISING SIGN REMOVAL

(Continued from page 12)

Since the act became a law considerable work has been experienced in getting it under way. New forms were required for applications; permit forms printed and permit plates made in conformity with its provisions. The fees set by the Legislature are intended to carry the expenses of the administration of the law. To have the fees greater than the cost of enforcement, of course, would be an addi-

tional tax burden; but to have the fees cover only the actual cost of enforcement, constitutes regulatory legislation and not added taxation.

It should be stated here that these fees have and will be required to enforce the provisions of the act and it is regarded as certain now that the receipt of these fees will be materially increased for this year because it will be necessary to increase the expenses of enforcement now that the six months' probation period is over.

Following the cleaning up of the prohibited locations of signs or structures on the highway there will begin a campaign to require that all signs and structures have a permit to remain in existence after the twenty-second of February. Permits will be evidenced by a license plate, showing the year and number of the permit, placed upon the face of the structure or sign. In due course every sign or structure in the State must carry this tag or be removed from the view of the highway.

The present enforcing personnel consists of:

- 1 chief enforcing officer, Assistant Deputy Director of Public Works.
- 1 assistant.
- 2 stenographer-clerks.
- 6 inspectors, covering the field.

This force will later be augmented by the entire Maintenance Department of the Division of Highways.

5,600,000 Yards of Overhaul on Victory Link

(Continued from page 17)

so wetted, of all the fine material; the other, the uniform distribution of the fine material throughout the coarser stone. A better bonded and better stabilized road metaling is thus achieved.

The method of manipulation of the asphalt-treated surfacing consisted of: first, mixing of the asphalt and the crushed stone in a pugmill mixer; second, hauling the mixed material to the road and spreading it; third, a second mixing of the material and resspreading it and rolling it to the specified grade, width and cross-section.

Both grading and surfacing projects were large-scale operations, involving the movement of enormous yardage of earth work and production of a considerable tonnage of crushed stone for the surfacing. As an evidence of this, final figures on construction reveal that:



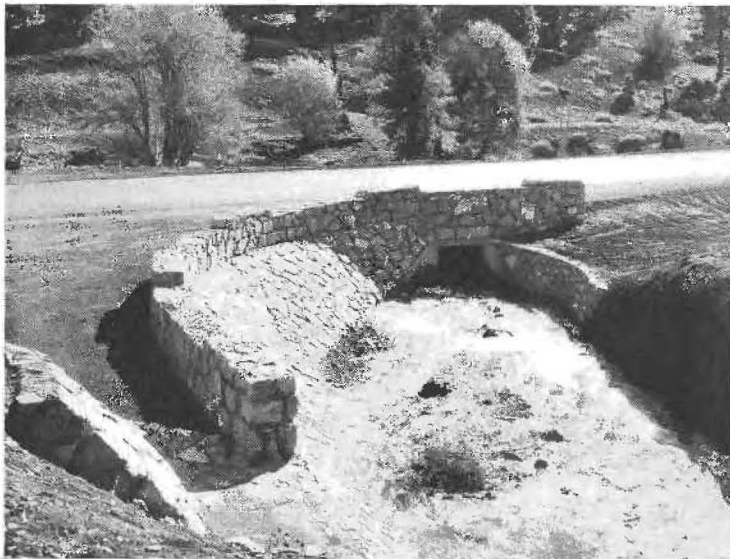
ROCKWORK SEAT and drinking fountain on new realignment

OPERATION FIGURES

- (a) 838,000 cubic yards of earth were moved from cut to fill sections.
- (b) 5,600,000 station yards of overhaul were necessary in moving the earth.
- (c) 92,000 cubic yards stone were crushed for the surfacing work.
- (d) 10,000,000 gallons of water were used for compacting the new earth work and mixing the crushed stone base and shoulders.
- (e) 1,100 tons of asphalt were used for mixing the road surfacing.
- (f) 22,000 lineal feet of culvert and drain pipe were placed to provide adequate drainage.
- (g) 1,700 cubic yards of structure concrete were involved in construction of the Towle underpass and roadway concrete culverts.

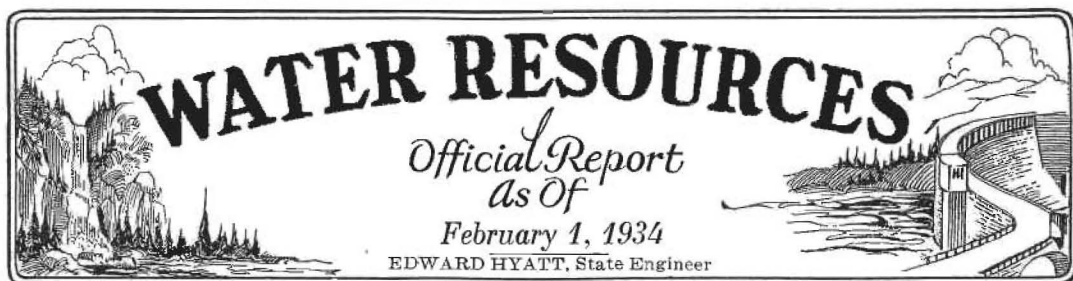
The recorded quantities are for only the major items of work. Miscellaneous construction, plus the value of the recorded items, resulted in a total cost of \$600,000. On the grading contract the State received the customary Federal aid for new construction of a rural post road, of which this project is a part.

The daily grading progress reached its peak with the movement of 7000 cubic yards of earth work. The maximum tonnage of crushed stone material placed in one day on the roadbed was 2000 tons.



BEAUTIFICATION treatment of culvert and access to brook

(Continued on page 24)



Progress in maintenance and flood control work is detailed in the regular monthly report of State Engineer Hyatt. Much of this work is being done by CWA county quota men but in several counties with small labor quotas work is being held up on certain State projects because all CWA labor is employed on local projects.

A moderate storm early in the month did not bring any of the streams in Sacramento Valley to high flood stage, the water spilling over various weirs for only short periods. Storm run-off of the Sacramento River at Sacramento for the period December 30th to January 19th approximated 1,500,000 acre-feet.

Details of dam applications, topographic mapping and other activities of the department are given in the report as follows:

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento Flood Control Project.

Under Project No. 502, Sacramento County CWA has furnished 33 men for clearing in the American River overflow channel, beginning work on December 8th. This project calls for a total of 2400 man-hours and an application has been recently made to continue for an additional 3000 man-hours. At the present time the crew is working 24 hours per week, in conformity with the recent order for reduction. Up to this time no CWA men have been made available for work on Project No. 502, flood control maintenance, in Yolo and Yuba counties.

Sacramento Flood Control Project—Bank Protection.

Work under the State-Federal cooperative program for permanent bank protection under the U. S. Engineer office at Sacramento is nearly completed as to the work under way in Districts 1500, 108 and 2047 and Levee District No. 3 of Glenn County. Twenty-five thousand dollars additional has been paid to the War Department from the State appropriation to continue the work at a total cost of \$150,000 for this fiscal year.

Russian River Jetty.

During this period there have been several severe storms, during each of which some damage was done to the trestle. The last of these was on January 16th,

at which time the last span of the trestle deck was removed at the shore end, the entire trestle deck being now removed. Only about four of the steel piles were broken, the remainder being bent over after the support of the deck was removed, but it is believed that most of these can be straightened for use in connection with the construction of a temporary trestle, put forward as the work of placing rock advances. This trestle has been in use for placing rock since August, 1931, a period of 28 months. The actual damage done by the storms is estimated at \$6,000.

During this period work has proceeded under CWA Project No. SLF 70, with 14 men. On December 19th the time was reduced from 30 to 15 hours per week and will continue on this basis until additional money is made available.

Mokelumne River.

On December 18th work was started on clearing the channel of the Mokelumne River from New Hope Bridge to Woodbridge in San Joaquin County. The work is being done under the direction of this office with a San Joaquin County CWA crew of 100 men, two foremen, and one supervisor furnished by this office.

This project provides for 30,000 man-hours, of which about 60 per cent has now been used. At present it is proceeding at the rate of 15 working hours per week.

WATER RIGHTS

Supervision of Appropriation of Water.

During the month of December, 25 applications to appropriate water were received; 26 applications were approved and 26 were canceled. During the same period 9 permits were revoked and the rights under 3 permits were confirmed by the issuance of license.

Sacramento-San Joaquin Water Supervisor.

After dropping to about 10,000 second-feet in the latter part of December, the flow of the Sacramento River at Sacramento was augmented by the storm of early January to a maximum of 58,000 second-feet on January 4. This had gradually dropped to 13,000 second-feet on January 19. Storm run-off from December 30, 1933, to January 19, 1934, amounted to approximately 1,500,000 acre-feet.

DAMS

The application of the Pacheco Pass Water District for the construction of a 95-foot earthfill dam on the

(Continued on page 32)

Removal of Car Tracks Gives Arterial Through 5 Cities a 74-Foot Pavement

ONE of the outstanding projects to be undertaken by the State of California for construction within a municipality is the improvement of a portion of San Pablo Avenue through the cities of Oakland, Emeryville, Berkeley, Albany and El Cerrito. This important link, connecting routes in the State Highway System, is the main arterial from the San Francisco Bay area leading to the Carquinez Straits and the Sacramento Valley.

The improvement now under construction consist of widening and placing 20-foot asphalt concrete pavement within the central area of San Pablo Avenue, formerly occupied by tracks of street cars abandoned in lieu of a bus service. The elimination of the car tracks extends from near Ashby Avenue in Berkeley to the city of Richmond and will permit the utilization of the entire width of the street for motor vehicle traffic.

UNDER TWO CONTRACTS

The work is under contract and embraces two units. The first, for complete repaving of the 20-foot central area of the street from Potrero Avenue in El Cerrito to Ashby Avenue in Berkeley. The second unit, recently awarded, covers the widening of San Pablo Avenue through the cities mentioned above from 38th Street in Emeryville to a point near Macdonald Avenue in Richmond. The two contracts will be carried on in unison without impeding the heavy flow of vehicular traffic to which this highway is subjected.

The widening work is done in accordance with plans as prepared by the various cities, and approved by the Division of Highways, and consists of setting back the curbs to a minimum of 5 feet on each side of the roadway and constructing a 5-foot concrete shoulder and resurfacing a portion of the existing pavement with asphalt concrete.

FEDERAL AID PROJECT

The total cost of the two combined contracts is covered by an allocation of \$314,026 of Federal aid funds made by the California Highway Commission.

The early completion of the work undertaken by the State will serve two important benefits to vehicular traffic: the elimination

of the street car tracks and traffic over a northerly portion of the combined projects allowing free use of pavement, and the provision of an additional width of pavement to a minimum of 74 feet.

This artery will be heavily taxed by local traffic centralizing at the east approach to the San Francisco-Oakland Bay Bridge when this great structure is completed.

All construction work on San Pablo Avenue is being pushed to maximum efficiency in order to provide the greatest amount of hand labor practicable under the contract regulations and it is expected the entire work will be completed before the heavy early summer traffic.

TRAVEL TIME HALVED

(Continued from page 22)

From Gold Run to Baxter's (approximately midway of the project) new construction is on radically different alignment to that of the old road. The routes of old and new construction from Baxter's to Airport are within narrow confines, on the same approximate alignment. On the Gold Run to Baxter's portion, adequate road approaches were provided to furnish service to the settlements on the old roadway that were by-passed by new construction.

A comparison between the old and new route indicates the following:

	Old route	New route
Length	12.97 miles	11.48 miles
Roadbed width.....	16 feet	30 feet
Maximum grade.....	12 per cent	6 per cent
Minimum radius curve	50 feet	500 feet
Railroad crossings at grade	3	None

We strongly advise you to see your dentist twice a year, but have your brakes tested at the same time—teeth are only good as long as you are able to sit up and take nourishment.—*Borrow Pit.*

Mistress (to new cook)—"My husband often brings three or four business friends home to dine without warning. You'll be prepared for that, won't you?"

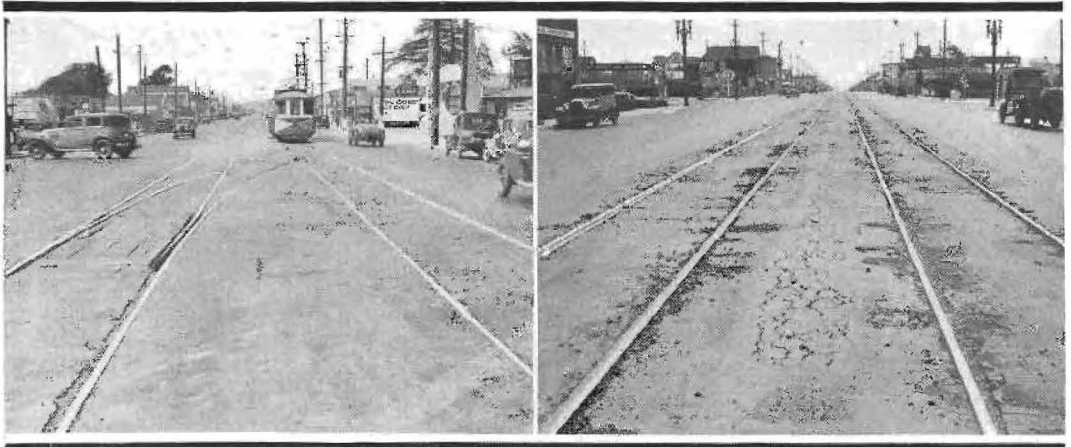
Cook—"You bet, Ma'am! I'll keep my bag packed ready!"—*Humorist.*



EXIT CAR TRACKS on San Pablo Avenue preparatory to repaving by State contract



FINISHED PRODUCT presents a 74-foot pavement adding two broad lanes for motor vehicle traffic.



ROUGH TRACK AREA practically barred center of avenue to motorists

Perpetual Fog Maintained to Cure Cement Concrete in Research Tests

By F. T. MADDOCKS, Senior Physical Testing Engineer

There is one spot in California that is bathed in fog 24 hours a day, year after year. This unique place is a room in the testing and research laboratory of the Department of Public Works at Sacramento where cement concrete and mortar samples are subjected to curing temperatures and moisture, some of them for many years. This interesting place is described in the following article.

THE physical properties of cement concrete and cement mortars are very definitely influenced by temperature and moisture. In order to determine whether or not concrete and mortars obtain sufficient strength to pass specification requirements and also to obtain accurate comparisons of strengths from day to day, it is essential that the temperature of curing air and water and the humidity of the curing air be very closely controlled. The American Society for Testing Materials requires a standard temperature of 70 degrees Fahrenheit with a permissible variation of 3 degrees Fahrenheit, and a relative humidity of not less than 90 per cent.

The Materials and Research Department has a "fog room" or moist room installed in the basement of the laboratory. This room is 23 feet long by 12 feet wide by 8 feet high, and is constructed entirely of concrete.

The term "fog room" has been applied to the curing room because it is always filled with a thick spray resembling fog.

In the "fog room" are cured all concrete compression cylinders made at the laboratory to test the concrete-making properties of aggregates, cylinders and beams fabricated in the field by the Resident Engineers to check the quality of the concrete entering into their various projects; all sand-cement mortar cylinders made at the laboratory to determine the concrete-making properties of fine aggregates and cement briquettes for the acceptance of cement entering into all concrete construction. These are kept in the "fog room" until broken.

SOME CURED TEN YEARS

The usual breaking periods for routine work are 7, 10, and 28 days. For special studies, such as those relative to the effect of age and various admixtures upon the strength

of concrete, cements manufactured for special purposes, and many others, test specimens are made covering breaking periods up to 10 years.

At the present time the oldest specimens have been in storage about seven years. These are concrete cylinders taken from five different bridge contracts and five different pavement contracts in which different brands of cement were used, for the purpose of determining the effect of age upon the compressive strength of concrete.

FANS BLOW SPRAY

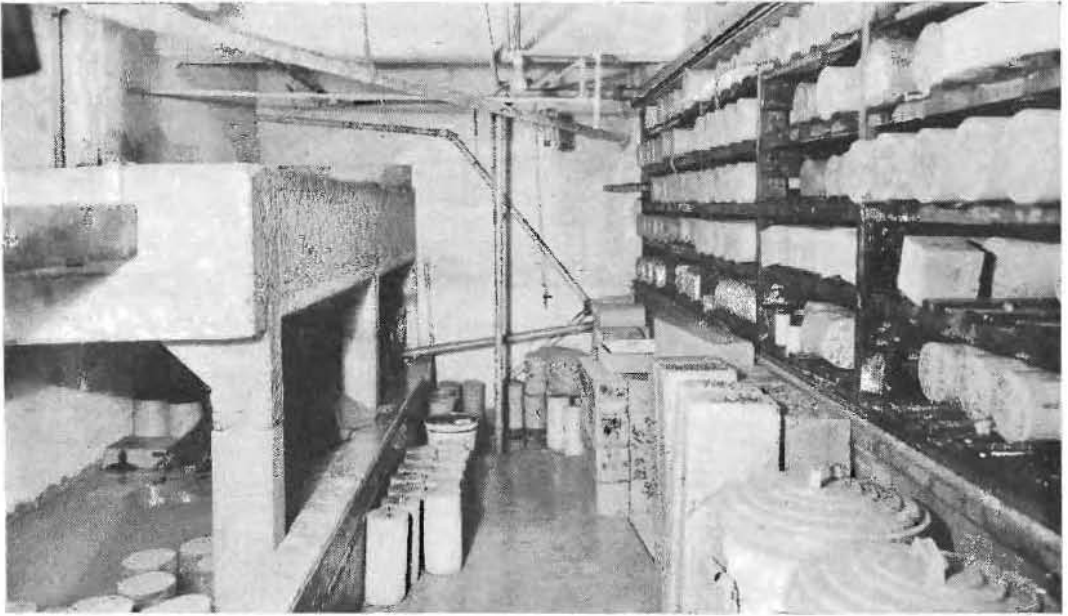
All compressive strength cylinders, beams for flexure tests, sand-cement mortar cylinders, cement briquettes, etc., are cured in the "fog room" until the breaking period.

A unit called a diffuser is located at the front end of the "fog room" and controls both the temperature and humidity of the room. It consists of a coil of cooling pipes connected to the refrigerating machine located in an adjoining room. This coil is partly enclosed by a metal case. The back of the case is open and the front fitted with adjustable shutters.

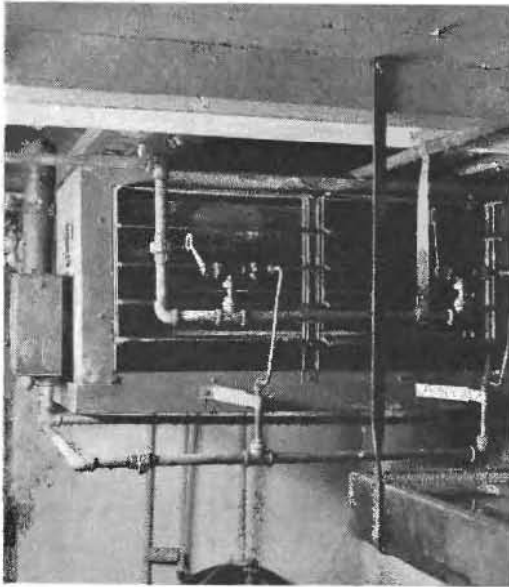
Equally spaced at the rear of the diffuser are two electric fans with 1/15 horsepower motors fully enclosed to make them waterproof. These fans force a strong current of air over the cooling coils and through the shutters. Directly in front of each fan and about one foot in front of the shutters is a spray nozzle pointed directly into the current of air created by the fans. These two nozzles supply the moisture which is blown to all parts of the room.

With the exception of the diffuser, all of the equipment is located in a room adjoining the "fog room."

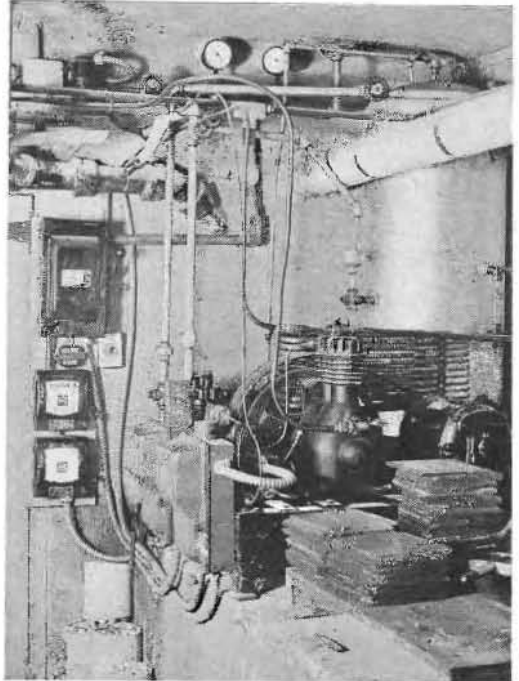
The temperature is controlled by means of a refrigerating plant similar to the electric type used in domestic refrigeration, but of



GENERAL VIEW of fog room for curing concrete samples



DIFFUSER unit which forces air through spray nozzle blowing moisture to all parts of room.



REFRIGERATION and humidity units that control temperature and moisture conditions producing fog.

larger capacity. The plant makes use of the well known principle in physics that heat is given off by a gas when it is compressed and heat is absorbed when compressed gas is released to normal atmospheric pressure.

This particular cooling unit uses methyl chloride as a refrigerant. The gas is compressed to a liquid state in a condenser by

means of an air compressor driven by a one horsepower motor. The condenser consists of two coils of copper tubing, one inside the other, the gas being compressed in the space

(Continued on page 28)

Permanent Fog in Test Room Made by Automatic Machines

(Continued from page 27)

between the two tubes. The gas is cooled by water passing through the inner coil.

The compressed gas flows from the condenser through a regulating valve into the coils of the diffuser where it expands and absorbs heat from the air, thereby lowering the temperature. The expanded gas is returned to the compressor to be used again.

A very sensitive thermostat in the moist room gives an automatic control of temperature both day and night. This thermostat is connected by means of a switch to the motor of the refrigeration machine and is so adjusted that the unit starts operating when the room temperature reaches slightly above 70 degree Fahrenheit. The cooling continues until the temperature reaches approximately 70 degrees Fahrenheit. At this point the switch automatically stops the motor.

HUMIDITY CONTROL

The humidity is controlled by means of compressed air and water. An air compressor driven by a 3/4 horsepower motor forces air into a storage tank about one-half filled with water. The air enters the storage tank at the bottom and passes through the water. This removes all dust particles which might cause a clogging of the spray nozzles.

The air pressure is reduced in the line running to the diffuser by means of a reducing valve to a pressure ranging between 22 and 30 pounds. This air line enters a small copper tank on the side of the diffuser filled with filtered water from the laboratory water mains. By means of an ejector, the water is forced through the air nozzles in the form of a spray. The diffuser fans blow the spray to all parts of the room.

The humidity process is automatic. When the air pressure in the storage tank reaches 85 pounds the compressor stops and does not start again until the pressure drops to 40 pounds.

A continuous record is kept of the temperature and humidity of the "fog room" on a chart attached to a clock mechanism.

Young Man—I should like to ask your advice, sir, as to whether you think your daughter would make me a suitable wife.

Lawyer—No, I don't think she would. Ten dollars, please.

Auto Registrations for 1933 Record a Decrease of 4906

Fee-paid motor vehicles registration in California during 1933 totaled 2,036,918, a loss over 1932 of 4906.

This small drop in fee-paid registration indicates an actual improvement over conditions in 1932, when there was a registration decrease of 65,451, according to Motor Vehicle Department officials.

Last year's registrations, as listed by Russell Bevans, Registrar, were: Automobiles, 1,850,608; solid tire trucks, 5794; pneumatic tire trucks, 102,395; motorcycles, 8134; solid tire trailers, 6151; pneumatic tire trailers, 63,836.

These totals do not include the 38,507 vehicles registered by the State, county and city governments and public utility companies for which fee-exempt plates were issued.

As in 1932, registrations of all classifications of vehicles dropped with the exception of pneumatic tire trucks and trailers. These continued to make substantial gains. License fees for these classes of vehicles are much lower than those for solid tire vehicles.

Two Improvements in Santa Barbara City

On the Coast Highway between Olive Mill Road and Santa Barbara city limits, a distance of 0.8 of a mile, the pavement is being widened to a 40-foot asphaltic concrete pavement on a 56-foot roadbed with 8-foot oiled earth shoulders. This work is through the business section of the community of Montecito, a highly improved residential suburb of Santa Barbara.

Bids are being received on the construction of a through boulevard in Santa Barbara city. This includes a route through the city and westerly to a point on Hollister Avenue about one-half mile east of the underpass of the highway under the Southern Pacific tracks. This project comes under the provisions of the National Industrial Recovery Act of 1933. The construction work will be handled under two contracts.

Admirer: "Fifty years of happy married life! How have you managed it?"

Retired Mine Superintendent: "Well, for one thing, son, I've always admitted I was wrong."

Donner Summit Snow Crew Carries on Traditions of the Highway Service

UNCLE SAM'S mail service delivers about one thousand letters daily to the Department of Public Works for distribution to various officials and divisions. Most of these communications, of course, deal with regular business matters in terse business fashion without a touch of human interest in style or subject matter. Many of them in these times bring an all too poignant appeal for relief and employment. A few, like the following, bring a little "pat on the back" for the highway service that makes everybody feel good all along the line:

The Letter

STANDARD OIL COMPANY OF CALIFORNIA
Standard Oil Building
San Francisco, Cal.

Sales Operating Department
J. H. McEachern, Manager
Mr. Earl Lee Kelly
Director of Public Works

Dear Mr. Kelly:

I recently drove over the Truckee Summit on to Lake Tahoe in order that my family might view the snow in the high Sierras. On our return trip, we reached Truckee Monday morning, New Year's Day, and drove over the Truckee Summit shortly after noon, at which time we ran into the worst blizzard that I have ever experienced. It obliterated the road, causing us to stop in front of the roundhouse in which the snow plows are maintained on the Donner Summit.

We were considerably worried as to whether to proceed to Sacramento or endeavor to get back to Truckee; however, before making a definite decision as to our future course, I discussed storm conditions with various members of your organization at the roundhouse on Donner Summit, seeking their advice. They suggested that I follow one of the rotary plows down from the summit and in the course of four or five miles I could see the road and would be able to proceed to my home in San Anselmo. A big, yellow rotary plow was brought out—by this time several other motorists had reached this point and were much concerned with their plight—and we followed the plow down from the summit in perfect safety and proceeded home.

As a taxpayer, I wish to compliment you on having such a fine bunch of men in the State Highway Department in charge of your equipment at Donner Summit, and I desire to express my appreciation of the very courteous manner in which these men treated a stranded motorist who possibly should have been at home in front of the fireplace instead of crossing the Truckee Summit at this time of the year.

Yours very truly,

J. H. McEachern (Signed).

The Reply

Mr. J. H. McEachern, Manager,
Sales Operating Department,
Standard Oil Co. of California.

Dear Mr. McEachern:

I have received your letter of January 2, 1934, and I wish to thank you for the kindly, friendly thought that prompted the sending of it. It is mighty nice in the midst of a busy day to receive a compliment such as you wrote, and coming from a person who occupies your high position.

I am very proud and happy to be the Director of Public Works and to head an organization composed of men who render a real service to the public, often at a great sacrifice to themselves.

You may be very sure that cognizance will be taken of your letter, and the information transmitted to the official in charge of that division, who will in turn relay it to the men affected.

With kindest personal regards and best wishes, I am

Sincerely yours,

EARL LEE KELLY,
Director of Public Works.

Cities of Nation Join in a Safety Contest

New safety records may be established this year with several hundred cities again competing for honors in the Third National Safety Contest, says the Automobile Club of Southern California.

First prize will go to the city which most successfully reduces traffic deaths through a well-rounded accident prevention program. More than 30,500 persons were killed in motor vehicle accidents in the United States during 1933 and a million more were injured, at least 85,000 of which are permanently disabled, according to estimates received by the automobile club.

Highway Bids and Awards

FOR JANUARY

ALAMEDA AND CONTRA COSTA COUNTIES—Through Emeryville, Oakland, Berkeley, Albany and El Cerrito, about 6.8 miles to be graded and paved with asphalt concrete and Portland cement concrete. District IV, Route 14, Section A. Heafey-Moore Co., Oakland, \$211,589; Southern California Roads Co., Los Angeles, \$216,217. Contract awarded to Peninsula Paving Co., San Francisco, \$269,964.

AMADOR COUNTY—Between 4 miles west of Pine Grove and $\frac{1}{2}$ mile west of Pine Grove, about 3.4 miles to be graded and surfaced with crushed gravel or stone. District X, Route 34, Section C. Coats Construction Co., Sacramento, \$67,866; Biasotti, Willard & Biasotti, Stockton, \$69,839; Larsen Bros., Sacramento, \$57,993; J. A. Casson, Haywards, \$64,083; Granite Construction Co., Ltd., Watsonville, \$62,154; Kennedy Construction Co., Oakland, \$78,234; Contoules Construction Co., San Francisco, \$69,784. Contract awarded to Hemstreet & Bell, Marysville, \$57,413.

FRESNO COUNTY—In Fresno between California Ave. and Echo Ave., 0.8 of a mile to be graded and paved with asphalt concrete. District VI, Route 4. Jack Casson, Hayward, \$57,332. Contract awarded to Valley Paving and Construction Co., Fresno, \$52,934.40.

HUMBOLDT COUNTY—Bridge across south fork of the Eel River at Smith Point, consisting of two 190-foot, two 120-foot plain girder spans and two 57 $\frac{1}{2}$ -foot reinforced concrete girder spans on concrete piers and foundations. District I, Route 1, Section A. M. B. McGowan, Inc., San Francisco, \$111,178; Mercer-Fraser Co., Eureka, \$108,578; Mitty Bros. Const. Co., Los Angeles \$103,162. Contract awarded to Neves & Harp, Santa Clara, \$102,658.50.

KERN COUNTY—Between Route 140 and Route 58, about 8.1 miles to be graded and treated with fuel oil. District VI, Route 139, Section A. Griffith Co., Los Angeles, \$77,487; Yglesias Bros., Inc., San Diego, \$80,564; Union Paving Co., San Francisco, \$69,554; Granite Construction Company, Ltd., Watsonville, \$78,721; A. Teichert & Son, Inc., Sacramento, \$71,182; Dimmitt & Taylor, Los Angeles, \$74,118; Hemstreet & Bell, Marysville, \$76,133. Contract awarded to George K. Thompson, Los Angeles, \$61,905.

LOS ANGELES COUNTY—Between Saugus and Williams Ranch, about 6.7 miles graded and paved with asphalt concrete. District VII, Route 22, Section A.B. Gibbons & Reed Co., Burbank, \$78,229. Contract awarded to Griffith Company, Los Angeles, \$73,917.90.

LOS ANGELES COUNTY—1 mile east of Los Angeles on 39-foot 6-inch reinforced concrete girder span on concrete piers. District VII, Route 26, Section D. Byerts & Dunn, Los Angeles, \$17,332; Const. Engineers, Inc., Los Angeles, \$19,236; Jahn & Bressi Const., Los Angeles, \$18,968; Craighton, Inc., Los Angeles, \$20,682; Weymouth Crowell Co., Los Angeles, \$17,696; Jones Bros., Beverly Hills, \$18,500; R. H. Travers, Los Angeles, \$17,586. Contract awarded to Joseph R. Lippincott, Los Angeles, \$18,886.25.

LOS ANGELES COUNTY—Bridge across Ramona Blvd. at Lord St., in Los Angeles, consisting of 2 reinforced concrete slab spans, 50 feet long on reinforced concrete piers and reconstructing existing timber stringer spans on timber bents and concrete footings. District VII, Route 26. Andy Sordal, Long Beach, \$24,357; Jerome K. Doolan, Pasadena, \$26,468; R. H. Travers, Los Angeles, \$25,443; Contracting Engineers, Inc., Los Angeles, \$26,193. Contract awarded to Joseph Maiser & David J. Reed, Los Angeles, \$23,458.

LOS ANGELES COUNTY—In Long Beach, between easterly boundary of city of Los Angeles and Pacific Ave., 1.8 miles grading, paving asphalt concrete. District VII, Route 60, Section G. Southern California Roads Co., Los Angeles, \$134,818; Mundo Engineering Co., Los Angeles, \$132,534; Sully-Miller Contracting Co., Long Beach, \$128,959. Contract awarded to Griffith Company, Los Angeles, \$117,888.50.

LOS ANGELES COUNTY—Bridge across Ramona Blvd. at Moreño St., in city of Los Angeles, consisting of 2 reinforced concrete girder spans on reinforced concrete abutments. District VII, Route 26. P. J. Akmodzich, Los Angeles, \$45,876; J. K. Doolan, Pasadena, \$44,865; James Noon, Baldwin Park, \$40,980; Sharp & Fellows Const. Co., Los Angeles, \$45,689; Weymouth Crowell Co., Los Angeles, \$41,560; A.

Sordal, Long Beach, \$44,413; J. Maiser & P. J. Reed, Los Angeles, \$42,000; Lindgren & Swinerton, Inc., San Francisco, \$43,323; T. A. Beyer Corp., Los Angeles, \$46,048.50; Contracting Engineers, Inc., Los Angeles, \$49,160. Contract awarded to Bamister & Field Co., Ltd., and Fred W. Potts Co., Los Angeles, \$40,916.

LOS ANGELES COUNTY—Reinforced concrete bridge on Sunset Blvd. across Glendale Blvd. in Los Angeles, consisting of a filled arch having a clear span of 90 feet. District VII, Route 2. Contract awarded to Herbert M. Baruch Corp., Los Angeles, \$130,438.20.

MENDOCINO COUNTY—Bridge across south fork of the Eel River, 65 miles north of Willits, consisting of two 183-foot spans on pier and abutments of existing bridge. District I, Route 1, Section K. W. J. Tobin, Oakland, \$50,871; Lynch Cannon Engineering Co., Los Angeles, \$52,256; M. B. McGowan, Inc., San Francisco, \$47,958. Contract awarded to Neves & Harp, Santa Clara, \$45,768.20.

MENDOCINO COUNTY—Between McDonald and Yorkville, 1.4 miles grading, surfacing. District I, Route 48, Section A. Kennedy Const. Co., Oakland, \$58,443; Contoules Const. Co., San Francisco, \$49,356; Larsen Bros., Sacramento, \$45,810; Granite Const. Co., Watsonville, \$58,376; Hemstreet & Bell, Marysville, \$46,649. Contract awarded to Coats Const. Co., Sacramento, \$45,474.

MENDOCINO COUNTY—At Rattlesnake Creek, 0.7 of a mile grading and surfacing approaches to bridge on new alignment. District I, Route 1, Section I. W. J. Tobin, Oakland, \$69,274; Coats Const. Co. and M. A. Jenkins, Sacramento, \$78,545; Union Paving Co., San Francisco, \$94,114; Hemstreet and Bell, Marysville, \$72,968. Contract awarded to Hein Bros. Basalt Rock Co., Petaluma, \$67,627.30.

RIVERSIDE COUNTY—Between Cabazon and Whitewater, about 2.0 miles to be graded and surfaced with oil treated crushed gravel or stone (plant mix). District VIII, Route 25, Section C. Match Bros., Elsinore, \$90,961; C. O. Sparks, Los Angeles, \$90,963; United Concrete Pipe Corporation, Los Angeles, \$95,691; Walter Trepte, San Diego, \$103,987. Contract awarded to Oswald Bros., Los Angeles, \$89,476.

SAN DIEGO COUNTY—Between San Diego and Point Loma, about 2.7 miles to be graded and surfaced with bituminous treated crushed gravel or stone surfacing. District XI, Route 12, Section I. Daley Corporation, San Diego, \$65,645; Griffith Co., Los Angeles, \$68,200. Contract awarded to Walter Trepte, San Diego, \$44,586.

SAN DIEGO COUNTY—Between Encinitas and Oceanside, 19.2 miles graded, paved asphalt concrete. District XI, Route 2, Section B. Sander Pearson and Mundo Engineering Co., Los Angeles, \$314,947; Sharp & Fellows Contracting Co., Los Angeles, \$335,911; V. R. Dennis Const. Co., San Diego, \$327,337; Daley Corporation, San Diego, \$352,290; Oswald Bros., Los Angeles, \$307,058; Southern California Roads Co., Los Angeles, \$369,086; Hanrahan Co., San Francisco, \$581,733; Jahn & Bressi Const. Co., Los Angeles, \$306,773. Contract awarded to Griffith Company, Los Angeles, \$304,154.30.

SAN MATEO COUNTY—In Daly City between School St. and Market St., grading, surfacing crusher run base and bituminous surface treatment, 0.26 of a mile. District IV, Route 2, Section A. Lee J. Immel, Berkeley, \$19,190; A. J. Grier, Oakland, \$9,484; The Fay Improvement Co., San Francisco, \$9,431; A. J. Ralich Co., San Francisco, \$8,721; Chas. L. Harney, San Francisco, \$8,693. Contract awarded to Jack Casson, Hayward, \$8,435.

SANTA BARBARA COUNTY—Through Santa Barbara, 3.2 miles grading, paving with asphalt concrete on a Portland cement concrete base and with bituminous macadam surface on a crusher run base. District V, Route 2. M. J. Bevanda, Stockton, \$230,953; Griffith Company, Los Angeles, \$244,754; P. J. Akmodzich, Los Angeles, \$285,772. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$211,514.90.

SANTA BARBARA COUNTY—Between Santa Ynez River and Santa Ynez, 2.1 miles to be graded and surfaced with oil treated gravel. District V, Route 80, Section A.B. M. J. Bevanda, Stockton, \$45,675; Granite Const. Co., Watsonville, \$47,942; J. E. Had-

(Continued on page 32)

Hard Rock Miners at Work in Middle of San Francisco Bay

BELIEVE it or not, 25 hard rock miners and 58 experienced mine laborers are at work on the San Francisco-Oakland Bay Bridge, according to reports filed with Governor James Rolph, Jr., chairman of the California Toll Bridge Authority.

It may seem a far cry from hard rock mining to bridge building, but doubters may take a launch to Yerba Buena Island, in the middle of San Francisco Bay where the State Department of Public Works is building the world's largest bridge, and there they will see a typical mine bored into a solid rock island, with typical miners driving shafts deep into the rock, and hauling the muck out with little steel dump cars, or skips, on a mine railway.

The "mines" are tunnels for the two cables of the San Francisco-Oakland Bay Bridge and several shafts, later to be broken together for the huge vehicular tunnel so wide and high that a 4-story building could be pulled through it upright.

WORKING THREE SHIFTS

Thus far the miners have bored a pioneer shaft, 6 feet by 8 feet, at an angle of approximately 45°, a distance of 125 feet for the south cable anchorage. At the tunnel for the north cable, the 6 by 8 foot pioneer shaft has been bored and blasted to a depth of 84 feet.

Three shifts of hard rock miners, working eight hours a day, but only 30 hours a week, are driving these bores into the sandstone, using compressed air drills and dynamite.

The tunnels, into which the barrel-size cables of the suspension bridge will be anchored, go back a total of 164 feet into the rock. The tunnels are 14 by 27 feet at the mouth and gradually increase in size until, at the end of the shaft, they reach a dimension of 27½ feet wide and 40 feet high.

BORING GROUT HOLES

Other miners are at work boring little 2-inch holes over the crown of the main vehicular tunnel which will be 58 feet high by 78 feet wide and 540 feet long.

Into these holes liquid cement grout is pumped which fills the cracks in the rock and congeals it into a solid mass, thereby preventing cave-ins during the driving of the major tunnel.

Several small tunnels will be bored and



AN AIRY PERCH is provided for this equipment on the face of the west portal of the Yerba Buena Island tunnel where a 200-foot grout hole is being drilled.

then broken into one to make the large vehicular double-deck tunnel to carry the traffic of the bridge through the island, according to plans which have been submitted by Director Earl Lee Kelly to Governor Rolph.

BIDS ON BRIDGE PROJECT

On the San Marcos Pass route, bids have been received for the construction of approaches, about 2.1 miles in length, to a proposed bridge across the Santa Ynez River. This project comes under the provisions of the National Industrial Recovery Act of 1933.

NOJOQUI GRADE RELOCATION

Plans are in progress for the relocation of the Coast Highway over the Nojoqui Grade from Las Cruces to 2 miles north of the summit, a distance of 3.7 miles. This work will correct unsatisfactory alignment and grade which form more or less of a bottle-neck with the increase in traffic over the grade. This project comes under the provisions of the National Industrial Recovery Act of 1933.

Agent—Is the boss in?

Proud Father—Yes, he's asleep upstairs in his crib.—*Excavating Engineer.*

Topographic Mapping Work Progressing in Northern Counties

(Continued from page 23)

North Fork of Pacheco Creek was approved by the State Engineer on December 26, 1933.

The application for the Sequoia Lake Dam was approved on December 21, 1933, and the application of the city of St. Helena for repairs to the St. Helena Dam was approved by the State Engineer on December 26, 1933. Civil Works Administration labor will be used on both these dams.

The heavy rainfall over a limited area in the vicinity of Los Angeles on December 31-January 1, apparently did not extend appreciably into the watersheds above major structures as none of the Flood Control District's reservoirs were entirely filled. No damage was done to any of the structures under State jurisdiction.

FEDERAL COOPERATION

Cooperative Topographic Mapping.

Vertical control work was carried on during the month of December on the Paynes Creek Quadrangle in Tehama County and Parksfield Quadrangle in Kings and Fresno counties. Drafting of Colfax Quadrangle in Placer County is in progress.

The final sheets of the Kettleman Plain and Tejon Hills Quadrangles of the U. S. Geological Survey have been published and are now available for distribution. These sheets are published on a scale of 1:31,680 with contour intervals of 5 and 25 feet. The Kettleman Plain Quadrangle covers an area in western Kings County and the Tejon Hills Quadrangle covers an area in western Kern County.

The field work in connection with these quadrangles was carried on in 1930 and 1931 by the U. S. Geological Survey in cooperation with the State of California, acting through the State Engineer's office.

CENTRAL VALLEY PROJECT

The Central Valley Water Project Authority at its meeting held on January 25th resubmitted an amended application for approval of the Central Valley Water Project of California and for grant and loan for its construction under the provisions of the National Industrial Recovery Act of 1933. The original application was filed by Governor Rolph before the formal creation of the Water Authority but the revision was made necessary by an alteration in the amortization schedule and changed requirements of the Federal Government on the matter of outright grants. Both revisions were dictated by the Public Works Administration officials. Many representatives of the State Water Plan Association, irrigation districts and other interested agencies were present. They expressed a desire to contact the Authority at as early a date as possible to discuss the purchase of water and power required by their respective units.

In Memoriam

HARRY E. FEARNALL, Resident Engineer with the Bridge Department of the Division of Highways, died in San Francisco on February 4th after a brief illness.

The Department suffers a distinct loss. Mr. Fearnall served the State well. He had the full faith and trust of his superiors, who reposed in him the responsibility of supervising bridge construction amounting to one and one-quarter million dollars during his seven and one-half years of service.

These important jobs included the following bridges: at Herndon over the San Joaquin River; at San Ardo over the Salinas River; at Bradley over the Salinas River; at Santa Maria over the Santa Maria River and the Big Dann and Cedar Creek structures in Mendocino County.

Mr. Fearnall was born in Stroud, Gloucestershire, England, May 20, 1878, attending the public schools there, and Glengarron and Upland Colleges. He came to America when a youth. Prior to coming to California, he was in private engineering practice in Miles City, Montana, being thus engaged from 1901 to 1906. In 1906 he was appointed County Engineer and Surveyor of Custer County, and in 1908 was elected to that office, serving for sixteen years. As County Engineer he had complete charge of all highway and bridge design and construction. During this time he built four bridges across the Yellowstone River, eight bridges over Powder River and one across the Missouri River. In 1924 he resigned to come to California.

In 1915 Mr. Fearnall was appointed by the United States War Department to draw plans and specifications and to take charge of the construction of an irrigation project for Fort Keogh, Custer County, Montana.

Mrs. Fearnall has the sincerest sympathy of the Department in her bereavement.

Highway Bids and Awards

(Continued from page 30)

dock, Ltd., Pasadena, \$45,768; Gist & Bell, Arcadia, \$48,737; J. L. Conner & K. Kristich, Monterey, \$80,520; L. A. Brisco and John Jurkovich, Arroyo Grande, \$43,575; Contoules Const. Co., San Francisco, \$54,204; Yalesias Bros., Inc., San Diego, \$44,810; Western Motor Transfer Co., Santa Barbara, \$53,589. Contract awarded to Macco Const. Co., Clearwater, \$41,690.60.

VENTURA COUNTY—Overhead crossing near Ventura consisting of nine 40-foot and two 57-foot reinforced concrete spans and one 54-foot steel span. District VII, Route 2, Section D. R. E. Campbell, Los Angeles, \$102,724; M. B. McGowan, Inc., San Francisco, \$95,333; Byerts & Dunn, Los Angeles, \$89,792; Merritt-Chapman and Scott Corp., San Pedro, \$95,033; Andy Sordal, Long Beach, \$109,791; Weymouth Crowell Co., Los Angeles, \$96,704; Herbert M. Baruch Corp., Los Angeles, \$107,660; Sharp & Fellows Contracting Co., Los Angeles, \$94,978; R. H. Travers, Los Angeles, \$95,209; Lynch Cannon Engineering Co., Los Angeles, \$111,266; Clinton Construction Co. of Calif., Los Angeles, \$96,375; Bannister Field Co., and Fred E. Potts Co., Los Angeles, \$97,471; Theo. A. Beyer Corp., Los Angeles, \$100,798; Bodenhamer Const. Co., Oakland, \$94,774. Contract awarded to Lindgren & Swinerton, Inc., San Francisco, \$83,975.

STATE OF CALIFORNIA
Department of Public Works

HEADQUARTERS: PUBLIC WORKS BUILDING, ELEVENTH AND P STS., SACRAMENTO

JAMES ROLPH, JR.-----Governor
 EARL LEE KELLY-----Director
 ERIC CULLENWARD-----Deputy Director
 MORGAN KEATON-----Assistant Deputy Director

DIVISION OF HIGHWAYS

CALIFORNIA HIGHWAY COMMISSION

HARRY A. HOPKINS, Chairman, Taft
 TIMOTHY A. REARDON, San Francisco
 PHILIP A. STANTON, Anaheim
 FRANK A. TETLEY, Riverside
 DR. W. W. BARHAM, Yreka
 C. H. PURCELL, State Highway Engineer, Sacramento
 JOHN W. HOWE, Secretary

HEADQUARTERS STAFF, SACRAMENTO

G. T. McCOY, Assistant State Highway Engineer
 J. G. STANDLEY (Acting), Principal Assistant Engineer
 R. H. WILSON (Acting), Office Engineer
 T. E. STANTON, Materials and Research Engineer
 FRED J. GRUMM, Engineer of Surveys and Plans
 C. S. POPE, Construction Engineer
 T. H. DENNIS, Maintenance Engineer
 F. W. PANHORST (Acting), Bridge Engineer
 L. V. CAMPBELL, Engineer of City and Cooperative Projects
 R. H. STALNAKER, Equipment Engineer
 E. R. HIGGINS, Comptroller

DISTRICT ENGINEERS

J. W. VICKREY (Acting), District I, Eureka
 F. W. HASELWOOD, District II, Redding
 CHARLES H. WHITMORE, District III, Marysville
 J. H. SKEGGS, District IV, San Francisco
 L. H. GIBSON, District V, San Luis Obispo
 R. M. GILLIS (Acting), District VI, Fresno
 S. V. CORTELYOU, District VII, Los Angeles
 E. Q. SULLIVAN, District VIII, San Bernardino
 S. W. LOWDEN (Acting), District IX, Bishop
 R. E. PIERCE, District X, Stockton
 E. E. WALLACE, District XI, San Diego
 General Headquarters, Public Works Building,
 Eleventh and P Streets, Sacramento, California

DIVISION OF WATER RESOURCES

EDWARD HYATT, State Engineer, Chief of Division
 J. J. HALEY, Jr., Administrative Assistant
 HAROLD CONKLING, Deputy in Charge Water Rights

A. D. EDMONSTON, Deputy in Charge Water Resources Investigation
 R. L. JONES, Deputy in Charge Flood Control and Reclamation
 GEORGE W. HAWLEY, Deputy in Charge Dams
 SPENCER BURROUGHS, Attorney
 EVERETT N. BRYAN, Hydraulic Engineer, Water Rights
 A. N. BURCH, Irrigation Investigations
 H. M. STAFFORD, Sacramento-San Joaquin Water Supervisor
 GORDAN ZANDER, Adjudication, Water Distribution

DIVISION OF ARCHITECTURE

GEO. B. McDOUGALL, State Architect, Chief of Division
 P. T. POAGE, Assistant Chief
 W. K. DANIELS, Administrative Assistant

HEADQUARTERS

H. W. DeHAVEN, Supervising Architectural Draftsman
 C. H. KROMER, Principal Structural Engineer
 CARLETON PIERSON, Supervising Specification Writer
 J. W. DUTTON, Principal Engineer, General Construction
 W. H. ROCKINGHAM, Principal Mechanical and Electrical Engineer

DIVISION OF CONTRACTS AND RIGHTS OF WAY

C. C. CARLETON, Chief
 HUGH K. McKEVITT, Attorney, San Francisco
 FRANK B. DURKEE, General Right of Way Agent
 C. R. MONTGOMERY, General Right of Way Agent

DIVISION OF PORTS



Port of Eureka—William Clark, Sr., Surveyor
 Port of San Jose—Not appointed

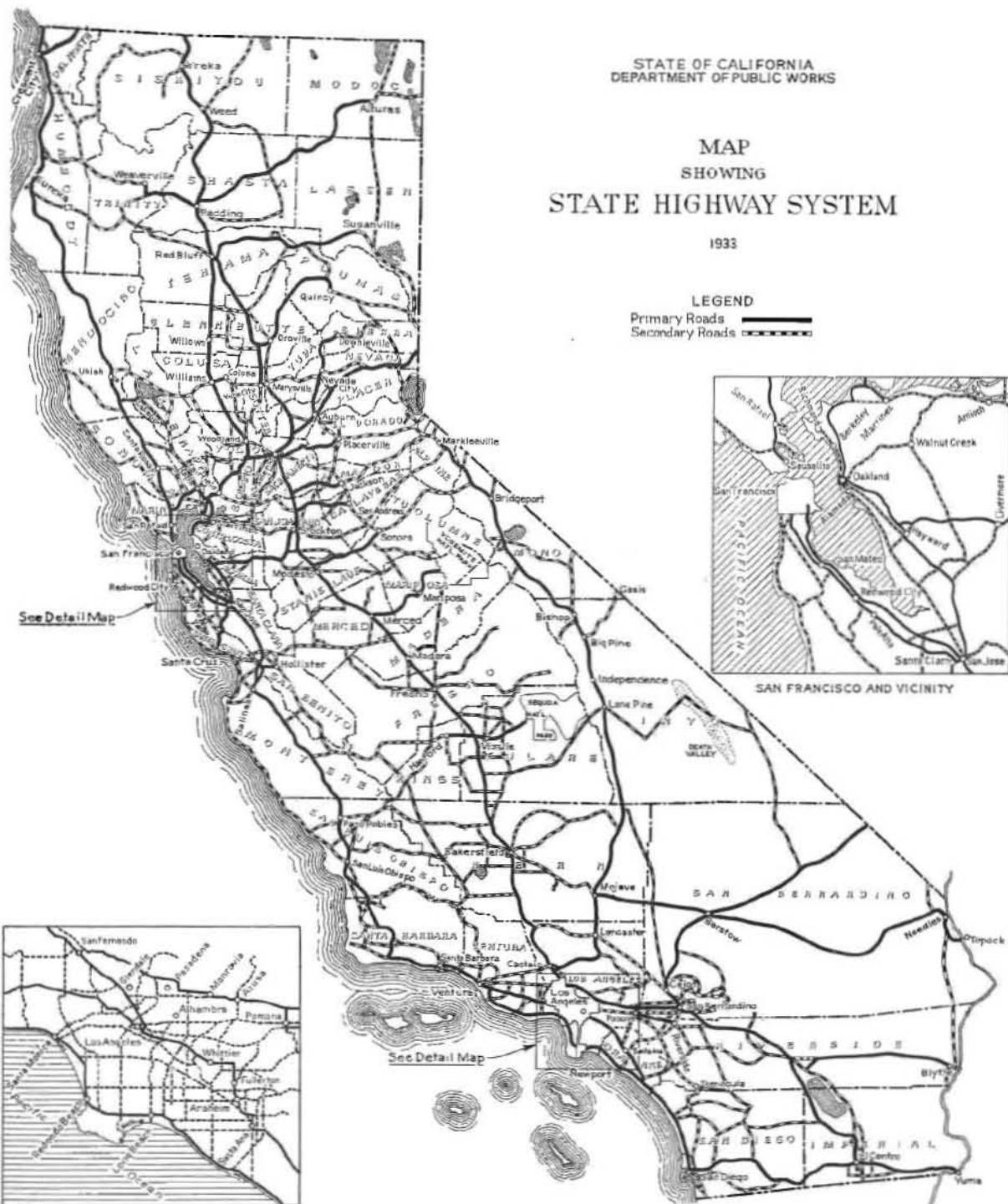
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

MAP
SHOWING
STATE HIGHWAY SYSTEM

1933

LEGEND

Primary Roads 
Secondary Roads 



See Detail Map



SAN FRANCISCO AND VICINITY



LOS ANGELES AND VICINITY