

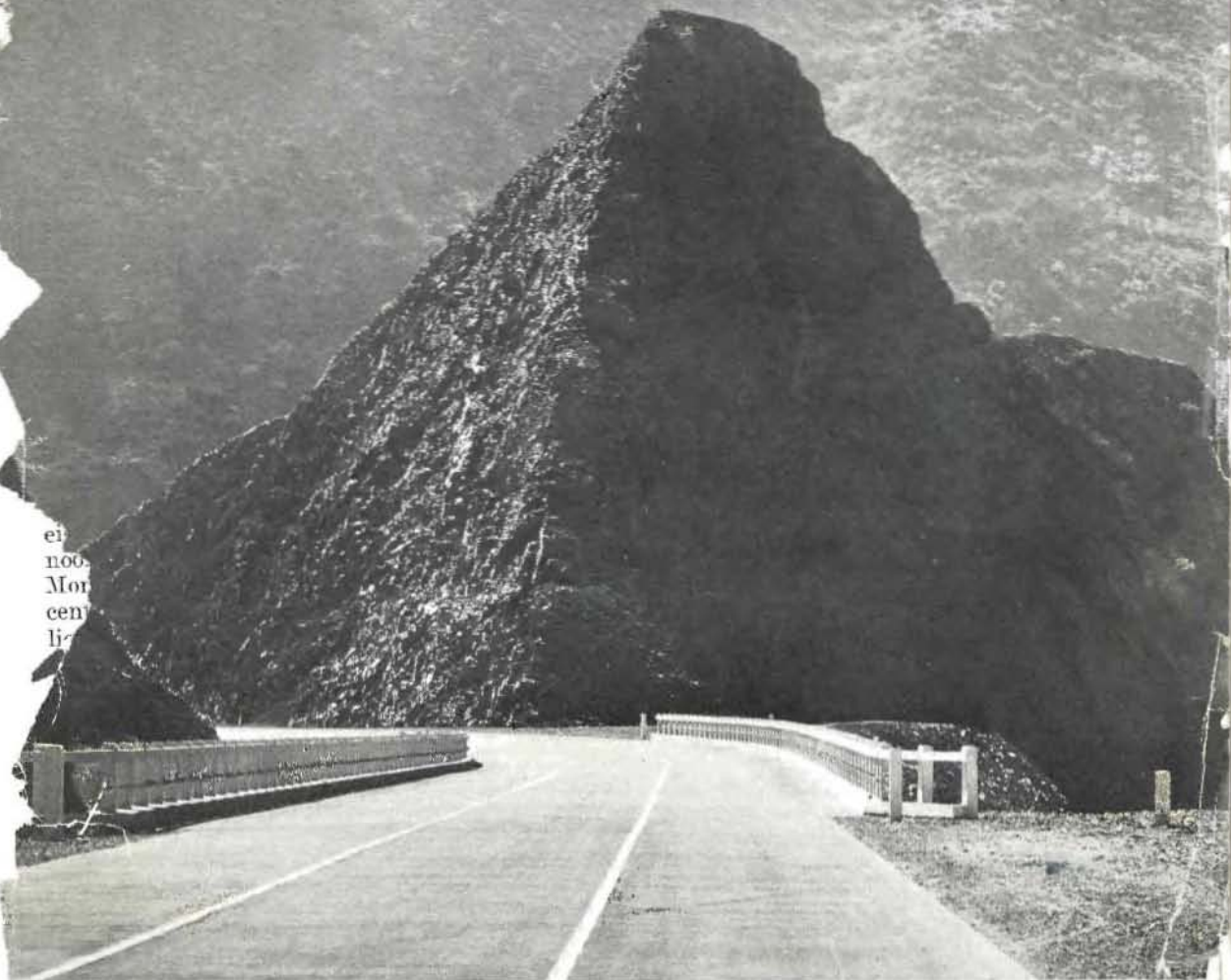
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PYRAMID ROCK IN PIRU GORGE ON NEW RIDGE ALTERNATE

Official Journal of the Department of Public Works

DECEMBER 1933

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"THE FORGOTTEN MAN"

Director of Public Works Describes Plight of "the White Collar" Job Seeker and the Problem of Providing him Relief Employment for Winter on the Highways

By EARL LEE KELLY, Director of Public Works

"THE FORGOTTEN MAN."

Perhaps the most distressing problem to face and the hardest one to solve in the Department of Public Works, is that of trying to find work for the thousands, who, month after month, besiege these offices.

One little story regarding the awarding of a contract; one mention in the press of the possibility of additional projects being launched by the Department of Public Works—and a veritable flood of fine real citizens out of employment descends upon headquarters. Four hundred men appeared between eight o'clock and noon of a certain Monday morning recently following publication in the local press that this department had prepared 1871 projects which could employ 20,596 men if such projects were accepted by the C. W. A. The little "if" was what these men, desperate to find an honest means of earning their living, had overlooked in the story.

"The Forgotten Man."

Unemployment is still a major problem of this State. It is true that the Federal government's efforts to relieve the county relief rolls have had good effect. But there are still on our records, thousands of names of men seeking permanent work.

But the "Forgotten Man" is the most pitiable case with which we have to deal. He is the salesman, the insurance broker, the clerk—the so-called white collar man. He probably has never done one bit of manual labor in his life. Civil service regulations bar him from the office job to which he might be fitted. A physique used to indoor work bars him from manual labor. He is indeed "The Forgotten Man."



EARL LEE KELLY

It is for this man that the department of Public Works relief work each winter, has been a salvation. The approximately 4120 whom we will employ throughout this winter is made up for the greater part of "The Forgotten Man." Provided he has dependents, this citizen is put on regular maintenance work, but at half time instead of full time. Our winter relief workers are employed for eight hours a day at \$4.40 per day, five days a week, with a lay-off each second week; in other words, he is employed to earn \$22 every other week. By this stag-

gering we are able to employ twice as many as we ordinarily would.

First crews began this employment December 4th. Additional men are being added each week until by the first of January we anticipate more than 2000 will be thus employed.

(Continued on page 8)

American Canyon Job Involves 1,166,000 Yards Excavation, 14,000,000 Overhaul

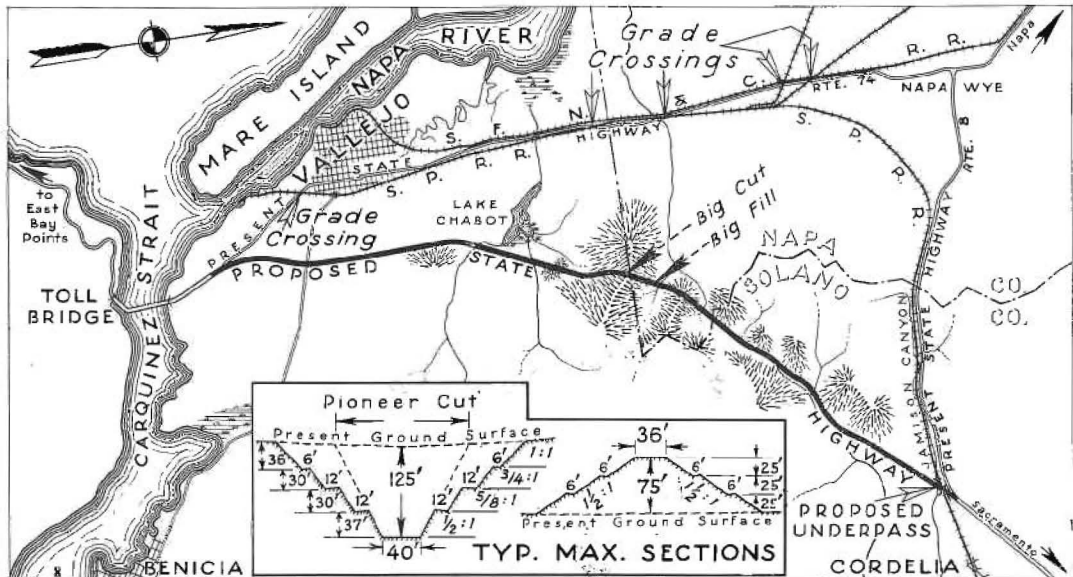
By R. E. PIERCE, District Engineer

ON October 9, 1933, the first shovel of earth was dug by the contractor on the so-called American Canyon Cut-off, thus starting the project which will shorten the distance between San Francisco and Sacramento by six miles and make a vast improvement in alignment and saving in time on this important trancontinental artery.

This cut-off has been in the minds of many interested people for years, and in fact was originally surveyed by State Highway engineers in 1926. At that time this cut-off was

reached between the State and Solano County, in which the county agreed to take over and maintain the present State highway from Cordelia to Benicia, as a county road, and the State agreed to construct and maintain the American Canyon Cut-off and to take over and maintain the Vallejo-Benicia Road from the American Canyon Cut-off to Benicia.

Since that time a further study of the route proposed has been made by the Survey and Plans Department and a radical change recommended which, while involving very heavy



ROUTE of American Canyon Cut-off and cross-section plan for terraced cuts and fills.

not a part of the State Highway System and the matter of financing a survey caused some concern. This was solved by funds in the amount of \$4,500 being provided by the boards of supervisors of Solano and Napa counties, each contributing one-half the amount, or \$2,250. This appropriation was agreed upon after the advantages of the new route had been pointed out to them.

STATE MAKES AGREEMENT

After this survey the matter lay dormant until about 1929, when an agreement was

grading and some adverse grade, makes an additional saving of about a mile in distance and improves the alignment. This change is considered worth while on account of the importance of this route and the volume of present and probable future traffic.

The work now under contract consists, in the main, of grading and drainage structures. In volume of excavation this project ranks among the largest ever handled in a single State contract, there being an estimated total of 1,166,000 cubic yards set up

(Continued on page 12)



"BIG CUT" of the American Canyon cut-off project where a total of 520,500 cubic yards will be moved. The cut is 2400 feet long with 130-foot maximum depth.



"BIG FILL," adjacent to the "Big Cut," is 2500 feet long, with a maximum height of 75 feet, requiring 605,600 cubic yards of material.



TERRACING OPERATIONS in the "Big Cut" are shown in this picture. A shovel and truck are making a 12-foot terrace along the left slope. Fills will also be terraced.

Annual Battle With Snow Begins on 3,300 Miles of State Highways

By T. H. DENNIS, State Maintenance Engineer

ROAD condition inquiries vary with the season. Today, it is: "Are the roads open? Are chains necessary?" Answering in the affirmative both questions, we suddenly realize another snow removal season is under way and that, scattered throughout the State, 170 snow plows of all types have already had their initial skirmish with the enemy.

Last year, this battle was waged on a 3000-mile front at a cost of \$312,000; a similar amount will be required this season. Can we justify this expenditure, which requires approximately 17½ cents from the gas tax return made by each of the 1,800,000 motor vehicles in California? Let us determine.

Snow is removed on 29 State Highway routes, which serve in the aggregate some 11,226 vehicles daily during the winter months. Assuming each machine traveled 150 miles, making 14.5 miles to the gallon of gasoline—averages determined in the joint survey conducted by the United States Bureau of Public Roads and the Division of Highways—then the daily return from gas tax would be \$3,486 or \$313,740 for a conservative winter season of three months' duration.

OPEN ROADS PAY

Apparently, therefore, the motorists enjoying this service on these particular routes pay their way. Furthermore, if these roads were closed for a three months' period, the interest loss at 4 per cent on some 3000 miles of road, conservatively estimated to cost \$15,000 per mile, would amount to \$450,000. Considered from this angle, also, it would appear advisable to keep these routes open.

Let us consider the situation from the standpoint of business. The State Chamber of Commerce is authority for the statement that some \$1,500,000 was expended by motorists during the 1931-32 season for transportation alone to winter sports areas, and that this same figure for last year was nearer \$2,000,000. The expenditures for snow sports wearing apparel and equipment, together with the sums spent for meals and lodgings, might conservatively equal, if not exceed, this cost of transportation.

Even assuming the year's expenditure with business at \$3,000,000, then a 10 per cent profit on this amount would almost equal the sum invested to make this development possible. Therefore, snow removal from the standpoint of traffic and business interests is economically sound, and its development will continue.

MILEAGE INCREASED

During the past winter season, snow was removed on 3000 miles of State highways. It is planned to continue the work on the same sections this year and also include the mileage of the new secondary roads where the public was formerly given this service by county forces. This will increase the mileage some 300 miles.

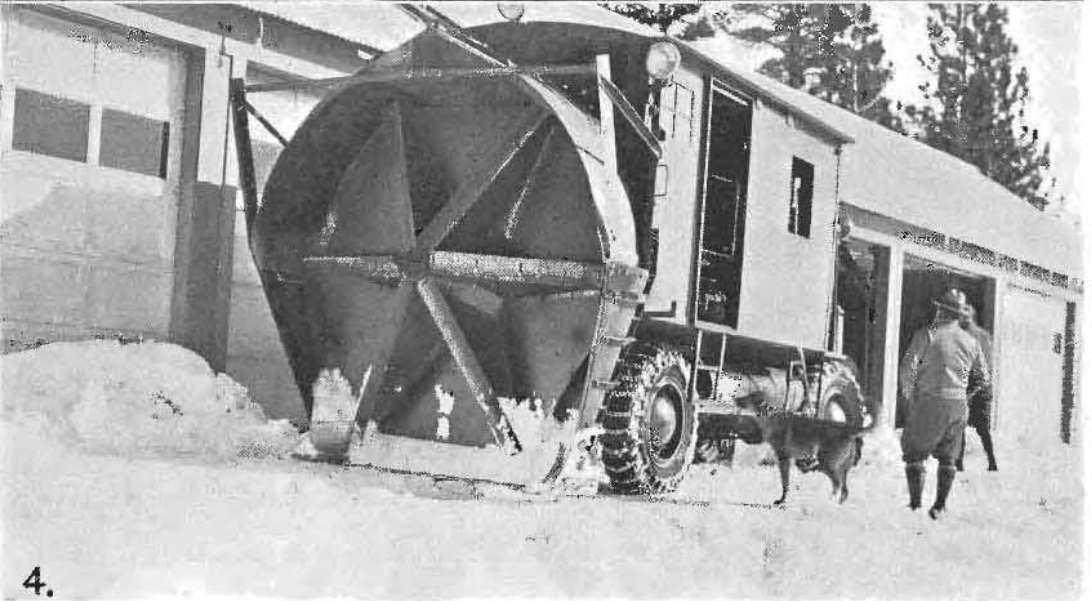
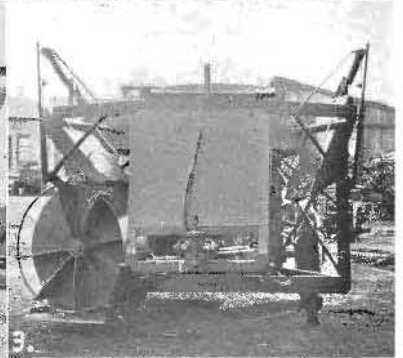
This work carries with it a very definite responsibility for the proper protection of traffic. It is the view of those in charge that, if an open road is advertised, it must be as safe as conditions will permit. With this in mind, arrangements are made for the placing of hazardous sections of road under control. This phase of the work is handled in cooperation with the California Highway Patrol.

Whenever there are icy conditions, motorists are not permitted to enter the control area unless the vehicles are equipped with skid chains. Likewise, during periods when snow is falling heavily or there is a strong wind with consequent low visibility and danger of temporary blockade, traffic is held up entirely until conditions are favorable for safe passage.

This control is a part of the routine work on the Donner Summit section of U. S. 40, and between Bishop and the State line on State Route 23. Controls are placed in operation at other points as the need arises.

PARKING SPACE ESSENTIAL

One of the gravest problems in recreational areas where snow sports are held is the lack of parking space. As a result, when sudden storms occur, our snow equipment is often blocked by locked cars parked along the roadway. This condition might easily jeopardize the safety of all motorists using this



SNOW-FIGHTING EQUIPMENT already skirmishing on the 1933 battlefront. No. 1—Team work last winter with big auger blower plow following truck equipped with slice bar. No. 2—One of the auger blowers. No. 3—A widening rotary on semitrailer. No. 4—Big Blade rotary ready for action.

Laboratory Tests Determine Relative Efficiency of Reflector Sign Buttons

By T. E. STANTON, Materials and Research Engineer

THE Materials and Research Department of the California Division of Highways has recently completed an investigation of the use of the photo electric cell for testing the relative efficiency of various types of directional and warning sign reflector buttons.

Field tests are difficult because (1) tests made in the open require a secluded location free from extraneous light sources such as automobile headlights, street lights, etc.; (2) such tests can be conducted only at night and in element weather; (3) considerable labor and expense are involved in setting up and conducting the tests; (4) the human eye is quickly fatigued and not reliable; and (5) camera records used to supplement the eye test fail in that the sensitivity of the film to various parts of the spectrum band is not comparable to that of the eye.

It was, therefore, decided to investigate the use of the photo electric cell for the purpose.

THE PHOTO ELECTRIC CELL

Photo electric cells are light sensitive devices with an extremely high electric resistance in the dark which decreases as light falls on the cell, thereby permitting the passage of currents of varying intensity. This current can be amplified and accurately measured.

The sensitivity of a photo electric cell is many times that of the human eye; corresponds exactly in proportion to the light intensity; is not subject to fatigue; and is not affected by normal changes in temperature—in short, it is an ideal device for measuring the intensity of light.

APPARATUS

A light-tight box (Fig. 1), about six feet long, was built in one end of which was mounted the photo electric cell placed behind an adjustable shutter. The light beam enters through a hole in the end of the box—the center of the hole and center of the cell shutter being in the same horizontal plane.

Near the opposite end of the box is the support and holder for the reflector button. This unit consists of a plate mounted on a

support having a vertical adjustment. The support is carried on a "U" shaped trunnion that allows the plate to be rotated without raising or lowering the center of the button. A pointer attached to the trunnion shaft is placed outside the box to indicate the angle between the reflecting button and the beam of light.

LIGHT BEAM CONCENTRATED

A halopticon equipped with special lenses provides the source of light. The projecting lens is placed close to the hole in the dark box. To concentrate the light and to minimize extraneous reflection a plate, in the center of which is cut a small square hole, is inserted in the slide carriage, thereby defining a 2-inch square illuminated area on the button holder at the far end of the box.

The path of the light beam, the center of the photo electric cell shutter and the center of the button plate are all in the same horizontal plane.

Variations in the current through the cell are on the order of billionths of an ampere—much too small to be directly measured. Consequently, an extremely sensitive vacuum tube amplifier is used to boost the current 10,000 times when it is read on a micro-ammeter (an instrument reading to millionths of an ampere).

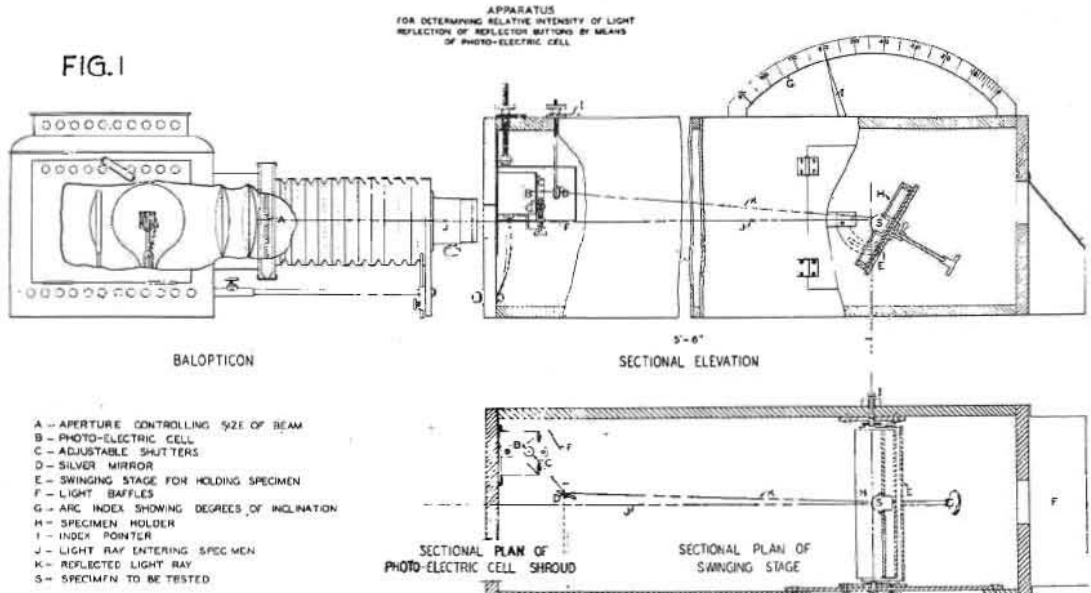
Figure 1 is a cross-section of the complete set-up.

PROCEDURE OF TEST

With the empty button holder in place the light is turned on and the amount of extraneous reflection recorded.

The button is then inserted and the trunnion set so that the face of the button is normal to the light beam. This reading is recorded as that of an angle of incidence of 0°. The trunnion is then rotated from the normal in steps of 5° with a reading recorded at each step.

Due to the low cost at which these buttons must be manufactured, it is not to be expected that the lenses will be absolutely true. A very appreciable variation is found in the light intensity of the same button when it is rotated about an axis perpendicular to the center of the lens.



In placing the buttons in road signs there is no way of predetermining when the button is placed to its best advantage, therefore, any rating to be truly representative of the efficiency of a particular type of button must consist of the average single measurements on a large number of buttons or of several readings on each of a relatively few number of buttons at different positions.

FOUR READINGS TAKEN

Whenever initial tests show a particular type of button to be of such quality as to merit further consideration, four sets of readings are taken on each of not less than three buttons. When one set of readings is completed, the button is rotated 90° (in the plane of the face of the holder) and another set of

readings at varying angles of incidence recorded.

Readings are taken at each of the quarter points in the circumference of the button. The button is rated on the average of the readings taken in the four positions; the average for the three buttons being taken as the relative value of the buttons of that particular size and make.

The scale of the meter, 0° to 200°, is increased when necessary by a shunt giving a range from 0° to 400°. All readings beyond 400 are designated at 400+, and no effort is made to determine a top limit beyond 400.

SOME MARKED VARIATIONS

Figure 2 lists the comparative reflection of some of the reflector buttons tested. It will

Fig. 2 COMPARATIVE REFLECTION OF VARIOUS REFLECTOR BUTTONS

Ang. of Inc.	TYPE							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0°	7/8"	1"	1-1/4"	1"	1"	1"	1-1/8"	7/8"
5	194	153	372	282	221	111	96	55
10	117	141	377	246	196	95	102	40
15	65	130	385	219	211	110	106	39
20	41	98	385	83	247	95	97	33
25	14	53	329	67	320	140	113	36
30	5	9	284	89	362	142	106	51
35	14	9	9	126	343	160	94	122
				153	4	100	106	273

\$13,903,124 of Contracts Awarded

(Continued from page 1)

These "Forgotten Men" have been chosen by committees in the various localities in which they live. Their selection was made by the mayor of the town, the commander of the American Legion, and one prominent business man. And, in passing, I extend my sincere thanks to these committees for the promptness and effectiveness and dispatch with which they have cooperated with the department in relieving distress. It is our hope that our fund may last so that this employment shall not terminate before the end of May, 1934.

"The Forgotten Man."

Eyebrows were raised in August when I announced that the program of this department had been ordered speeded up by Governor Rolph so as to put the maximum number of men to work in a minimum space of time. Those eyebrows raised because Governor Rolph urged advertising and letting of \$20,000,000 worth of highway construction by Christmas. He told us that the greatest thing we could do for the State was to put the honest citizen back to profitable labor.

"FIFTY THOUSAND MEN" SLOGAN

Double shifts, night and day work, became the order of the department and in the middle of August our great highway building program was launched.

"Fifty thousand men at work by Christmas."

That became the slogan of the department.

I am happy now to announce that that slogan was no idle cry. At the date of this writing, December 8th, \$13,903,124 worth of contracts have been advertised and awarded. Barring additional unforeseen circumstances, such as the suit brought against us which holds up a \$200,000 contract pending a test of the legality of a recent act of the Legislature our \$20,000,000 program will be an accomplished fact around Christmas.

Under Federal and State provisions, employment on the majority of this work goes to men with families in the neighborhood of the project.

"The Forgotten Man."

A distinct change for the better in the employment situation in California seems at hand. But are we not overlooking another grave problem in employment? What is being done for the single man without dependents? Is he not really:

"The Forgotten Man?"

The youth who graduated from high school or college in the last two or three years and who would, under more prosperous conditions in the nation, immediately go to work, finds that he is not wanted. Every employer today is concerned with placing on the pay roll men of families.

To me the idleness of the young men of the State and Nation is a grave problem. I feel that bitterness, radicalism and communism are bred of this condition.

Is it not the fact that the youth of today filled with the theoretical point of life but none of the practical; forced into idleness by an economic condition over which he has no control, and denied the privilege of earning his own money is

"The Forgotten Man?"

TRUCK TRANSPORTATION SURVEY

In an effort to determine the existing relationship of motor trucking to freight transportation and the sphere in which the transportation of goods by motor vehicle is more economical or serviceable than by other means of transportation, the Federal Coordinator of Transportation on September 13 started a nation-wide survey among motor truck fleet operators, according to an announcement by Joseph B. Eastman, Coordinator.

About 16,000 operators of motor truck fleets throughout the country, including franchise and contract carriers for public hire, and also those private operators of ten or more vehicles who handle their own goods in their own or rented vehicles, are included.

"I've just got rid of my saxophone in part exchange for a new car."

"I didn't think they accepted things like that for a car."

"Well, this case was an exception. The dealer happened to be our next-door neighbor."

—Vancouver Province.

Schoolboy (home for summer holidays): "Well, dad, I bought some books on farming for you to dig into."

Father: "And I've bought another thirty acres for you to dig into."—*Exhaust*.

Gasoline Tax Shows \$4,000,000 State Loss in Biennial Revenue

By E. R. HIGGINS, Comptroller
Department of Public Works

THE October gasoline tax assessments recently announced by the State Board of Equalization amounted to \$3,182,008, a decrease of 3.59% from the October, 1932, assessments, and 5.71% from the October, 1931, assessments. Total assessments for the year 1933 to and including October have amounted to \$52,528,898 as compared with \$34,090,814, and \$35,241,596 for the corresponding periods of 1932, and 1931 respectively. In terms of percentage these decreases amounted to 4.58% and 7.70%.

While the rate of decrease on a percentage basis may not seem large, when expressed in terms of dollars the biennial loss to counties is approximately \$2,000,000, and the loss to the State Division of Highways about \$4,000,000. In view of the fact that maintenance and administration expenditures are more or less in the nature of fixed charges, the decrease of \$4,000,000 in the amount of funds available to the Division of Highways necessitates a direct reduction in the construction program to that extent.

DIMINISHING ELSEWHERE

That the gasoline tax as a source of highway revenue may have reached the point of diminishing returns is indicated by the fact that receipts in other States have also fallen off materially. Information is not available from all of the States for 1933. However, in 1932 the total gasoline tax collected in the 48 States and the District of Columbia amounted to \$513,000,000 compared with \$536,000,000 for 1931, a decrease of 4.3%. On the basis of partial returns receipts for 1933 will show a further decrease from 1932 of 4 to 5% or a decrease from 1931 of about 8%.

Diminishing returns may be solely a direct result of depressed business conditions or they may indicate that motorists are restricting their use of motor fuel in order to save gasoline tax costs. If the latter is the case then gasoline taxes have been imposed to the point where further increases in basic rates will provide no increase, in fact may even result in a decrease in revenue. It is quite likely that this point has been reached in some States where the rates are high.

PROGRESS—A VALEDICTORY

Before the advent of the Bayshore Highway, Mrs. Marguerite Flagg Anderson of San Mateo lived on a quiet, unpaved street. To accommodate the great four-lane highway on its route through the little street it was necessary to acquire a considerable portion of Mrs. Anderson's front yard, and the following poem is her valedictory to the graduation of her home into the big, busy world of modern progress.

OH, for tranquillity—peace as of yore!
Just for a day of that rest and content
When never a boulevard passed my door
Nor traffic noises my faculties spent.
Where is the cypress hedge, arched for a gate—
My colorful garden, gay in the sun?
Adieu to them all; they met the same fate:
Tractors and plows over sentiment won!
Must I now harbor resentment at heart—
Want back my flowers so tenderly sown?
Should even a home or treasures of art,
Time's mighty March of the Ages postpone?
PROGRESS: I'll fashion my life to the mode—
Concede to Advancement, my Country Road.

—MARGUERITE FLAGG ANDERSON.

New Pavement for Valley Boulevard Link

In San Bernardino County 3.5 miles of the El Centro-Los Angeles highway is to be graded and paved from Sierra Avenue to Riverside Avenue on Colton Avenue between the towns of Ontario and Colton.

The new pavement will be 20 feet wide with 8-foot shoulders and will connect at its westerly end with the new pavement which was completed in June of this year between Vineyard Avenue and Sierra Avenue.

This route is one of the important State highways which lead easterly from the metropolitan Los Angeles district and as such it carries a large volume of commercial trucking and transcontinental traffic.

Traffic Policeman: "Miss, you were doing sixty miles an hour!"

She: "Oh, isn't that splendid! I only learned to drive yesterday."

It is unlikely that such a point has been reached in California, and undoubtedly with the restoration of normal business conditions the gasoline tax at present rates will produce more revenue than it has at any time in the past.

Tragedy Springs, Where Pioneers Were Murdered, to be Beautified by State

By A. I. RIVETT, Assistant to Maintenance Engineer

TRAGEDY SPRINGS! Even the name conjures vivid and stirring pioneer pictures depicting the tragic events of the days of our forefathers. Today, however, only silence and calm and a carved marker reveal the location of this historic old waterhole.

Sixty-two miles east of Jackson, just west of Silver Lake, on the old Kit Carson trail, now known as the Alpine Highway, Tragedy Springs still give forth their cooling waters for the refreshment of today's passers-by, but not a murmur of the stirring events of long ago in which they figured.

In the month of June, 1848, Daniel Browett, Edgar H. Allen and Henderson Cox, three hardy pioneers, drove a large herd of cattle down over the Kit Carson trail to market and, having disposed of their stock and received payment therefor, they came on the evening of the twenty-seventh, on their return journey, to a pure cool spring just off the trail.

MURDERED IN NIGHT

Here they camped for the night. But the night, instead of bringing quiet and peaceful rest, brought bloodshed and death. Tradition long held that the three had been murdered as they slept and their bodies burned by a band of roving Indians. However, tradition often bears close scrutiny and examination, and it has since been proved that renegade whites who knew of the trip of these cattle men to market lay in ambush for them and murdered them for their money, endeavoring at the same time to throw suspicion upon the Indians of the locality.

So today near Tragedy Springs, as they were named in memory of Browett, Allen and Cox, a mound of loose stone on the slightly sloping hillside marks the last resting place, the common grave, of these three pioneers.

To record this event, not long after that tragic date in 1848, the names of Browett, Allen and Cox and the date of the murder were carved into a massive fir tree, near the grave.

Storms and time weakened the old tree, however, and in the winter of 1930-31 it

was blown over, breaking off some eight feet above the ground, but leaving intact the carved inscription upon its stump.

MARKED BY PLAQUE

In 1931, 83 years after the crime, a heavy slab bearing the ancient carving was taken from the old stump and removed to Sutter's Fort in Sacramento, where it now rests in the fort museum. That the location might not lose its identity the Native Sons and Daughters of Amador County caused a replica in bronze of this old marker to be prepared, and on August 30, 1931, dedicated it to the memory of the murder victims. This plaque, imbedded in a great granite rock near the scene reads:

To the Memory
of
Daniel Browett,
Edgar H. Allen
and
Henderson Cox

who were supposed to have
been murdered by Indians on
the night of the 27th of June, 1848

Following a pilgrimage by a caravan of the Odd Fellows Lodges of Amador County in August, 1929, to the Kit Carson monument which marks the summit of the old trail, during which pilgrimage the caravan rested at Tragedy Springs, a request was made to the Director of Public Works that the State develop a resting place at this historic point and preserve the memory and atmosphere of the event of yesteryear for the passersby of today.

STATE PLANS FOUNTAIN

As a result of this suggestion, the Department of Public Works, through the Division of Highways, recently signed an agreement with M. and George Bachich, present owners of the spring, who because of their fine public spirit and interest granted the use of a portion of the spring waters to supply a drinking fountain to be erected by the State in the center of a beautified location marking the spot.

That Tragedy Springs early became a



THE PIONEERS' GRAVE at Tragedy Springs on the old Kit Carson Trail is shown by the mound of stones under which were buried Daniel Browett, Henderson Cox and Edgar H. Allen, murdered in their night camp June 27, 1848. The carved record of the tragedy made in the tree of which the trunk remains was removed for preservation in Sutter's Fort Museum. Seepage from the historic springs is seen in right foreground.



MARKING THE SPOT, a bronze plaque bearing names, date, etc., was set in big boulder near the springs and grave by the Native Sons and Daughters of Amador County.

resting place for caravans and travelers was shown by a discovery made on August 26, 1901, by Nick J. Ferrari, a former owner, who on that date filed a water claim on these waters.

DISCOVERED OLD BLAZE

While visiting the spot one day Ferrari observed a tree, a short distance west of the spring along the old emigrant trail, which carried a slight scar. He cleared away the bark and revealed the following inscription:

AUG XIX 1848
2ND CO
J. J. WRIGHT

Mr. Ferrari states that Wright led the second party of emigrants that traveled the

old trail. Other tell-tale marks indicate the old route. Grooves on the rocks where many wagon tires passed still show. Blazed trees are yet to be found, the scars healed over.

Only a few minutes' wandering in the vicinity of Tragedy Springs will raise in the heart of today's traveler a high respect and a profound feeling of debt to those trail blazers who opened the way into the Golden State and who by their courage and hardihood left to posterity an example of grit and perseverance which every age might well emulate.

He: "But don't you cook much more for dinner than we use, darling?"

She: "Of course, silly! If I didn't, how could I economize by making left-over dishes?"

12-foot Terraces for Cuts and Fills

(Continued from page 2)

in this contract. Another large item is the overhaul of 14,000,000 station yards.

An unusual feature is the "BIG CUT" near the center of the job. This comes on the revised alignment where a ridge is crossed. Nearly one-half the entire excavation on this contract will come from this one cut, where an estimated total of 520,500 cubic yards will be moved. This cut is 2400 feet long, with a maximum depth of 130 feet.

Adjacent to this cut, on the north, is a fill 2500 feet long, reaching a height of 75 feet, which will require 605,600 cubic yards of material, to be made partly from the "Big Cut" and partly from another large cut to the north containing 217,300 cubic yards.

Due to the unusual size of these cuts and fills and uncertainty as to rock formation in the cuts, a method of terracing has been worked out. This was first suggested by Construction Engineer C. S. Pope for the fills and afterward it was decided to extend it to both cuts and fills.

In the large cuts exceeding 30 feet in depth it is our plan to open up on pioneer slopes of $\frac{1}{2}$:1 before determining the final slopes to be used. If the bedding planes of the rock stratification are very nearly horizontal, we will grade the section as shown on the typical cross section, with a 1:1 slope extending for the entire length of the cut for the upper 30 feet of cut depth; then a terrace and slopes of $\frac{3}{4}$:1 to $\frac{1}{2}$:1 will be graded, varying in approximately 30-foot depths with a terrace between each change in slope.

If the strata are tipped, the slope will be increased on the side which dips toward the roadbed, and decreased on the opposite side. We believe that this method of excavating will result in fewer slides, in addition to providing a method of removing slides should they occur.

TERRACING PLAN

We plan to make the terraces, with the exception of the top one, 12 feet in width, which is wide enough to walk a shovel to any point along the slope which might break out subsequent to excavation. The grades of the terraces along the roadway are approximately parallel with the existing ground, with a

maximum grade of 15 per cent and a 1:12 slope away from the roadway.

It is believed that this terracing will help to prevent slope erosion by collecting the water on each lift and leading it to an outlet at the end of the cut, will protect the traveling public by intercepting falling rock, and will provide a method for taking out any local slides after the excavation is completed.

On the large fills these stepped slopes consist of a series of berms six feet wide at differences in elevation of about 25 feet, the fill side slopes to be $1\frac{1}{2}$:1. The berms will slope toward the roadway at 1:12. It is believed that this terracing of the big fills will reduce slope erosion and give greater stability in the foundation of these deep fills.

The work to be done under the present contract will leave the grade 1.5 feet low in cuts and in sections where soil is not too adverse. On other portions, due to very adverse soil conditions, the grade will be left 2 feet low. Satisfactory selected material will be placed over the entire section prior to paving.

We hope to get this important section paved and open to traffic early in the next biennium.

In order to make this road available for traffic a grade separation is to be built under the Southern Pacific Railroad near Cordelia, this being the only point of contact with a railroad on this cut-off. In contrast, the present route via Jameson Canyon to the Napa Y and through Vallejo has five grade crossings with various branches of the Southern Pacific Railroad. This subway and approaches will be handled under separate contract and should be under way by the time this article appears in print.

SMALL ITEM, BIG NEWS

The present work now being done by the State Highway Department at Conway Summit and in the building of snow fences, together with that being done by several contractors working on the State Highway building contracts, leaves but few unemployed men in this vicinity. Supervisors Gene G. Crosby and Robert L. Currie both reported that their cabins are filled by men who are working on these contracts.—*Bridgeport Chronicle-Union*.

Diner: "I ordered an egg sandwich and you brought me a chicken sandwich."

Waiter: "Yes, sir, I was a little late calling for your order."

U. S. Public Works Program Developed Rapidly in November

COMPLETION of 59 public works highway projects up to November 25, at a cost of \$1,301,000 was announced by the Bureau of Public Roads, U. S. Department of Agriculture, in a tabulation of highway construction. This work was completed under the Public Works Administration highway fund allotment provided for in the National Industrial Recovery Act.

Awards on 3266 projects at a cost amounting to \$165,309,000 have been made, out of a total of 4239 projects advertised for contract amounting to an estimated expenditure of \$213,551,000.

On November 25, the work advertised for contract or started by day labor employed by the highway authorities represented 50.1 per cent of the \$400,000,000 provided for highways by Public Works Administration under section 204 of the National Industrial Recovery Act.

134,805 MEN EMPLOYED

Highway work under construction by the States under section 204 was employing directly on highway work a total of 134,805 men on November 25, the Bureau of Public Roads reports. This force of men was divided between contract and day labor work as follows: 100,512 men on 1890 contract projects and 34,293 men on 533 projects on which the labor is directly employed by the highway authorities.

The estimated total cost of the work under construction on November 25 was \$129,060,000, of which \$116,525,000 was by contract and \$12,535,000 was by day labor employed directly by the highway authorities.

Awards have been made on 77 per cent of the projects approved by the district engineers of the Bureau of Public Roads, and construction is actually under way on 57 per cent of the approved projects.

SHARPS AND FLATS

Lady Friend: "Well, how do you like your new flat?"

Mrs. Newlywed: "Which do you mean—the one I married or the one I live in?"

Dentist: "You say you've never had a tooth filled, yet I find flakes of metal on my drill."

Miserable Plebe: That was my collar button."

—Annapolis Log.

HIGHWAY ENGINEERING IN 1692

"LET ME ADVISE both the greater and lesser Surveyors, to do their work substantially as far as they go. And what is now left undone, may be done another time. But a thing done slightly is good for nothing. A due thickness of Stones and Gravel, may (with a little reparation) last forever: whereas too small a Quantity will soon be swallowed up in the Dirt, and no sign left of it. Moreover where the Ground is false, and rotten, and of the nature of a Quagmire; all the cost of labour bestowed upon it is merely lost, unless you lay faggots or bavins of Brush wood, across and under the made Way. And in this and all other sorts of ground, it must be a principal care to lay the Wayes dry: so that no water may run along them or over them, or ly upon them . . ."

As quoted from "A Proposal for Maintaining and Repairing the Highways"—E. Littleton, in the new book on old engineering entitled: "The Early Years of Modern Civil Engineering."

Great Fill and Wall for Bridge Approach

One of the largest projects to be undertaken by the State in some time is the construction of the dredger fill and placing of a rock wall for the East Bay approach to the San Francisco-Oakland Bay Bridge. This project involves the removal of nearly a million cubic yards of mud and the placing of over three and one-half million cubic yards of dredger sand fill along the northerly side of the Key Mole fill and the westerly waterfront of Emeryville as far as Ashby Avenue in Berkeley. The fill will be protected with a face of 348,000 tons of rock.

Another important East Bay improvement being made by the State is the paving of the central portion of San Pablo Avenue in Berkeley, Albany and El Cerrito, where the car tracks are now being removed. This improvement will do much to facilitate heavy traffic on this important State highway route through a metropolitan area.

GRADE SEPARATION TO BE

BUILT EAST OF DEL MONTE

Further work on the Los Angeles-Pomona lateral involves the construction of a grade separation under the main line tracks of the Southern Pacific Railroad 1½ miles east of El Monte.

The State will place the concrete abutments and the steel girders which will carry the tracks will be placed by the railroad.

New pavement is nearing completion on this route between El Monte and Covina.

Adequate Program for Highways to be Topic of Convention

HIGHWAYS are leading the Public Works Program for National Recovery. This fact will have an important bearing on the coming convention of the American Road Builders' Association which will be held in Chicago, during the week of January 22, 1934. In connection with the convention the Association will hold a comprehensive exhibit of highway equipment and materials.

In announcing the convention date and location, H. C. Whitehurst, engineer of highways of the District of Columbia and president of the American Road Builders' Association, emphasized the four major subjects that will engage the attention of the convention. They are:

TOPICS FOR DISCUSSION

"The Need for Continuation of an Adequate Highway Program.

The Necessity for Federal Participation in the Nation's Road Program.

The Use of Highway Revenues for the Extension and Improvement of the Nation's Highway Network.

The Necessity for Bringing Back to the Highway Program Gasoline and Motor License Revenues which, During the Period of Economic Stress, Have Been Diverted to Other Purposes."

Mr. Whitehurst pointed out the necessity of coordinated action to stop the inroads upon highway funds. "Unless checked," he said, "the diversion of gasoline taxes and motor vehicle license fees to other than highway purposes constitutes a serious threat to a continued highway program.

FALLEN BELOW NEEDS

These diversion tendencies must be dealt with in a positive manner; otherwise the entire highway program may collapse. This must not occur, as the highway program plays too important a part in our national life today."

The Nation's highway development in the past three years—in spite of the \$400,000,000 emergency public works road program—has fallen below a standard that gives reasonable assurance of meeting the needs of motor transportation.

Customer: "Did I leave an umbrella here yesterday?"

Grocer: "What kind of umbrella?"

Customer: "Oh, any kind, I'm not fussy."

Huge Monolith Rises from Bay Waters to Bear Bridge Tower

ONE concrete pier completed, 11 others in construction, and the approach to the Yerba Buena Island tunnel virtually completed—this is the status of the San Francisco-Oakland Bay Bridge, which was placed in construction July 9 by the State Department of Public Works.

Aside from the fact that 2100 Bay Region men are at work on the bridge to provide a livelihood for 3000 dependents, this \$75,600,000 bridge is making itself felt as a real entity in the San Francisco-Oakland Bay Bridge metropolitan area.

The progress of the bridge is visible daily to thousands of commuters in its various phases of construction.

CONCRETE MONOLITH COMPLETED

On historic Rincon Hill, San Francisco, 20 per cent of the concrete cable anchorage has been completed by Healy-Tibbitts Construction Company, contractors.

At the end of Harbor Dock No. 24, at the foot of Harrison Street, Bridge Pier No. 2, a concrete monolith rising to the height of a 7-story building from bedrock to a point 40 feet above the water line, has been completed ready for the steel tower which has already been partially fabricated in steel mills of the Columbia Steel Company and associates.

On Spear Street and the Embarcadero the first land pier on the western shore is now taking visible form as a stockade of steel sheet piling is being driven to form a crib into which to dump concrete.

HUGE CAISSONS IN BAY

On the bay two huge compressed air flotation caissons, like large buildings topped with many domes, float on the water between San Francisco and Yerba Buena Island as they are slowly weighted down to bedrock. These caissons are the matrices for concrete piers, and the bottom of one of them is already 95 feet below the surface of the water, and in a few weeks will have been forced 15 feet farther until its bottom rests on mud.

On Yerba Buena Island where a few months ago Governor James Rolph, Jr., Ex-President Hoover, State Director of Public Works Earl Lee Kelly, Chief Engineer C. H. Purcell, and other distinguished citizens broke ground on



DOMES OF STEEL forming the tops of the 55 cylinders in the world's largest compressed air flotation caisson for the concrete center anchorage of the San Francisco-Oakland Bay Bridge are shown in the above photograph revealing San Francisco's skyline in the background as the caisson is being sunk in mid-bay. The domes are alternately cut off and rewelded into place as the cylinders are increased in height. The caisson is 92 feet wide by 197 feet long and the anchorage when completed will be 478½ feet high and project 298½ feet above water.



UP FROM THE DEPTHS of the bay off the end of San Francisco's Harbor Dock No. 24 a mass of solid concrete the size of a 7-story building has been constructed from bedrock to a height of 40 feet above water. It constitutes Bridge Pier No. 2 and is all ready for the great steel tower that will be erected upon it.

July 9th last, the approach has been cut through on the west side to a point where tunnel operations will soon begin.

On the east side of the island, on Army Point, where President Roosevelt set off the first blast of the bridge, a steam shovel has excavated tons of earth for the most westerly pier of the world's third largest cantilever span to be erected here.

East of the island in two false bottom caissons, concrete has been built up to more than 100 feet from the bottom to their tops above water.

Four other piers of the steel sheet piling cofferdam-construction type are well under way, and some are nearing completion just north of the Key Route Mole where the bridge ends and a fill will begin.

Defects Found in Reflector Buttons

(Continued from page 7)

be noted that some of the buttons lose visibility very rapidly beyond an angle of incidence of 30°; the $\frac{3}{8}$ " and 1" size of one button falling off rapidly from the start; whereas, in the case of four of the buttons the intensity is greater at an angle of incidence of 25° to 35° than the intensity of reflection in a normal position.

Figure 3 shows a cross-section of two standard type buttons.

Construction of Buttons

Reflector buttons differ widely in their characteristics, therefore a short description may be of interest.

The ones included in the test may be classified in one of two general types:

- 1—Those in which the reflector and lens are separate and held in proper relation by a metal housing.
- 2—Those in which the reflecting medium is applied to the rear surface of the lens by plating.

The latter method, for a uniform and durable product, involves a precision process which does not appear economically practicable in connection with the manufacture of a unit which must sell for 7 cents or less. If the plating is not well done, the expansion and contraction of the glass, caused by temperature changes, will loosen the reflecting plating and seriously impair the efficiency of the reflector button.

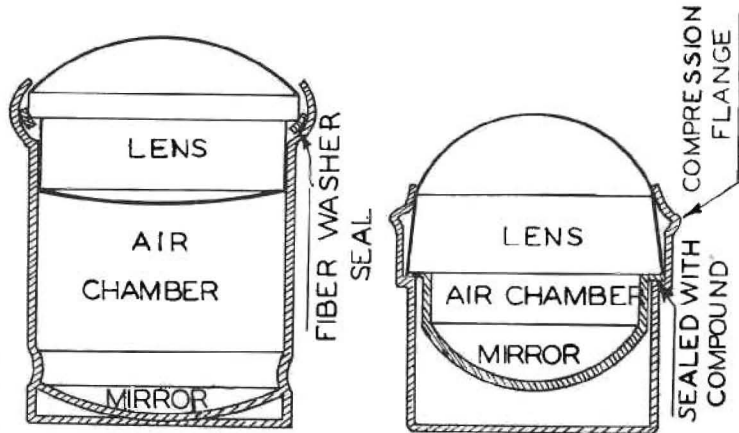
IMPORTANCE OF SEALING

With buttons of the first type, the mirror (of metal) is plated with either silver or chromium. Silver has a reflecting efficiency of 95 per cent as against 70 per cent for chromium, but silver, unless hermetically sealed, tarnishes more quickly than chromium.

The question of sealing is very important, not only to prevent tarnishing of the reflec-

tor surface but to keep out moisture which, entering with the warm air, precipitates, thereby fogging the reflector and rendering it almost useless.

In one type of button sealing is attained by a fiber or rubber washer under the lens. This washer may in time, if not very accurately and substantially constructed, oxidize and permit the air and moisture to enter the large



CROSS SECTION OF TWO
STANDARD TYPE BUTTONS

FIG. 3

chamber between the lens and the reflector, destroying the usefulness of the button.

LARGE LIFE INDICATED

In another type, the sealing media is a compound which resists oxidation and remains tacky at all normal atmospheric temperatures. The air chamber between the lens and reflector is very small and the reflector is so shaped and placed that it makes direct contact (through the sealing media) with the lens. There is a possibility that the useful life of this type of button will be materially greater than that of the first one described.

A comparison of the lenses in the different buttons indicates better workmanship in some than in others. This is to be expected as in some cases the buttons are manufactured by

(Continued on page 22)

Highway Funds For States in 1934 Will Total \$644,450,000

WHILE States are assuming increased financial responsibility for a larger mileage of highway construction and maintenance, the past year showed a decided slump in the funds furnished the State road departments for this work, and the amounts for 1933 and 1934 will again decline, W. C. Markham, Executive Secretary of the American Association of State Highway Officials pointed out in his report at its annual meeting held recently in Milwaukee.

It is estimated that the total State funds for this year will reach little over \$485,725,000 and for next year about \$448,700,000.

FIFTY PER CENT LESS

Adding to this all remaining portions of regular Federal aid and emergency Federal funds, plus one-half of the \$400,000,000 Federal funds available under the NRA, the total available to States for roads in 1933 is put at \$721,400,000. Next year's total for highway purposes is placed at slightly more than \$644,450,000—almost 50 per cent decrease in funds in about two years.

Mr. Markham noted with disapproval the tendency of State Legislatures to divert highway funds to other purposes, mostly for unemployment relief. More than \$200,000,000 of motor license fees and gasoline tax receipts have been thus far transferred this year, Mr. Markham said.

APPROVED BY CONGRESS

"The very fact that Congress in passing the Recovery Act provided \$400,000,000 to be spent on highways is clear evidence that it recognized road work as a quick and economic method of aiding the unemployed," he added. "Yet protestors have declared in and out of legislative halls that we are overbuilt in dependable highways and had better use our public funds in other directions."

The total mileage on the State road systems in this country is now about 373,000,000 miles—almost 21,000 miles having been added during the past calendar year. The surfaced mileage on this system was increased almost 23,000 miles during this time. Thus, according to Mr. Markham, the surfaced mileage has hardly more than kept pace with the mileage added to the systems. About 25 per cent is still unimproved.

\$253,850,000 SHRINKAGE OF HIGHWAY FUNDS FOR STATES IN PERIOD OF TWO YEARS

Total highway funds available to the States from all sources, including Federal aid in 1933.....	\$721,400,000
Total funds available in 1934.....	644,450,000
Decrease for 1934.....	\$76,950,000
Total funds from States' sources available for highway purposes in 1933.....	\$485,725,000
Total State funds for 1934.....	448,700,000
Decrease for 1934.....	\$37,025,000
Total available funds for State highway departments in 1931.....	\$898,317,794
Decrease in two years of nearly 50 per cent.....	\$253,850,000

COLOR SCHEMES ADOPTED FOR 1934 LICENSE PLATES

Color schemes of 1934 licenses will change in 34 States. California plates will be black on orange, the reverse of 1933. The only other change in the 1934 plates will be the name "California" across the top instead of the bottom.

Issuance of 1934 California numbers will start Tuesday, January 2, at offices of the Division of Motor Vehicles, and to out-of-State motorists and members, through automobile clubs.

Survey of 1934 plate colors discloses that California and 13 other States and the District of Columbia will retain 1933 color schemes, reversing them as to background and lettering.

White on black will be used in six States, Florida, Minnesota, Mississippi, Missouri, Rhode Island, and Virginia. Black on yellow will be used in Idaho, Michigan, Oklahoma, West Virginia, and District of Columbia. Black on orange, yellow on black, and white on blue will each be used in four States. Beyond these standard colors will be a wide variety of hues, such as old gold on blue in Delaware; yellow on blue in Iowa; black on aluminum in Utah; green on white in Washington and white on wine in Wyoming.

Alaska will use plates with white letters and numerals on a green background. The Canal Zone will use white on blue, as will Hawaii. The Philippines will have white on apple green and Porto Rico yellow on black.

Road building produced nearly 10 per cent of the railroads' entire tonnage in 1932. *Public Roads* points out that, in addition to materials such as sand, gravel, broken stone, slag, cement and steel, construction equipment bulks large, the combined tonnage furnishing the carriers 60,000,000 tons of revenue freight annually.

Girl (to tiresome suitor at 3 a.m.)—I think I'll name my car after you.

Suitor—Thanks for the compliment; it's a swell-looking car.

Girl—Yes, but it's so difficult to get it going in the morning.

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EXTENDING OUR SUBURBS

The completion of the new Ridge Alternate Highway cutting the old road from Los Angeles to the San Joaquin Valley nine miles in distance and an hour in time, forms



a link between these points of far greater importance and value to southern California even than appears at first sight. It will, of course, prove itself a great convenience to the motorist

traveling for pleasure or making a quick business trip, and such light traffic will undoubtedly form its most prominent feature. But from the practical transportation standpoint it fills a more general need than this.

Though not so immediately apparent the new Ridge Highway will confer a marked benefit on land in the lower San Joaquin Valley, since the worth of agricultural lands depends to a considerable extent on their proximity to metropolitan markets. Putting it briefly, it brings these lands closer to Los Angeles and thereby adds suburban advantages to an agricultural area. This shorter and easier route has brought the lower San Joaquin Valley as close, in point of time, to Los Angeles as were lands only fifteen miles out in the dirt-road and horse-and-wagon days. The value of the valley lands is correspondingly and proportionately enhanced.

Los Angeles retailers and consumers will benefit to the same extent by the larger amount of foodstuffs that can more economically be brought to market here through the facilities afforded by this new trade artery—and that will prove the most useful purpose of the Ridge Alternate Highway.

—Los Angeles Times.

Road Beautification Programs Urged by MacDonald in Speech

IN HIS discussion of the highway recovery program at the recent convention of the American Association of State Highway Officials, Thomas H. MacDonald, Chief of the Bureau of Public Roads of the U. S. Department of Agriculture, spoke as follows on the importance of roadside beautification:

“There is yet another field in which a large support and assistance is available in every part of the country. This 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, particularly now since this type of work can be used to advantage in providing employment that reaches rather different classes than normal highway operations.

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. The highway departments have been called upon to submit projects for roadside improvement on a reasonable mileage. A few miles in each State will not be considered a reasonable mileage of such work. It is hoped, with the cooperation of the States, that work of this character will be sufficiently extensive to accomplish an adequate demonstration of the tangible benefits to be derived from roadside improvement, to indicate the methods most appropriate for doing work of this character, and to establish the basis for an organization in each highway department which can carry forward continuously work of this character.

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. Already provision has been made for extensive work of this character in one or two States through the use of work relief labor.

Snow Removal Operations Described

(Continued from page 4)

particular road. It is our feeling that providing this parking space is the distinct problem of those promoting such snow sports, and their responsibility is indeed a real one.

Most of the snowfall is above the 2000-foot elevation, but an occasional freak storm descends to lower altitudes. At such times all available maintenance blade equipment must be pressed into service. A considerable portion of the mileage cleared is above the 5,000-foot elevation, and it is on these sections that difficulties are encountered and the major expense incurred.

This is particularly true on U. S. 40, between Auburn and Truckee; the Crestline Road, State Route 43, east of San Bernardino; and State Route 23, between Bishop and Bridgeport. Snow is removed on these roads at elevations in excess of 7000 feet and, due to the lack of forestation, drifting constitutes one of the main difficulties. Miles of snow fence are required, but its effectiveness is continually impaired by the vagaries of the wind currents, side-hill cuts over deep canyons being particularly bothersome.

CREWS KEPT ON DUTY

One or two light storms are expected any time after October 15, with the first heavy snowfall coming about a month later. Normally, the crews must be kept organized and all equipment held available until March 15. After that date, there will be occasional storms of short duration. Most of the equipment is then available to open up roads allowed to close over the winter.

Early in the snow removal work in California, it was realized that successful snow removal at the higher elevations depended on proper equipment, adequate shop facilities, and comfortable living quarters. Every winter season, storms of several days' duration may be expected. Equipment must be in operation practically continuously from the start of the storm until it ceases and the road is clear. Any delay on account of breakdown or insufficient equipment makes it more difficult to keep an open road.

The continuous operation in bucking snow under low temperature conditions is a severe strain on equipment, and, in order to properly service it and make necessary repairs, well heated quarters and complete shop equipment and facilities are provided in the heavy snow areas. Likewise, an eight-hour trick at the wheel of a truck plowing snow is a strain on a man, and warm, comfortable quarters, with facilities for serving hot meals at any hour of the day or night, are provided at such locations.

FOUR DONNER STATIONS

On the Donner Summit route, there are four maintenance stations which serve as headquarters: One at Colfax, from which equipment normally operates to Baxter's; one at Yuba Pass, three miles east of Emigrant Gap, which serves the section from Baxter's to about nine miles east of Yuba Pass; one at Donner Summit, which covers the section to the east of Don-

ner Lake; and one at Truckee out of which the equipment is operated east to the State line, south to Tahoe City, and this year will take care of the new secondary road to Hobart Mills. The equipment is shifted as the need develops.

The plan of operation is as follows: With the start of a storm, the one-way push plows, which are mounted on 3½ to 5-ton four-wheel drive trucks, are on the road pushing the snow into a windrow at the side of the pavement. A rotary plow is put in operation as soon as sufficient snow has been bladed to the side and the windrowed snow is thrown clear.

As the snow accumulates into a high bank alongside the roadway, it is necessary to use a slicer bar mounted on the side of a truck to slope back the bank. The snow brought in with the slicer bar is then thrown clear by the rotary equipment. At the expiration of a storm, icy sections are sanded as an added safeguard to traffic.

OPERATIONS VARIED

The plan of operation must be varied somewhat for each route as conditions are different in each locality. On the Pacific highway, the snowfall is not extreme but there is usually considerable drifting. On the Susanville lateral there is a fairly heavy fall, but much of the road is protected by timber and the drifting is limited thereby. On the road between Bishop and the State line there is a considerable mileage at about 8000-foot elevation. The snowfall is not extremely heavy but the snow is dry and, with a strong wind, the road drifts full in a few minutes.

It was found last season that on this particular route, push plows of the "V" type would serve to better advantage as they can be operated at higher speed and break through drifted snow more easily than the one-way speed plows, although they are not so effective for widening operations.

Plans are made to work the crews on an 8-hour basis, although in emergencies it is sometimes necessary to extend the day's work to 12 hours.

PLOWES OF ALL TYPES

The State now has 170 snow plows of various types with a few more in transit. These plows are of all types, from the light "V" plows on motor graders, light one-way push plows for 2-ton trucks, one-way and "V" plows for 3½- to 5-ton trucks, tractor push plows, tractor rotary plows, and truck rotary plows.

The truck rotary plows are of four types, as follows: One consists of a regular "V" type plow augmented by revolving wheel equipped with small buckets, the wheel being mounted on a movable arm, which may be moved back and forth or up and down in front of the truck at the will of the operator. On the other type, the revolving blades are on a shaft fixed to the "V" plow and simply throw the snow as the "V" pushes it to the side. This equipment may be removed and the trucks made available for other work.

The third or auger blower type consists of two long augers mounted parallel to the road surface. The revolving augers break up the snow and throw, rather than blow, it to the side through a chute. The fourth type is a large diameter wheel with several

(Continued on page 24)

Highway Replacement in U. S. Figured at 44,400 Miles Yearly

THERE are 3,040,000 miles of highways in the United States, and of that total only 868,000 miles have been improved with macadam, concrete, asphalt, oil or brick. The remaining 2,172,000 miles are still in unsurfaced dirt.

It has been the practice during the past few years under the government's federal aid policy to add approximately 15,000 miles of hard surfaced roads each year.

At that rate, with no replacements considered, it would require nearly 150 years to get the country out of the mud.

TWENTY YEARS LIFE

But the average life of the 868,000 miles now improved is only about 20 years, which means that 5 per cent, or 44,400 miles, must be replaced every year. We would be therefore, at a 15,000 mile annual rate of construction, losing 29,400 miles of improved highways every 12 months, considering the loss over a 20 year period. To be more exact, at the end of 20 years we should have lost 568,000 miles.

To make headway, then, against the huge unimproved total of 2,172,000 miles, we must build in addition to the basic program next year 44,400 miles and each year thereafter 5 per cent of the mileage which is then improved.

3,000,000 FARMS HANDICAPPED

The replacement program must go on steadily. Permanent improved highways have come to be more essential even than the railroads, and their importance grows with each succeeding year. There are still 3,000,000 farms in the United States which are served only by dirt roads and are operating, therefore, against a handicap with relation to the more fortunately situated.

The highways are the people's own immediate means of transportation. They are being constructed at no cost to government, paid for in excise taxes by those who use them. There is no such thing as "overbuilding."—*Arizona Highways*.

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

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

New Bascule Bridge at Knights Landing Officially Dedicated

FOLLOWING formal dedicatory exercises on Saturday, December 2, participated in by State and county officials, the counties of Yolo and Sutter were linked by a splendid new bridge of the bascule type at Knights Landing, picturesque Sacramento River town, of Yolo County.

Deputy Director of Public Works Eric Cullenward, representing Governor James Rolph, Jr., severed the ribbon with the assistance of three charming young ladies who had been named to represent the community of Knights Landing and the two counties.

The bridge designed by the district engineer, Edward Von Geldern of Yuba City, was built by Contractors Rocca and Caletti of San Rafael. It represents the second unit of the Yuba City-Woodland highway to be completed by Joint Highway District No. 12. The first unit, the road between Yuba City and Robbins, was dedicated by Governor Rolph on October 24, 1931. The highway is now a part of the State secondary system.

More than 1500 people from all parts of Sacramento Valley were in attendance at the bridge rites, which were made more colorful by spectacular airplane feats, including two flights by Dan Best, Woodland aviator, under the new bridge; band concerts by the Marysville municipal band and Woodland high school band; a baseball game and the arrival by speed boat of Santa Claus cleverly impersonated by Robert G. Alderman, Secretary-manager of the Woodland Chamber of Commerce.

The program was under the auspices of the Knights Landing Lions Club, assisted by the Woodland and Sutter-Yuba Chambers of Commerce. Visiting State officials made the trip from Sacramento on Mr. Von Geldern's large motor yacht. The party included Deputy Director Eric Cullenward; John W. Howe, secretary of the California Highway Commission; District Engineer Charles H. Whitmore; Fred W. Panhorst and Stewart Mitchell, bridge engineers of the Department of Public Works; Judge Arthur Coates of Yuba City; Lloyd Hewitt, attorney for the joint highway district.

BRIDGE COST \$137,000

The Knights Landing bridge replaces as a highway unit an old, narrow railroad bridge that afforded scant accommodations for high-



CLOSING TO OPEN for traffic a new highway crossing of the Sacramento River at Knights Landing, the recently finished bascule bridge built by Joint Highway District No. 12, was caught by the camera just as the official dedication ceremony ended.



BEHIND THE BARRIER, ready to cut the ribbon and declare the bridge open to the public stands Eric Cullenward, Deputy Director of Public Works, representing Governor James Rolph, Jr., with other officials and three comely maidens chosen as queens for the festal ceremonies. In the group (left to right) are Edward Von Geldern, district engineer and designer of the bridge; Miss Sutter (Betty Saunders); Editor A. A. McMullen of Yuba City; Miss Knights Landing (Preble Berger); Eric Cullenward; Miss Yolo (Harriett Huston); Acting State Bridge Engineer F. W. Panhorst; Contractor Carlos Galetti; Secretary J. W. Howe of the California Highway Commission and Chairman W. O. Russell of the Yolo County Supervisors.

way traffic. The new span cost approximately \$137,000, while the entire improvement project, including the Sutter By-Pass causeway, cost \$900,000. Of this amount the State will

have contributed \$350,000, Sutter County \$450,000 and Yolo County \$100,000. With the exception of half of the new bridge, the whole project lies in Sutter County.

Road Tests Check with Laboratory

(Continued from page 16)

expert and experienced manufacturers of this type of equipment.

Most of the buttons examined were held in place by pressure from the rear of the sign, thereby involving some expense and difficulty in maintaining them in a proper position.

VARIOUS ANCHORING METHODS

Two of the buttons examined are pushed through from the front until a flange comes in contact with the face of the sign. This locates the button accurately. Anchoring is accomplished by means of a spring and locking retainer installed from the rear, leaving the button dependent for support solely on the metal plate of the sign.

In one of the buttons of this latter type, the locking is by a horseshoe collar which, to withstand vibration, must fit tightly, and consequently is not quickly installed. Another button of the same type has a neat arrangement, employing a slotted ring which, when turned through 90°, is forced by the spring into contact with fins projecting from the button sleeve. Locking is absolute and can be released only by compressing the spring to the point where the ring can be rotated past the fins. This type of button can be readily installed or removed.

LABORATORY TEST CHECKED

After making the laboratory tests on the different types of buttons and ascertaining that one button was apparently superior to another, a number of buttons of the apparently superior type were secured and placed in two letters of a sign close to Sacramento, replacing the buttons of the type making up the directional sign as originally constructed.

The difference in reflecting value was readily apparent to the eye, thus checking the laboratory tests.

A further study of the sign indicated that further investigation as to size, shape and space of the letters, the location of the reflector buttons therein and reflection from the face of the sign itself might be advantageously undertaken.

TESTS FOR DURABILITY

In order to determine the relative resistance of the buttons to deterioration from

weathering in the field, laboratory tests were made on a number of the buttons by placing them in a wire basket, lowering into a bath of hot water maintained at a temperature of 135°, allowing them to remain in the bath 5 minutes, or longer if any air bubbles continued to rise, removing the basket from the hot water and immediately lowering it into a bath of ice water to which a quantity of red ink had been added as a coloring media. The buttons were allowed to remain in the ice water for 5 minutes.

The hot bath expands the air within the button, and if leakage is possible, forces out a part. The immersion in the cold bath contracts the air, and the pressure without, if there is any leakage, forces the ink-colored water into the space between the glass portion of the button and the reflector back.

The buttons were then examined by holding under the surface of clear water. Any pinkish tinge resulting from leakage was readily discernible.

WHITE TRAFFIC LINE CALLED

BLESSED FRIEND OF SAFETY

On one of those pitch dark, rainy nights when the headlights' brightest efforts seem feeble, when passing a truck becomes a task of careful engineering, when nervous drivers crawl along fairly hugging the center lane, then do we bless one friend of safety—that reliable, reassuring, white guide line marching steadily beside us down the highway.

And in the city—as the Chicago traffic officer at one of Jackson Boulevard's busiest intersections once said, "That white line there at the corner does pretty near as good a job as I do!"

On city street and country highway, guarding curves and corners and crossings, keeping lanes clear, expediting safe traffic flow, the pavement traffic marker does a good, efficient job of policing—*Highway Magazine*.

PROOF

Owner of Car (to prospective purchaser): "And to show you the speed I've got out of her—here are the sunnouses."

SOUND YOUR J'S

Tourist: "I stopped over in San Juan and"—

Old Resident: "Pardon me, but you should say San Juan. In California we pronounce our J's like H's."

Tourist: "Well, you'll have to give me time. You see, I've been in the State only through Hune and Huly."—*Motor Land*.



Continued progress in the refinancing of irrigation districts is noted in the monthly report of State Engineer Hyatt with particular reference to the authorized refunding of \$16,190,000 of the Merced District bonds. Rights of way are being secured for units of the Federal-State program for permanent bank protection on sections of the Sacramento Flood Control Project and radio transmitters are being installed at gaging stations on the American and Yuba rivers to send flood warnings to Sacramento. Other news of the department's activities are contained in the report which follows:

IRRIGATION DISTRICTS

Petition has been filed with the supervisors of Modoc County for the organization of an irrigation district on the south fork of the Pit River. The proposed district contains about 12,000 acres lying between Likely and Alturas.

The Big Valley Irrigation District, containing 12,400 acres located in Lassen and Modoc counties, is preparing to construct a storage dam on Pit River at Allen Camp. The district, which has been inactive since its organization in 1925, expects to obtain funds from the P. W. A. for financing the work.

The Pacheco Pass Water District, in San Benito County, has prepared plans and estimates in support of an application to the P. W. A. for funds to construct a storage dam and other works on Pacheco Creek. The works to be constructed are estimated to cost about \$250,000.

The California Districts Securities Commission approved a plan submitted by resolution of the directors of the Merced Irrigation District for refunding the district's outstanding bond issues amounting to \$16,190,000.

The calling of a bond election by the directors of the West Stanislaus Irrigation District for an issue of \$250,000 in bonds was approved.

FLOOD CONTROL AND RECLAMATION

Sacramento Flood Control Project—Bank Protection.

Right of ways have been secured for the units of work to be undertaken immediately on the State-Federal cooperative program for permanent bank protection. This includes work on the Sacramento River in Districts 1500, 108, 2047 and Glenn County

Levee District No. 3. At the request of trustees, an examination was made on the left bank of the Sacramento River in Reclamation District No. 535 to determine the need for bank protection work. It was determined that the conditions along this district are not sufficiently serious to require immediate protection.

The new flood control project levee on the left bank of the Feather River from the Bear River to Starr Bend has been completed by the War Department, and in order to make use of the additional flow area provided the old river levees are to be cut in several places. A part of this work was done last season, and work is now under way at one point where the levee is being reduced in height with teams and scrapers, so that a breach will be formed at high water allowing the flood water to occupy the new channel between the old and new levees.

Pajaro River.

The work of clearing the channel of the Pajaro River, under contract with L. C. Karstedt of Watsonville has proceeded during this period, and approximately five miles of channel have been cleared to date, on three miles of which the brush has been raked and burned. The total contract covers seven miles of work.

Arrangements have been completed for the installation of radio transmitters at the gaging stations at Coloma on the south fork of the American River, at Rattlesnake Bridge on the north and middle forks of the American River near Auburn, and at Smartsville on the Yuba River for the purpose of promptly transmitting flood warnings. The receiver will be installed in the Sacramento office. This system of radio transmission of water stages has been devised and the installations are being made by Irving Ingerson, an engineer of this division.

WATER RIGHTS

Among the more important applications received to appropriate water were two by Pacheco Pass Water District of Hollister, seeking appropriations from Dos Picachos Creek and North and South Forks of Pacheco Creek tributaries of Pajaro River in San Benito County at an estimated cost of \$200,000; an application by Big Valley Irrigation District to appropriate from Pit River for the irrigation of 12,430 acres in Modoc County at an estimated cost of \$251,000; and an application by George F. Cuthbert of Los Angeles seeking to appropriate 80 cubic feet per second from the South Fork of Merced River for power purposes at an estimated cost of \$6,000.

During the month a permit was issued to Bennie Kimsey of Salyer, California, allowing 50 cubic feet per second from Spike Creek, Bee Tree Creek, Big

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Season's Field Work Completed on Delta Salinity Conditions

(Continued from page 23)

Lake, Ammon Creek, White Sides and Bear Trap Creek in Humboldt County for mining purposes at an estimated cost of \$50,000.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

The field work on this project for the 1933 season comprising measurements of the stream flow, diversions, and return flow throughout the Sacramento-San Joaquin territory, and salinity in the delta, has been completed.

At the time of discontinuance of field work on November 1st, the Sacramento River at Sacramento was flowing about 4000 second-feet and the San Joaquin River near Vernalis about 1500 second-feet. The salinity at various upper bay and delta stations at the time the sampling at all stations was stopped, is shown in the following:

Salinity at Upper Bay and Delta Stations in Parts of Chlorine per 100,000

Station	October 30, 1933
Point Orient	1,760
Bullshhead	1,220
Bay Point	720
O. and A. Ferry	600
Collinsville	360
Emmaton	162
Three Mile Slough	101
Rio Vista	7
Antioch	370
Central Landing	8
Middle River	11

DAMS

The usual activities, consisting of regular and continuous supervision over the maintenance and operation of the dams under jurisdiction and the inspection of repair work under way has been carried on during the month, except that in addition, during the last month it has been necessary to complete inspections on structures in the higher altitudes which will shortly be closed to travel for the winter. A review of these inspections indicates that in general the mountain dams are in satisfactory condition and should safely pass the coming run-off season. Very few repairs remain to be completed on these structures.

Said the tourist with a stricken automobile to the farmer, apparently of foreign extraction: "Say, have you got a monkeyrench?"

The farmer gaped at him.

"Naw; I got no monkeyrench. My brother Nels, two mile opp de road, he got cattlerench; my brother Ole, one mile down de road, he got sheeprench, but it ban too tamm cold for monkeyrench, mister!"

Snow Removal Work for 1932-33 Season Cost Stated \$312,000

(Continued from page 19)

fixed blades. The outfit is mounted on the rear of the truck, which is operated backward into the snow-drift. This plow is on the principle of railroad rotary plows.

ROTARIES ON HEAVY WORK

There is also the widening rotary, which is mounted on a trailer unit, having an independent power plant to operate the blade rotary. The rotary is mounted at the front of the trailer and can be swung in an arc to operate either side of center.

Rotary type plows are operated in areas of either heavy snowfall or where drift conditions are prevalent. The heavy "V" and push plows, straight or reversible, are usually used in conjunction with the rotaries, handling the storm until all available storage space is exhausted. The lighter push plows are operated at the lower elevations where the snowfall is light and does not pack on the ground for any long period. Where drift conditions are absent, often a light truck-mounted plow with side-wing attachment will handle snow areas where the season's fall does not exceed six feet.

SPECIAL FENCES DESIGNED

In addition to the removal work, a considerable amount of snow fence has been installed. Some of this fence is of our own design patterned after that used by railroad companies and installed permanently in place. Most of the fencing is of the lath type, however, as it is cheaper to install, easier to move, and, in the main, is more effective. In some cases, considerable experiment is necessary to determine the proper location for this fence to insure the desired protection to the roadway.

The cost of snow removal per mile of road is reduced by the use of proper equipment. It is difficult to compare one season with another exactly, as the amount of snowfall, duration of storms, wind, and similar conditions have a bearing. During the 1931-32 season, the average cost of the work on 2480 miles of road was \$124 per mile. During the 1932-33 season, the average cost per mile was \$104 on 3000 miles of road. The snowfall on these roads ranged from 48 inches to 533 inches for the season. The cost of snow removal for the entire system for the 1932-33 season was \$312,000, distributed as follows:

Materials and supplies	18.8%
Service and expense	9.0%
Salaries and wages	36.6%
Equipment rental	35.6%

The equipment is all owned by the State, but is charged to the work on the basis of a rental rate per shift or month as the case may be. This rate is established by the equipment department and covers depreciation and upkeep but no operating charges.

Snow removal presupposes that the roadway is improved so that traffic will have no difficulty once the road is open. Likewise, it is necessary, that the road alignment and surface shall be favorable for the operation of equipment.

Ray: "Where do the jellyfish get their jelly?"

Partay: "From the ocean currents, I guess."



WRIST WORK ON BAY BRIDGE—Director Earl Lee Kelly is here seen putting some real muscular effort into the job of building the San Francisco-Oakland Bay Bridge. The pile of documents surrounding him are bridge bonds, each of \$1,000 denomination. There are six thousand of them and he had to write his signature on every one. Figure the number of pen strokes and the time and energy required to complete the job.

PUTTING our "John Henry" on one \$1,000 bond would be quite an adventure for most of us.

But it is just a pain in the wrist for Earl Lee Kelly, State Director of Public Works, who is confronted with the ask of putting his signature on six thousand bonds, each of a denomination of \$1,000, for the California Toll Bridge Authority, and he must achieve this signature endurance contest by the middle of December.

FUNDS FOR BRIDGE

Whenever the San Francisco-Oakland Bay Bridge Division of the Department of Public Works, of which Mr. Kelly is Director, wants more money for contractors, he is called upon to sign bonds for the necessary amount, which are then sold to the Reconstruction Finance Corporation.

In other words, no bonds signed—no money for the San Francisco-Oakland Bay Bridge, so Director Kelly in the midst of his duties, which take him from San Diego to Eureka, must trace his full name on thousands of bonds so that men can keep on working and contractors can pay their bills and the San Fran-

cisco-Oakland Bay Bridge can progress toward completion.

Ordinary signature jobs are achieved by means of a signing machine by which a man may sign as many as six signatures with one flourish of the pen.

MANUAL LABOR

The California Toll Bridge Authority bonds are not of the modest dimensions which would fit in any such machine. Whether by malice aforethought or to produce a more impressive indenture, the Authority bonds are large engraved scrolls which require individual treatment. So, the Director had to sign each one separately and it must be removed and another placed before him.

Governor Rolph, Chairman of the California Toll Bridge Authority, is considering Director Kelly's dilemma with amusement because the Governor's signature is engraved into a copper plate in facsimile and lithographed on the bonds.

Mrs. Moriarity: "I'm sorry for Mrs. O'Brien. It's tough to be left a widow with two children."

Mrs. Fogarty: "Sure, it is, Mrs. Moriarity—but she knew he was a pedestrian when she married him."

New San Gabriel River Bridge an Example of Construction Economy

By H. D. STOVER, Designing Engineer of Bridges

THE NEW San Gabriel River Bridge, very recently completed under State contract and opened to traffic, is located in Los Angeles County on State Highway No. 26, locally known as the Garvey Avenue-Holt Route, between the cities of Los Angeles and Pomona.

In a comparatively short course between the nearby mountains and the sea the San Gabriel River has developed into a broad, raging stream during flood periods with a record of widespread damage and destruction. To meet these conditions the new bridge has been given a total length of 964 feet with a 44-foot roadway flanked by 3-foot sidewalks.

A MAJOR STRUCTURE

At first observation of the accompanying photographs one would get the impression that the bridge consists of a series of comparatively short span openings and being elevated so little above the ground line, that it is a minor structure. However, due to the extreme length and the difficulties of bridging this stream, it is a major structure as far as bridges on State highways are considered. Although there is nothing spectacular in its construction, the bridge has several unusual and interesting features.

Comparative estimates indicated that a continuous concrete rigid frame structure would meet all the requirements. Fourteen 65-foot spans were chosen with 27-foot cantilever approaches at each end which rest on footings constructed on the approach fills, thus eliminating expensive end abutments. The piers are skewed at 27°.

In order to avoid complications resulting from this skew, the bridge was built in two symmetrically independent halves. No further consideration was given in the design to stresses which may be developed in a skewed concrete structure.

PIERS SUNK TWENTY-FIVE FEET

San Gabriel River is known to have scoured to a depth of 15 feet at piers of an existing bridge within half a mile of this site. Since even small settlement of piers would be disastrous for a rigid frame con-

tinuous type, these piers were carried 25 feet below the ground surface where coarse sand was encountered and test loading indicated that four tons per square foot could be safely obtained. The actual maximum calculated pressure, however, is only three tons per square foot on the foundation material. Carrying foundations to this depth below stream channel made it possible to omit the use of foundation piling.

Upon examination of the structure one will note that in its entire length there are only four expansion joints located 195 feet apart. The girders are continuous over three piers with a joint coming at the quarter point of the span. Due to the flexibility of the slender piers, which are built monolithic with the girders, the girders were considered as continuous beams.

In order to develop negative moment over the piers an inverted tee beam was provided by placing haunch slabs at the bottoms of the girders and extending 11 feet each side of the piers.

FALSEWORK DESIGNED

To prevent settlement of forms during the placing of concrete, the design of the falsework was furnished in the contract drawings, which proved to be a very satisfactory method and resulted in securing a completed job without any appreciable settlement during construction.

On account of considerable duplication in constructing spans of the same length as well as simplicity in form construction, the State secured extremely low bids on concrete in this structure, which included \$8.12 Portland cement Concrete Class "A" (footing blocks) and \$12 concrete for the remainder of the structure. These prices were undoubtedly lowered somewhat due to the extremely low prices of aggregate at the time these bids were taken.

In any event, the bid price of \$109,101 for this project resulted in securing a permanent type of structure which cost only \$2.40 per square foot of roadway surface, which is probably the cheapest bridge of this type ever constructed on the State highway. The

Bridge Has 65-foot Concrete Spans



UNUSUAL FEATURES in concrete rigid frame construction are embodied in the new San Gabriel Bridge which has only four expansion joints in its entire length of 964 feet.



PLENTY OF ROAD ROOM is afforded for heavy traffic that will use this bridge. The roadway has a clear width of 44 feet and three foot sidewalks are provided for pedestrians.



NEARBY MOUNTAINS looming in the background send down raging waters in flood periods that necessitated sinking the bridge piers to a depth of 25 feet.

bridge was designed by John Chernow of the Bridge Department, and construction was supervised by Engineer Tom Ferneau.

Salesman: "Did you like that cigar I gave you? For 500 coupons of that brand you get a banjo."

Clerk: "If I smoked 500 of those cigars, I'd need a harp."

November Contracts Total \$5,151,100 Providing Jobs for 3,765 More Men

WITH THE PASSING of November the National Recovery Program is forging ahead in California at an unslackened pace. The Department of Public Works, through the Division of Highways, set in motion State highway work amounting to \$5,151,100 between November 1st and December 1st.

This five million dollars means work for approximately 3765 men on State roads and bridges and it likewise means thousands of additional jobs in the plants furnishing materials and supplies and in the transportation companies through which such materials are shipped.

MAJOR RECOVERY FACTOR

The Division of Highways has extended every effort to advance its program of State highway work to the point of construction and each month sees additional thousands of Californians put to work on the projects included in the program. That the expenditure of these millions of State and Federal funds for construction is being felt by all industries throughout the State is fast becoming evident and the continued prosecution of the division's program will undoubtedly prove to be a major factor in economic recovery throughout California.

In the period between October 27th and November 24th, construction and maintenance work orders were issued in the sum of \$3,164,500. This sum meant jobs for many more Californians on work which had been already started or would be started within the next few days.

ONE HUNDRED TWENTY-FOUR GOING CONTRACTS

On November 23d, the Department of Public Works had 124 going contracts for highway construction in force, consisting of 94 road construction contracts and 30 contracts for the construction of bridges and grade separations.

In addition to the above, there are now published advertisements for projects estimated to cost \$2,586,300, bringing the total expenditures for work authorized, work pending and work advertised during the period from October 28th to November 24th to \$5,750,700.

These figures, added to the work put under way between August 25th and October 27th, brought the total cost of work inaugurated since the beginning of the Division of Highways construction drive to \$16,000,000.

The following tabulation sets forth the detail of the November progress in getting State highway work under way in California:

	Federal funds	State funds	Total	Men
Construction awards	\$1,293,100	\$1,394,400	\$2,687,500	1,825
Maintenance		675,000	675,000	550
Minor improvements		16,900	16,900	15
Miscellaneous projects		52,800	52,800	45
Maintenance contracts		20,400	20,400	20
Projects advertised	924,600	773,900	1,698,500	1,300
Totals	\$2,217,700	\$2,933,400	\$5,151,100	3,765

The following segregation gives the types of work and mileage of construction included in the major contract awards in the first item listed above:

CONTRACTS AWARDED

Type	Miles	Amount	No. of men
Pavement	14.0	\$719,300	600
Bituminous treated crushed gravel or stone surface	19.4	414,200	345
Graded roadbed	62.9	1,419,500	765
Shoulder treatment	36.1	77,100	65
Bridges (9)		57,400	50
Totals	132.4	\$2,687,500	1,825

The proportions of State and Federal funds are given in the following tabulation of the awards by types:

Type	Federal funds	State funds
Pavement	\$622,700	\$96,600
Bituminous treated crushed gravel or stone surface	309,400	104,800
Graded roadbed	321,400	1,098,100
Shoulders, treatment, seal coat, etc.		77,100
Bridges	39,600	17,800
Totals	\$1,293,100	\$1,394,400

Similar analysis of the projects advertised during November are made in the tabulations given below:

PROJECTS ADVERTISED

Type	Miles	Amount	No. of men
Pavement	10.8	\$699,500	585
Bituminous treated crushed gravel or stone surface	20.9	294,100	245
Crushed gravel or stone surface	0.8	33,900	30
Graded roadbed	5.4	293,500	245
Rock wall shore protection (Bay Bridge)	4.1	288,400	120
Bridges (3)		89,100	75
Totals	42.0	\$1,698,500	1,300

Supplementary to the above tabulations are given the bids opened and contracts awarded on the larger projects:

Bids and Awards for November

ALAMEDA AND CONTRA COSTA COUNTIES—Between Ashby Avenue and Potrero Avenue in Berkeley, Albany and El Cerrito, about 5 miles to be paved with asphalt concrete. District IV, Route 14, Section A. Heafey-Moore Co., Oakland, \$87,654; Southern California Roads Co., Los Angeles, \$105,404; Eaton & Smith, San Francisco, \$117,903. Contract awarded to Peninsula Paving Co., San Francisco, \$74,907.

BUTTE COUNTY—Reinforced concrete slab bridge across Pine Creek about 13 miles north of Chico consisting of six 31-ft. spans on concrete piers with steel pile foundations and concrete abutments with wing walls. District III, Route 3, Section D. E. T. Lesure, Oakland, \$18,286; M. B. McGowan, Inc., San Francisco, \$15,989; J. P. Brennan, Redding, \$15,122; Neves & Harp, Santa Clara, \$15,817; J. W. Terrell, Sacramento, \$16,892; J. W. Halterman, Willows, \$16,251; M. A. Jenkins, Sacramento, \$15,467. Contract awarded to Bodenhamer Construction Co., Oakland, \$14,585.

IUMBOLDT AND DEL NORTE COUNTIES—Furnishing and stockpiling screenings various locations. Dist. I, Rt. 1. E. B. Bishop, Sacramento, \$12,255; Smith Bros. Co., Eureka, \$12,341; Hein Bros., Basalt Rock Co., Petaluma, \$12,728. Contract awarded to Hemstreet & Bell, Marysville, \$11,094.

IMPERIAL COUNTY—Between Holtville and East Highline Canal, 6.9 miles oil treated gravel borders. District VIII, Route 27, Section D. R. E. Hazard Contracting Co., San Diego, \$24,690; Griffith Company, Los Angeles, \$26,575. Contract awarded to V. R. Dennis Const. Co., San Diego, \$21,520.

IMPERIAL COUNTY—Between El Centro and Calexico, 10.1 miles to be surfaced with bituminous treated gravel. District VIII, Route 26, Section J. E. G. Carroll, San Diego, \$56,220; V. R. Dennis Const. Co., San Diego, \$62,100; Griffith Company, Los Angeles, \$48,034. Contract awarded to R. E. Hazard Contracting Co., San Diego, \$36,997.

INYO COUNTY—Between Bishop and Owens River Canal, 3.5 miles to be graded and surfaced with selected material and bituminous treatment. District IX, Route 23, Section E. Southwest Paving Co., Los Angeles, \$30,428; Hemstreet & Bell, Marysville, \$26,367. Contract awarded to Basich Bros., Torrance, \$26,627.25.

KERN COUNTY—Between westerly boundary and 2.4 miles south of Maricopa, 8.7 miles to be graded. Dist. VI, Rt. 57, Sec. A. Larsen Bros., Sacramento, \$160,831; Fredrickson & Watson, Oakland, \$152,700; J. L. Conner & Kristich, San Juan Capistrano, \$194,467; George K. Thompson, Los Angeles, \$149,498; J. E. Haddock, Pasadena, \$158,496; C. G. Willis & Sons, Chas. G. Willis & Crew Bros., Los Angeles, \$154,228; Griffith Company, Los Angeles, \$143,065; Sharp & Fellows Contracting Co., Los Angeles, \$140,654; Macco Construction Co., Clearwater, \$143,065; Basich Brothers & John Jurkovich, Torrance, \$155,331; Gist & Bell, Arcadia, \$169,102; M. J. Bevanda, \$137,932; Hemstreet & Bell, Marysville, \$151,495; Gogo & Rados, Los Angeles, \$159,359; C. W. Wood, Stockton, \$155,880; Von der Hellen & Pierson, Castaic, \$155,560. Contract awarded to J. F. Knapp, Oakland, \$133,773.

LOS ANGELES AND KERN COUNTIES—Between Lancaster and Mojave, about 24.4 miles of roadbed to be widened and about 11.2 miles of earth shoulders to be oil treated. District VII, Route 23, Sections G, A, J. E. Haddock, Pasadena, \$47,997; Geo. K. Thompson, Los Angeles, \$48,019; Griffith Co., Los Angeles, \$51,684; Tiffany Construction Co., San Jose, \$52,746. Contract awarded to Dimmitt & Taylor, Los Angeles, \$45,617.

LOS ANGELES COUNTY—Between Sunland and Tujunga, about 1.6 miles to be graded and paved with asphalt concrete. District VII, Route 9, Section A. Mundo Engineering Co., Los Angeles, \$95,418; Griffith Co., Los Angeles, \$87,557. Contract awarded to P. J. Akmadzich, Los Angeles, \$86,970.

LOS ANGELES COUNTY—14.5 miles of shoulders, gutters and dykes to be treated with heavy fuel oil. District VII, Route 4, Sections A, G, H, I. Match Bros. & Geo. Gardner & Sons, Elsinore, \$11,995; Alex C. Chalmers & Max Winter, Jr., Los Angeles, \$12,237; Peter J. Akmadzich, Los Angeles, \$12,750; H. E. Cox & Son, Pasadena, \$14,587; Gogo & Rados,

Los Angeles, \$15,500. Contract awarded to Oilfields Truck Co., Bakersfield, \$11,240.

LOS ANGELES COUNTY—Between Foothill Boulevard and Alasta Avenue 0.6 mile graded and paved with asphalt concrete. District VII, Route 9, Section H. W. W. Hall Company, Alhambra, \$34,514; Griffith Company, Los Angeles, \$34,543; P. I. Akmadzich, Los Angeles, \$45,933. Contract awarded to Oswald Bros., Los Angeles, \$32,333.

MADERA COUNTY—Across Ash Slough near Chowchilla, timber bridge, thirty-four 19-ft. spans on pile bents. District VI, Route 4, Section C. Carl N. Swenson Co., San Jose, \$33,785; Neves and Harp, Santa Clara, \$37,876; J. P. Brennan, Redding, \$37,699; Lord & Bishop, Sacramento, \$37,447; J. F. Knapp, Oakland, \$35,240; M. B. McGowan, San Francisco, \$37,698; Stroud Bros. & Seabrook, Bakersfield, \$36,635; M. A. Jenkins, Sacramento, \$36,448. Contract awarded to F. O. Bohnett, Campbell, \$32,951.

MARIN COUNTY—Construction of maintenance station buildings near San Rafael. District IV, San Francisco Construction Company, Inc., San Francisco, \$6,931; Thos. J. Doyle, San Francisco, \$6,877. Contract awarded to Albert H. Seimer, San Anselmo, \$6,437.

MENDOCINO COUNTY—Bridge across Feliz Creek at Hopland, consisting of nine 38-ft. steel stringer spans with concrete deck on concrete pile bents. District IV, Route 1, Section L. M. B. McGowan, San Francisco, \$27,291; Lindgren & Swinerton, San Francisco, \$31,600; L. C. Seidel, Oakland, \$33,885; Rocca & Caletti, San Rafael, \$33,692; J. P. Brennan, Redding, \$29,846; Chas. Kuppinger, Lakeport, \$28,742; Fredrickson & Watson, Oakland, \$31,895; Smith Bros. Co., Eureka, \$38,140; Barrett & Hill, San Francisco, \$32,369; F. J. Maurer & Son, Eureka, \$28,975; Mercer-Fraser Co., Eureka, \$33,614; J. F. Knapp, Oakland, \$31,142. Contract awarded to A. T. Howe, Santa Rosa, \$26,428.

MERCED COUNTY—Between N. boundary and Livingston, 6.2 miles bituminous surfacing. District VI, Route 4, Section D. Willard-Biasotti & Covotti, Stockton, \$29,213; Stewart & Nuss, Inc., Fresno, \$28,992; A. Teichert & Son, Inc., Sacramento, \$30,606; Tiffany Const. Co., San Jose, \$27,840; Valley Paving, Fresno, \$23,230. Contract awarded to Granite Const. Co., Watsonville, \$25,857.

MONO COUNTY—Between Sherwin Hill Summit and Whisky Canyon, 3.7 miles to be graded, surfaced with bituminous treatment. District IX, Route 23, Section B. Basich Brothers, Torrance, \$64,257; Kennedy Const. Co., Oakland, \$59,935; Larsen Bros., Sacramento, \$47,598; Southwest Paving Co., Los Angeles, \$61,715. Contract awarded to Hemstreet & Bell, Marysville, \$46,137.50.

MONTEREY COUNTY—Between Gonzales and Soledad, 7.2 miles of property fence constructed. Dist. V, Rt. 2, Secs. C, D. L. A. Brisco, Arroyo Grande, \$3,142; Walter B. Roselip, San Luis Obispo, \$3,523; Edward R. Jameson, Sacramento, \$3,035; Teslaus Bros., Berkeley, \$4,406; John Fester, Santa Maria, \$3,086; Charles W. Lane, \$3,541; A. J. Grier, Oakland, \$3,300. Contract awarded to Westcott's Plumbing and Electrical Co., Soledad, \$2,497.

MONTEREY COUNTY—Between King City and 2 miles south of Greenfield, about 8.9 miles to be graded and bituminous surface treatment applied. District V, Route 2, Sections F, E. Tiffany Construction Co., San Jose, \$123,886; Granite Construction Company, Ltd., Watsonville, \$117,514; T. C. Rogers, Inc., Los Angeles, \$144,280; Heafey-Moore Co., Oakland, \$117,859. Contract awarded to Jones & King, Hayward, \$103,897.

MONTEREY COUNTY—Between Carmel River and Carmel, 1.9 miles graded and oil treated. Dist. V, Rt. 56, Sec. H. Yglesias Bros., Inc., San Diego, \$75,221; Hemstreet & Bell, Marysville, \$61,288; M. J. Bevanda, Stockton, \$60,825; Chas. L. Harney, San Francisco, \$52,611; Tiffany Const. Co., San Jose, \$59,902; Kennedy Const. Co., Oakland, \$70,016; M. T. Murphy, Inc., Carmel, \$54,534. Contract awarded to J. L. Conner & K. Kristich, Monterey, \$48,962.

MONTEREY COUNTY—Timber bridge across Willow Creek, about 32 miles north of San Simeon, consisting of one 76-ft. truss span, two 57-ft. truss spans

(Continued on page 30)

Bids and Awards for November

(Continued from page 29)

and fifteen 19-ft. spans on frame bents. District V, Route 56, Section B. Stroud Bros. and Seabrook, Pakersfield, \$54,916; Neves & Harp, Santa Clara, \$44,438; M. B. McGowan, Inc., San Francisco, \$50,823; B. A. Howkins & Co., San Francisco, \$45,274; J. W. Terrell, Sacramento, \$44,909; Theo. M. Maino, San Luis Obispo, \$44,396; E. T. Lesure, Oakland, \$35,738. Contract awarded to Associated Constructors, Inc., Los Angeles, \$35,665.

MONTEREY COUNTY—Bridge across Carmel River, consisting of thirteen 40-ft. reinforced concrete girder spans. District V, Route 56, Section H. J. W. Terrell, Sacramento, \$42,936; V. Maggiora, Sausalito, \$42,881; Carl N. Swenson Co., San Jose, \$37,968; L. C. Seidel, Oakland, \$49,817; Sam Sciarrino, San Jose, \$37,162; M. B. McGowan, San Francisco, \$38,497; Rocca & Caletti, San Rafael, \$42,794. Contract awarded to Bodenhamer Const. Co., Oakland, \$36,929.

MONTEREY COUNTY—Between San Adro and King City 7.4 miles of bituminous surface treatment. District V, Route 2, Sections F, G. M. J. Bevanda, Stockton, \$40,175; Tiffany Const. Co., San Jose, \$32,127. Contract awarded to Granite Const. Co., Ltd., Watsonville, \$31,068.

NAPA COUNTY—Between E. Boundary and Napa Wye; Between Napa Wye and S. Boundary, 8.2 miles surfaced with bituminous gravel. District IV, Routes 8, 74, Sections B, A. Pacific States Const. Co., \$44,788; Granite Const. Co., Ltd., Watsonville, \$44,487; A. Telchert & Son, Inc., Sacramento, \$46,509; J. C. Compton, McMinnville, Oregon, \$42,054.

ORANGE AND LOS ANGELES COUNTIES—Various location ciling over 31 miles. District VII, Routes 2, 26, 60, Sections A, F, C; A, B, C. Dimmitt & Taylor, Los Angeles, \$28,321; Match Bros. & Geo. Gardner, Elsinore, \$25,146; C. W. Wood, Stockton, \$28,575. Contract awarded to Kovacevich & Price, Southgate, \$24,511.

ORANGE COUNTY—In Anaheim between Sycamore Street and Romneya Drive. 1 mile to be graded and paved with asphalt concrete. District VII, Route 2, Section E. P. J. Akmadzich, Los Angeles, \$45,223; Gogo and Rados, Los Angeles, \$45,317. Contract awarded to Griffith Company, Los Angeles, \$41,801.

PLUMAS COUNTY—Bridge across N. fork of Feather River, consisting of one 130-ft. through steel arch span with concrete deck. District II, Route 21, Section B. H. Sneed, Berkeley, \$25,628; M. B. McGowan, San Francisco, \$27,698; Smith Bros., Eureka, \$26,003; Rocca & Caletti, San Rafael, \$24,106; Lord & Bishop, Sacramento, \$23,737; Paul M. White, Santa Monica, \$27,283; Baldwin & Butter, Berkeley, \$23,701. Contract awarded to Lynch-Cannon Engineering Co., Los Angeles, \$23,251.

RIVERSIDE COUNTY—Between Corona and Southerly boundary, 41.6 miles to be treated with oil. District VIII, Route 77, Sections A, B, C, D. Clyde W. Wood, Stockton, \$41,632; Geo. K. Thompson, Los Angeles, \$45,950; Weymouth & Crowell Co., Los Angeles, \$43,584; Southwest Paving Co., Los Angeles, \$48,982; V. R. Dennis Const. Co., San Diego, \$43,626; Martin Bros. Trucking Co., Long Beach, \$49,618; E. L. Yeager, San Bernardino, \$55,152; Match Bros. & Geo. Gardner & Sons, Elsinore, \$40,214; United Concrete Pipe Corp., Los Angeles, \$45,414; P. J. Akmadzich, Los Angeles, \$46,960. Contract awarded to Dimmitt & Taylor, Los Angeles, \$40,214.

RIVERSIDE COUNTY—District VIII, Routes 19, 78, Sections B, D, C. Weymouth & Crowell, Los Angeles, \$26,273; Southwest Paving Co., Los Angeles, \$29,785; E. L. Yeager, San Bernardino, \$33,247; Oilfields Trucking Co., Bakersfield, \$38,536; C. W. Wood, Stockton, \$25,127; United Concrete Pipe Corp., Los Angeles, \$26,734; P. J. Akmadzich, Los Angeles, \$28,955; Dimmitt & Taylor, Los Angeles, \$25,782. Contract awarded to Match Bros. and Geo. Gardner & Sons, Elsinore, \$23,933.50.

RIVERSIDE COUNTY—District VIII, Routes 19, 78, Sections B, D, C. Weymouth & Crowell, Los Angeles, \$26,273; Southwest Paving Co., Los Angeles, \$29,785; E. L. Yeager, San Bernardino, \$33,247; Oilfields Trucking Co., Bakersfield, \$38,536; C. W. Wood, Stockton, \$25,127; United Concrete Pipe Corp., Los Angeles,

\$26,734; P. J. Akmadzich, Los Angeles, \$28,955; Dimmitt & Taylor, Los Angeles, \$25,782. Contract awarded to Match Bros. and Geo. Gardner & Sons, Elsinore, \$23,933.50.

RIVERSIDE AND IMPERIAL COUNTIES—Between Avenue 62 and the Riverside-Imperial County line and between 3 miles and 10 miles south of co. line, 21.7 miles shoulder oiling. District VIII, Route 26, Sections G, D, E. Walter Trepts, San Diego, \$26,927; United Concrete Pipe Corp., Los Angeles, \$26,358; P. J. Akmadzich, Los Angeles, \$25,270; Geo. K. Thompson, Los Angeles, \$27,477; Southwest Paving Co., Los Angeles, \$29,955; Clyde W. Wood, Stockton, \$23,856. Contract awarded to Match Bros. & Geo. Gardner & Son, Elsinore, \$21,994.

RIVERSIDE COUNTY—Between 4 miles east of Mecca and Snavers Summit, 19.6 miles to be treated with fuel oil. District XI, Route 64, Sections A, B. A. Telchert and Son, Inc., Sacramento, \$29,670; Match Bros. & Geo. Gardner & Sons, Elsinore, \$22,911; E. L. Yeager, San Bernardino, \$27,789; Gogo & Rados, Los Angeles, \$26,677; Walter Trepts, San Diego, \$26,677; Oilfields Trucking Co., Bakersfield, \$29,952. Contract awarded to Clyde W. Wood, Stockton, \$16,545.

SACRAMENTO COUNTY—Between Citrus and Salsburg, an irrigation ditch about 0.7 mile in length to be excavated and lined with gunite. District III, Route 11, Section B. Case Construction Company, Inc., Los Angeles, \$13,562; D. McDonald, Sacramento, \$12,805. Contract awarded to J. W. Hoopes, Sacramento, \$11,265.

SACRAMENTO COUNTY—Between Sacramento and McConnell, widening 8 ft. reinforced concrete slab bridges and 1 culvert from 24-ft. to 31-ft. width. District X, Route 4, Section B. J. W. Hoopes, Sacramento, \$16,695; The Valley Const. Co., Modesto, \$18,047; Geo. G. Pollock, Sacramento, \$23,637; Lord & Bishop, Sacramento, \$18,230; P. F. Bender, Sacramento, \$20,695; Holdener Const. Co., Sacramento, \$22,527. Contract awarded to M. A. Jenkins, Sacramento, \$14,964.75.

SACRAMENTO COUNTY—Constructing addition to the headquarters shop building in Sacramento. C. J. Hopkinson, Sacramento, \$17,869; P. F. Bender, North Sacramento, \$18,795; Holdener Const. Co., Sacramento, \$18,200; Azevedo-Sarmento, Sacramento, \$18,200; Theodor Johanns, San Francisco, \$18,998. Contract awarded to Leo Epp, San Francisco, \$16,770.

SAN BERNARDINO COUNTY—Between Camp Waterman and Arrowhead Springs 4.5 miles bituminous surface treatment applied. Dist. VIII, Rt. 43, Sec. A. E. L. Yeager, San Bernardino, \$3,369; L. A. Paving Co., Los Angeles, \$3,560; C. V. Sparks, Los Angeles, \$3,820; H. E. Cox & Son, Pasadena, \$3,357. Contract awarded to G. Gardner & Sons, Redlands, \$2,970.

SAN BERNARDINO COUNTY—In San Bernardino between west city limits and Mount Vernon Avenue, about 0.4 mile to be graded and paved with Portland cement concrete. District VIII, Route 9, Section C. Match Bros., Elsinore, \$25,884; E. L. Yeager, San Bernardino, \$25,289; J. E. Haddock, Ltd., Pasadena, \$24,682. Contract awarded to United Concrete Pipe Corporation, Los Angeles, \$23,884.

SAN BERNARDINO COUNTY—Between Arrowhead Springs and San Bernardino, 0.8 mile grading, surfacing with oil treated gravel. Dist. VIII, Rt. 43, Sec. A. George Herz & Co., San Bernardino, \$34,503; C. O. Sparks, Los Angeles, \$35,344; Kuhn Bros., Inc., Manhattan Beach, \$38,152. Contract awarded to United Concrete Pipe Corp., Los Angeles, \$32,123.

SAN BERNARDINO COUNTY—At Mt. Vernon Avenue Crossing in San Bernardino about 0.2 mile to be graded and paved with Portland cement concrete. District VIII, Route 9, Section C. E. L. Yeager, San Bernardino, \$28,431; George Herz Co., San Bernardino, \$27,353. Contract awarded to United Concrete Pipe Corp., Los Angeles, \$26,926.

SAN DIEGO COUNTY—Between Oceanside and Carlsbad, 2 reinforced concrete girder bridges to be widened. Dist. XI, Rt. 2, Sec. B. Miracle Company, San Diego, \$19,351; Byerts & Dunn, Los Angeles, \$18,162. Contract awarded to Contracting Engineers, Los Angeles, \$12,743.

(Continued on page 32)

An Appeal for Unemployment Relief

Urging compliance with the conditions of the National Recovery Act and stressing the ardent desire of Governor James Rolph, Jr., to give work to as many as possible of the unemployed citizens of the State who have families dependent on them, Director Earl Lee Kelly sends the following letter to every contractor who is awarded a contract for State highway work:

Gentlemen:

It is a pleasure, indeed, to enclose your contract for highway work which has been awarded to you.

As you well know, Governor Rolph's administration has had, since its inception, the prime objective of giving relief to the unemployed, especially those with dependents.

Now, with the National Recovery Act in effect, and with the plea of President Franklin Delano Roosevelt before us that we should shorten hours and, wherever possible, increase pay, I write urging upon you the necessity of falling in line with this nation-wide movement to the end that the economic recovery of the Nation and of this State may be hastened.

The Department of Public Works itself has initiated the five-day week among its day labor men without corresponding decrease in pay and with the employment of additional men.

If every contractor securing State work through this department cooperates with the National Recovery Act, he must and will benefit materially. That cooperation I now ask of you.

With kindest personal regards and best wishes, I am

Sincerely yours,

EARL LEE KELLY,
Director of Public Works.

GOLD RUN-AIRPORT CUT-OFF COMPLETED, OPEN TO TRAFFIC

The improvement of an important section of the Victory Highway between Gold Run and Airport in Placer County has just been completed eliminating 13.5 miles of narrow, crooked highway and grades.

Construction has been under way for two years involving grading and surfacing of 11.5 miles that included excavation of 838,026 cubic yards and the placing of 49,000 tons of crusher run base and 23,000 tons of bituminous treated surfacing, 10,000 lineal feet of laminated timber guard rail, 1034 timber guide posts, and 294 culvert markers. The total cost was \$572,168. C. H. Whitmore was District Engineer with J. G. Meyer as Resident Engineer.

CONTRACT AWARDED FOR ANOTHER BAY SHORE LINK

The Bay Shore Highway is being advanced towards San Jose with the award of contract for the construction of another section of modern highway. This new portion will carry the wide boulevard, which extends down the peninsula from San Francisco, from Lawrence Station Road to the Alviso-Santa Clara Road.

On the Redding-Alturas lateral one of the last unimproved sections is to be brought to modern standards by the construction of a graded roadbed and placing of a bituminous treated surface between Diddy Hill and Montgomery Creek, in Shasta County.

A contract has recently been awarded for construction of the portion from Redding to Bella Vista.

Bids and Awards for November

(Continued from page 30)

SAN JOAQUIN COUNTY—Between Lodi and 4½ miles east, about 4.5 miles to be graded and surfaced with crushed gravel or stone bituminous treated. District X, Route 21, Section B. A. Teichert & Son, Inc., Sacramento, \$87,908; Blasotti, Willard & Biosotti, Stockton, \$77,885; Heafey-Moore Co., Oakland, \$78,838; Fredrickson & Watson Construction Co., and Fredrickson Bros., Oakland, \$83,047; Granite Construction Company, Ltd., Watsonville, \$82,523; Hanrahan Co., San Francisco, \$92,875; Eaton & Smith and A. J. Grier, San Francisco, \$94,018; M. J. Bevanda, Stockton, \$93,939. Contract awarded to Tiffany Construction Co., San Jose, \$76,851.

SAN LUIS OBISPO COUNTY—Widening a bridge at the south city limits of San Luis Obispo. District V, Route 2, Section E. J. J. Mannermann Co., Santa Barbara, \$1,461; Chas. W. Lane, Paso Robles, \$1,282; Walter B. Roselip, San Luis Obispo, \$1,498. Contract awarded to Theo. M. Maino, San Luis Obispo, \$1,248.

SAN LUIS OBISPO, MONTEREY AND SAN BENITO COUNTIES—17.2 miles of shoulders oiled. District V, Routes 2 and 22, Sections D, L. A. A. E. M. J. Bevanda, Stockton, \$22,163; Granite Construction Co., Watsonville, \$21,344; Tiffany Construction Co., San Jose, \$21,329; Oilfields Trucking Co., Bakersfield, \$31,486. Contract awarded to L. A. Brisco, Arroyo Grande, \$20,682.05.

SANTA BARBARA COUNTY—Between Olive Mill Road and Santa Barbara, 0.8 mile grading, paving with asphalt concrete. Dist. V, Rt. 2, Sec. J. United Concrete Pipe Corp., Los Angeles, \$53,123; Griffith Company, Los Angeles, \$43,627; Western Motor Transfer, Santa Barbara, \$45,957. Contract awarded to P. J. Akmadzich, Los Angeles, \$36,725.

SANTA CLARA COUNTY—Between Lawrence Station Road and Atviso-Santa Clara Road, about 2.7 miles to be graded and paved with Portland cement concrete. District IV, Route 68, Section B. Heafey-Moore Co., Oakland, \$238,559; Fredrickson & Watson Construction Co., and Fredrickson Bros., Oakland, \$238,860; A. J. Raisch Co., San Jose, \$223,518; Hanrahan Co., San Francisco, \$222,206; Peninsula Paving Co., San Francisco, \$229,342. Contract awarded to Basich Bros., Torrance, \$213,461.

SISKIYOU COUNTY—At Big Canyon, 0.8 mile line change grading surfacing bituminous treated. District II, Route 3, Section A. George Pollock, Sacramento, \$68,590; Dunn & Baker, Klamath Falls, Oregon, \$75,885; A. Young, Yreka, \$89,523; Union Paving Co., San Francisco, \$74,067; D. McDonald, Sacramento, \$73,757; Contoules Const. Co., San Francisco, \$69,541; Fredrickson & Watson Const. Co., Oakland, \$61,584; Isbell Const. Co., Carson City, Nevada, \$77,887; Young & Son, Berkeley, \$64,878; M. J. Bevanda, Stockton, \$77,230; Kennedy Const. Co., Oakland, \$85,696. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$59,457.

SONOMA COUNTY—Between Fairville and Shellville, 0.9 mile to be graded and surfaced with crusher run base and bituminous treated crushed gravel. District IV, Route 3, Section A. A. Teichert & Son, Inc., Sacramento, \$73,407; Central States Contracting Co., Oakland, \$67,167; D. McDonald, Sacramento, \$87,650; Hanrahan Company, San Francisco, \$93,456; Clyde W. Wood, Stockton, \$94,414. Contract awarded to Peninsula Paving Co., San Francisco, \$63,021.

SONOMA COUNTY—Bridge across Russian River at Preston, one 150-ft. through steel truss span, two 33-ft. steel beam spans and three 37-ft. steel beam spans. District IV, Route 1, Section D. Barrett & Hilp, San Francisco, \$75,135; Neves Harp, Santa Clara, \$72,932; Rocca & Caletti, San Rafael, \$74,111; J. F. Knapp, Oakland, \$68,247. Contract awarded to M. B. McGowan, San Francisco, \$67,793.

VENTURA COUNTY—Bridge across Calleguas Creek, 8 miles south of Oxnard, consisting of eight 30-foot reinforced concrete girder spans on concrete pile bents. District VII, Route 60, Section A. Oscar Oberg, Los Angeles, \$36,477; R. R. Bishop, Long Beach, \$37,400; Clinton Construction Co., Los Angeles, \$35,237; C. Bongiovanni Const. Co., Hollywood, \$35,186; Sharp & Fellows, Los Angeles, \$37,932; Byeris & Dunn, Los Angeles, \$33,541; M. B. McGowan, San Francisco, \$37,149; Dimmitt and Taylor, \$34,303;

United Concrete Pipe Corp., Los Angeles, \$34,901; Neves & Harp, Santa Clara, \$33,963; Contract awarded to Constructors, Inc., Los Angeles, \$26,851.

VENTURA AND LOS ANGELES COUNTIES—Between Ventura and Castaic, 40.3 miles of bituminous seal coating to be applied to existing shoulders. District VII, Route 79, Sections A, B, C, A. M. J. Bevanda, Stockton, \$25,692; Griffith Company, Los Angeles, \$20,564; P. J. Akmadzich, Los Angeles, \$25,561; Kemper Const. Co., Ltd., Los Angeles, \$21,747; Geo. K. Thompson, Los Angeles, \$23,216; Contract awarded to Match Bros. & Geo. Gardner & Sons, Elsinore, \$19,916.60.

VENTURA COUNTY—Between W. limits of Ventura and Sanjon Road, 1.6 miles Portland cement pavement widening. District VII, Route 2, Section C. Gibbens & Reed Co., Burbank, \$36,886; United Concrete Pipe Corporation, Los Angeles, \$33,895; P. J. Akmadzich, Los Angeles, \$35,177; Weymouth-Crowell Co., Los Angeles, \$36,289; Griffith Company, Los Angeles, \$32,121; T. C. Rogers, Los Angeles, \$37,121; M. J. Bevanda, Stockton, \$40,110. Contract awarded to Kovacevich & Price, Southgate, \$30,454.

YOLO AND BUTTE COUNTIES—4 miles bituminous treatment applied between Davis Wye and Willow Slough, Route 7; Between 1 mile north of Rock Creek and 1 mile south of Pine Creek, Route 3, District III; Routes 7 and 3, Sections A, D. Granite Const. Co., Watsonville, \$37,581; Clyde W. Wood, Stockton, \$36,908; J. C. Compton, McMinnville, Oregon, \$37,055; Tiffany Const. Co., San Jose, \$36,894; A. Teichert & Son, Sacramento, \$40,285; Pacific Truck Service Corp., San Jose, \$36,420. Contract awarded to E. A. Forde, San Anselmo, \$35,851.

YOLO COUNTY—Between Rumsey and the northerly boundary, about 3.7 miles to be graded. District III, Route 50, Section A. Central States Construction Co., Oakland, \$191,428; Bechtel Kaiser Company, Ltd., San Francisco \$186,334; Fredrickson & Watson Construction Co., and Fredrickson Bros., Oakland, \$148,509; Von der Hellen & Pierson, Castaic, \$151,408; Hemstreet & Dell, Marysville, \$149,185. Contract awarded to Young & Son Company, Ltd., Berkeley, \$140,708.

YUBA COUNTY—Between Wheatland and Morrison Crossing, 2.5 miles grading, paving with asphalt concrete. District III, Route 3, Sections A, B. Basich Brothers, Torrance, \$85,952; A. Teichert & Son, Sacramento, \$92,056; Tiffany Const. Co., San Jose, \$88,992; Hanrahan Co., San Francisco, \$84,836; Hemstreet & Bell, Marysville, \$91,837. Contract awarded to A. J. Raisch, San Francisco, \$81,753.

DISTRICT BID AWARDS

IMPERIAL COUNTY—Between Araz and the Colorado River, 6 miles earth shoulders to be treated with fuel oil. District VIII, Route 27, Section B. Match Bros. & Geo. Gardner & Sons, Elsinore, \$6,381; Weymouth-Crowell Co., Los Angeles, \$7,823; Alex D. Chalmer & Max Winter, Jr., Los Angeles, \$7,243. Contract awarded to V. R. Dennis Const. Co., San Diego, \$5,576.

LOS ANGELES COUNTY—Near Beverly Boulevard, 0.08 mile slope protection. District VII, Route 60, Section B. Carl Hallin, Los Angeles, \$4,628; F. E. Aldous, Beverly Hills, \$5,488; F. B. Gridley, Pasadena, \$5,660; H. E. Cox & Son, Pasadena, \$5,736; Dimmitt & Taylor, Los Angeles, \$5,847; Maiser & Reed, Los Angeles, \$7,935; Oscar Oberg, Los Angeles, \$8,775. Contract awarded to F. R. Hughes, Long Beach, \$4,320.

SAN BERNARDINO COUNTY—Between Camp Waterman and Brunt Mill maintenance station, about 11.8 miles, bituminous surface treatment. District VIII, Route 43, Sections A, B. Match Bros. & Geo. Gardner & Sons, Elsinore, \$9,760; George Herz & Co., San Bernardino, \$9,056. Contract awarded to E. L. Yeager, San Bernardino, \$8,755.

SONOMA COUNTY—Furnishing and applying bituminous surface treatment between Willow Brook and Haystack, 4.2 miles. District IV, Route 1, Section C. E. A. Forde, San Anselmo, \$5,040; Lee J. Immel, Berkeley, \$4,791; Pacific Truck Service, Inc., San Jose, \$4,578. Contract awarded to Helwig Const. Co., Sebastopol, \$4,510.

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

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CALIFORNIA HIGHWAY COMMISSION

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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

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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

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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

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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

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GORDON ZANDER, Adjudication, Water Distribution

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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

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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

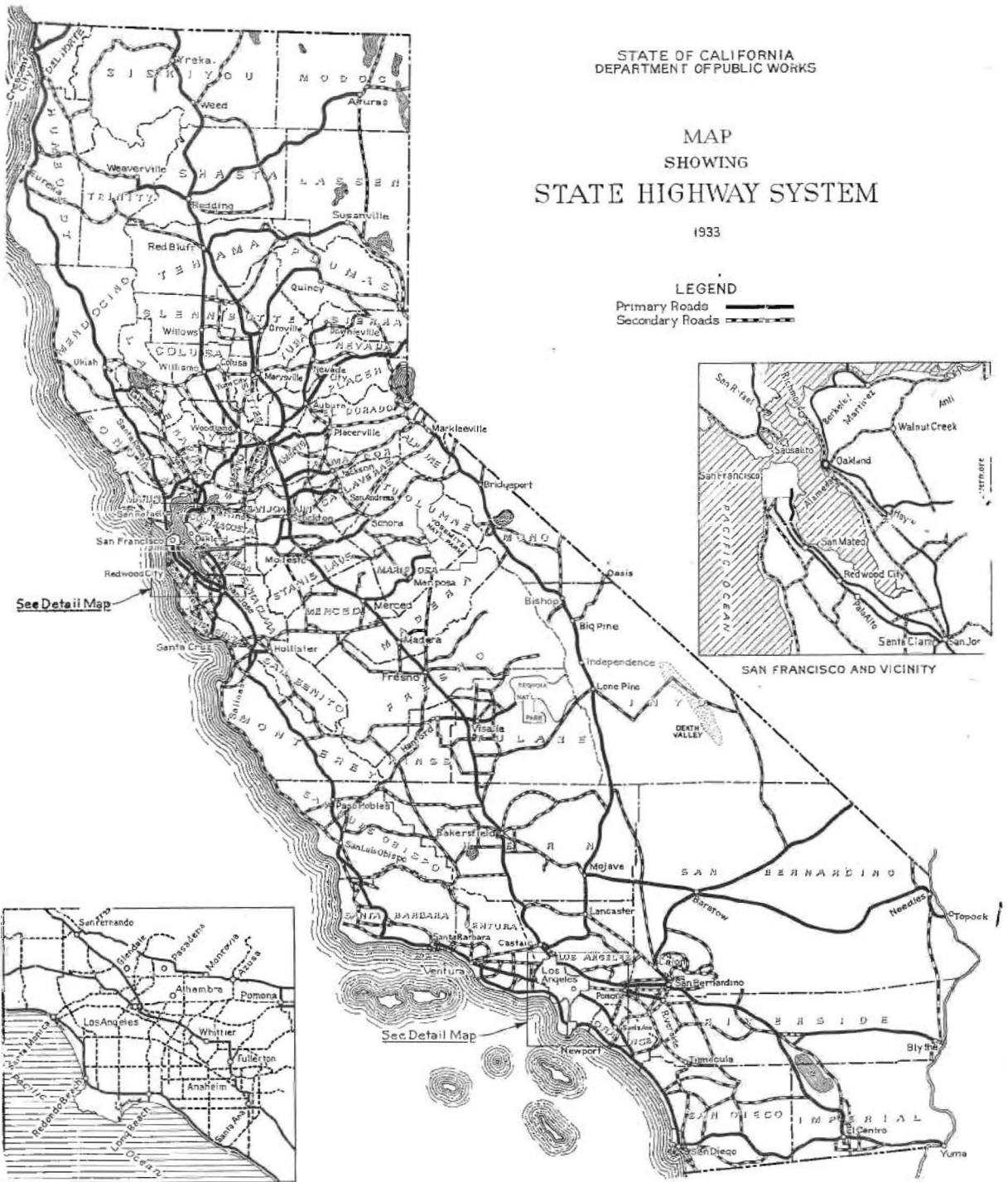
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

MAP
SHOWING
STATE HIGHWAY SYSTEM

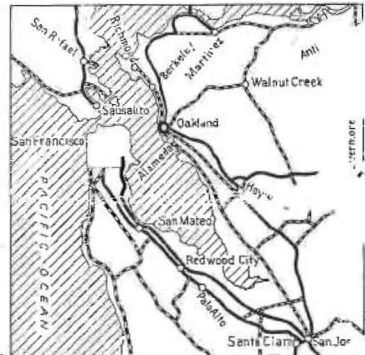
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LEGEND

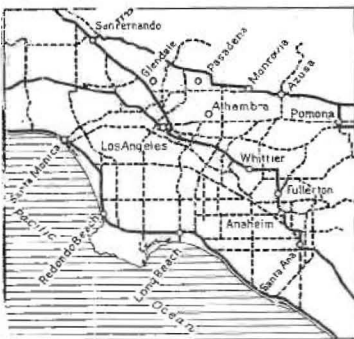
Primary Roads 
Secondary Roads 



See Detail Map



SAN FRANCISCO AND VICINITY



LOS ANGELES AND VICINITY

See Detail Map