

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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Shasta Dam Power and Plans For Its Marketing

The following article comprises an address by Charles E. Carey, Senior Engineer in charge of Power Administration of Central Valley Project made before the California Water Project authority and some of the discussion that ensued. Mr. Carey is considered one of the outstanding authorities in this country on public ownership and distribution of power. He has established headquarters in Sacramento to organize a public market for Central Valley Project Power.

Mr. Carey was employed as general consulting engineer and acting administrator for the Bonneville Power Administration, having served successively as rate engineer, principal construction engineer and acting supervisor.

Mr. Carey's experience with electrical engineering extends back to a professorship with the University of New Mexico where he taught the subject for three years. He left the teaching job to become general engineer for the Westinghouse Electric & Manufacturing Co., and later the company's engineering supervisor for the Pacific Northwest.

In 1935 he entered the Federal service as assistant district engineer for WPA, and served as consulting engineer for the National Resources Committee at Portland and supervisor of the Division of Operations for the WPA.

COMMENTING at a meeting of the Water Project Authority of California on the action of the Appropriations Committee of the House of Representatives of Congress in deleting approximately \$15,000,000 for construction of Central Valley Project transmission lines and a steam plant at Antioch, Mr. Carey, representing U. S. Bureau of Reclamation, expressed this encouraging opinion:

"The recent action of the Appropriations Committee, of course, is rather disturbing to me. I do not believe that in the long run it will have any effect on the Central Valley Project. Somehow or other, I feel that those transmission lines which are an essential and integral part of this development will be built by the Federal Government. They are so essential and so important to the success of the whole project that it seems to me they can not be overlooked."

MARKETING HIS PROBLEM

Mr. Carey, who is in charge of the marketing of Central Valley Project power for the Bureau of Reclamation, attended the meeting of the Authority at the invitation of the chairman, Director Frank W. Clark.

Addressing himself to the Authority members, Mr. Carey revealed that the offer of the Pacific Gas & Electric Company to purchase all power generated at Shasta Dam and at Keswick has been turned down by the Department of the Interior.

The Authority will be represented in Washington when the matter of an appropriation for transmission lines and the Antioch plant is taken up by the Senate. Every effort will be made to have the deleted appropriation items restored.

Expressing his views on the Washington situation as it affects the Central Valley Project, Mr. Carey said:



CHARLES E. CAREY

"We who have followed the power development on the Pacific Coast have repeatedly said that the agency which controls and operates the transmission systems naturally controls and operates and sets all the policies of the power within the territory which it serves. That is why it is rather important to certain interests and certain people that the Federal Government does not construct transmission lines.

"I am very happy to be with you people. I am very happy to work with you on a problem of marketing power in the territory in which, when the position was offered to me, I said the most attractive part of it was that it was a challenge to anybody who has

ever been in the power game—and it certainly is.

"As I see this picture, gentlemen, I think it is exactly as you see it. The water of this valley—and when I say 'water' I mean water in all of its uses—is to be put to work to produce the maximum prosperity of the region. That means water for navigation, water for irrigation, water for industrial and domestic use, and the concomitant power.

"That is quite a task, but it has been done elsewhere and it can be done here. How to do it is a problem which I am trying to solve and to which I hope we will have the answer before long. Incidentally, that is my first function: to try to set a pattern and program for the Department of the Interior and the Bureau of Reclamation so that goal of maximum prosperity for the region can be reached. That means, incidentally, the lowest cost for water and the lowest cost for power for the ultimate consumers in this territory.

POWER CREATED PROSPERITY

"Gentlemen, I naturally see power from a viewpoint somewhat different from most of you. I have recently come here from 20-odd years' experience in your neighbor States. I have seen power create a new economy in Oregon and Washington in a period of months. I have seen low-cost power from the Columbia River go into that territory and an economy which was based upon forest and forest products and upon agriculture, change, inside of 12 months, to an economy of the future which will be based upon light metals and new metals and hard metals.

"Because of the low-cost power in that territory we are seeing a new empire being created on the coast. We are seeing new industries come in

there, industries which will produce and manufacture aluminum, magnesium, ferro-chrome, ferro-silicon, calcium carbide, new chemicals, new fertilizers of phosphorous.

COULEE AND BONNEVILLE

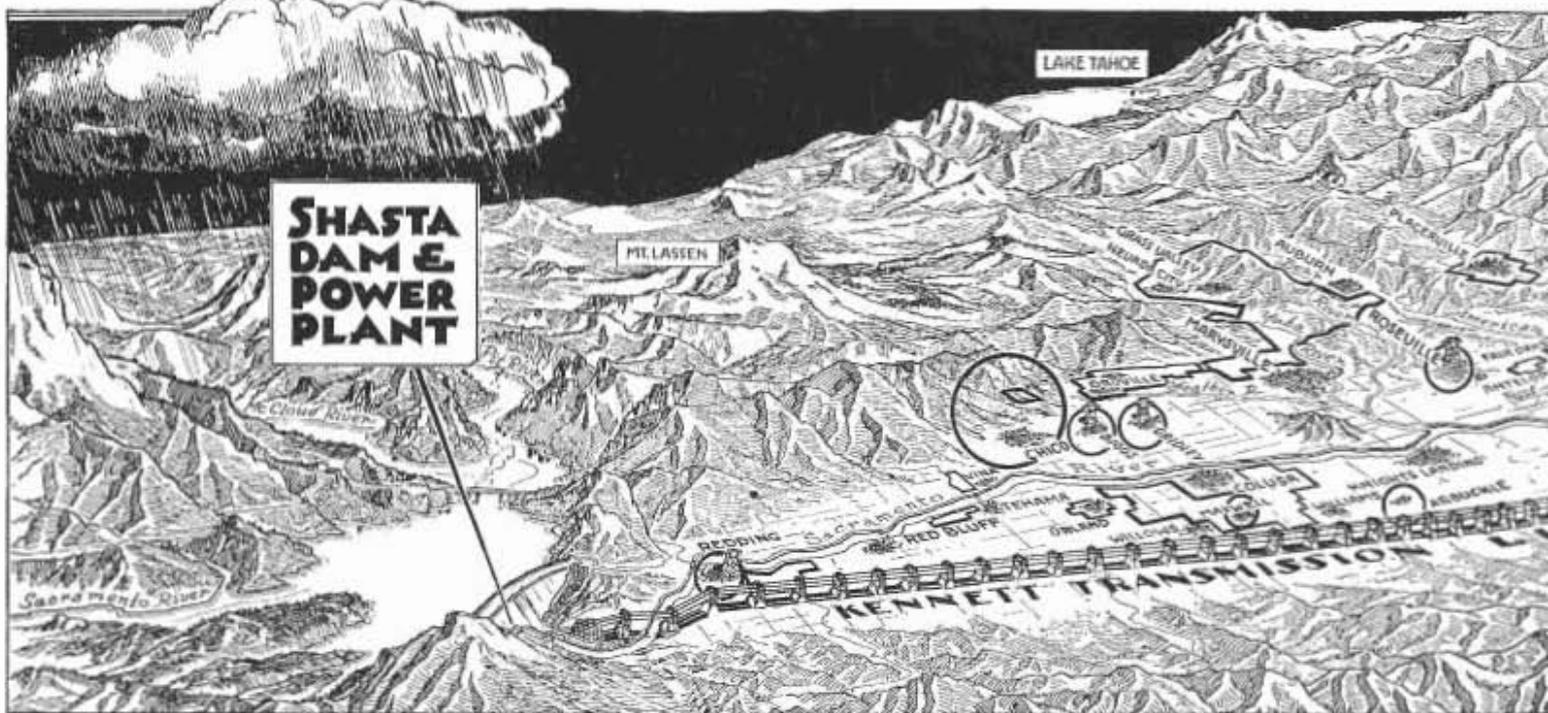
“We have seen, gentlemen, the so-called white elephants of the Columbia River—and people said there was no use for the power—we have seen the time come inside of a few months in which not only was all the power which they could generate put to work but there was a cry and a demand that all of the generators in Coulee and Bonneville be installed as rapidly as possible. We have seen in a period of 18 months the first power from Bonneville being delivered and at the end of 18 months we have seen firm, definite contracts for power totaling over 700,000 kilowatts, with

“That has been the result of two things: of a carefully planned program of having power available, and the second one is having a rate structure, a cost of power, that would attract the industries into that territory. I could tell you in a lot of detail what these industrial plants are; I could tell you in a lot of detail what this whole power program has meant up there.

“If nothing else, it has meant a new economy. It has meant the beginning of a new industrial expansion in Oregon and Washington and on the Pacific Coast, and, above all, it means permanent jobs for 10,000 or 15,000 people. When I say ‘permanent,’ I mean just that, because those of you who will translate the cost of energy in kilowatt hours to the cost per pound of aluminum, magnesium, and many of these basic materials,

people who use either water or power are entitled to receive those facilities at the lowest possible cost. The record to the north and the south of you, places where the program of multiple-purpose projects has been carried out continuously, and aggressively, in order to accomplish the goal, shows an ever-increasing use of energy in the home; and along with it we have found a rapidly decreasing cost of that energy.

“The entire States of Oregon and Washington during a period from 1933 to 1940 have enjoyed continually decreasing rates for electric energy, and the savings which have resulted from these rate reductions which were made by the public systems, and likewise the private systems, are now amounting to approximately \$9,000,000 per year. That does not consider any power that was delivered by



Sketch Map of Central Valley Project Water and Power Features Showing Public Agencies and Public

a continuous output of somewhere in the neighborhood of about 350,000 kilowatts, which was the total amount of generating capacity then installed. And above all, we have seen the most rapid rise in the increase of the consumption of power that has ever taken place anywhere in this Nation or any place else. In the State of Washington alone it has increased in a period of 12 months by an amount greater than 52 per cent in kilowatt hours.

will find that one mill difference in the cost of energy per kilowatt hour means one cent or $1\frac{1}{2}$ or $1\frac{3}{4}$ cents per pound in the basic cost of aluminum or magnesium or synthetic rubber. For that reason the low-cost power in that territory will maintain and sustain and keep the so-called war plants in operation long and continuously after this war emergency is over.

“There is another part of this power program that is important, and that is you individual consumers and you

Bonneville and Coulee. The influence of those plants and the policies which went into effect were worth better than \$9,000,000 a year to those two states.

MILLIONS SAVED PUBLIC

“Now, gentlemen, in a territory in which the power facilities, the number of people, and the policies are quite similar to the Central Valley Project, you have a pattern and you have a possibility of what the power

program can and might do in this territory. I am quite sure the people in this territory can use a saving of \$9,000,000 a year, regardless of where it comes from, the saving in power bills and what-not, because after all that saving in power means that you merchants and you people who have other things to sell find that that money goes back to the merchants and the other people of the community, either for homes or for other commodities.

"As I say, I see this power picture

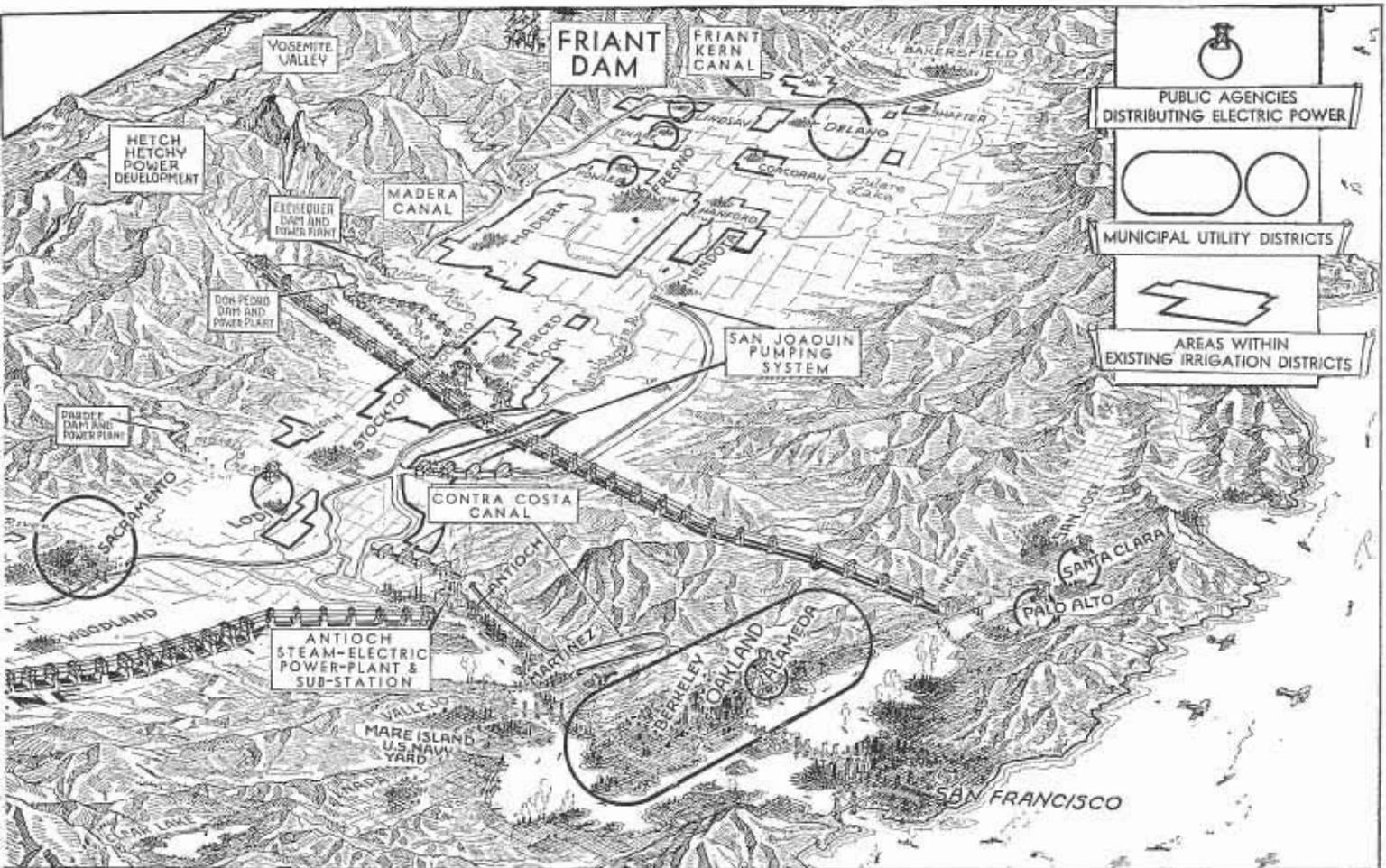
sumer at the lowest possible cost. "That, I think, states broadly the principles of marketing the power in the Central Valley so far as I am concerned. I am sure it states broadly the principles of the Department of the Interior and the Bureau of Reclamation, and it certainly is in line with the legal regulations which were set up in the Reclamation Act of 1939.

"To the members of this board I wish to say I am very happy to be with you this morning and I am very happy to work with you."

Mr. Hyatt and Mr. Ely and two other gentlemen were advised of the conferences and pretty much of what the conclusions were, about what had been discussed.

Mr. Hyatt: That is right.

Mr. Carey: You were advised prior to any official notification to the Pacific Gas & Electric Company that for the time being we felt it was in the better interest of the Government to proceed with the construction of transmission lines and steam plants which were essential and integral parts of the Central Valley Project, rather than to enter into a contract for power at this time which would give the Pacific Gas & Electric Company



ly-Owned Irrigation and Electric Facilities Which Can Be Linked to the Vast New Sources of Supply

perhaps in a different light than a lot of you people because I have approached it, gentlemen, as an engineer sees power at work, power doing things and power making things and power reducing the costs of everything that we use. In order to accomplish that, there must of necessity be a policy behind the marketing of that power which fulfills a fundamental principle, namely, that the power from these public works projects must be made available to the ultimate con-

Concerning hearings held in Washington by the House Appropriations Committee, Chairman Clark, Carey, State Engineer Edward Hyatt and Attorney General Earl Warren, member of the Authority, engaged in a discussion which proved interesting as evidenced by the following transcript of what they said:

Mr. Carey: As I recall, Mr. Abe Fortas did explain pretty much the negotiations which were under way. While in Washington, if my memory serves me correctly,

almost exclusive and monopolistic rights to Federal power, and you concurred in our conclusion.

Mr. Hyatt: That is correct. Mr. Carey, in the first place, this offer was not in writing?

Mr. Carey: That is right.

Mr. Hyatt: So it was not the subject of detailed analysis. Now, this is getting into some technicalities which Mr. Matthew perhaps had better take up, because it is covered in his testimony here; but in analyzing the offer as best we could from the verbal statements we do not find it is anywhere near as good an

(Continued on page 7)

Additional Traffic Lane Added to U. S. 40 3-Lane Sections Where Traffic Is Heavy

By C. F. PRICE, Resident Engineer

DUE to increased activity at industrial plants and the decrease in toll charges on the Carquinez Bridge in September, 1940, traffic on U. S. 40 highway, between Oakland and the bridge, has increased approximately 100 per cent in three years. A large percentage of this increase has been experienced within the last year.

Prior to 1933, this was a two-lane highway carrying approximately 4,800 vehicles per day. In 1933, due to a normal traffic increase, the pavement was widened to three lanes. Late counts indicate traffic has now increased to 15,000 vehicles per day, of which more than 10 per cent is composed of trucks and buses.

This large increase of traffic has overtaxed the present facility and has necessitated the immediate addition of another traffic lane at locations where sight distance or driving visibility is inadequate for safe driving of high speed traffic interspersed with heavy trucks and buses.

There are a number of locations on this road where, because of the hilly topography, there is poor sight distance due to blind vertical curves over summits approached by steep grades, horizontal curves with short radii, or a combination of the two conditions. The worst of these conditions on this route are located at what is known as Tank Farm Hill and also at Oleum and Selby.

The summits at these locations are approached by grades varying from 3.5 per cent to 7.0 per cent, and due to trucks ascending them at slow speed, all traffic, being confined to two traffic lanes on account of the hazard in passing, is retarded to a snail's pace.

The project now in progress consists of widening the existing 30-foot pavement to a 40-foot width to provide four 10-foot traffic lanes over Tank Farm Hill and from Oleum to the Carquinez Bridge—a total length of 3.53 miles. This is accomplished on most of the project by adding a 5-foot strip on each side of the present pavement. At Oleum, a change

Highway System Is Crucial Cog in Our Defense Production

America is at war! Today, in the words of War Production Board Chairman Donald M. Nelson, "We have just one job to do—to make enough war material to lick Hitler and the Japs and to do it in the shortest possible time." This will require the total mobilization of every military, industrial and human resource of the country.

Crucial cog in the machinery of defense production is the National Highway System. Over the streets and highways of America now roll materials vital to the construction of planes, tanks, ships, guns and the other supplies needed to make the United States truly the arsenal of democracy.

Cars and buses each day carry thousands of defense workers to their jobs and home again. Farm-to-market roads and main highways unite to transport food for these workers and for our armed forces as well. One firm, for example, uses trucks and trailers to haul 64,000 pounds of produce to Fort Sill, Oklahoma, every week.

Army convoys, which contain as many as 1,000 or more trucks, motorcycles and passenger cars, move soldiers and Army supplies across the country. On the efficiency of the Nation's roads and bridges depends the speed and safety with which these essential men, machines and materials can be moved.—Charles M. Upham in *Highway Information Service*.

in alignment has been made to improve sight distance, which required additional right of way. Here, a new

full width 40-foot pavement is being constructed on 1,000 feet of new alignment.

To match the existing pavement with the 5-foot widening strips, two types of construction were necessary. One type consists of Class "B" portland cement concrete 7 inches thick on a 4-inch crusher run base, and the other consists of 2 inches of asphalt concrete on 6 inches of Class "B" portland cement concrete. The whole project is to be flanked on both sides by borders 3 feet wide, composed of 8 inches of crusher run base with an armor coat surface.

At Oleum, large industrial plants are located. Plant vehicles used in the daily routine of operation frequently cross back and forth and in addition many trucks enter and leave the premises in the transport of supplies, equipment, etc. These vehicles, added to the hundreds of cars used by employees who daily drive to and from work, have created a very congested and dangerous situation at this location, both from the standpoint of main highway traffic and the local traffic.

Added to this hazard is the grade of the highway in front of the main driveways, which approximates 6 per cent. To improve this hazardous condition to highway traffic, accelerating and decelerating lanes are being added to the 40-foot pavement.

The Valona intersection at the south approach to the Carquinez Bridge is to be channelized by constructing a triangular traffic island, consisting of 6-inch concrete curbing.

Future plans provide for extending this widening program to include all of the mileage between the metropolitan East Bay area and the Carquinez Bridge, with four lanes of pavement throughout, which when completed will further relieve the heavy traffic flow and congestion on this important highway link.

The present project, when complete, will materially increase the capacity, reduce delay, and improve traffic safety on this road.



Three busy sections of U. S. 40 recently transformed from a three-lane to a four-lane highway

New Santa Paula Lateral Unit Eliminates 30 Curves in 6 Miles

THE secondary State highway between Ventura and Castale Junction serves as lateral connection in southern California for two north and south trunk highways. This lateral leads easterly through the fertile valley of the Santa Clara River, passing through the cities of Santa Paula and Fillmore and the town of Piru.

During the past five or six years the Division of Highways has been conducting an extensive reconstruction program along this entire route, replacing the poorer sections with modern units as rapidly as available funds would permit. On January 20, 1942, the Director of Public Works accepted the most recent of these units in Ventura County, across the sloping debris cones and river bottom between Piru Creek and the Los Angeles County line, a distance of 5.7 miles.

OLD ROAD INADEQUATE

As the alignment and grade of the old road at this location, constructed by the county in 1916, were entirely inadequate for present day traffic, reconstruction necessitated complete revision.

The contract for this project involved the construction of a graded roadbed 36 feet wide and the placing of portland cement concrete pavement 22 feet in width on a selected material subgrade. Shoulders, with bituminous surface treatment, were constructed 7 feet in width on each side of the new pavement.

The degree of improvement to the highway accomplished by this latest project may be gauged by comparison of the alignment of the old and new roads. On the old route there were 42 curves in the five miles between the termini of the project, while there are only 12 curves on the new alignment. The sharpness of curvature on the old road is shown by the fact that of the 42 curves, 12 had radii from 1,000 to 500 feet and 19 had radii of 500 feet or less, with a minimum of

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Can you put me on your mailing list, and may I have a copy of the November, 1941, issue.

Thank you.

Very truly yours

Charles Albert Smith,
Civil Engineer,
Altadena, California.

160 feet. The minimum radius on the new line is 1,300 feet.

MODERN BRIDGE INCLUDED

Construction operations involved movement of 230,000 cubic yards of material in roadway excavation and channel change, 15,500 cubic yards of Class "B" portland cement concrete, in which was used 108,000 pounds of bar reinforcing steel and 47,000 pounds of wire mesh reinforcement.

Included within the limits of this construction project, but built under a separate contract, was a modern reinforced concrete slab and girder bridge across Piru Creek about one-quarter of a mile easterly of the town of Piru. The bridge is 880 feet long and consists of seventeen 50-foot spans and two 15-foot cantilever spans.

This new structure replaced the 30-year old, narrow steel truss located on old and dangerous alignment about 2,000 feet upstream from the new crossing. As the modern bridge crosses an alluvial fan near the confluence of Piru Creek and the Santa Clara River, it is of necessity much longer than the old structure.

216 PILES IN FOUNDATION

Materials used in construction of the bridge included 2,489 cubic yards of portland cement concrete and 510,000 pounds of bar reinforcing steel. The 216 piles driven for foundations required 4,360 lineal feet of piling.

The bridge contract was awarded by the Director on July 7, 1939, and completed on March 25, 1940.

The road construction contract totaled \$282,200 and the construction cost of the bridge was \$85,300. The projects were financed with both Federal and State funds. The road contract was performed by the firm of Fredericksen and Westbrook of Sacramento and J. S. Metzger and Son were the bridge contractors.

At the present time bank protection work is under way along the Santa Clara River near this completed improvement at about four miles easterly of Piru. This work includes construction by State forces of rock and wire mattresses, slope paving, and sacked concrete riprap.

A contract is also in progress for construction of 20 steel rail tetrahedrons. These measures will provide protection to the roadway from flood waters of the Santa Clara River during the flashy winter storms to which this section is subject.

5,000,000 Trucks Now In U. S.

When the United States entered World War I in 1917, there were on the highways only 326,000 trucks—largely truck bodies on passenger car chassis. Today there are about 5,000,000 trucks in use in this country. These have a total hauling capacity estimated to be 50 times greater than the capacity of trucks in use in 1917.

Earnestness is enthusiasm tempered by reason.



Above pictures show portions of old and new road on realignment of a State Highway lateral eliminating curves between Castaic and Ventura

Shasta Power Marketing

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offer as the committee was led to believe it is. That is, it was that offer that really defeated this appropriation, in my opinion, or was one of the main items, anyhow.

Mr. Carey: That is correct.

Mr. Hyatt: Now, they said that was a firm offer. Our investigation there in Washington, based on verbal statements only, because we had no copy of any document, led to the conclusion that the offer was predicated on a method of operation which the bureau under the law might not be able to carry out.

Therefore, this offer, while it might have been very effective in defeating the appropriation, if and when it is to be translated into a document later on, as you all know, there will be plenty of difficulties come up. That is, this guarantee may never eventuate at all. It served a wonderful purpose in defeating the appropriation, but whether it is ever translated into something is something else again.

Now, as I say, we were under some difficulty in analyzing an offer which was not in writing in an effort to defend that appropriation. That is, we could have defended the appropriation a lot better if we had been a party to the discussions of the offer.

Mr. Carey: Well, the transcript of the hearing was available, Mr. Hyatt.

Mr. Hyatt: So I understand. I did not see it. I guess Mr. Matthew did.

Mr. Carey: Yes, it was available. After all, the principal discussions of the particular offer that was made contained—or, rather, I should say, were more or less around the general policy by which power might be purchased from the Federal projects and marketed by either the Pacific Gas & Electric Company or any private or public utility.

The most important part of those discussions, Mr. Chairman, came when the question was asked, "Will you deliver power over your system to any customer of the Federal Government?" and the answer was "No" by Mr. Black.

In answer to another question, "Will you pass on to the ultimate consumers

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Diagonal White Bars Mark Warning Areas At Medial Separations

PUTTING traffic "down the groove"—making it easier to do the right thing and undesirable or even difficult to do the wrong thing—is traffic engineering. The easier a change in traffic movement is brought about or mobility obtained, the better is the engineering.

In locations of heavy traffic, the divided or separated highway is fast becoming the desirable construction. Where these sections lead from and into narrower roadways—frequently two-lane pavements—a transition area must be provided. The California Division of Highways is making it easier for the motorist to do the right thing at such spots by the construction of stream-lined medial divider ends.

Using raised plant-mix bars, painted white with traffic lacquer and set at an angle of 45 degrees to the traffic flow, a long pointed segment is constructed gradually separating opposing traffic to the constructed width of the separating area, which is frequently 20 feet or greater.

One hundred feet or more from the point of maximum width, the point of the separating end divider is laid. From this point, gradually lengthened bars are placed to form an advance warning island of medial separation. Standard double traffic stripe eases the traffic from the two-lane pavement to the separated roadway.

To give the line greater night visibility, the stripe is reflectorized with glass beads. To increase the visibility of the bars these, too, are often glass-beaded. Bars are 6 inches to 8 inches in width and increase in height from $\frac{3}{4}$ inch to three inches from the point to the maximum width of the island. Bars are placed from 5 feet to 20 feet apart.

The divider is further marked with a standard reflectorized "KEEP TO RIGHT" sign.

Daughter (talking to her mother): "And our Domestic Science professor is teaching us how to spend money."

Father (interrupting): "The next thing we know they will be trying to teach ducks how to swim."



Raised white plant-mix bars prove effective channelization aids at medial divider ends

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any saving in the cost of electric energy which might accrue for power which you purchase from the Federal plants?" the answer was indefinite and to the extent that that would have to be considered and passed back through other channels, but no commitment and no promise was made.

POWER AT LOW COST

Therefore, in line with the general policy that has been set up—that power from these plants must be made available to the ultimate consumer at the lowest possible cost and at as near a non-profit basis as possible—the conference, so far as the purchase of this power was concerned, crystallized very quickly on those two answers, and all of the technical detail and all of the study of water power in the picture, gentlemen, was just background, that is all.

Chairman Clark: It is significant, though, that Mr. Hyatt is of the impres-

sion that the committee was influenced by, and in my opinion probably certain members of the committee were justified in the position that they wanted to take by being fortunate enough in having this supporting data, and that evidently it was of such a nature that it influenced the outcome. I think that is very important.

Mr. Hyatt: This report here says that evidence was given by one witness that an existing power agency would be willing to purchase the entire supply of power generated at Shasta Dam at a fair profit to the Government. That is the statement in the committee's report, that they had evidence to that effect. Now, I am not sure that that alleged offer guaranteed anything of the kind because the limitations as to operation which were therein contained might have brought about a different answer; but, in any event, there was plenty of room for argument.

FAIR PROFIT?

Mr. Carey: As a matter of fact, Mr. Hyatt, I believe the offer was at a fair

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Leonard D'Ooge New Administrative Assistant in Public Works Department

EQUIPPED for his new duties by many years of experience in Public Relations and the manufacturing business, Leonard D'Ooge has been appointed Administrative Assistant to Director of Public Works Frank W. Clark.

Born in Ypsilanti, Michigan, Mr. D'Ooge, after attending grade schools in the city of his birth, graduated from high school and from the Manlius Military Academy in Manlius, New York, and then completed courses in Michigan Normal School, Michigan State College and Northwestern University.

Upon leaving college Mr. D'Ooge was associated with the Buick Motor Company of Flint, Michigan, and following the outbreak of World War I, was called to Washington, D. C., where he served under Secretary of War Newton Baker in War Camp Community Personnel Service. After the war he was for a time purchasing agent of Dodge Brothers Motor Company of Detroit, and then entered business for himself in Detroit as a manufacturers' agent handling structural steel, electric travelling cranes and foundry equipment and supplies.

He disposed of his sales agency in 1922 and engaged in advertising and sales promotion in Chicago until 1933, when he came west. He first entered State service in structural work on the San Francisco-Oakland Bay Bridge. Following this assignment he accepted Civil Service appointment under the California Commission for the Golden Gate International Exposition as Assistant Exhibit Coordinator. He organized the Agricultural and State Mining Exhibits



LEONARD D'OUGE

on Treasure Island and in addition showed that he has better than average artistic ability by winning a state art contest and having one of his water colors hung in the art exhibit in the State Building. Early in 1940 he founded the Leonard D'Ooge & Associates Advertising Agency in Oakland, which he relinquished to accept Director Clark's appointment.

Mr. D'Ooge's father, Dr. B. L. D'Ooge, was an American scholar of renown and author of many nationally used Latin and Greek text books. Mr. D'Ooge and his family have established a residence in Sacramento.

Shasta Power Marketing

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profit, but I don't think the fair profit would be to the Government.

Chairman Clark: That is what I am thinking about, the fair profit to the Government. After all, this project is for the benefit of the people of California, is it not?

Mr. Carey: That is right.

Mr. Warren: Mr. Carey, am I entitled to infer from what you have said that the department has rejected the offer of the P. G. & E.?

Mr. Carey: Yes, certainly for the time being. Gentlemen, this war program has

been of such a nature, moving so fast, that it did not seem to be the part of wisdom on the part of the department to make any commitments of power two years in advance of which it would actually be ready, when it could actually be delivered, and if the war closed in the morning we did not care to have any commitments for delivering the power. There was a situation out here in which we would have a post-war program that would have to be solved and power would play an important part in rebuilding the Central Valley area, the same as water plays an important part. We felt that that should be kept unencumbered and free to be programmed as it should be programmed.

Motorists of U. S. Can Save \$62,000,000 in Gas Bills at 40 M. P. H.

MOTORISTS can increase their tire mileage by 20 per cent and also save 8 per cent on gasoline by reducing their driving speeds to 40 miles an hour as recommended by President Roosevelt to State Governors, the Public Roads Administration announces. In his letter the President emphasized particularly the need for conserving tires.

By a further reduction in speed to 35 miles an hour, it is estimated by PRA that an additional 20 per cent in mileage from tires and a saving of another 5 per cent in gas can be obtained.

On the average, a used tire that is serviceable for another 10,000 miles under normal driving on rural highways, will go 12,000 miles if the speed never exceeds 40 miles an hour, or 14,000 miles at a speed of 35 miles an hour, according to the estimates.

Studies of gasoline saving show that on the basis of normal automobile mileage, motorists would save about \$62,000,000 on their gasoline bills by reducing driving speeds to a maximum of 40 miles an hour, or about \$97,000,000 at maximum speeds of 35 miles an hour.

Movement to Reduce Speed Spreading Over Nation

The movement launched in California to bring about voluntary reduction of driving speed to conserve cars and tires and promote safety is to become a campaign of nationwide scope.

Action was taken by the executive committee of the American Automobile Association, in a meeting at Washington, D. C., to carry the slower driving appeal to more than a million motorists organized in 750 affiliated A. A. A. clubs.

Herb (writing to dealer)—"Sir, send me two mongooses."

He did not like the looks of this, tore it up and began again—"Sir, send me two mongooses."

This also failed to please him, so he wrote—"Sir, please send me a mongoose; and, by the way, send me another."

Report on Construction Projects And Pavement Records for 1941

The following annual report by the Construction Department of the Division of Highways, giving details of pavement construction in 1940, is eagerly awaited both by the contractors and State engineers connected with the various projects, who evince a keen competitive interest in the records of average daily concrete yardage laid, strength per square inch, per cent variation in cement control, asphalt tonnage, and roughness index per mile.

By EARL WITHYCOMBE, Assistant Construction Engineer

THE Standard Specifications governing all types of construction carried on by the Division of Highways were revised and reprinted as of July, 1940, and became effective on the projects constructed during 1941. A great many changes were made in construction procedure as well as quality of materials, and represent the accumulated opinions of field forces, Materials Laboratory, and Construction Department, gained from personal experience with the various problems involved.

In advance of the redraft of these specifications, invitations were sent out to the field forces suggesting participation in the discussion of specification requirements. Each individual was given an opportunity to offer his suggestions through the agency of the 11 highway districts, with Sacramento Headquarters acting as coordinator. Contrary to expectation, there was a marked unanimity of opinion on most of the controversial features of specification requirements.

These specifications have been in effect throughout the 1941 construction year and have proven of general benefit to the various projects. Contributions are continually being made toward a further perfection in construction procedure and are being carried in special provisions for the individual projects until such future time when the Standard Specifications may again be revised.

CEMENT-TREATED BASE

The latest contribution to pavement design is the development of the cement-treated base construction. This consists of a road-mix or plant mix of native or low cost imported material with cement and water. The cement content is usually specified within a three point range between 5 and 10 per cent by weight of dry

aggregate, and is predetermined from laboratory tests of material proposed for use. A compressive strength of 1,000 pounds per square inch at 28 days is considered the minimum advisable with this type of construction.

A considerable mileage of this type was constructed in 1941, and although most of the mixing was performed by plants of the pug mill type suitable for mixing both base and surface, one project was specified by the road-mix method, a Gardner type mixer being used for this purpose with very gratifying results.

The material consisted of disintegrated granite, and was imported from a nearby source. The surface was scarified and pulverized for the cement treatment to a depth of 0.5 foot and a width of 24 feet. This width was divided up into 8-foot sections and the required amount of cement laid out in bags end to end down the center of each section.

Just prior to mixing, the bags were emptied and the edges of the scarified material thrown up over the loose cement to form a windrow. The windrow was given one dry mixing, followed by two mixings with half the specified amount of water applied each trip through the mixer. This method gave a very satisfactory mix with good uniformity.

Mixtures are designed by laboratory methods fabricating the specimens in a mold under a pressure of 2,000 pounds per square inch. The optimum moisture content is determined for the material to be used and is offered as a field guide.

Maximum consolidation and maximum strengths go hand in hand in this type of construction. A deficiency in moisture gives low compaction and resulting low strengths, and excessive moisture for similar reason results in low strengths. Excessive moisture is evidenced by jelling of the mixture which makes rolling impossible and is readily identified.

The most satisfactory moisture condition for the type of compaction equipment being used is that moisture just short of producing the jelling condition.

The most satisfactory method so far developed for spreading the mixture is by means of a bulldozer equipped with side wings and wheel mountings on forward corners to maintain a constant height above the subgrade.

ROLLING PROCEDURES

The first rolling is given immediately behind the spreading operation, and the surface is either lightly scarified and shaved with a heavy drag spanning the full width of the compacted surface, or shaved with a motor grader.

Following this, the consolidation is completed and the final rolling with pneumatic-tired equipment is carried out with the addition of a fine spray of moisture to the surface in the amounts necessary to correct any surface lamination and to give a uniform surface texture.

As quickly thereafter as practicable, the curing seal is applied, consisting of approximately 0.2 gallon per square yard of penetration-type asphaltic emulsion. Traffic is normally barred from the freshly laid base for a period of seven days, although it has been necessary in a few instances, for the sake of expediency, to permit traffic to use the base continuously immediately following the laying and without any noticeable detrimental effect.

Speed in laying is essential with this type of construction, the best compaction results being obtained by consolidating as soon as possible behind the spread. Samples are cut from the compacted base and the weight per cubic foot determined by measuring the size of the hole with dry sand. The specifications require that the field compaction shall be not less than 95 per cent of the results



A 23-foot portland cement concrete pavement for one-way traffic on a recently completed divided highway section of U. S. 101

obtained by consolidating a specimen in a steel cylinder under a load of 2,000 pounds per square inch.

Strengths that are being obtained with this type of mixture are very gratifying. Cores were taken from five of the largest projects constructed last season at ages ranging from three to seven months after construction. Results, calculated on the basis of L/D ratio equals one, averaged for each project 710, 970, 2,155, 2,190, and 2,400 pounds per square inch, respectively. The two projects averaging strengths less than 2,000 pounds were constructed with material containing practically no coarse aggregate; those above 2,000 were constructed with run of bank sand and gravel approximating a good concrete grading.

The practice has been to top these bases with either asphalt concrete or plant-mix. Experience has demonstrated that the surfacing should not be less than two inches in thickness for satisfactory results, a lesser thickness being too susceptible to displacement under traffic.

**PORTLAND CEMENT
CONCRETE**

With the shortage of sacks, bulk cement was used to a greater extent than in previous seasons. Automatic proportioning devices for cement and aggregate have been considerably simplified and difficulty in operation is much less common.

No change has been made in the design of $\frac{3}{4}$ -inch expansion joints at 120-foot intervals, with weakened plane joints at 15 feet, except on experimental projects where this interval was varied. One project has sheet metal strips submerged in the surface in place of the normally edged weakened plane joint, and this pavement was the smoothest recorded for the season. Redwood joint material is being used almost exclusively.

With one exception all projects were constructed with 5-sack concrete, this exception being a 6-sack design.

Construction Records

The highest average daily output of portland cement concrete pavement was by Fredericksen & West-

PORTLAND CEMENT CONCRETE PAVEMENT RECORDS FOR 1941

Location	Contractor	Resident Engineer	Street Assistant	Average cu. yds. laid per day	Average strength, 28 days, lbs. per sq. inch	Per cent average daily variation in cement	Roughness index, inches per mile
Redding Underpass—Hill Street	Fredericksen-Westbrook	F. Drinkhall	A. Bigelow	349	4265	0.72	13.8
South Fork Putah Creek—1 mi. E. of Davis & Swingle—Yolo Causeway	Fredericksen-Westbrook	J. W. Corvin	W. J. Braker	520	3467	1.48	8.6
1 mi. East of Davis Subway—Swingle	Fredericksen-Westbrook	J. W. Corvin	W. J. Braker	485	4379	1.06	10.7
Liagas Creek—Gilroy	N. M. Ball Sons	H. S. Payson	H. A. Hart	445	3193	.70	5.8
At El Camino Real & University Avenue	Union Paving Company	H. S. Payson	H. A. Hart	218	4496	.80	20.8
2.6 miles north of Capistrano	Griffith Company (S.Fe R.R.)	C. Gilderleeve	H. D. Johnson	334	5703	.80	7.5
Piru Creek—Los Angeles County Line	Fredericksen & Westbrook	E. L. Seitz	W. T. Lamb	680	4027	.93	6.7
Keyes—Hatch Crossing	M. J. B. Construction Co., & F. Kaus	R. H. Lapp	J. C. Witherell	605	4468	---	4.5
0.5 miles north of Ash Slough—Dutchman Creek	M. J. B. Construction Co., & F. Kaus	R. H. Lapp	A. J. Hull	425	4505	.62	5.0
0.6 miles north—2.3 miles north of Route 208	Heafey-Moore, & Fredrickson-Watson	A. K. Nulty	G. R. Barry	229	4630	.73	10.0
Ballast Point—Upper Cantonment	Daley Corporation (WPA)	L. H. Williams	W. C. Cattell	292	2814	.87	16.0
			Averages	480	3840	.87	7.8



This section of four-lane divided highway of modern design is paved with both asphaltic concrete and portland cement concrete

brook on Contract 27XC7, road VII-Ven-L.A-79-C,A, Piru Creek to Los Angeles County line, where an average of 680 cubic yards per day with a 34-E paver was maintained. E. L. Seitz was resident engineer, and W. T. Lamb, street assistant.

The average daily output for the entire State in 1941 was 460 cubic yards as compared to 374.3 cubic yards in 1940. The increase in output is largely due to the specified 20 per cent permissible overload in a paving mixer permitted under the new standard specifications.

The highest average *compressive strength* for 5-sack concrete during

1941 was 4,630 pounds per square inch on Contract 410TC2, road X-Sol-Nap-7-G,A, 0.6 mile north to 2.3 miles north of Route 208; Heafey-Moore & Frederickson-Watson, contractors, A. K. Nulty, resident engineer, and G. R. Barry, street assistant. The average for the State for 28-day compressive tests was 3,840 pounds in 1941 as compared to 4,204 in 1940.

The record for *cement control* was made on Contract 410TC1, Road X-Mad-Mer-4-C,A, 0.5 mile north of Ash Slough to Dutchman Creek, where the average variation was 0.62 per cent. M. J. B. Construction Company & F. Kaus were the contractors,

R. H. Lapp, resident engineer, and A. J. Hull, street assistant. The average variation for the State in 1941 was 0.87 per cent as compared to 0.93 per cent in 1940.

The record for *surface smoothness* was made on Contract 210TC9, road X-Sta-4-A,Cer,B, Keyes to Hatch Crossing, with an average roughness index of 4.5 inches per mile. M. J. B. Construction Company & F. Kaus were the contractors, R. H. Lapp, resident engineer, and J. C. Withereil, street assistant. The average smoothness for the State in 1941 was 7.8 inches per mile, as compared with 7.4 inches in 1940, which indicates a slight decrease in riding quality.

ASPHALT CONCRETE PAVEMENT RECORDS FOR 1941

Location	Contractor	Resident Engineer	Street Assistant	Average tons laid per day	Average stability of surface mixture in %	Roughness index, inches per mile	
2.3 miles north—1.2 miles south of Petaluma	Louis Biasotti & Son., & L. D. Tonn	F. W. Montell	G. W. Levier	697	33.3	11.9	
Llagas Creek, Gilroy	N. M. Ball Sons	H. S. Payson	H. A. Hart	428	44.0	11.2	
Broadway—Charter Street	Piazza-Huntley, & Trewhitt, Shields & Fisher	L. G. Marshall	G. A. Wildman	747	34.0	15.5	
At El Camino Real & University Avenue	Union Paving Company	H. S. Payson	G. L. Beckwith	502	34.1	23.5	
Selma—Fowler	Piazza & Huntley	F. W. Howard	T. W. Voss	231	41.1	9.2	
Foothill Blvd., Las Lomas Ave.—Irwindale Ave.	J. E. Haddock	J. R. Rubey	J. R. Rubey	525	47.0	21.8	
Fairfax Ave.—La Brea Ave.	Oswald Bros.	G. H. Lamb	R. W. Anderson	443	37.6	19.9	
0.6 miles north—2.3 miles north of Route 208	Heafey-Moore & Fredrickson-Watson	A. K. Nulty	G. R. Barry	352	40.3	18.6	
Sandy Beach—Truckhaven	Basich Bros.	W. T. Rhodes	S. M. Templeton	590	37.6	22.3	
				Averages	508	37.0	14.9

BITUMINOUS TREATED SURFACES—RECORDS FOR 1941

PLANT MIX

Location	Contractor	Resident Engineer	Roughness Index, Inches per Mile
Scotia—1 mile north of Rio Dell	A. Soda & Son	C. M. Butts	42.1
Heagney's—0.5 mile north of Lanes	N. M. Ball Sons	R. Bergroth	38.3
North Fork—Keddie	Hemstreet & Bell	C. A. Potter	16.2
Likely—Cedar Pass	Harms Bros.—Powers & Patterson	H. K. Ward	19.3
Bailey Hill—Oregon State Line	Parish Bros.	R. E. Halter	31.4
Red Bluff—6 miles north	Jones & King	E. J. Peterson	12.6
Redding Underpass—Hill St.	Fredericksen & Westbrook	F. N. Drinkhall	17.5
Constantia—Route 21	Fredericksen & Westbrook	H. B. Milner	9.3
Beckwourth—Edes Ranch	Poulos & McEwen	G. Sundman	8.0
Lincoln—Yuba County Line	Hemstreet & Bell	E. Hay	26.6
Homewood—Tahoe City	Independent Construction Co.	E. L. Miller	19.5
Woodland—Cache Creek	A. Teichert & Son	W. G. Remington	16.3
Cache Creek Bridge—0.4 mile north	L. Biasotti & Son	W. G. Remington	19.5
1 mile east of Davis Subway—Swingle	Fredericksen & Westbrook	J. W. Corvin	15.3
Baxter's—Hampshire Rocks	Hayward Building Matls. Co.	H. O. Ragan	18.9
Grove St. Tahoe City—3 miles west	Independent Construction Co.	E. L. Miller	12.4
Across Hancut Creeks	Engineers Ltd. & Parish Bros.	E. Hay	42.1
2.5 miles north of Cloverdale	Heafey-Moore & Fredrickson-Watson	H. A. Simard	12.4
San Rafael-Richardson Bay Bridge	A. G. Rasich	W. A. Rice	33.6
Prunedale Junction—Sargent Overhead	Heafey-Moore & Fredrickson-Watson	H. S. Payson	29.9
Lake Lucerne—2 miles south of Tunitas	N. M. Ball Sons	C. F. Price	43.9
Rockaway Beach—Edgema	A. Teichert & Son	H. A. Simard	28.9
Llano Road—Wright Station	L. Biasotti & Son	G. H. Heberling	50.2
Teolote Creek—Las Varas Creek	Basich Bros.	J. C. Adams	14.4
At Miles Station	Gibbons & Read	V. E. Pearson	15.2
Orella—1 mile west of Canada del Refugio	Basich Bros.	J. C. Adams	17.8
1.7 miles south of McKittrick—Route 58	Fredericksen & Westbrook	D. G. Evans	25.3
Myrtle Ave. San Rafael—San Quentin Wye	A. G. Rasich	W. A. Rice	36.1
Cypress Avenue—Big Dalton Wash	J. E. Haddock	B. Frykland	10.5
At Mill School	J. E. Haddock	B. Frykland	10.0
Newport Beach Blvd.—Corona del Mar	Mittry Bros.	W. D. Eaton	22.4
Bellflower Blvd. 0.3 mi. S. of South St., Artesia Ave.	J. E. Haddock	G. E. Farnsworth	10.1
Bellflower Blvd. Spring St.—South St.	J. E. Haddock	G. E. Farnsworth	8.7
1.6 miles west of Saticoy	Griffith Company	W. A. Norman	12.8
22d Street—Lampson Avenue	Griffith Company	H. B. Lindley	23.3
Dracaea Avenue—Route 19	Oswald Bros.	R. A. Bergman	16.7
Route 19—Banning	Oswald Bros.	J. M. Hollister	12.5
Route 187—Banning	George Herz & Co.	G. E. Malkson	8.5
Riverside—3 miles west	Matich Bros.	E. A. Bannister	22.7
Keyes—Hatch Crossing	M.J.B. Construction Co. & F. Kaus	R. H. Lapp	17.3
0.5 mi. north of Ash Slough—Dutchman Creek	M.J.B. Construction Co. & F. Kaus	R. H. Lapp	33.1
Merced—Tuttle	J. A. Carson	A. H. Lund	17.3
Mission Blvd. W.—Pt. Loma Blvd.—Pacific Beach Drive	V. R. Dennis Const. Co.	F. D. Pearce	17.2
Sandy Beach Road—Truckhaven	Basich Bros.	W. T. Rhodes	26.0
Lakeside—1 mile north	State Forces (WPA)	L. H. Williams	20.0
Average			19.3

ROAD MIX

Likely—Cedar Pass	Harms Bros., Powers & Patterson	H. K. Ward	38.8
Crescent Mills—Greenville	Oranges Bros.	C. A. Potter	32.3
Weed—1.4 miles north	Parish Bros.	C. A. Potter	29.1
Viewland—Madeline	Harms Bros., Powers & Patterson	H. K. Ward	13.4
Callatoga—0.2 mile north	N. M. Ball Sons	H. A. Simard	42.3
Edgema—Thornton	Piombo Bros.	H. A. Simard	50.0
Davenport—1.5 miles south	Heafey-Moore, Fredrickson-Watson	A. Walsh	51.4
Peachtree Valley—Mustang Grade	Harms Bros.	A. L. Lamb	13.5
Famosa—Woody Road—Deepwell Ranch	Griffith Company	D. G. Evans	12.6
San Luis Obispo Co. Line—0.2 mi. S. of Kings Co. Line	Griffith Company	R. Windele	121.7
Elsinore—Corona	Oswald Bros.	W. H. Crawford	15.6
Otey's Corner—Bishop	James E. Anderson	F. R. Pracht	26.2
Columbia Wye—Sonora	Johnston Rock Co.	A. K. Nulty	36.5
Mariposa—2 miles north	Valley Construction Co.	E. L. Craun	55.0
Jamestown—1.0 mile south	Dan Caputo	A. K. Nulty	46.7
Mountain Springs—3.6 miles east	Denni Investment Corp.	R. C. Payne	12.1
Oak Grove—0.8 mile north	Roland T. Reynolds	F. W. Stewart	8.6
Farallone—Rockaway Beach	A. Teichert & Son	H. A. Simard	35.1
At Montara Creek	N. M. Ball Sons	H. A. Simard	14.8
Hernden Ave.—1.6 miles N. of San Joaquin River	Fredrickson Bros.	L. Tresidder	22.7
Average			29.4



Road mix on gravel base surfaces a relocated section of State Route 18 in a mountainous area

ASPHALT CONCRETE

Two projects during the 1941 construction season employed the type of bituminous finisher ordinarily used without side forms. On one project a wheel was mounted on the side of the box and the one side operated with the machine taking the grade off of a wooden side form, giving very good riding results. On the other project, no side form was used and the resulting roughness is considerably more than the average for the season.

It is not considered that the bituminous finisher without side forms is equal to the standard asphalt concrete finishing machine operating on side forms, in producing a smooth riding asphalt concrete pavement.

Asphaltic emulsion seal coats without a cover are becoming more popular for asphalt concrete, and are used to an even greater extent to cover bituminous-treated surfaces as an ideal type of seal to carry freshly laid surfacing through the winter without the raveling and pitting generally experienced with winter work.

The rate of application for asphalt concrete has been reduced to about one-twentieth gallon per square yard of surface. This is sufficient to add the necessary tension between the surface particles without leaving an excess on the surface.

Construction Records

The highest average daily output of asphalt pavement tonnage was laid on Contract 24TC8, road IV-S.M-2-RdwC, Broadway to Charter Street, where 747 tons per day were averaged by Piazza & Huntley & Trew hitt, Shields & Fisher; L. G. Marshall was resident engineer, and G. A. Wildman, street assistant. The average daily output for the State was 508 tons in 1941 as compared to 541 tons in 1940.

The highest stability of surface mixture was obtained on Contract 27VC5, road VII-L.A-9, G, Foothill Boulevard, Los Lomas Avenue to Irwindale Avenue, with an average of 47 per cent; J. E. Haddock, contractor, J. B. Rubey, acting as resident engineer, and street assistant. The average for the entire State was 37 per cent in 1941, as compared to 37.4 per cent in 1940.

The record for surface smoothness was secured on Contract 26TC2, VI-Fre-4-A, Fowler, Selma to Fowler, where the average roughness index was 9.2 inches per mile. Piazza & Huntley were the contractors, F. W. Howard, resident engineer, and T. W. Voss street assistant. The average for the entire State in 1941 was 14.9 inches per mile, which is the identical figure for the preceding year an unusual coincidence in surface smoothness records.

BITUMINOUS-TREATED SURFACES

The plant-mix type again predominated in 1941, about 73 per cent of the 222 miles of oiled roads listed herein being the plant-mix type.

Spreading machines were used on a greater number of projects during 1941 than was the case in 1940.

Construction Records

The record for surface smoothness on plant-mix of 8.0 inches per mile was obtained on Contract 42WC3, road II-Plu-21-G, Beckworth to Edes Ranch, by Poulos & McEwen, contractors, with G. Sundman, resident engineer. The average for the entire State in 1941 was 19.3 inches as compared to 23.1 inches per mile in 1940.

The record for surface smoothness for road-mix was made on Contract 211XC1, road XI-S.D-78-E, Oak Grove to 0.8 mile north, with 8.6 inches per mile; Roland T. Reynolds, contractor, F. W. Stewart, resident engineer. The average for the entire State in 1941 was 29.4 inches as compared to 49.2 inches in 1940.

Witte—Young Spendleigh inherited a modest fortune from an aunt.

Dubbe—Has he gone through with it yet?
Witte—Not yet. So far he has succeeded only in going through the windshield of his new \$5,000 car.

State Employees Go To Special Class in Welding Engineering

AN intensified five-day training course in welding engineering was held in Sacramento February 24th to 28th. This special course was brought to Sacramento by the combined efforts of the Sacramento Section of the American Society of Civil Engineers, the Sacramento Junior College and the Lincoln Electric Company. While the bulk of the 85 men attending the course were residents of Sacramento there were representatives from as far north as Chico, Modesto, the San Francisco Bay Area and Reno, Nevada.

Approximately 50 men from the State Bridge Department were regular attendants at the course and there were many present from the Divisions of Water Resources and Architecture.

The course consisted of morning and afternoon shop courses and evening lecture sessions. Identical shop sessions held each morning gave each man attending an opportunity to get the actual feel of welding by making a butt and T Weld.

The afternoon shop sessions were demonstration courses covering welding inspection, reclamation of work parts, and special problems in welding. Demonstrations were given of Non-Ferrous welding and designed methods for expansion and contraction.

In the evening lectures the designed theories on welding were outlined and stress and load conditions were shown by means of celluloid models, polarized light and slides.

The course was given by Mr. E. W. P. Smith, nationally known consulting engineer with the Lincoln Electric Company in conjunction with the Sacramento Junior College personnel.

The course was enthusiastically received by the Department of Public Works' Engineers as an opportunity to broaden their knowledge of welding engineering. Welding, of course, is playing a more prominent part than ever in modern construction.

The number of Department employees that paid their registration enrollment fee and attended this course again demonstrates the wide awake interest of State employees in "in training" education.



Group of State employees watching expert demonstration before welding engineering class

Los Angeles Gets \$3,000,000 Quarter Cent Gas Tax Project

At a conference held in Los Angeles between Director of Public Works Frank W. Clark, Highway Commissioner Amerigo Bozzani, State Highway Engineer C. H. Purcell and members of his staff, and representatives of the City of Los Angeles, a list of highway projects within the city on which will be expended $\frac{1}{4}$ cent gas tax allocations, was approved.

The gas tax money involved is available to Los Angeles for construction work on State highways within the municipal limits.

The approved projects totaling approximately \$3,000,000 were as follows:

- Olympic Boulevard
Berendo Street to Western Avenue
- Olympic Boulevard
Hoover Street to Menlo Avenue
- Olympic Boulevard
Traffic signals
- Cahuenga Pass
Riverton Avenue to Barham Boulevard
- Cahuenga Pass
Highland to Barham
- Figueroa Street
Neola Street to Buena Vista Terrace
- Daly Street
Main Street to Pasadena Avenue

- San Fernando Road
Delay Drive to Verdugo Road
- Moorpark Street
At Tujunga Wash
- San Fernando Road
Ensign Avenue to Burbank boundary
- San Fernando Road
Branford Street to Truesdale Street
- Sepulveda Boulevard
Sunset Boulevard to south of Waterford Avenue
- Sepulveda Boulevard
Ohio Avenue to south of Pico Boulevard
- Colorado Boulevard
Townsend Avenue to Eagle Rock Boulevard

Thanks Highway Crew

Honorable Culbert L. Olson,
Governor of California,
Sacramento, California.
Dear Governor Olson:

I just want to convey to you—with the hope that you will tell the men involved—how very much I appreciate the courtesy, cooperation and extreme kindness of the highway maintenance crew of three men who helped me recently when I had some trouble with my car.

This happened on the McGee Creek Ski Lodge Road, Inyo National Forest. They were most helpful and I am deeply grateful.

Very truly yours,

H. W. von Morpurgo
The Paraffine Companies, Inc.
San Francisco

Revision of Biennial Highway Program Indicated by \$13,000,000 Estimated Reduction in Gasoline Tax Revenues

AN estimated reduction of \$13,000,000 in returns from the 3-cent gas tax in 1942 due to tire and automobile rationing and demands of the Federal Government for defense highway construction indicates a change in policy of highway administration in California and a possible further revision of the highway budget for this biennium.

This is the gist of a report prepared by State Highway Engineer C. H. Purcell and presented to the California Highway Commission by Director of Public Works Frank W. Clark.

During the past year the report says, the normal program of highway work has been restricted by regulations limiting allocation of Federal aid, involving military access and strategic roads and by increases in cost of work due to the labor, material and equipment situation. Developments such as tire and gasoline rationing and further increases in the Federal income tax, for example, will have a far more serious effect on the program.

STUDY UNDER WAY

A study is under way to determine the trend of traffic volume, the probable reduction in income and other factors bearing on future administration of highway work. It is too soon to determine with any certainty, the full effect of forces now in operation. It is quite evident, however, that revenue available for highway purposes will be reduced during 1942 and for an indefinite period thereafter. A reduction of \$13,000,000 in returns from the three-cent State gasoline tax in 1942 as compared to an estimated revenue for a normal year is used, tentatively, for purposes of preliminary analysis.

The volume of automobile travel will fall off, the Purcell report predicts, but where such declines will occur is difficult to determine. The record of mid-February counts taken

at points on the State highways shows an erratic pattern of gains and losses as compared to counts in February, 1941. On the whole, however, there was an apparent gain of 4.6 per cent for February, 1942. A certain undetermined percentage of such traffic, however, is nonrevenue producing vehicles—principally military traffic. It seems probable that the volume of military truck and bus traffic on the State Highway System will increase as the war effort intensifies.

BUDGET REVISION

It is not too early, for purposes of preliminary programming of work for the current biennium, to consider the type of work and even specific projects which should be retained, reduced or abandoned. Consideration should also be given to projects which should now be added to the budget program as a result of changes in the financial and traffic situation.

REVENUE INADEQUATE

It is well known that revenue available for the State Highway System has been inadequate to meet requirements since 1933 when the mileage was doubled. It has been necessary to use a large part of the funds for improvement of highways within or immediately serving urban areas. Even here in many cases the quality of surfacing was sacrificed, stage construction was employed in order to finance improvement on the most desirable and permanent location. While this policy has been justified, it has had the effect of over-extending demands on maintenance funds for the entire period of the past nine years.

The surface on many of the secondary roads taken into the system in 1933 was inadequate either as to age, type, or width or even on all three counts. Under county control, maintenance had been neglected in many cases since the beginning of the

depression period. In some instances, the counties applied a minimum oil treatment shortly before transferring the roads to the State to insure future maintenance as an oiled surface.

Through judicious selection of minor construction projects, some improvement was made. Reliance has been placed, however, on continuous restoration and patching of the existing surface from maintenance funds to keep the so-called 1933 secondary highways as well as the inadequate surfaces on the older State highways in passable condition. This surface condition frequently has been one of appearance only. When put to the test by any unusual combination of load and weather conditions, failures have occurred. The field forces are required to be constantly on the alert to guard against dangerous conditions which develop overnight. In other words, a large mileage of the highway system was in a state of incipient failure even before wartime traffic developed.

MAINTENANCE PROBLEM

The report "Highway Needs" shows that in 1938 some 1,760 miles of highway was inadequate as to type of surface, and a total of 6,055 miles was inadequate as to both width and type of surface for the existing traffic. There has been some reconstruction of surface in the interim, but in general the structural stability of highway surfacing has further deteriorated in the four years since the data were accumulated.

The Maintenance Department has reviewed its yearly program and the least essential items are being eliminated or standards reduced to conserve funds. The situation as to maintenance funds is complicated by several factors and any savings thus affected are taken up by extraordinary demands. For example, some \$1,250 per day is spent in guarding bridges,

maintenance stations, and powder magazines. Up to February 16th, these items cost over \$100,000. There must also be considered such matters as, increasing difficulty and cost in securing materials and equipment and the problem of holding the organization or securing replacements for men who are called to the service or go into defense industries.

CHANGE OF POLICY

There are other matters which enter the picture, but it is believed that the considerations discussed point the way toward a change in policy in the administration of highway work in California. There is no question that the first duty is to maintain the road surfaces and structures on every important road in usable condition for defense and military activities during the emergency. There is the further duty of so planning the work as to carry along the sections having inadequate surfacing for a period of adjustment after the immediate emergency has passed. The problem then, is the determination of type and extent of work to be deferred.

The restoration work which should have immediate attention includes 14 projects on which resurfacing and strengthening is required. The estimated cost of the resurfacing and incidental work for these 14 projects is \$1,271,700.

It should be kept in mind that these projects are only the most desirable or necessary at the moment and that others will be presented from time to time.

The most logical projects to be reduced or removed from the budget are (1) those for which priorities can not be secured for critical materials, (2) certain projects planned primarily to serve normal increasing traffic volumes, and (3) certain projects on the secondary road system which have little or no part in the scheme of military or defense activities.

Autos Pay U. S. \$602,000,000 Taxes

Breakdown of the taxes collected by Uncle Sam from the motorists of the Nation during the 1941 calendar year follows:

Federal gasoline tax, \$371,000,000; lubricating oil, \$44,000,000; imposts on sales of new cars, trucks and motorcycles, \$115,000,000; tires and tubes, \$72,000,000.

If both sides makes you laugh, you are broad-minded.

Vacation Travel by Civilians Urged for Health and Morale

Secretary of the Interior Harold L. Ickes has recommended that civilian travel for purposes of relaxation should be continued as far as consistent with troop and materiel movements, as an aid in the promotion of National health and morale. Pointing out that national park areas would be continued in operation as recreational areas for visitors, the Secretary said that reports submitted by W. Bruce Macnamee, Chief of the United States Travel Bureau of the National Park Service, emphasized that America should profit by the experience of warring nations who "learned early in the war that too long hours at high pressure work resulted in decreased production."

England and the Dominion of Canada have recognized the necessity of civilian relaxation, the report emphasizes in a review of the travel situation in those countries.

"Two years of war have brought bombs, death and destruction, but have not done away with that cherished institution, the British week-end," Mr. Macnamee said. "Despite the stress of conditions, people take their Friday-to-Monday holiday, arguing that long hours of work in the city entitle them to relief."

Canada has found, he continued, that paid vacations are in complete accord with the war effort she has sustained for nearly two and a half years.

Transportation Has Big Job

The National Highway Users Conference, in a recent statement sent to Director Donald Nelson of the War Production Board, gives the following pertinent examples of American dependence upon highway transportation: (1) Use of the passenger automobile by workers in defense industries in getting to and from their jobs; (2) 2,320 cities and towns with

Broken Traffic Stripe Adopted to Save State \$91,000 Yearly

IN the interest of war time economy, Director of Public Works Frank W. Clark has instructed the Division of Highways to substitute a broken three-inch painted traffic stripe for the four-inch solid stripe now in use on the State Highway System.

By breaking the continuous traffic stripe, it is estimated that approximately from 70,000 to 80,000 gallons of paint will be saved annually. The breaks will not exceed 25 feet in length. It is proposed further to use a broken double stripe.

The change will be made legal by an amendment to "Regulation Adopting Distinctive Marking for State Highways Indicating No Driving to the Left Thereof" which Director Clark approved.

"The Department of Public Works realizes that the broken stripe will result in a slight reduction in the efficiency of our striping methods and reduce the conspicuous feature of the continuous traffic lines now in use," Mr. Clark said. "However, I feel that in the interest of war time economy, the change is fully justified. I solicit the fullest cooperation of the motoring public in giving the same strict observance to the broken stripe as it now gives to the continuous stripe."

Mr. Clark said the paint used in striping costs \$1.30 a gallon and that the minimum use of 70,000 gallons a year would mean a saving to the State of \$91,000.

a combined population of 12½ million without any form of local public transportation; (3) 48,000 communities in the Nation completely dependent upon highway transportation; (4) 32,400 rural letter carriers; (5) Additional movement of freight by highway to and from defense plants, and (6) Increased movement of millions of tons of farm products by highway resulting from the increased wartime agriculture production program.—*Contractors and Engineers Monthly.*

The greater the difficulty, the greater the glory.

State and County Provide Funds for Relocation of Highway in San Diego

BY authorizing the City of San Diego to expend funds accruing to it from the 1-cent gas tax for development of streets of major importance and by approving an allocation of \$175,000 of State highway moneys, Director of Public Works Frank W. Clark has cleared the way for completion of San Diego's San Vicente dam and reservoir project.

Involved in the undertaking is the relocation of State Route 198 a section of which will be inundated by the reservoir. Division of costs of this realignment presented a sizeable financial problem to the State, the city and the county of San Diego.

Coincident with approval of highway fund allocations, Clark awarded to Clyde W. Wood of Los Angeles a contract in the sum of \$655,784.70 for grading and surfacing 11.7 miles of the new realignment highway between Lakeside Bridge and Mount Woodson.

The financing of the project, under terms of agreements with the City of San Diego and the County of San Diego, based upon a decision by the California Highway Commission and approved by Clark as to the portion of the cost of the improvement properly chargeable to highway funds is as follows:

\$75,000 State Highway Fund, 93d-94th Fiscal Years

\$100,000 State Highway Fund, vote of Highway Commission

\$100,000 Contribution by San Diego County

\$153,243.90 City of San Diego—1-cent major street funds

\$315,000 Bond Funds, contribution City of San Diego

The total work order allotment is \$742,243.90, including items of contingencies, supplemental work and construction engineering.

A budget recommending the expenditure of \$42,550.15 of 1-cent gas tax funds for the 1943 fiscal year for improvement of Highway 198 at San Vicente Dam, and a supplemental budget recommending the expenditure of \$178,565.23 for the acquisition of right of way and for improvement of streets of major importance and of Highway 198, both submitted by the City of San Diego, were approved by Clark. The latter work will be performed jointly by the Department of Public Works and the City of San Diego.

"I have given my approval to the allocation of State highway funds to further completion of the San Vicente dam and reservoir because San Diego is urgently in need of increased water supplies due to the tremendous increase in defense activities in that area," Clark said. "The project is desired by the Army and the Navy."

Gasoline Tax Revenues Show Downward Trend

Distribution of gasoline throughout California continued to show a gain during February, but an indication of the beginning of a downward trend was seen in the figures announced by the State Board of Equalization.

On the basis of the distribution of 147,604,993 gallons of gasoline, the February motor vehicle fuel tax amounted to \$4,428,149.83, the report stated. This represented a gain of \$113,333.45 or 2.63 per cent over the same month of the previous year.

Board officials have been expecting a drop in gasoline tax income because of the restricted use of tires says the report which pointed out that the 2.63

per cent gain for February, was well below the average gain of 10 per cent recorded during the last year and a half.

The February total also was well under the \$4,993,304.50 assessed against January, 1942, sales which represented a gain of 10.08 per cent over January, 1941.

Sally—Oh, my brother writes me that he is a haberdasher for a railroad.

Mamie—What do you mean—"haberdasher" for a railroad?

Sally—Well, he says he has charge of the ties.

Office Boy—Could I have tomorrow afternoon off, please?

Employer—Ah yes. Your grandmother, I suppose?

Office Boy—Yes, sir. She's making her first parachute jump, you know.

"Drive For Victory" Campaign Started Among Motorists

GEARED to prevent the breakdown of California's transportation facilities, a State-wide, five-point "Drive For Victory" motor vehicle conservation program is being launched. More than 300 civic, business and fraternal organizations, including the California State Chamber of Commerce, the California Newspaper Publishers Association, and the California State Automobile Association are sharing the leadership with the Automobile Club of Southern California in carrying the conservation program to every motorist in the State.

The California motorist, as his important contribution to the all-out car saving campaign on the home front, will be asked:

1. To drive voluntarily under 40 miles an hour as requested by President Roosevelt.

2. To set up a strict personal mileage budget, curtailing all unnecessary driving.

3. To share business driving with friends, neighbors or fellow employees on a turn-about basis.

4. To have his automobile and tires thoroughly inspected regularly by competent mechanics to assure maximum life.

5. To cooperate in the wartime program of staggered business hours to relieve over-loads on available mass transportation facilities.

"This is not alone a problem of the motorist," declared S. L. Mitchell, general manager of the Automobile Club of Southern California. It vitally affects the lives, the work and the home of every Californian.

"Out of the total of 5,248 California communities, 2,240 are served entirely by the motor vehicle. In Los Angeles only 85 square miles of 1,235 square miles are served by rail. Our mass transportation systems are inadequate. Their operators admit that they can not begin to handle the transportation load if any considerable number of private automobiles are taken out of service. The regular street car and bus commuter will feel the pinch of passenger car curtailment.

Our characters are the result of our conduct.

In Memoriam

George W. Hawley

TO HIS numerous friends throughout the State the sudden passing of George W. Hawley, Deputy State Engineer in charge of supervision of dams, came as a shock. Although he had been afflicted with a heart ailment for several years, only a few of his closest associates were aware of the fact, for George went smilingly on with his duties as though he were in the best of health.

After working through the day as usual on March 16th he decided to go out to the Sutter Hospital that evening for what he told friends was just a checkup. The following evening, less than 24 hours later, he had a sudden heart attack and passed away at the hospital.

Mr. Hawley was born in Portland, Oregon, November 19, 1889, the son of James and Margaret Hawley. He attended the elementary and high schools in Portland, and in 1909 entered Stanford University. In 1913 he received a Bachelor of Science Degree in civil engineering and in 1916 the Degree of Engineer.

Following his graduation in 1913 he went to work for the Oregon Electric Company but left that company in 1914 to become construction engineer for the South San Joaquin Irrigation District. He remained with the irrigation district until 1917 during which time he was in charge of construction of Woodward Dam. From 1917 until 1928 he was employed by East Bay Water Company during construc-

tion of the San Pablo Dam and the San Leandro Dam. He rose to the position of Chief Construction Engineer with the company and when it was sold to the East Bay Municipal Utility District he became assistant director of operations for that organization.

Then from 1925 until he entered the State service in 1929 he also maintained a private practice as consulting engineer on hydraulic projects. Following the St. Francis Dam disaster, the Legislature in 1929 placed the supervision of dams in California under the State Engineer in the Division of Water Resources, Department of Public Works, and Mr. Hawley came into State service in charge of dams.

As Deputy State Engineer in charge of dams Hawley traveled to all parts of the State and was widely known in engineering and utility circles. He was a member of the Sigma Xi, honorary engineering society, the American Society of Civil Engineers, the American Water Works Association, the American Concrete Institute and the Sutter Club in Sacramento.

A requiem mass was celebrated in Sacramento on Thursday, March 19th, in the Cathedral of the Blessed Sacrament and the burial took place in the city of Portland, Oregon. Surviving are his wife, Sara Nancy Hawley of Sacramento; a brother, Henry James Hawley of Berkeley, and a sister, Mary E. Hawley of Tracy.



GEORGE W. HAWLEY

BUILDING SUMMARY

The automotive industry in the last 44 years has built in the United States alone 86,168,702 cars, trucks and buses with a wholesale value of \$58,207,700,000. During this period there have been 1,481 different makes of cars built.

VICTORY CAR CLUB

With 1,000 cars in the "pool," a "Victory Car Club" has been organized on a community basis in a defense industry plant near Chicago whereby members "take turns" transporting fellow-workers to their jobs. Informal transportation clubs have been formed in many localities in the Mid-West.

TAXES ADD TO GAS COST

Taxes add 44 per cent to the annual cost of gasoline in the United States, according to studies conducted by the Automobile Club of Southern California.

Fire is the test of gold; adversity of strong men.

Highway Bids and Awards for the Month of March, 1942

MARIN COUNTY—Intersection of Routes 1 and 52 at Alto, about 0.4 mile in length, roadway intersection to be widened and surfaced with crusher run base and plant-mixed surfacing, and provided with channelization and traffic signal facilities. District IV, Route 1, Section C. A. G. Raisch, San Francisco, \$22,938; E. A. Forde, San Anselmo, \$26,090; Lee J. Immel, Berkeley, \$31,784. Contract awarded to J. J. Ongaro, San Anselmo, \$19,636.

MARIN, NAPA AND SONOMA COUNTIES—Oiling roadside vegetation on 173 roadside miles at various locations in District IV. Sheldon Oil Co., Suisun, \$5,980; J. J. Ongaro, San Anselmo, \$6,302. Contract awarded to Pacific Truck Service, Inc., San Jose, \$5,681.

MERCED AND MARIPOSA COUNTIES—Oiling roadside vegetation on 116 roadside miles at various locations in District X. Close Building Supply, Hayward, \$2,560; Pacific Truck Service, Inc., San Jose, \$2,716. Contract awarded to Sheldon Oil Co., Suisun, \$2,619.

MONTEREY COUNTY—Across Salinas River, about 3 miles south of Castroville at Neponset, a bridge to be constructed. District V, Route 56, Section I. A. Soda & Son, Oakland, \$379,904; Earl W. Heple, San Jose, \$422,289. Contract awarded to Harry J. Oser and Peter Sorensen, Redwood City, \$329,950.

MONTEREY COUNTY—Between Castroville and Route 2, near Prunedale, about 5.2 miles to be graded and surfaced with crusher run base and plant-mixed surfacing. District V, Route 22, Section A. J. E. Haddock, Ltd., Pasadena, \$532,224. Contract awarded to Harms Bros., Sacramento, \$478,028.

MONTEREY COUNTY—Between Hames Valley School and East Reservation Boundary, about 13.1 miles to be graded and surfaced with plant-mixed surfacing on cement treated base. District V, Jolon-Bradley. Marshall S. Hanrahan, Redwood City, \$1,047,930. Contract awarded to N. M. Ball Sons, Berkeley, \$996,962.

MONTEREY COUNTY—Between Route 2 near Bradley and Hames Valley School, about 5.9 miles to be graded and surfaced with plant-mixed surfacing on cement treated base. District V, Bradley. J. E. Haddock, Ltd., Pasadena, \$425,263. Contract awarded to Louis Biasotti & Son, Stockton, \$371,584.

MONTEREY COUNTY—Between North Reservation Boundary and Quinado Canyon, about 3.9 miles to be graded and surfaced with cement treated base and plant-mixed surfacing. District V, Jolon-King City. N. M. Ball Sons, Berkeley, \$279,221. Contract awarded to Brown, Deko & Baun, Pismo Beach, \$260,721.

MONTEREY COUNTY—A reinforced concrete slab bridge across Tembladero Slough at Castroville. District V, Route 56, Section I. Earl W. Heple, San Jose, \$20,725; John Careano, San Rafael, \$22,248; Granite Construction Co., Watsonville, \$22,830; Bert P. Ward & Son, San Jose, \$23,235; Harry J. Oser & Peter Sorensen, Redwood City, \$29,975. Contract awarded to Dan Caputo, San Jose, \$17,790.

PLUMAS COUNTY—Between Keddie and Quincy, about 7.0 miles to be plant-mix surfaced. District II, Route 21, Sections C.D. Harms Bros., Sacramento, \$27,668. Contract awarded to Poulos & McEwen, Sacramento, \$26,770.

RIVERSIDE COUNTY—Between 3 miles south of March Field and Dracaea Avenue, about 5.0 miles in length to be graded and surfaced with plant-mixed surfacing on cement treated base. District VIII, Route 78, Section D. Oswald Bros., Los Angeles, \$404,687; Griffith Co., Los Angeles, \$455,731; Fredericksen & Westbrook, Sacramento, \$470,434; J. E. Haddock, Ltd., Pasadena, \$521,254; W. E. Hall Co., Alhambra, \$597,928. Contract awarded to George Herz & Co., San Bernardino, \$393,513.

RIVERSIDE COUNTY—Between Dracaea Avenue and Route 19, about 1.5 miles to be graded and surfaced with plant-mixed surfacing on cement treated base and reinforced concrete overhead crossing to be widened and grade separation structure to be constructed. District VIII, Routes 19 & 78, Sections C, D. J. E. Haddock, Ltd., Pasadena, \$189,433; Oberg Bros., Los Angeles, \$192,193. Contract awarded to George Herz and Co., San Bernardino, \$169,851.

RIVERSIDE COUNTY—Between Riverside and Route 78, about 3.8 miles to be graded and paved with portland cement concrete pavement. District VIII, Route 19, Sections B,C. Matich Bros. & E. L. Yeager, Riverside, \$476,475; Oswald Bros., Los Angeles, \$512,256; United Concrete Pipe Corp., Los Angeles, \$594,572. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$461,997.

SAN DIEGO COUNTY—On Pacific Highway between Enterprise Street and Mission Bay, about 2 miles in length, to be graded, existing pavement to be widened with portland cement concrete base and asphalt concrete pavement to be placed on existing pavement and new portland cement concrete base. District XI, Route 2, San Diego. R. E. Hazard & Sons, San Diego, \$215,354; V. R. Dennis Construction Co., San Diego, \$221,712; Daley Corporation, San Diego, \$225,314. Contract awarded to Griffith Co., Los Angeles, \$124,982.

SAN DIEGO COUNTY—Between Route 77 and 0.6 mile westerly, about 0.6 mile to be graded and surfaced with plant-mixed surfacing. District XI, Route Fallbrook. J. E. Haddock, Ltd., Pasadena, \$36,710; R. L. Oakley, Pasadena, \$39,937; Walter H. Barber, San Diego, \$46,666. Contract awarded to Arthur A. Johnson, Los Angeles, \$29,935.

SAN DIEGO COUNTY—On Pacific Highway between Market Street and Coats Street about 2.8 miles to be graded and paved with asphalt concrete and portland cement. District XI, Route 2, Section S.D. Griffith Co., Los Angeles, \$364,712; Daley Corp., San Diego, \$372,694. Contract awarded to V. R. Dennis Construction Co., San Diego, \$347,975.

SAN DIEGO COUNTY—At Camp Callan Highway Crossing about 14 miles north of San Diego, a reinforced concrete underpass to be constructed, and approaches about 0.5 mile in length to be graded and surfaced with plant-mixed surfacing. District XI, Route 2, Section S.D. F. Fredenburg, South San Francisco, \$80,803; J. E. Haddock, Ltd., Pasadena, \$83,927; V. R. Dennis Construction Co., San Diego, \$85,188. Contract awarded to B. G. Carroll & Harry L. Foster, San Diego, \$78,907.

SAN DIEGO COUNTY—A reinforced concrete bridge to be constructed over Canyada Way, on Robinson Ave., between Eighth Ave. and Tenth Avenue, and about 0.12 mile of approach roadway to be graded and paved with portland cement concrete

pavement. District XI, Robinson Avenue. V. R. Dennis Construction Co., San Diego, \$58,904; R. E. Hazard & Sons, San Diego, \$59,483; J. E. Haddock, Ltd., Pasadena, \$61,502; Oberg Bros., Los Angeles, \$67,659; Contracting Engineers Co., Los Angeles, \$70,486; B. G. Carroll & H. L. Foster, San Diego, \$75,168. Contract awarded to F. Fredenburg, So. San Francisco, \$58,648.

SAN DIEGO COUNTY—Two highway grade separations on Pacific Highway in the city of San Diego, one at Witherby St. and the other at Barnett Avenue, to be constructed. District XI, Route 2, Section San Diego. R. E. Hazard & Sons, San Diego, \$834,314. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$761,938.

SAN DIEGO COUNTY—Between Lakeside Bridge and Mount Woodson, about 11.7 miles to be graded and bituminous surface treatment applied. District XI, Route 198, Section H. M. S. Ross and R. E. Hazard & Sons, San Diego, \$784,313; Maceo Construction Co., Clearwater, \$796,552; W. E. Hall Co., Alhambra, \$820,427. Contract awarded to Clyde W. Wood, Los Angeles, \$655,784.

SOLANO COUNTY—Between 1.2 miles north of Rio Vista and Ryer Island Ferry, washed out portions to be filled and surfaced with untreated rock surfacing. District X, Route 99, Section A. C. C. Steele, Rio Vista, \$18,137; Sheldon Oil Co., Suisun, \$18,115; C. E. Huls, Merced, \$17,312; L. G. Lentz, Sacramento, \$18,035; Oranges Bros. Const. Dept., Stockton, \$15,800. Contract awarded to Claude C. Wood, Lodi, \$15,050.

SOLANO COUNTY—Between Benecia and 3.2 miles north, about 3.9 miles to be graded and surfaced with plant-mixed surfacing on crusher run base and a reinforced concrete bridge to be constructed. District X, Route 74, Section Ben. C. Union Paving Co., San Francisco, \$309,154; Eaton & Smith, San Francisco, \$325,026; Louis Biasotti & Son, Stockton, \$325,501; Harms Bros., Sacramento, \$338,681; C. L. Harney, San Francisco, \$365,517; Fredericksen & Westbrook, Sacramento, \$376,009; Contract awarded to Parish Bros., Sacramento, \$288,421.

SOLANO, SAN JOAQUIN, CALAVERAS AND AMADOR COUNTIES—Oiling 123 miles of roadside vegetation at various locations in District X. Close Building Supply, Hayward, \$2,976; Pacific Truck Service, Inc., San Jose, \$3,034. Contract awarded to Sheldon Oil Co., Suisun, \$2,851.

STANISLAUS, TUOLUMNE, CALAVERAS AND AMADOR COUNTIES—Oiling roadside vegetation on 141 roadside miles at various locations in District X. Close Building Supply, Hayward, \$3,122; Pacific Truck Service, Inc., San Jose, \$3,203; Hayward Building Material Co., Hayward, \$3,029. Contract awarded to Sheldon Oil Co., Suisun, \$3,087.

The new traffic cop had been told by his inspector to overtake and stop a speeding car. Ten minutes later he rang up to report: "Car was being driven by an actress. I stops her, pulls out my notebook. She snatches it, writes her autograph and leaves me standing."

Pedestrian: A man who has two cars, a wife, and an 18-year-old daughter.

State of California
CULBERT L. OLSON, Governor

Department of Public Works

Headquarters: Public Works Building, Twelfth and N Streets, Sacramento

FRANK W. CLARK, Director of Public Works

FRANZ R. SACHSE, Assistant Director

MORGAN KEATON, Deputy Director

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F. W. PANHORST, Bridge Engineer
L. V. CAMPBELL, Engineer of City and Cooperative Projects
R. H. STALNAKER, Equipment Engineer
J. W. VICKREY, Traffic and Safety Engineer
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JNO. H. SKEGGS, District IV, San Francisco
L. H. GIBSON, District V, San Luis Obispo
E. T. SCOTT, District VI, Fresno
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E. Q. SULLIVAN, District VIII, San Bernardino
S. W. LOWDEN (Acting), District IX, Bishop
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CALIFORNIA STATE HIGHWAY SYSTEM



~ LEGEND ~
 Primary Routes ———
 Secondary Routes ———
 Proposed Routes - - - - -

