

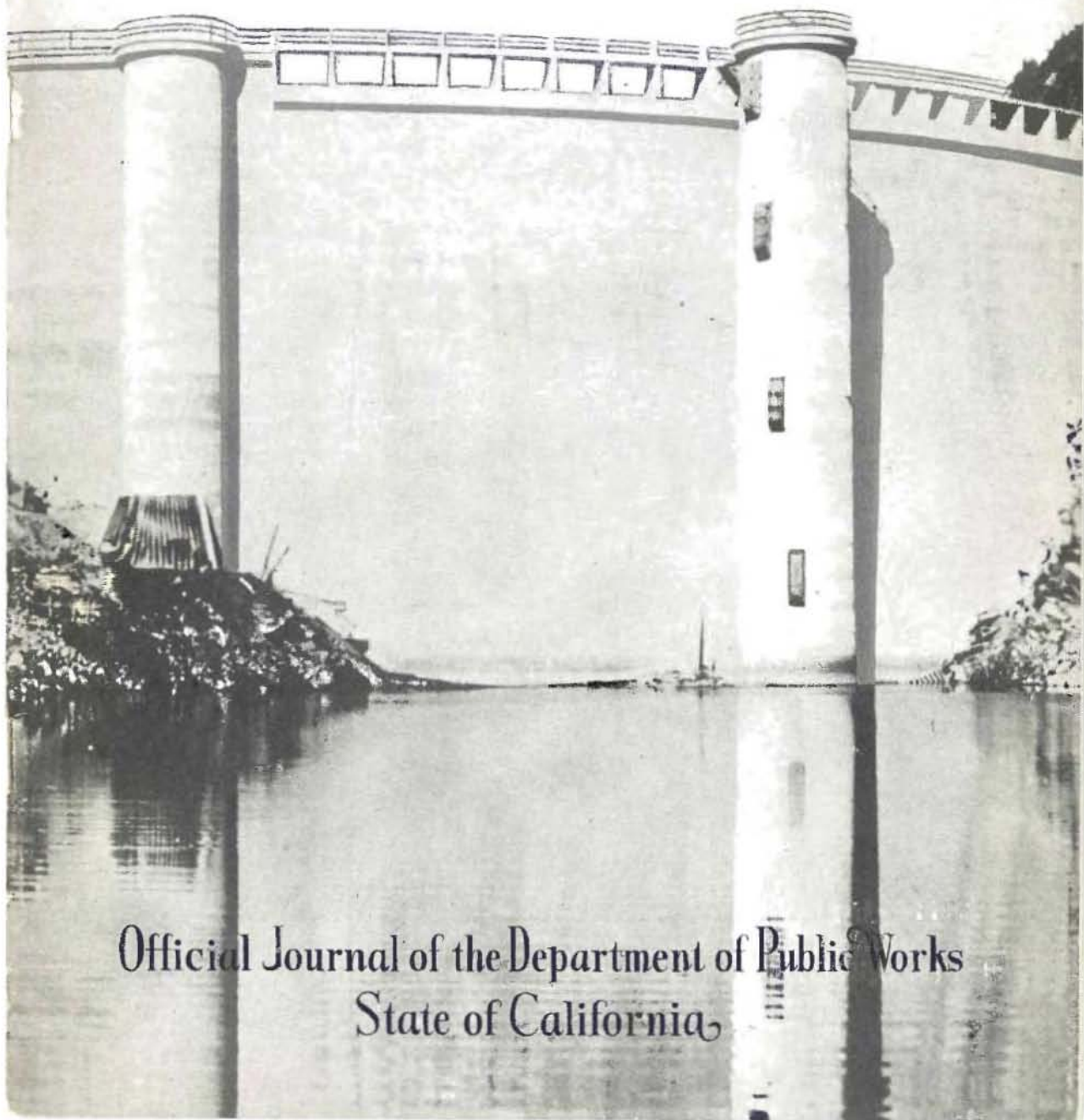
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# California Highways and Public Works

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# Public Works and Prosperity

By TIMOTHY A. REARDON, Member California Highway Commission

**I**T IS an ill wind that does not blow someone some good.

Out of the now departing business depression, there has come for the first time something of public realization of the part that public works can play in staying depression and in promoting prosperity.

Hitherto public works and prosperity has been largely a matter of theoretical discussion among political economists. The economists have preached, but the public has not practiced.

Today the public generally knows the expansion of public works during a time of unemployment and business depression, is a palliative and a remedy, both relieving distress and hastening a cure.

In California the extension of state highway work has proved of inestimable value to holding up business and providing an increased market for labor. One reason for this is the wide distribution of state highway activity. State highway dollars travel into every county of California. They find their way into homes in both metropolitan centers and rural communities.

Added to this is the further helping fact that the State is a cash customer. It does not ask credit.

State highway work is of further value in that it bends itself to a wide distribution among labor. There is much State highway work that requires the service of the skilled mechanic. Much must also be done by the handworker.

The work also requires large purchase of supplies both locally and in manufacturing and business centers.

In past depressions public works have not played the part in supporting business and employment that they could have taken because of the long time that of necessity elapses between the authorization of a project and actual construction. This time is not wasted, but is taken up in preliminary and final engineering, and the development of finances to pay costs.

We have learned in this depression the value of having on hand a reservoir of public improvement projects, upon which the basic engineering has been done and which are quickly available for construction activity in dull and depressed times.



TIMOTHY A. REARDON

If State Highway Engineer C. H. Purcell had not such a reservoir of projects available, it would have been impossible for the California Highway Commission and Colonel Walter E. Garrison, Director of the Department of Public Works to have speeded up the highway program to the extent that it has been advanced at the request and under the instructions of Governor Rolph.

Neither the State, the counties or the cities of California should allow their cupboards to be entirely empty of such projects.

This is the outstanding lesson that eighteen years service as president of the Board of Public Works of San Francisco has taught me. The lesson has been confirmed by my experience as a member of the California Highway Commission.

The difficulty with such a program lies in the insistence of the people concerned for immediate construction of any project that they learn is in contemplation. This can be overcome, however, by proper publicity to the

(Continued on page 7.)

# Governor Rolph Opens New Unit of Bayshore Highway

By COLONEL JNO. H. SKEGGS, District Engineer

**A** MOST IMPORTANT LINK, in so far as the traveling public is concerned, of the Bayshore Highway, between San Mateo and Redwood City, was formally dedicated to the public by Governor Rolph, who made a special trip from Sacramento for the occasion, on the 14th day of May, 1931.

Present with the Governor were Colonel Walter E. Garrison, State Director of Public Works, and C. H. Purcell, State Highway Engineer, from Sacramento; State Highway Commissioner Timothy A. Reardon of San Francisco and Colonel Jno. H. Skeggs, District Engineer, under whose supervision the work had been completed.

Prior to the formal dedication, a group of public spirited organizations and citizens of Redwood City gave a luncheon at Emerald Lake for their honored guests; after which the assemblage proceeded to the south end of the new highway at Redwood City, where a parade of the school children of this city took place reflecting the interest not only of present citizenship, but of the future leaders of this wide-awake community in this highway achievement. The ceremonial, in which the Governor cut the ribbon for formal opening of this 7.4-mile section of the Bayshore Highway, was started at 2 p.m.

Previous to the construction and opening of this section between San Mateo and Redwood City, the Bayshore Highway served as a fast interurban artery to a terminus at Fifth avenue in San Mateo, at which point all travel to the south was forced to proceed to the Peninsula Highway, causing great congestion and the inconvenience to motorists of cross traffic through the towns of San Mateo, Redwood City, Menlo Park and Palo Alto.

## RELIEVES CONGESTION

The opening of the new link, however, by connecting at Redwood City with Washington Street and the Middlefield Road, an excellently paved county highway, gives the motorist assurance that he can travel from the heart of San Francisco to Palo Alto, or East Bay points via the Dumbarton Bridge, without being forced into the overburdened Peninsula Highway at any point. Thus, all the heavily settled urban territory in the twelve-

mile strip of the peninsula between San Mateo and Palo Alto is given the advantage of two arterial highways into San Francisco.

## CONSTRUCTION DIFFICULTIES

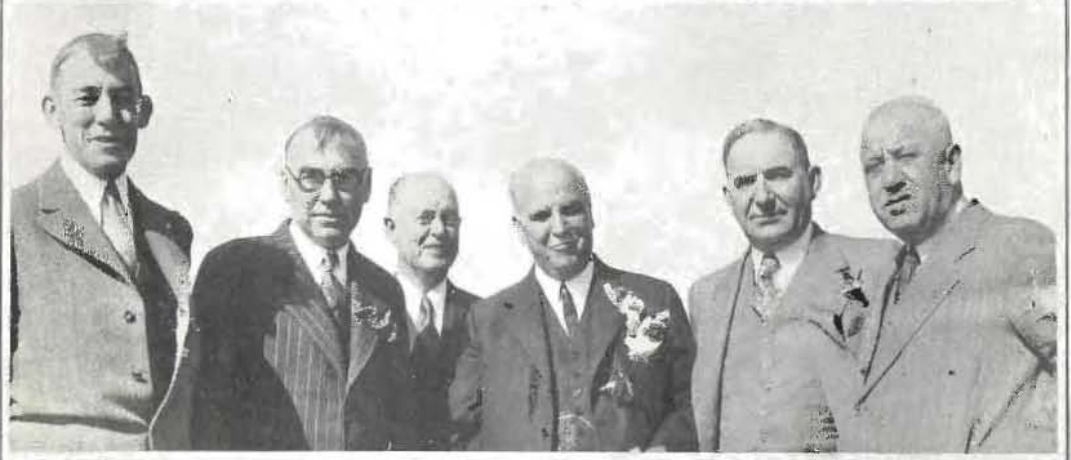
The difficulties of constructing this important strip of highway were many, due to the fact that it traverses for almost its entire length the marshes and the many salt ponds of this territory, where gradual settlement of the roadbed can normally be expected for some years to come. That section of the Bayshore Highway between South San Francisco and Burlingame, which traverses a terrain similar to that of the new section, was first graded in 1924; but, due to gradual settlement, was not considered ready for heavy type concrete pavement until 1930. The first four miles of the new section—namely, between San Mateo and Belmont—were constructed entirely of fill material obtained from the rocky knoll located at Belmont, just west of the Bayshore Highway and south of Harbor Boulevard. The last three miles were constructed by pumping in material from the bay adjacent to the highway between previously constructed levees, a blanket fill, however, of two feet in thickness of the material from Belmont Hill being placed over the hydraulic fill.

The cost of this section of highway was \$450,000 for grading and \$135,000 for rock base and temporary surfacing, bringing the total expenditures to date upon the twenty miles of the Bayshore Highway now open to traffic, from the county line at San Fran-

(Continued on page 40.)

## PICTURES ON OPPOSITE PAGE

Top Picture—Governor Rolph is greeted by delegation of peninsula women; center—Governor Rolph cutting the ribbon, formally opening the Bayshore Highway from San Mateo to Redwood City; lower—Colonel John H. Skeggs, District Engineer headquarters, San Francisco; C. H. Purcell, State Highway Engineer; Mayor Stafford of Redwood City; Governor James Rolph Jr.; Colonel Walter E. Garrison, Director of the Department of Public Works; and Timothy A. Reardon, member of the California Highway Commission.



## California's Highway Leadership

By Dr. L. I. HEWES, Deputy Chief Engineer, U. S. Bureau of Public Roads, San Francisco Headquarters\*

AT A DINNER some years ago in the Palace Hotel, in honor of Dr. Swazey, who makes the chasses for the world's great telescopes, the guest of honor said the engineer bridged the gap between science and industry. That is particularly true in respect to the modern highway engineer. The roads of our country prior to 1893 had received little or no engineering. The present epoch is the epoch of highway transportation and the engineer has found his job in the application of an increasingly complex body of scientific facts to highway betterment.

This application of science to highways has been particularly successful in California. This State has always been an inspiration to the entire country in her leadership. California was first in a number of very important highway developments. It was the California State Highway Department that first established concrete as a standard State pavement. It was California that passed the first real contractor's prequalification law, recently followed by Oregon and Nevada. It was in California that the first bridges were constructed with inverted vertical grades. It was California that introduced the new asphaltic oil road mix and built such structures as the Rincon Seawall, and it is California that now dares to set up continually higher standards of design.

There are times when we have a conviction of the complete achievement. Roads such as the new three-way pavement on beautiful lines through Rose Canyon near San Diego are examples of what I mean. We almost know this highway will be adequate for all time.

I say "almost" advisedly. The march of time is an inexorable force. No man can hope for the complete survival of his ideas in time. Time is invincible. Law and science strive in vain for permanency in time. You may see much of what I mean in the films that are now being shown in San Francisco of the city of 1906—Market Street at the time of the fire. It is a remarkable scene, a living record of a quarter of a century past. You have a high sense of the progress of the years. There are the poor dirty cobble pavements, the little cable cars with a toy turntable at the Ferry

Building, the absurd two-story slow automobiles high above the street, the long skirts of women sweeping the pavement, a confused movement of slow traffic. You gaze with amazement, you recognize in a flash that inexorable law of the forward movement that time must bring.

And so we can not be too sure of our present standards. The engineers who gear science into industry must be alert and willing to progress. Law must not lag too far behind in formulating scientific discovery.

New ideas come constantly. A few days ago I had the pleasure of a call from Mrs. W. L. Lawton, who is making a study of California roadsides—a survey sponsored by the American Nature Association. We are thinking new thoughts about our roadsides. I told Mrs. Lawton of some things the California State Division of Highways was doing for roadside improvement. There is to me no more inspiring effort for roadside beauty than that struggle that is being waged to establish an avenue of trees along the highway south of Bakersfield—a struggle of years against heavy odds and now successful. Too often the landscape people try to force beautiful effects exclusively through the engineering. I think Mr. Purcell is giving a noteworthy example of how to restore roadside beauty in his work on the Skyline Boulevard. Here a log grillage against the stony slopes offers place for earth seed beds behind the horizontal logs and soon those obstinate raw cut slopes will be covered with pleasing vegetation. We may, twenty-five years hence, look back to pictures of ugly sign-littered highways with surprise and amusement. We can only strive now to move in the right direction.

The engineer dealing with facts of nature can not develop his imagination in all directions. He must follow closely scientific discovery and school himself to foresee its application. He is now in the midst of a vast new movement—this era of enormous highway traffic. His vision is primarily concerned with the realities of that action. In California, for example, highway grading is often extremely expensive. Roadbed costs here are greater than in the prairie states like Illinois and Iowa that are setting up records for yearly pavement mileage. Such mountains as ours tax the genius of the engineer in his design and in his allocation of funds.

\* This article contains the substances of an address given by Dr. Hewes at a dinner given in his honor at Sacramento on April 22, 1931, at which Assemblyman George Biggar, chairman of the Assembly Roads and Highways Committee, was the host.

Federal funds have helped California in considerable measure. For National Forest highways about 9,000,000; for the Federal Highway System about 38,000,000; and several million for the four national parks. We are finding it pleasant to work with the California Division of Highways. One of the happy items in the Bureau of Public Roads is its colonization. We have supplied states with engineers. When we gave you Purcell we felt that business in still another state was on an assured sound foundation.

We engineers are not much worried in this State nor in others about details of engineering nor with the immediate construction problems. If, however, we keep our vision broad, we must realize that time is also preparing for us its inexorable test. We must realize that there is always an irresistible forward surge of economic adjustment. We must admit that an element of change similar to that which has transformed the Market Street of 1906, will operate upon our own work of 1931. We can not be too vigilant in our effort to know in what direction that change will move us. It is our duty to furnish the record of the present highway era to you of the law-making body who must deal in a broader way with the great problems of economics and the future operation of our modern highways.

## Appointments Made To Highway Patrol

**T**EMPORARY appointment of fifteen traffic officers to serve as members of the California Highway Patrol was announced today by Superintendent E. Raymond Cato.

The men have been assigned to duty in Sacramento, Yolo, Lake, Modoc, Mariposa, Mono and Inyo counties, it was announced, and will be used to augment existing squads and to assist in working out plans for a permanent night patrol. The men were all appointed from the lists submitted by the Boards of Supervisors in the respective counties.

Superintendent Cato also announced the appointment of Clarence Warden, former foreman of the State highway maintenance shops at Sacramento, to act as traveling equipment inspector for the patrol. Warden will travel from county to county checking up equipment of the men. He will also assist in the establishing of district servicing stations. The names of traffic officers appointed follow:

## Merit Citations Are Awarded to 11 Traffic Officers

Eleven members of the California Highway Patrol were cited during the month of April for services of an unusually commendable nature, Superintendent E. Raymond Cato announced today.

Seven of the men received letters of commendation because they were instrumental in capturing thirteen automobile thieves during the month. These were L. R. Frye, O. H. Ellis and W. H. Rutherford of Santa Barbara County; C. A. Loomis of San Luis Obispo County; E. L. Stuart of San Joaquin County; A. Rawles of Mendocino County, and Leo Ramsey of Monterey County.

Officer Ramsey was commended particularly because, after being called at 2 o'clock in the morning from his bed, he arose and checked hotels, hospitals and other places until two men who had stolen a car were found.

L. E. Euer, border checker in Humboldt County, was cited because he was instrumental in the arrest of a man and woman wanted for passing worthless checks.

J. L. Degnan, a border checker in the same county, was cited for apprehending two runaway boys from Portland, Oregon.

R. A. Paquette and B. H. Combs, traffic officers of Kern County, were commended for the arrest of a man engaged in the smuggling of Chinese across the border. The man arrested and the Chinese were turned over to the Federal authorities.

### FRONT COVER PICTURE

Picture on the front cover of this issue of CALIFORNIA HIGHWAYS AND PUBLIC WORKS is a view of the Junical Dam in Santa Barbara County.

And it came to pass that a green business man read in black and white that business is in the red. And lo, when he beheld these tidings, he became blue, for he was already yellow.—Indigoitis.

Sacramento County—E. L. Bond, H. C. Cruse, F. A. Gabrielli, L. J. Jarvis and Francis J. Perry.

Yolo County—J. E. Dickey, E. J. Englehart, Chas. A. Leathers, J. F. Granucci.

Lake County—C. R. Burris.

Modoc County—F. W. Caldwell.

Mono County—N. G. Nicoll.

Mariposa County—J. H. Ellingham, G. M. Bertken.

Inyo County—L. J. Roeper.

## Building Bridges By Revenue Bonds

By CHARLES C. CARLETON, Chief, Division of Contracts and Rights of Way, State Department of Public Works \*

THE recent decision of the Supreme Court of California upholding the constitutionality of the California Toll Bridge Authority Act of 1929 (*California Toll Bridge Authority et al. vs. Wentworth, etc.*, 81 Cal. Dec. 615), completes a coast-to-coast hookup of favorable court ruling sustaining the validity of the financial plan of meeting the cost of construction of large public projects, such as bridges and tunnels, through the medium of their own earnings derived from tolls paid by the actual users of such conveniences rather than by the old-fashioned method of issuing bonds secured by taxes on general property. This decision, we believe, is the first expression of a western court in a State case holding that revenue bonds retired entirely from tolls do not violate the limitations usually prescribed by state constitutions that debts or liabilities of the states exceeding a fixed amount (in California, \$300,000) shall not be created without a vote of the people; and that, as a matter of law, they do not constitute the "debts" or "liabilities" at all, for the very explicit reason that the credit of the states is not pledged in such bonds.

### SOLUTION OF TOLL BRIDGE PROBLEM

Two years ago State officials of California were approached to aid in the solution of the toll bridge problem rapidly developing in this State.

Several private companies had, with an investment of about \$20,000,000, erected large toll structures in key positions in the highway system of the State, and for many years it had been the dream of San Francisco, Oakland and other municipalities bordering San Francisco Bay to span that great expanse of water with a colossal bridge.

Local officials had been swamped with applications of private promoters to construct a privately-owned bridge or tube connecting the city of San Francisco with the county of Alameda on the opposite shore.

### NEW POLICY ADOPTED

While credit is due the initiative and enterprise of private capital in overcoming many obstacles and actually completing several fine toll bridges, now serving traffic, yet it seemed as if by spontaneous agreement immediately



C. C. CARLETON

prior to the 1929 session of the California Legislature, State, county and city officials and civic leaders concluded that the day of privately promoted toll bridge was ended in this State; and in the future in extraordinary cases where the cost of new structures would be so vast that it would deplete current highway funds the structures should be financed as publicly owned projects through the use of revenue bonds with the object in view of them becoming free bridges at the earliest possible time.

The Legislature of 1929 quickly grasped the proposition and by practically unanimous action passed the enabling legislation which has now been upheld by the Supreme Court of the United States.

Moreover the Legislature adopted the following ringing declaration of State policy, "It is hereby declared to be the policy of the State of California to acquire and own all toll bridges situated upon or along any part of the highways of the State, with the end in

\* Reprinted from the United States Daily.



view of ultimately eliminating all toll charges thereon."

Nothing has occurred the past two years that has altered or diminished the determination of California to acquire and own the future, necessary toll bridges in its system of highways and to make them pay for and free themselves as soon as practicable.

The timely decision of our Supreme Court has given a great impetus to this movement.

#### SAN FRANCISCO BAY BRIDGE

The first project to be undertaken under the provisions of the California Toll Bridge Authority Act and through the California Toll Bridge Authority and the State Department of Public Works is a huge bridge about four miles and one-half in length, extending from the city of San Francisco to Goat (also known as Yerba Buena) Island in San Francisco Bay; thence to the city of Oakland, the cost of which is estimated at \$75,000,000.

The location of the bridge has been determined after a thorough survey of navigation needs, vehicular traffic movements, and terminal locations, and extensive borings made to ascertain foundation conditions, under the direction of a special commission appointed by the President of the United States and the Governor of the State of California, known as the Hoover-Young Bay Bridge Commission.

Before its recent adjournment the Congress of the United States passed an act granting a permit for the construction of the bridge. The Legislature of California now in session is passing an appropriation of \$650,000 for necessary plans and estimates which appropriation will be returned to the State Treasury out of the first sale of revenue bonds.

Governor James Rolph, Jr., of California has given orders that the California Toll Bridge Authority and the State Department of Public Works "go right ahead with the work, with no delay."

The dream of the residents of the region about the Golden Gate is about to become a reality.

#### THE COURT'S DECISION

The Supreme Court of California in its decision comments on the fact that the revenue bond plan of financing toll bridges has been held to be constitutional by the highest courts of the following states, citing certain leading cases in their respective jurisdictions.

West Virginia: *Bates vs. State Bridge Commission et al., etc.* 153 S. E. 305.

Alabama: *Alabama State Bridge Corporation vs. Smith*, 116 So. 695.

Kentucky: *Estes vs. State Highway Commission*, 29 S. W. (2d) 583.

Arkansas: *Bush vs. Martineau*, 295 S. W. 9.

These states are already well embarked on large publicly-owned toll bridge enterprises.

No article on this subject would be complete without acknowledgement to The Port of New York Authority for its splendid accomplishments under the revenue bond plan of financing. The able management of that public corporation, created jointly by the States of New York and New Jersey, to carry out the terms of The Port Treaty adopted by the two states, has developed this method to the highest degree of safety and saleability.

Without ultimate cost to the general taxpayers of those states great bridges, such as the spectacular George Washington Bridge across the Hudson River, thus financed, are springing into existence, and a new tunnel under the Hudson River and an immense freight terminal building will in the not distant future become available to public use.

Vast undertakings, which, if dependent upon the issuance of property tax-secured bonds would be long deferred or, perhaps, never erected, are through their own earnings literally pulling themselves up into place by their own financial boot straps.

With such notable examples of signal success elsewhere California enters upon its own ambitious bridge programs with sanguine spirit.

**The Text of the Decision of the  
Supreme Court of the San Fran-  
cisco Bay Bridge Case will be  
found on page 19.**

#### PUBLIC WORKS AND PROSPERITY

(Continued from page 1.)

purposes which the particular project is intended to serve, and by educating the people to the value of protection against depression through having always on hand a supply of immediately available improvement projects which have been thoughtfully considered in advance and upon which the basic engineering has been carefully completed.

Such a program eliminates the danger of undertaking projects, conceived in moments of hysteria, and undertaken without proper economic and engineering facts.

Such a public works policy is the best and cheapest insurance against adversity that states, counties or cities can purchase.

# California Prepares for Tourist Crop

By FRANK G. SNOOK, Chief of the Division of Motor Vehicles

**C**ALIFORNIA is ready to receive what we confidently believe will be the biggest crop of out-of-state tourists in her history.

More than ever we believe that California will continue to be the nation's motoring ground this season for already vacationists from every state have begun to pour over our borders.



FRANK G. SNOOK

Many of these will remain in California to make their permanent homes here. The majority, however, are coming simply for a good time, to enjoy the balmy weather and ideal motoring conditions that no place affords like the Pacific Coast.

Anticipating this annual influx of tourists we have put our border "courtesy" checking stations in order. These stations afford us the opportunity for giving an official

welcome to the visitors as well as to explain to them our motoring regulations and the details of our registration laws.

In southern California we have border stations at Yuma, at Daggett and at Yermo, these stations covering the principal routes into the State.

In the far north we have stations at Clam Beach and at Dunsmuir covering the Redwood Highway and Pacific Highway respectively.

By the time this is in print we will have opened our stations at Donner Lake and Myers, covering the two principal routes over the high Sierra.

At each of these stations a competent staff of checkers is maintained under the direction of an experienced traffic officer. These men have orders to treat motorists entering the State with the utmost courtesy.

Records of all cars entering the State with

license plates other than those issued by California are kept. If the motorist intends to remain in the State less than ten days he is advised to proceed.

If he expects to remain longer, he is advised to take out a visitor's permit which gives him the right to remain in the State six months without securing a California license. No other state in the Union has such extremely liberal provisions.

Our men at these stations are able to give the tourists much valuable information concerning the points of scenic interest in the State and the best roads. Our whole endeavor is to have the tourist leave the station with a feeling that he is in a friendly land where he will be well received.

Our men at the stations carry on a constant campaign of propaganda for safety and safe driving. Tourists are told of the necessity of careful driving and of keeping within the speed limit.

The automobile tourist crop is worth many thousands of dollars to California and greater numbers should be encouraged to come here for no place in the world can offer such ideal motoring conditions so many days in the year.

Much has been said about California's motor vehicle death rate and the large number of people killed and injured here every year.

While there are entirely too many accidents of a fatal nature in California and most of them could be prevented by more careful driving, comparisons made with other states will be most unfair unless the death rate be computed against gasoline consumption.

Because our climate permits all-year driving of motor vehicles, the accident hazard per car is necessarily higher than in states where driving is impossible from three to six months in the year. In other words the vehicle that travels most in a year will necessarily be exposed to the greater accident hazard.

Figured on gasoline consumption 19 states have a higher motor vehicle death rate than California. Our rate of 1.81 deaths per million gallons of gasoline consumed is well below the general average of 1.99 for 34 states.

Tourists, therefore, who come to our State are actually safer driving on our highways than in other states as the figures will show.

And factors of safety become greater every year as our splendid road-building program is developed and as more men are added to the California Highway Patrol to protect the motorists.

The importance of our tourist crop is best evidenced by the fact that we issued visitors permits for 91,247 cars last year. We estimate these cars contained at least three persons each which would give a grand total of some 275,000 persons entering the State by motor. Many thousands more of whom we have no records were visitors.

We believe the average sum spent by these tourists in our State was at least \$50 each.

In this connection it may be well to remind our own people that the "playtime" season is approaching when traffic is heaviest on roads leading to mountain and seaside resorts and to remind them of the necessity of careful preparations for the vacation motor trip and of careful driving while on the roads.

No motorist should endanger the lives of himself, his family and others by starting out with a car equipped with faulty brakes, glaring headlights or defective vulnerable parts.

Observe the law with respect to loading baggage and camping equipment. Nothing should extend farther than the hub caps on the left of the vehicle or more than six inches beyond the hub caps on the right. License plates must not be covered and spare tires may not be carried on the front of the vehicle.

Respect the law while on the highways. California now has a highway patrol second to none under the able leadership of Captain E. Raymond Cato. Cato's men are on the roads to help and protect you on your vacation trip.

When driving on steep roads in the mountains use your low and second gears. They were put on the car for that purpose. Keep well to the right at all times but particularly on the curves.

#### APPOINTMENT IS ANNOUNCED

Eric Cullinward, former newspaper man of Los Angeles and San Francisco, has been appointed secretary of the California Highway Commission and editor of CALIFORNIA HIGHWAYS AND PUBLIC WORKS, succeeding George C. Mansfield. Mr. Cullinward will assume his duties on June 1st.

A survey of the origin and destination of heavy traffic was made recently in San Francisco for the purpose of working out new routings for trucks plying between the city's water front and its 75 commercial and industrial areas.

## Sale of "Right to View" Proposed as Billboard Solution

A PLAN for protecting rural roadside scenery against too many arguments to purchase this, that and the other thing, by putting the question up to roadside property owners instead of the police, was adopted in Washington by the second meeting of a special Conference on Roadside Business and Rural Beauty.

The plan, formally accepted by representatives of the billboard interests, and automobile and farm groups, provides that rural views can be preserved if three-fourths of the owners of certain strips of land want to keep the area cleared of billboards and other commercial uses. And in return for giving up revenues from rentals of roadside space, this plan would have state and local authorities recompense the landowners by "greatly enhancing" their properties through gifts of copious plantings of trees and shrubbery, for the purpose of creating a scenic highway system.

The plan was presented in the form of a model bill drawn and put before the meeting by Herbert U. Nelson, Executive Secretary of the National Association of Real Estate Boards that, with other national organizations, has been working for years on the question of possible control of commercial uses that destroy roadside beauty.

Called a just and sound solution of the billboard problem, by Senator George Wharton Pepper (Pennsylvania) chairman of the conference, the Nelson plan is the only plan advanced thus far that does not attack the question from the heretofore unsuccessful point of view of using the police power of the State to clear scenic spots of the "appealing" signs.

This plan, giving leeway to the billboard interests and accepted by their representatives at the conference, cites "necessary" exceptions where boards and signs may be used in scenic areas, but makes it possible for three-fourths of the owners of roadside land to petition the proper authorities to bar commercial uses. With such a petition, the majority owners of not less than a half mile or more than ten miles of roadside land would convey their "rights to the view" to the township, county or state, and the rights of the remaining one-fourth of the owners then would be taken by condemnation proceedings.

(Continued on page 11.)

# Relief Results from Relief Employment

By L. H. GIBSON, District Engineer

THE results obtained from the establishment of unemployment camps, and the enlargement of maintenance crews to take care of more of the unemployed, has demonstrated the great good that has been performed by the Department of Public Works through its policy in assisting in the nation-wide relief.



L. H. GIBSON

An announcement of the relief program did not meet with immediate enthusiastic response among the Engineers of the Division of Highways, but it must be stated that as soon as the work was started, knowledge gained of

the actual need of the men employed in the emergency, created great sympathy among all of the engineers and other employees of the Division of Highways, and it was only a short time before every individual was lending his utmost assistance to help the good work along. "Efficiency with Economy" is a rule rather than a slogan in the Division of Highways. Consequently it must be confessed that the expenditure of hundreds of thousands of dollars through the use of hand labor was at first viewed with some alarm.

With the exception of those men obtained through the State Employment Bureau at Sacramento and San Francisco, men employed in District V were hired only after submitting a signed questionnaire which detailed among other things the number of dependents; whether any other members of the family were contributing the support; the matter of sickness or disability in the family, and the period during which the individual had been without employment. References which might be used to verify statements in the questionnaire were also given. Innumerable applications for employment were made, and only those who showed the greatest need for employment were hired. It must be confessed plenty of those were found on the list.

Employment of the needy has continued through the Spring months. The character of labor furnished by these men has been excellent, and they have demonstrated that for the most part they appreciated the effort of the State to give them assistance. Men have not been allowed to shirk in any way, but are

expected to give their best efforts to the job to which they are assigned. On the other hand, the effort put forth by the individual is the chief consideration in his continued employment. No man was discharged because he can not do as much work as others in the organization. What counts is how he tries.

Most of the men employed on the maintenance crews were given three days employment per week which permitted of assisting twice as many men as would have been possible with the same funds had continuous employment been furnished.

Statistics compiled from the questionnaires of those employed were interesting. Throughout District V the number of dependents of each employee has averaged about four to the man, which means that for every man who was employed, five individuals were being clothed, housed and fed. Up to the present time District V has been taking care of about 600 of the so-called unemployed. This shows that the District has been caring for about 3000 individuals, each group of dependents receiving from \$250 to \$300 during the period employed. As District V is only one in ten highway districts in California, the extent of relief furnished by the Department of Public Works is readily seen.

## FINAL PAYMENT

"Judge," said the contractor to his lawyer, "Doctor says I got about a month to live. I want to make my will.

"Fix it so my overdraft in the First National goes to my wife. She can explain it to them.

"My equity in my automobile I want to go to my son. He will have to go to work then to meet the payments.

"Give my unpaid bills to the bonding company. They took some awful chances on me and are entitled to something.

"That new-fangled machine on the job, I want the resident engineer to have. He made me buy it; maybe he can make it work.

"My retained percentage, give to the State. I never expect to get it, anyway.

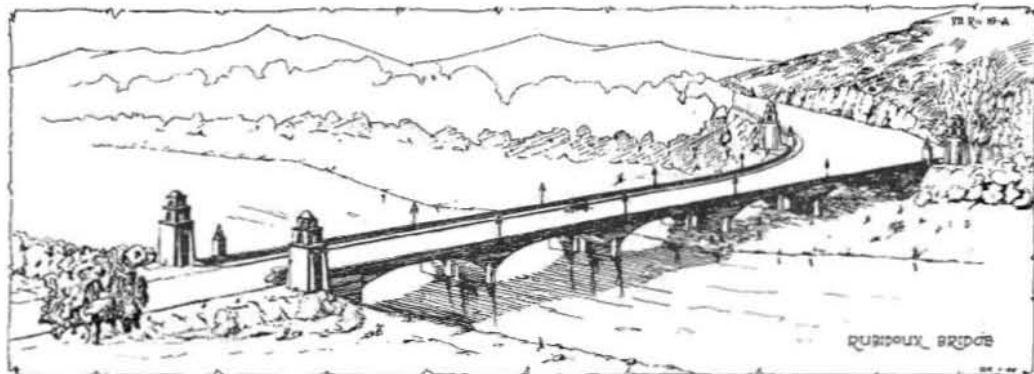
"My equipment, give to the junk man. He has had his eye on it for several years.

"My keg I want to go to my bootlegger. I hope it costs him as much to keep it wet as it has me.

"I want you to handle the funeral for me, Judge. Any undertaker will do, but I want these six material men for pallbearers. They have carried me so long they might as well finish the job."

—Exchange.

## The Rubidoux Bridge at Riverside



The rapid increase in quantity and speed of traffic carried by the Rubidoux bridge over the Santa Ana River in Riverside County has made it imperative that major alterations be accomplished on the structure. The existing bridge was built in 1923 by Riverside County. It consists of five earth-filled barrel arches with a total length of approximately 550 feet. The roadway is but twenty-three feet wide with no sidewalks. Due to the fact that the site of the bridge is adjacent to the city limits and provides a main entrance of Riverside, great care was taken to insure an architecturally beautiful structure. A perfect balance of arch dimensions combined with carefully selected decorative details of Spanish motif have secured this result. The bridge is amply strong to carry modern loads but has become dangerously narrow and is further antedated by a sharp fifty-foot radius curve approaching its eastern end.

Consideration of the problem by the B-ridge Department early lead to the conclusion that it would be highly desirable to preserve the existing structure but increase its capacity by combining it with a duplicate bridge built to one side. This construction will also permit the substitution of an approach curve of five hundred feet radius with proper superelevation for the present hazardous fifty-foot radius curve. The new roadway will be forty feet wide and two five-foot sidewalks will be provided. The estimated cost of this change amounts to \$150,000.

As completed all the desirable details of the former bridge will be preserved while complete modernization will be realized. Architecturally the enlarged structure will not differ from the existing bridge and complete harmony of appearance will be maintained. The accompanying artists sketch illustrates the completed bridge.

### SALE OF "RIGHT TO VIEW" PROPOSED AS BILLBOARD SOLUTION

(Continued from page 9.)

In such restricted sections exceptions are made for signs offering the property for sale or for products manufactured or grown on the premises.

Commenting on Mr. Nelson's bill which will be taken to the various organizations comprising the conference for official action by them, and possibly presented to the next legislatures in the various states, Senator Pepper said:

"This solution is novel but sound. Many interests have sought to have the police power of the state employed to protect highway beauty by forbidding commercial uses in

scenic spots. I doubt whether the police power will be regarded by the courts in the future as extending beyond the preservation of health and safety in this connection.

"Mr. Nelson's plan seems to me to be the most feasible one, first, because it is both just and effective, and second, because it does not make a demand upon the courts greater than they are likely to respond to. It looks to me as though this is the best solution yet produced. I wonder that no one thought of this way out before."

New highways across the jungles of British South Africa are dangerous to tourists, and one driver says he was chased by four leopards and two elephants. However, he probably escaped road hogs.—*Highway Topics.*

## Clearing the Highways of Snow

By J. W. VIECKRBY, District Maintenance Engineer, District Three \*

**P**LOWING snow is perhaps the most spectacular operation in connection with maintenance. It appeals most vividly to the individual imagination for it creates a very beautiful picture when accomplished with a rotary plow, and it usually means the difference between an unusable and a usable road.

Snow removal operations, to provide access to the recreational areas, where a depth sufficient to permit winter sports can be assured, has expanded tremendously in the last three years. The consequent costs have gone up at about the same angle that the snowflake comes down. The increasing flow of traffic over the roads opened in a good index to the demand, and the continuous enthusiasm of



Showing result of fast thawing shortly after removal of snow near Donner Summit, 1931.

the thousands of snow sport devotees indicates that winter sports and snow frolics, at locations accessible to automobile traffic, have become a permanent part of California's list of recreations.

A Sunday traffic count made at the Auburn ski jump, when Route 37 was open only to Emigrant Gap, showed approximately 750 machines above the snow line. On February 15, the last day of the Truckee-Tahoe Dog Derby, there were approximately five hundred machines parked on the Truckee streets. Donner Summit was closed at the time. On February 22 there were about 1000 machines at Truckee and Tahoe City. The count going



Rotary plow on dual motored four-wheel-drive truck, making first cut through two feet of snow, west of Soda Springs.

east over Donner Summit that day was between 450 and 500.

Snow removal work during the winter just passed below the 5000-foot contour was of very small consequence compared with a year ago. The snow equipment provided for such areas lay idle or was moved to higher elevations where the intensity of the storms, over a smaller area, made up any deficiency in the work to be done that may have seemed apparent when viewing the situation from the valley.

The first storm of the year began on Donner Summit on November 15, and during the night became a terrific blizzard driven by a 66-mile wind. Machines attempting to get



Rotary plow on four-wheel-drive truck, widening roadway through cut on Donner Summit, February, 1931.

\* The pictures for this article were furnished by D. D. Greeley, Superintendent of Equipment.



Push plow on three-ton, four-wheel-drive truck, clearing roadway on Donner grade, February, 1931.



Dual motored four-wheel-drive truck with latest type rotary plow, breaking through plug just west of Donner Summit, February, 1931.

over the summit before it closed crowded in so fast that the snow plows could not operate efficiently. Any idea of keeping the road open had to be abandoned and all effort made to get out the stranded machines and occupants. At times the storm was so severe that a man could not walk through the summit cut. The maintenance men spent all one night and most of the next day getting people out of the storm. When the skies cleared on the 19th, there was five feet of snow piled up, and thirty machines were snowed in; some completely covered. The rotary plows were started again. The road was plowed out, the machines rescued, traffic was resumed, and steel gates installed on either side of the summit to prevent a recurrence.

The intensity and duration of the storms in this area have emphasized very emphatically the necessity of fast equipment for snow removal work. Experiences to date have indicated that successful and satisfactory snow removal is dependent on adequate equipment,

both quality and quantity, and that it must be designed for the locality in which it is to work.

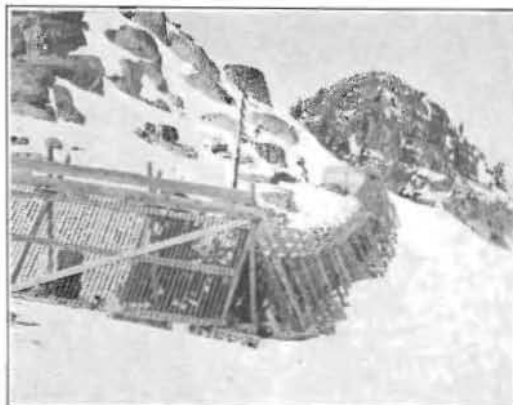
Early in our snow removal work we discarded all tractor types of power because of lack of speed, and installed all plows on pneumatic tired trucks.

Light trucks with low moldboard plows handle the snow very satisfactorily below an elevation of 3000 feet. Above that elevation and up to 5500 feet heavier trucks with slightly higher plows are very effective, especially with a little assistance from a rotary to widen cuts. Above 5500 feet rotary plows and four-wheel drive trucks are employed practically all the time to widen trenches and dispose of windrows made by the push plows.

Each piece of equipment is kept very close to its assigned section during the entire snow season, and as soon as indications of an impending storm are apparent it is made



Dual motored four-wheel-drive truck with rotary plow, Donner Summit, 1930-31.



A typical snow fence.

ready for snow work. When the snow reaches a depth of four inches on the sections below 5500 feet the plows are started and operations carried on continuously for the duration of the storm. The gates are closed and locked and watchmen go on duty to prevent machines attempting the higher elevations. After the storm the road between the gates is cleared and traffic resumed. Barometers are kept at all maintenance stations in the snow area as an aid to determining weather conditions.

The work is very strenuous and none except the men who are accustomed to cold and severe weather can stand the strain. On the night shifts the conditions are very severe indeed, and it is not practical to attempt to operate



Dual motored four-wheel-drive truck with rotary plow operating east of Soda Springs, near Donner Lake summit, February, 1931.

equipment which does not provide an enclosed cab and the very best lights. The trucks at Truckee have come in off the night shifts with icicles twelve inches long hanging inside the cabs, and a solid mass of ice extending from the radiators to the plows. It has been estimated that the trucks have come off shift at times carrying from two to two and one-half tons of ice.

Steam-heated truck sheds are provided at the maintenance yards in the higher elevations, and an adequate supply of hot water is always available. The trucks are cleaned of ice and serviced at the end of each shift, and between storms they are thoroughly checked over and necessary adjustment made to prevent breakdowns on the road.

The demand for open roads is rapidly extending the snow removal work to all routes leading into the Sierra Mountains that are surfaced to withstand winter traffic, and is rapidly becoming a major item of traffic service.

The costs are increasing as rapidly as the service is being extended. During the winter

## Snow Surveys Show Increasing Danger of Water Shortage

**A**LTHOUGH the principal snow surveys as a basis for run-off estimates were made in late March and early April and reported in the April 1 bulletin, additional surveys have been made in late April and early May at the key snow courses to furnish information for possible modification of earlier estimates and to indicate the extent of melting since April 1. These later surveys complete the seasonal record of monthly surveys, February to May, for the key snow courses.

The average precipitation to May 1 in per cent of normal to May 1 is about as follows for the various stream basins: Upper Sacramento, Pit, McCloud, Feather, and Yuba, 58 per cent; American, 60 per cent; Mokelumne, 64 per cent; Stanislaus, 72 per cent; Tuolumne, 65 per cent; Merced, 57 per cent; Mono, 57 per cent; Upper San Joaquin, 51 per cent; Owens, varying from 44 to 59 per cent; Kings, Kaweah and Kern 62 per cent, and Los Angeles, San Gabriel and Santa Ana from 65 to 80 per cent.

The lack of normal precipitation in April warrants a downward modification of the estimates given on April 1 for seasonal run-off. The estimated seasonal run-off for the Upper Sacramento River is reduced to 34 per cent or 2 per cent less than that of 1924; for the entire Sacramento Basin, including tributaries, the revised estimate is 30 per cent or the same as 1924, and for the entire Sacramento-San Joaquin drainage, including tributaries, 30 per cent or 2 per cent above the 1924 percentage. With a larger rice acreage in the Sacramento Valley than in 1924, these data indicate for the valley and delta even more severe conditions of water supply than in that year, and a corresponding salinity encroachment in the delta area equaling or possibly exceeding the 1924 invasion.

The Soviet government of Russia plans to spend one and a quarter billion dollars on the construction of 5,000,000 miles of roads during a five year period, largely under the direction of 38 American highway specialists.

of 1928 and 1929 there was expended in the district less than \$3,000 plowing snow; during the 1929-1930 season the cost reached \$13,500 and during 1930-1931 it will probably exceed \$18,000.



# Comparative Data Show California Hospital Building Costs Reasonable

**H**OW DO California's costs for institutional buildings for the insane compare with those of other states?

New York recently started an investigation of the relative costs among the states of the buildings in which the insane are housed. In the course of this investigation, Governor Rolph was asked regarding these costs in California.

This information was supplied by State Architect George B. McDougall, chief of the Division of Architecture, Department of Public Works. The figures were based upon costs of buildings recently constructed to modern standards of hospitalization for the insane.

On opposite page are comparative figures.

The institutions upon which California's figures are based were the Norwalk Receiving Building, built in 1926; wards 15 and K of the Mendocino State Hospital, built in 1930; the custodial unit of the Mendocino State Hospital, built in 1928, which houses disturbed patients; the Norwalk Nurses Home, built in 1928, and the Pacific Colony Employees building, built in 1928. These buildings are all of fire-resistant construction. Meals in these buildings are served from a central kitchen.

In acknowledging the receipt of the information furnished by State Architect McDougall, Fred K. Stuart Greenes, Superintendent of the Department of Public Works for the State of New York, wrote as follows:

Reception Building

	Capacity	Patient beds	Dining room	Kitchen	Clinic	Patient cost
Delaware.....	40	Yes	Yes	No	Yes	\$4,500 00
Illinois.....	700	Yes	Yes	Yes	Yes	3,000 00
Michigan.....	300	Yes	Yes	Yes	Yes	2,400 00
Pennsylvania.....	61	Yes	Yes	Yes	Yes	5,100 00
California.....	162	Yes	Yes	Yes	Yes	1,235 00
New Jersey.....	250	Yes	Yes	Yes	Yes	4,598 00
New York.....	150	Yes	Yes	Yes	Yes	2,780 00

Able-Bodied Custodial Building

	Capacity	Patient beds	Dining room	Kitchen		Patient cost
Delaware.....	60	Yes	Yes	Yes	Yes	\$2,584 00
Illinois.....	800	Yes	Yes	Yes	Yes	1,500 00
Massachusetts.....	156	Yes	Yes	Yes	No	1,150 00
Michigan.....	262	Yes	No	No	No	850 00
California.....	579	Yes	Yes	Yes	No	579 00
New Jersey.....	92	Yes	Yes	Yes	Yes	1,792 00
New York.....	400	Yes	Yes	Yes	Yes	1,290 00

Disturbed Custodial Building

	Capacity	Patient beds	Dining room	Kitchen	Baths	Patient cost
Massachusetts.....	86	Yes	Yes	No	Yes	\$1,750 00
Illinois.....	300	Yes	Yes	Yes	Yes	2,500 00
Michigan.....	300	Yes	Yes	Yes	Yes	2,400 00
Pennsylvania.....	1,240	Yes	Yes	Yes	Yes	1,240 00
California.....	65	Yes	Yes	No	Yes	2,045 00
New York.....	260	Yes	Yes	Yes	Yes	2,480 00

Employees Building Ward Attendants

	Capacity	Bed rooms	Reception	Laundry	Dining room	Kitchen	Room cost
Massachusetts.....	70	Yes	Yes	No	No	No	\$1,560 00
Illinois.....	100	Yes	Yes	Yes	Yes	Yes	1,500 00
Michigan.....	207	Yes	Yes	Yes	Yes	Yes	1,000 00
Pennsylvania.....	46	Yes	Yes	Yes	Yes	Yes	2,560 00
California.....	28	Yes	Yes	No	No	No	1,600 00
New Jersey.....	252	Yes	Yes	Yes	Yes	Yes	1,328 00
New York.....	100	Yes	Yes	Yes	Yes	Yes	1,480 00

NOTE.—All buildings are of fire-resistant construction.

# Reconstruction Problems and Projects On Redwood Highway

By F. W. HASELWOOD, District Engineer

**T**HE REDWOOD HIGHWAY extending from San Francisco to the Oregon line is approximately 324 miles in length. About 140 miles from San Francisco the highway crosses Ridgewood Summit, the divide between the Russian and the Eel River drainages. From this divide the highway follows the Eel River or its tributaries for 135 miles. This portion of the Redwood Highway and the country it traverses are unique in many respects.



F. W. HASELWOOD

While redwood trees are found in other portions of the State they are first encountered on the Redwood Highway on this unit about forty-five miles north of Willits. For nearly seventy-five miles this highway traverses an area in which redwoods abound. The longest continuous stretch of road through redwood forests is from Miranda to near Scotia along the South Fork of the main Eel River, a distance of about twenty-eight miles. In this area are found the finest groves of redwood in existence, both as to size and quality of trees.

From Ridgewood Summit the Redwood



View of Road winding through a Redwood Grove

Highway drops on an easy grade to Willits in the center of Willits Valley and follows Outlet Creek about thirteen miles to Longvale; thence up Long Valley Creek to a low divide near Laytonville, and down Ten Mile Creek to about eight miles north of Laytonville. Here the highway climbs about two miles to Rattlesnake Summit from which it follows Rattlesnake Creek for about ten miles and then the South Fork and the Eel River, leaving the drainage at Loleta, opposite the mouth of the river.

For the greater part of the 135 miles this highway traverses mountain areas. The Coast areas of California are, geologically



View of State Highway through a Redwood Grove



Another View of the Same Highway

speaking, quite young. In the process of upheaval the strata were very badly broken and the texture of the formation was thoroughly disorganized. Formations encountered are largely sedimentary of clay or sandstone and contain little rock of volcanic origin. Some sandstone that has been altered by heat and occasional intrusions of igneous rock are encountered. In general, however, even rock formations are soft and badly faulted. This soil characteristic together with the heavy rainfall contributes to the instability which is universally manifested by a tendency of the country to slide when excavations are made, or by inherent structural weakness which frequently results in its failure by slipping or rupture and displacement when loaded with a heavy embankment. Slide removal and fill stabilization are among the major maintenance activities of District I. Reconstruction to higher standards can not do other than greatly increase the difficulties resulting from this inherent structural weakness of the country itself and the unusual climatic conditions that prevail.

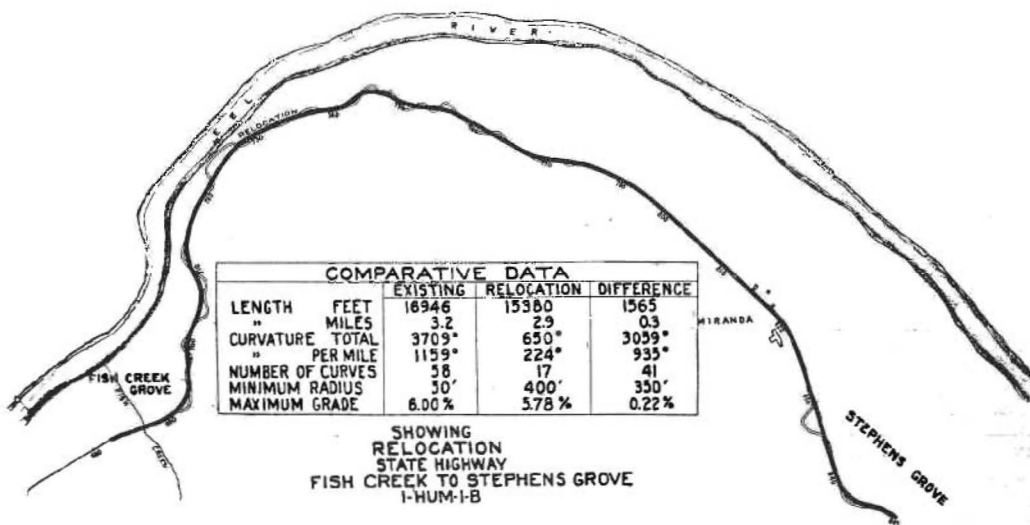
The original construction of this 135 miles was accomplished during the period from 1912 to 1920. This was during a period of severe financial limitations and when traffic density and the sparsely populated areas traversed were rather weak arguments for the major expenditures necessary for a modern highway through such a country. Consequently on initial construction length of improvement was the major consideration. From 1920 to 1929 work on this highway consisted of increasing its capacity by widening and improving its surface. It was in 1929 that the traveler first found it dust free.

#### PROGRESS OF WORK

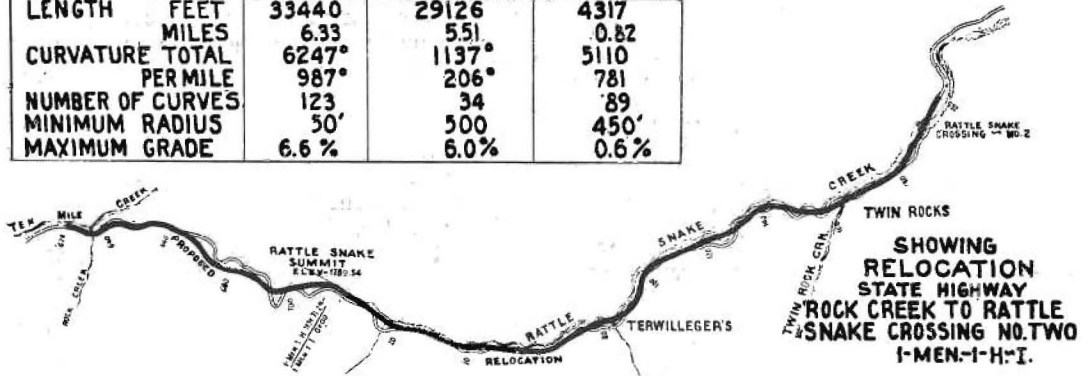
Up to 1929 limitation of funds and the necessity of completing unimproved gaps between Eureka and the State line prevented the initiation of any major reconstruction program on this section of highway. In the biennium beginning in 1929 four units aggregating 7.7 miles were reconstructed to present standards of alignment with asphalt treated crushed rock surfaces. These sections rather widely scattered are near Miranda, Hartsooks, Garberville and Red Mountain Creek north of Lane's Redwood Flat. The structural condition of the road and the inferior quality of traffic service it afforded were the reasons for their selection. Similar reasons dictated the selection of the 8.4 miles to be reconstructed in the biennium beginning this year. This process of selecting reconstruction projects unfortunately does not result in any continuous stretch of high quality road and on its face does not appear to constitute a well ordered program. However, as the units selected by this method are so outstanding in their comparative inferiority it is not probable that any other plan can be followed for several years.

#### MAGNITUDE OF PROBLEM

The magnitude of the reconstruction problem in District I may be visualized from a consideration of the cost of improvement. Approximately five and three-quarter millions of dollars must be spent on the reconstruction of this 135 miles, about one-fourth of the mileage in the district, to bring it to proper standards of alignment, grade and width before the placing of permanent pavement is justified. The obvious relief from such a



COMPARATIVE DATA				
		EXISTING	RELOCATION	DIFFERENCE
LENGTH	FEET	33440	29126	4317
	MILES	6.33	5.51	0.82
CURVATURE TOTAL		6247°	1137°	5110
	PER MILE	987°	206°	781
NUMBER OF CURVES		123	34	89
MINIMUM RADIUS		50'	500'	450'
MAXIMUM GRADE		6.6 %	6.0%	0.6%



dilemma is in a lesser degree to continue the improvement of the traffic service on the mileage, which can not be immediately included in major reconstruction projects, by widening the grade, removing sharp points, widening shoulders and improving the surface. This activity serves to balance what otherwise appears to be a crazy quilt method of reconstruction. In the biennium beginning in 1929 eighteen miles of this section of highway were so improved and in the biennium beginning in 1931 thirty miles will be so improved. By such a program improvement in traffic service will be constantly apparent throughout whatever period is required for complete reconstruction.

FUTURE PROGRAMS

Future programs therefore for this section of the Redwood Highway will continue the custom of containing one outstanding major project, several projects of lesser magnitude but nevertheless of outstanding necessity and supplemental development of the facilities of those portions not yet reachable as major projects.

In 1929 the major reconstruction project consisted of improving three miles between Fish Creek and Stephens Grove near Miranda about fifteen miles north of Garberville. The following comparisons offer ample justification for the selection of this unit as a major project.

	Existing road	Relocation	Difference
Length, feet	16,946	15,380	1,565
Length, miles	3.2	2.9	.3
Curvature, total	3709°	650°	3059°
Curvature, per mile	1159°	224°	935°
Number of curves	58	17	41
Minimum radius	50'	400'	
Maximum grade	6%	5.78%	.22%

This unit was reconstructed to a graded width of twenty-eight feet with four-foot side

ditches in cuts. Surfacing was eight inches of crushed gravel with a light bituminous surface. Excavation quantities were 217,750 cubic yards or 75,000 cubic yards per mile and the gross cost was \$162,700 or \$56,000 per mile. It has for some time been the practice to remove all construction slashings and roadside debris and leave the roadsides clean and attractive. On this project was initiated the practice of restoring by appropriate planting those unused areas of the old roadway or of daylighted cuts and in some cases fill slopes. This method of treating the landscape scars resulting from construction activities greatly supplements and hastens the healing processes of nature and contributes much to the roadside beauty.

1931 RECONSTRUCTION PROGRAM

The major reconstruction project for 1931 consists of 5.5 miles improving what is known as the Rattlesnake grade. This includes the two-mile rise from Ten Mile Creek to Rattlesnake Summit and 3.5 miles down Rattlesnake Creek.

The following comparisons illustrate the qualifications of this unit as a major reconstruction project:

	Existing road	Relocation	Difference
Length, feet	33,440	29,126	4,317
Length, miles	6.33	5.51	0.82
Curvature, total	6247°	1137°	5110°
Curvature, per mile	987°	206°	781°
Number of curves	123	34	89
Minimum radius	50'	500'	
Maximum grade	6.6%	6%	0.6%

It will be noted that in addition to a 13 per cent saving in distance there is a reduction in curvature equal to 2.2 complete circles per mile. Thus is the traveler enabled to save time safely.

Let's make this a nineteen thirty-won!

# Text of Supreme Court Decision In San Francisco Bay Bridge Case

Reprinted from California Decisions, April 24, 1931

In the matter of the controversy between California Toll Bridge Authority and the City and County of San Francisco (a municipal corporation) on the one part, proponents, vs. Benning Wentworth, as Auditor of the City and County of San Francisco, on the other part, respondent.

Application for writ of mandate prayed to be directed to respondent as Auditor of the City and County of San Francisco to compel him to audit and approve a demand for preliminary expenses in connection with the construction of a bridge across the bay of San Francisco. Writ granted.

For Proponent California Toll Bridge Authority—U. S. Webb, Attorney General; Robert W. Harrison, Chief Deputy Attorney General; Frank English, Deputy Attorney General.

For Proponent City and County of San Francisco—John J. O'Toole, City Attorney; John J. Dailey; C. C. Carleton, of counsel.

For Respondent—Frank L. Fenton.

The California Toll Bridge Authority, created by act of the Legislature (Stats. 1929, chap. 763, p. 1489), has obtained an alternative writ of mandate requiring the respondent, as Auditor of the City and County of San Francisco, to audit and approve, or show cause why he should not audit and approve, a demand for the sum of \$5,000, which amount, it is alleged, has been appropriated by the Board of Supervisors of the city and county for the purpose of aiding in meeting the necessary costs of making a survey and preparing plans, specifications and estimates for the construction of a bridge across San Francisco Bay between San Francisco and Oakland. A demand in due form for the sum of \$5,000 was presented to the Auditor, who refused to approve the claim on the ground that the appropriation is an illegal and unlawful appropriation of public funds, because it is in "aid of defraying preliminary expenses leading up to an issue of so-called revenue bonds to the extent of many millions of dollars under purported authority" of the act of the Legislature above referred to, and therefore a violation of section 1, article XVI, of the State Constitution, which provides in part: "The Legislature shall not, in any manner, create any debt or debts, liability or liabilities, which shall, singly or in the aggregate, with any previous debts or liabilities, exceed the sum of three hundred thousand dollars, except in case of war to repel invasion or suppress insurrection," without first submitting the particular proposition to a vote of the people.

The act in question, which marks a complete departure from the old system of constructing and acquiring toll bridges in connection with the State's highways, declares it to be the policy of the State of California to acquire and own all toll bridges situated upon or along any part of the highways of the State, with the end in view of ultimately eliminating all toll charges thereon. It creates the California Toll Bridge Authority, a public agency of the State, the members of which are the Governor, Lieutenant-Governor, Director of the Department of Public Works, Director of the Department of Finance and the chairman of the

California Highway Commission. The Authority has power under the act, operating through the Department of Public Works, to build or acquire toll bridges and other toll highway crossings in the name of the State of California. When the Toll Bridge Authority determines to build or acquire such toll bridges, it may authorize the issuance, in its own name, of revenue bonds to provide the funds for such acquisition or construction, and fix the rates or tolls on such bridges, and in doing so shall give due consideration to the cost of operating and maintaining the bridges, and the amount required to meet the bond obligations. The toll so fixed shall never be less than sufficient to meet the operating expenses and the bond obligations. Bonds issued under the provisions of the act "shall not constitute or be a debt or general obligation of the State, and the payment of both principal and interest of all such bonds shall be secured only by the tolls or other revenues collected from the particular bridge or bridges or other toll highway crossings for which such bonds were issued, and shall be paid from such tolls or revenues, or from such other contributions or appropriations as may be made available under the terms of this act." (Sec. 10.) The bonds must contain on their face a recital to this effect.

Finally, it is provided that political subdivisions of the State mentioned in the act may, upon the request of the Department of Public Works, or of the Authority, advance or contribute money, rights of labor, materials, and other property, toward the expense of building, acquiring, and maintaining the bridges, and for preliminary surveys and the preparation of plans and estimates of cost therefor, and other preliminary expenses. It was under this provision that the Board of Supervisors of the City and County of San Francisco, by resolution, appropriated the sum of \$5,000, which is the subject of the controversy now before the court.

Following the enactment of the statute, the President of the United States and the Governor of California appointed a commission, known as the "Hoover-Young San Francisco Bay Bridge Commission," to make a study of State and interurban traffic needs across the San Francisco Bay, with due regard to the needs of national defense and navigation. This commission rendered its final report and recommendation to the President and to the Governor, and the Department of Public Works, at the request of the commission, made its report and recommendation of a bridge site to the California Toll Bridge Authority, which latter body approved the recommendation and authorized and directed the Board of Public Works to make the necessary surveys and to prepare plans, specifications, and estimates for a bridge across San Francisco Bay as recommended. The Board of Public Works then made a request of the City and County of San Francisco that it contribute funds in aid of the cost of making the necessary surveys and preparing the plans, specifications, and estimates for the bridge, and it was in response to that request that the resolution appropriating \$5,000, payable to the Toll Bridge Authority, was adopted by the Board of Supervisors,

and the claim thereunder presented to the Respondent Auditor for approval, which approval the Auditor refuses to give.

(1) Respondent's objection rests mainly upon the finding of the Department of Public Works, in its recommendation to the Toll Bridge Authority, that the cost of the proposed bridge will be in the neighborhood of \$75,000,000. Therefore, he contends, the issuance of revenue bonds to that amount is not only greatly in excess of the \$300,000 limit placed by the Constitution, but the bonds, if issued, will constitute debts or liabilities of the State of California not authorized by vote of the people.

We are of the view that the language of section 10 of the act already quoted completely disposes of the question now before us, and that the contention of the respondent can not be sustained. The overwhelming weight of judicial opinion in this country is to the effect that bonds, or other forms of obligation issued by states, cities, counties, political subdivisions, or public agencies by legislative sanction and authority, if such particular bonds or obligations are secured by and payable only from the revenues to be realized from a particular utility or property, acquired with the proceeds of the bonds or obligations, do not constitute debts of the particular state, political subdivision, or public agency issuing them, within the definition of "debts" as used in the constitutional provisions of the states having limitations as to the incurring of indebtedness. The decisions we shall presently cite clearly establish that to be so.

While this court has had little occasion to consider the "revenue bonds" method of financing public utilities and structures, there is some precedent in this State, and we are not without ample authority from other sections of the country, where the question has, on repeated occasions, engaged the attention of other courts of last resort, notably, New York, West Virginia, Alabama, Kentucky, and Arkansas. We deem it only necessary, in support of the conclusion we have reached, to quote from the opinions of the courts in those states, and from our own decisions.

The legislature of the state of New York created the Port of New York Authority under a compact entered into between that state and the state of New Jersey. A district was created embracing the greater portion of the city of New York and a part of New Jersey across the Hudson River, and New Jersey passed a similar act relative to the construction of toll bridges across the navigable waters between the two states. These acts provide that the money needed for the construction of the bridges and incidental purposes "shall be raised by the Port Authority on its own obligations, secured by the pledge of the revenues and tolls arising out of the use of the bridges. . . . As security for obligations so issued and moneys so appropriated, the revenues and tolls arising out of the use of said bridges shall be pledged to the repayment of the entire issue of bonds and other securities for the construction thereof, together with interest, and the repayment of the moneys appropriated by the state; it being the declared policy of the state that the said bridges, so far as the payment of the bonds or other securities issued for the construction thereof, together with the repayment of the moneys advanced by the state, shall in all respects be self-sustaining." By agreement of the two states, the legality of such an organization as the Port Authority, and the validity of its bonds, was submitted to the Honorable Charles Evans Hughes, then practicing law in New York, and now the Chief Justice of the Supreme Court of the United States. After a close study of the provisions of the act and an examination

of the authorities, Mr. Chief Justice Hughes gave as his opinion that "this legislation places upon the Port Authority the duty to provide adequate tolls and charges for the purpose described, and the performance of this duty may be compelled by any court of competent jurisdiction." While the opinion of the learned Chief Justice does not have the force of judicial precedent, it does express the opinion of a very distinguished lawyer and an eminent jurist.

We are not, however, left without the decisions of the highest courts of several states on the exact question.

(Here follows a discussion of decisions in cases arising in West Virginia, Alabama, Kentucky and Arkansas.)

This court has not heretofore had occasion to pass directly upon the question whether or not revenue bonds secured only by the revenues of a particular utility acquired with proceeds of such bonds constitutes a debt or liability in violation of section 1 of article XVI of the State Constitution, but a consideration of the exact principle involved in the cause now before the court will be found in the opinion in the case of *Shelton vs. City of Los Angeles*, 206 Cal. 544, 275 Pac. 421. The water and power commission of the city of Los Angeles proposed to issue certain obligations termed short-term notes, under authority of a charter provision, the notes to be paid solely out of water revenues of the commission. In seeking to enjoin their issuance, a taxpayer claimed that the obligations, when issued, would constitute an indebtedness of the city itself, and one incurred in violation of section 18 of article XI of the State Constitution forbidding the contraction of an indebtedness by a municipality in any such manner. This court held (p. 552) that the short-term notes would not be promises on the part of the city of Los Angeles, but would constitute acknowledgments of indebtedness on the part of the department of water and power, under which the city would not be bound to do anything which might be enforced by action, there being no liability on the part of the city in the premises. In that opinion this court distinctly recognized the fact that "the incurring of such indebtedness has been held elsewhere not to be violative of a constitutional provision such as our own section 18 of article XI," citing cases, some of which have been discussed in this opinion.

The respondent auditor specified a large number of objections when asked to approve the claim for the \$5,000 appropriated by the board of supervisors. What we have already said disposes of the main objection raised; in fact is fairly determinative of all the points raised. [2] But, it is argued, the Legislature can not lawfully delegate to a subordinate body or board, such as the California Toll Bridge Authority, the right to pledge the earnings or revenue derived from property belonging to the State without approval of the Legislature or without specific approval by the voters of the State. It has not done so. The act creating the Toll Bridge Authority, and providing for the cost of the construction of toll bridges through the revenue-bonds method of financing, pledges the earnings and revenue derived from the bridge, when erected, as security for the payment of the bonds, without any liability resting on the State, and merely creates a subordinate administrative body to carry out a declared legislative purpose. (*Bates vs. State Bridge Commission*, supra.)

[3] While the parties to the controversy sought to submit it to the court without action, under the provisions of sections 1138 to 1140 of the Code of Civil Procedure, we have elected to treat it as an application for a writ of mandate, following our action in

(Continued on page 21.)

## Grade Crossing Study is Inaugurated

PLANS FOR a study of the grade crossing situation in California that will cover every phase of the subject were discussed at the meeting of the Commission held in Sacramento on May 12 by Colonel Walter E. Garrison, Director of the Department of Public Works, and the members of the California Highway Commission. The study is being undertaken in accordance with a bill passed by the present Legislature and signed by Governor Rolph. It will be made cooperatively by the Department of Public Works and the California Railroad Commission.

The study will include railroad grade crossings built both upon the State and the county highway systems.

Following the conference, C. H. Purcell, State Highway Engineer, was instructed to immediately proceed in cooperation with the State Railroad Commission to gather data showing the number and location of all railroad grade crossings in California; the approximate railroad and automobile traffic at these points; protective warning designs now installed; the accident record of each of these crossings.

With this data, it is believed that a program of grade crossing eliminations can be formulated that will make possible the early removal of all dangerous crossings from all roads in the State, and the eventual removal of all crossings, other possibly than spur tracks in more or less isolated districts.

The thorough character of the study that is contemplated is indicated by the fact that its cost is estimated at \$50,000. The report will be submitted to the Legislature at its session in 1933.

Commenting on today's conference, Earl Lee Kelly, chairman of the California Highway Commission, said:

"We are going to know by 1933 just how extensive the grade crossing problem is in California. We know what this problem is in our State highway system, and are making very rapid progress in the elimination of these crossings for the State system. There has not been the careful survey made of crossings on county roads and city streets.

"It has been said that the complete elimination of railroad grade crossings in California

would cost a billion dollars. Before the next Legislature meets, we will know what this cost is, and will not have to guess at it. Moreover, we will know the practical method of proceeding to eliminate them, whether by relocation of railroad or highway, or by building underpass or overpass separation structures.

"We will also know how to better the protection of such crossings as can not be immediately eliminated.

"I feel that the bill for this study as signed by Governor Rolph constitutes a determined effort to solve the grade crossing problem in California, and marks a long step forward in the Rolph highway program."

### TEXT OF SUPREME COURT DECISION IN SAN FRANCISCO BAY BRIDGE CASE

(Continued from page 20.)

*In re City and County of San Francisco*, 195 Cal. 426, 233 Pac. 965.

Therefore, let a peremptory writ of mandate issue to the respondent, as Auditor of the City and County of San Francisco, directing him to audit and approve the demand of the petitioner, California Toll Bridge Authority, for the sum of \$5,000, duly appropriated by the Board of Supervisors of the City and County of San Francisco, as set forth in the petition.

WASTE, C. J.

We concur:

SEAWELL, J.  
CURTIS, J.  
SHENK, J.  
RICHARDS, J.  
LANGDON, J.  
PRESTON, J.

It takes a little courage,  
And a little self-control,  
And some grim determination,  
If you want to reach a goal.  
It takes a deal of striving,  
And a firm and stern-set chin,  
No matter what the battle,  
If you're really out to win.—Anon.

"How bashful you are," a pretty girl said to a young man.

"Yes, I take after father in that respect," he said.

"Was your father bashful?"

"Was he? Why, mother says if father hadn't been so darn bashful I'd be four years older."

Good men never see temptation when they meet it.

# Construction Records Made in 1930 on California State Highway System

By EARL WITHYCOMBE, Assistant Construction Engineer

The accomplishments of the 1930 construction program which are enumerated in the following tables indicate the progress made in better highway construction by the California Division of Highways. The following results were obtained on the outstanding projects:

## PORTLAND CEMENT CONCRETE

Record for smoothness was shared by two projects. Resident Engineers, W. J. Calvin and T. W. Voss; contractors, W. F. Peck Co., at Liberty Grade in Los Angeles County and Cornwall Construction Co., one-half mile north of Santa Maria in Santa Barbara County.

Record for average concrete strength. Resident Engineer, H. B. Lindley; contractor, Matich Bros., San Clemente to San Onofre in San Diego County.

Record for cement control. Resident Engineer, T. W. Voss; contractor, Cornwall Construction Co., one-half mile north of Santa Maria in Santa Barbara County.

Record for daily yardage. Resident Engineer, F. A. Read; contractor, Jahn & Bressi, between Balboa Avenue and Torrey Pines Road in San Diego County.

## ASPHALTIC CONCRETE

Record for smoothness was shared by three projects. Resident Engineers, W. T. Rhodes on the first project and H. B. La Forge on the other two; contractors, California Construction Co., between Pixley and Tipton in Tulare County, and Peninsula Paving Co., between Fowler Switch Canal and Fancher Creek and through Fowler, both in Fresno County.

Record for best hand-finished work. Resident Engineer, L. R. McNeely; contractor Ed Johnson & Sons, between Pier Avenue and Gould Lane, Hermosa Beach, in Los Angeles County.

Record for density of pavement surface shared by two projects. Resident Engineer, H. B. La Forge on both projects; contractor, Peninsula Paving Co. on both projects, between Fowler Switch Canal and Fancher Creek, and through Fowler, both in Fresno County.

Record for stability of pavement surface. Resident Engineer, J. M. Lackey; contractor, Griffith Co., between Citrus Avenue and Glendora in Los Angeles County.

Record of production. Resident Engineer, H. B. La Forge; contractor, Peninsula Paving Co., between Fowler Switch Canal and Fancher Creek in Fresno County.

## SUMMARY OF 1930 PAVEMENT CONSTRUCTION

Riding quality was decidedly improved on asphaltic concrete pavement, while the average smoothness for Portland cement concrete increased slightly.

The outstanding accomplishment of the year was the decided increase in average daily production of both types of hard sur-

face pavement mixtures. The average daily output for Portland cement concrete pavement mixers was 319.2 cubic yards, and the average daily output for asphalt concrete paving plants was 582.9 tons.

The record for average daily production of Portland cement concrete per mixer has been increased from 361.6 cubic yards in 1929 to 427.3 cubic yards in 1930. In figuring these averages, each calendar day worked is treated as a full day regardless of the number of hours the equipment was operated. This record represents 92.9 per cent of the maximum output that could have been secured had there been no delays.

The record daily average of asphalt concrete tonnage has been increased from 790.7 to 1040.9 tons, which represents 89.7 per cent of the maximum obtainable without delays.

## PRODUCTION COMPARISONS

A study of the riding qualities obtained on high production projects discloses very interesting comparisons and thoroughly explodes the old established theory that speed on a paving job necessitated a sacrifice in smoothness of the finished pavement.

The five Portland cement concrete paving projects having average daily production in excess of 350 cubic yards, totaling 25 miles of pavement, show an average roughness of but 6.1 inches per mile as compared to the general average for the year of 8.9 inches per mile.

The five asphalt concrete paving projects having average production in excess of 600 tons, totaling 35.1 miles of pavement, show an average roughness of but eight inches per mile as compared to the general average for the year of 10.6 inches per mile.

With such a comparison, the Construction Department does not hesitate to urge all employees of the department to cooperate with the contractor in every way, without sacrificing the interests of the State, to increase the production on the job. The department feels that our contractors will readily appreciate the efforts made in their behalf to increase production and will voluntarily equip their jobs with machinery and labor to handle



adequately the increase, thereby resulting in a better quality of work.

#### PORTLAND CEMENT CONCRETE PAVEMENTS

*Mix.* Cement content was held uniformly to six sacks per cubic yard of concrete in place except for special cases where additional cement was used to effect early hardening. The aggregate mixture was designed by the maximum density method which has been in use by this department since 1925.

*Design.* The thickness of the pavement section was increased from six inches to seven inches in the center portion of slab, early in 1930, the edge thickness remaining at nine inches. The details relating to reinforcing steel and joint interval remained the same as the 1929 standards. A modification of this design was used in a few instances to fit local conditions.

*Construction.* Methods of proportioning remained the same as in 1929.

Ten-foot width construction was generally followed during 1930 although a few of the projects were built in twenty-foot widths with a longitudinal weakened plane center joint.

Experiments with methods of finishing brought out a ten-foot ribbed, one-man float for final finishing, replacing the two-man operated light finish float. This float seems to insure an average riding job with less effort than under former methods. This device was developed by Assistant Resident Engineers W. T. Lamb and H. D. Johnson on Contract 27VC4, in Los Angeles County.

*Results of Tests.* The average compressive strength of concrete used in pavements during 1930 was 4942 pounds per square inch. This represents 33 projects, and of these projects 19 were selected by headquarters representatives to cast a special series of cylinders for 28-day comparisons. The average strength from the job cylinders for these projects was 4920 pounds per square inch, as compared to 5470 pounds average for the casts made by headquarters.

The 1930 general average for all the projects shows an increase of slightly more than 1000 pounds per square inch compressive strength at 28 days over the average for 1929. Likewise the casts made by headquarters representatives show an increase in 1930 of more than 1000 pounds over 1929. The uniformity of the breaks within the individual projects is marked in comparison with previous years and is attributed to the exercise of more care in fabricating and curing. The decided increase in average strength is attributed to the fact that the samples are all reduced before casting to a common maximum size of aggregate compatible with the size of specimen by passing all of the mixture through a one and one-half inch square opening screen.

#### ASPHALTIC CONCRETE

*Mix.* Mixtures are designed and controlled largely by stability tests of the mortar content.

Many substitutes for limestone dust have been used during the past year, approval thereof being based on these stability tests. The substitute filler is tested in combination with the fine aggregate proposed for use on the project and compared with a mixture of the same aggregate with limestone dust. If the substitute develops strengths equal to the limestone dust mixture it is approved for use on the individual project.

*Design.* Thickened edges on both new base and resurfacing has become standard practice. Surface course has been standardized at two-inch thickness. On new grade a uniform base course five inches thick with thickened edges is used, while on resurfacing

jobs the widening is placed with thickened edges of base course mixture, then brought up to within two inches of grade with a leveling course mixture.

Commercial filler is not required in either base or leveling course mixtures. In surface mixtures 8 per cent of the dry aggregate consists of limestone dust or a suitable substitute—the amount of the latter being determined on the basis of comparison with the 8 per cent of limestone dust.

*Construction.* The average capacity of mixing plants has not been materially increased during the past year. The marked increase in the production of asphalt concrete tonnage is due to greater efficiency in plant operation, and the handling of this increased quantity on the street is made possible by the use of mechanical finishers. As an illustration of the progress made along this line, it was suggested to the Peninsula Paving Co. on their contract 26EC3, Fresno 4-A,B, that a positive timing device on the mixing platform might add to the uniformity of mixing time and also increase production. A Koehring timing device was immediately purchased, being taken from a new concrete mixer and installed on the asphalt plant so as to operate coincidentally with the dump lever on the aggregate weigh box. The increase in production obtained was an incentive to other contractors and the timing device has since become a part of the equipment on most asphalt plants. This same contractor was operating a comparatively new 4000-pound pug mill mixer that required 14 to 15 seconds to discharge. At the end of the 1930 season this mixer was scrapped and something more than three thousand dollars was spent on a new mixer with a discharge gate having a much greater area of opening for this season's work in an attempt to save time lost in discharge and to increase production. The new mixer has been in use but a few days and with the increase in production shows a net profit of better than two hundred dollars per day over the performance of the discarded mixer on last year's work.

#### TABLES

The tables of the 1930 construction are complete in that they include all types of projects constructed by contract during the year, and are a true index of each district's accomplishments. In addition to the Portland cement concrete and asphalt concrete pavements above described, these tables include yearly comparisons by districts and roughness records on bituminous macadam, plant oil mix, road oil mix, and armor coat surfacing, built under supervision of the Construction Department.

**For Tables of 1930 State Highway Construction Records, see page 30.**

LONDON—Introduction recently of London's first traffic light at Ludgate Circus and Fleet street caused the worst traffic jam ever known at that intersection when thousands of people jammed the streets and were crowded into the roadway to view the apparatus.

To keep even with the sheriff is better than to "get even" with a competitor.

A well-regulated husband is one who can't pass a mail box without feeling in his pockets.

# Analysis of Motor Vehicle Accidents Occuring During March in California

CALIFORNIA MOTORISTS reported 2808 accidents for the month of March, 1931, in which 3781 persons were injured and 196 killed. March accidents increased 345 (14%) over March, 1930; the total injured increased 528 (16.23%) and fatalities increased 26 (15.29%).

The total of March accidents is 438 accidents greater than the total reported in February this year. The mean average number of accidents daily in February this year was 84.6; the mean daily average in March was 90.6.

The number of drivers between the ages of 20-29 years who were involved in March accidents greatly outnumbered the other age groups and represents 32.72 per cent of the total stated ages.

## CAUSE OF ACCIDENTS

The principal causes of accidents among the drivers were "violation of right of way," followed closely by "speeding." The third most recurrent cause was "drove off roadway." One hundred fourteen "hit and run" drivers were reported in March, seven of whom were involved in fatal accidents.

## INTERSECTION DANGERS

Most pedestrian accidents occurred at intersections, with the second greatest number between intersections. This clearly indicates the necessity of crossing streets only at designated crosswalks and in accordance with traffic regulations at such crosswalks. March pedestrian accidents, though representing only 28.63 per cent of the total accidents caused 39.79 per cent of the total March deaths. Since most pedestrian accidents occur within incorporated cities (only 9.07 per cent of the March pedestrian accidents occurred outside of incorporated cities) they are an important factor that greatly affect the ratio of persons killed per fatal accident in cities.

## PEAK HOUR OF ACCIDENTS

The peak hour of accidents moved from 6.01-7 p.m. in February to 5.01-6 p.m. in March. Sundays led the days of the week having the most accidents with a total of 601.

## THE WEATHER FACTOR

The longer daylight hours were reflected in the March summary of accidents, when 1587 (56.51%) of the total accidents were reported as having occurred in daylight. Comparatively few accidents were reported under inclement weather conditions; out of the 2808 accidents nineteen were reported as having occurred in "fog or mist," seventy-five in "rain," two in "snow" and one in "smoke or dust."

## CARS NOT AT FAULT

More passenger cars were involved in March accidents than any other single type of vehicle. Trucks were second and motorcycles third. Only 152 of the 4298 vehicles involved were definitely reported to be defective mechanically.

## INCREASE OVER 1930

An analysis of the accident statistics for the first three months of 1931 disclosed that the total accidents increased 880 or 12.25 per cent over the corresponding period of 1930. According to information received from the State Board of Equalization the consumption of gasoline in California as a motor vehicle fuel increased 14.03 per cent during this period. Motor vehicle deaths during the first quarter of 1931 totaled 566. This total (566) represents an increase of 8.42 per cent over the same period of 1930.

A further analysis determined that 6501 or 80.68 per cent of the 8058 accidents reported during the first three months of 1931 occurred within the limits of the various incorporated cities and were the cause of 77.31 per cent of the total persons injured and 59.54 per cent of the total persons killed.

## MONTHLY SUMMARY OF MOTOR VEHICLE ACCIDENTS IN STATE

	March, 1931 Total number reported		This year's total to date	Last year's total to date
	During March, 1931	During March, 1930		
Accidents ----	2,808	2,463	8,058	7,178
Persons killed	196	170	566	522
Persons injured ----	3,781	3,253	10,717	9,351
Drivers involved ----	4,254	3,712	12,051	10,693
Pedestrians involved ----	846	854	2,599	2,538
Vehicles involved ----	4,298	3,734	12,175	10,770

## Highway Patrol Courtesy Letters

### First Aid to Injured

From John F. Williams, Prescott, Arizona: It is with profound satisfaction and a deep sense of gratitude that I write to you regarding the conduct, efficiency, hospitality and untold ability of one of your officers in the Highway Patrol in the State of California. I refer to Officer J. O. Linthicum, or No. 364, stationed at Indio or thereabouts.

Approximately three weeks ago I, in company with two friends, Mr. and Mrs. Tipton, were forced off the road in the deep sand about ten miles from Indio. The car overturned twice and we all were somewhat painfully cut and bruised.

Officer Linthicum, by his promptness in getting us clear of the wreck and rushing us to the hospital for first aid, in all probability saved us many painful hours, and in my case in particular, saved me the loss of my left leg. I had a very severe cut which my physician tells me would have had very serious results, had I not received the prompt medical attention that I received.

In addition to the said officer's efficiency in line of duty, he also invited us to the hospitality of his own home, and allowed us to make ourselves presentable in order to continue our trip.

In closing I will say that in traveling clear across the country from Boston, Massachusetts, to Los Angeles, I have yet to meet with such whole-hearted efficiency and kindness towards strangers as manifested by one of your officers in the patrol.

I, in company with my friends, do sincerely appreciate the same and hope that all good fortune will follow in the footsteps of one of God's own gentlemen, Mr. J. O. Linthicum, No. 364.

\* \* \* \* \*

### Courtesy Commended

From E. P. Malherbe, U. S. N. Retired, Naval Hospital, San Diego: While making a trip from San Diego to Los Angeles, on Saturday, April 18, 1931, the car in which I was a passenger was stopped by Patrolman William Jensen, badge No. 396, for some infraction of the highway laws of the State.

Being blind, I do not know just what section was involved, but while I have lost my sight I still retain the sense of hearing and the conversation I heard between the officer and the driver of the car was a revelation to me, the more so as I have had some experience in stopping and searching cars myself, as a member of what some paper nicknamed "The Night Hawks," in 1927 and 1928, when the Collector of Customs had fifteen men patrolling the highways around Los Angeles, San Diego and Santa Barbara.

While we had orders to be at all times courteous, I learned, for the first time last Saturday, just what that word means.

Had the officer recognized you and your family as passengers in the car instead of sailors and myself, he could not have been more considerate of the choice of his language or treatment and I can not speak too highly of his conduct. He might be a new man on the force.

### Speeder Admits Error

From H. Bedford Jones, Hollywood: Yesterday, April 13th, I was halted by an officer of the State Patrol, a couple of miles north of Carpinteria on the Coast Highway, under the following conditions:

The officer was riding along at about forty. I overhauled him and passed, going about forty-three and held this speed steadily. At times I touched forty-five but did not exceed this mark, as the officer was hanging along behind. Upon passing him I called the attention of my wife and son to the speed. Aware that the officer was gradually coming up, they kept track of the speed; when he halted me, he stated that I had been doing fifty-six for the past mile or two.

Either my speedometer must be away off, or else he had been irritated because I had passed him. The latter seemed the most logical, because the three of us could swear that the speed had never exceeded forty-five. He gave me no citation, but entered up the matter on a white ticket.

Today I have had the speedometer checked and found it to be broken.

I am sending in this report to you as an interesting example of how easily a grave injustice might have been done an officer. Apparently he was dead wrong in the matter, and a hot-headed complaint with three witnesses against him might easily have been made. As a matter of fact, I feel that his action has possibly saved me from more serious, if unintentional, speeding charges; and it serves to confirm the very friendly feeling which I believe every good motorist entertains toward your highway force.

I don't know whether you pay any attention to these communications, but I should like to commend this officer for the courtesy he displayed, when he must have felt that my family were all combined to swear falsely against him. That is about the sweetest test of a man's restraint and courtesy; and his were perfect. His number was 371 or 374—I'm not certain. It will show on his report, no doubt.

\* \* \* \* \*

### Gave Tow to Stalled Car

From D. N. Zann, Glendale: It is with pleasure that I write you regarding the following incident, which took place on the State Highway between Ventura and Santa Barbara, California.

On the eve of April 15th, about 11 p.m. we were en route to Santa Barbara from Los Angeles. Just five miles north of Ventura, my car stopped—out of gasoline. Probably you know that service stations on the particular stretch of highway are few and far between. We had been there but a very short while when one of your white patrol cars came along, offering assistance. We stated our plight and rather than leave us sitting on a narrow shoulder of the dark highway, Officers 310 and 311, insisted on towing us to the nearest station, which, incidentally was just six miles further north.

Such courtesy and protection on the part of our California Highway Patrol is certainly a real asset to the motoring public.

<p>Irrigation District Activities</p> <p style="text-align: center;">✦ ✦ ✦</p> <p>Applications for Approval of Dams</p>	<h2 style="margin: 0;">Report of Activities</h2> <p style="margin: 0;">in the</p> <h2 style="margin: 0;">Division of Water Resources</h2> <p style="margin: 0;">AS OF MARCH 1, 1931</p> <p style="margin: 0;">EDWARD HYATT, Chief of Division</p>	<p>Flood Control and Reclamation</p> <p style="text-align: center;">✦ ✦ ✦</p> <p>Bulletins Issued on Water Resources Study</p>
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### IRRIGATION, WATER STORAGE DISTRICTS

A resolution of sufficiency on petition for the organization of an irrigation district to be known as the West Empire Irrigation District was received by the State Engineer from the Board of Supervisors of Kings County, and a report favorable to the calling of an election on organization was made to the Supervisors by the State Engineer. The proposed district contains 7000 acres of land lying along the west side of the lower Kings River in the vicinity of Stratford. The petitioners submit as their principal reason for the formation of the district their desire to control and stabilize whatever water rights they are entitled to and to manage the distribution of the water which the court has allotted to their land through their own system of works. Heretofore whatever water they have obtained from Kings River has been distributed by the Empire Water Company, whose works the district proposes to acquire, and these works are to be obtained by the district without cost through a waiver of certain claims against the water company for damages.

Field visits were made and conferences held with officials of the Buena Vista Water Storage District in Kern County, the Tulare, Terra Bella, Lindsay-Strathmore and Alta Irrigation Districts in Tulare County; the Corcoran, Lemoore, and proposed Empire West Side Irrigation Districts in Kings County; and the Fresno, Consolidated and Tranquillity Irrigation Districts in Fresno County, of the purpose of discussing matters connected with the economic operation of these districts.

Inspection was made of construction work in progress in the El Nido Irrigation District, Merced County, and a field investigation was made on the Oakdale Irrigation District in connection with the proposal of the district to refund certain of its bond issues.

A compilation and preparation of data for the 1930 report on the activities of California irrigation districts have been practically completed and without doubt will be submitted to the State Printer during the early part of May for publication.

The Granada Irrigation District, located in Siskiyou County, is now before the Commission with a plan for the reorganization and refinancing of the district.

At the meeting of the California Bond Certificate Commission held on March 25, favorable action was taken on expenditure orders relating to the following districts:

#### Carpenter Irrigation District:

Approval of order for expenditures from the construction fund in the amount of - \$149,250

#### Serrano Irrigation District:

Approval of order for expenditures from the construction fund in the amount of - 149,250

#### El Nido Irrigation District:

Approval of order for expenditures from the construction fund in the amount of - 87,442

Total approved construction fund expenditures ----- \$385,942

### DAMS

During April satisfactory progress has been made in reviewing the existing dams throughout the State which are pending approval. Frequent inspections have been made of dams under construction and repair.

To date 755 applications for approval of existing dams are on file; 64 applications for approval of plans and specifications for construction or enlargement, and 142 for approval of plans for repair or alteration.

Application received for approval of plans for repair or alteration:

Eleven such applications have been received during this month.

Applications received for construction or enlargement:

Dam	Owner	County
Chatsworth Highline	City of Los Angeles	Los Angeles
Haypress	Santa Catalina Island Company	Los Angeles
Quaking Asp Gulch No. 1	Antone Avilla	Lassen
Quaking Asp Gulch No. 2	Antone Avilla	Lassen
Donner Creek	Central Pacific Railway	Nevada

An amended application was filed by the City of Pasadena for the approval of plans and specifications for the construction of the Pine Canyon dam 50 feet lower than originally planned. This application is under consideration by the same board of consultants engaged to review the original application and immediately upon a completion of their investigations action on it will be taken by the State Engineer.

Plans approved for construction:

Dam	Owner	County
Benbow	Benbow Power Company	Humboldt

Plans approved for repair or alteration of dams: Eleven such applications have been approved this month.

Orders have been issued authorizing the use of the following dams:

Dam	Owner	County
Swanzy Lake Dam	Calif. Hawaiian Sugar Refining Co.	Solano
Tiger Creek Reg.	Pacific Gas and Electric Company	Amador

A representative from this office, Mr. E. W. Case, has returned to Modoc and Lassen Counties where he

will remain during the coming summer. He will supervise the repairs and alterations of the many dams in that locality with a view to recommending their approval before the end of the season. Spillway studies have been completed on all these dams, and he is in a position to inform the owners of the State's requirements in this respect. Those wishing to discuss problems relating to their dams may get in touch with him at either Alturas or Susanville.

## FLOOD CONTROL AND RECLAMATION

**Maintenance of Sacramento and San Joaquin Drainage District:** The maintenance force in Sutter County has been engaged principally in routine maintenance of the by-pass structures, levees, drainage canals and pumping plants. Repairs to the Franklin road bridge in the Sutter by-pass have been completed, and repairs have been made on a number of the smaller bridges over the drainage canals. A small crew has been engaged in cutting young thistles on the East Sutter by-pass levee, on which the thistles have been practically eliminated by the work of the past two years.

**Flood control project maintenance—bank protection:** No bank protection work is now under way as all the jobs for the current season have been completed. The river floating equipment is being repaired and painted by the caretakers under the direction of the river foreman. The launch "Alioth" has been repaired and a new engine installed.

**Emergency flood control and rectification of rivers:** Channel rectification work at the mouth of Little River in Humboldt County has proceeded and will be completed within a short time. This is being done by the Hammond and Little River Redwood Company in cooperation with the State and Humboldt County. The channel rectification work on the San Jacinto River in cooperation with landowners and the County of Riverside has been completed. This consists of a small levee 2200 feet in length, protected with a wire fence barrier.

**Russian River jetty:** A crew of eleven men has been employed in the operation of the quarry and railroad, placing rock in the structure. An experimental timber barrier 90 feet in length has been erected in an attempt to prevent the sand of the bar passing over the jetty and into the river channel.

**Flood measurements and gages:** All gages maintained by this Division are now in operation but will be discontinued on May 1. In the office the compilation of records for the flood seasons of recent years has been continued, for the purpose of incorporating in a report all the data that has not been hitherto published.

## WATER RIGHTS

Applications to appropriate:

During the month of March there were received twenty-six applications to appropriate, eleven were canceled and ten were approved. Ten permits were revoked and forty-six licenses were issued.

Field work in connection with the inspection of permits was initiated for the season on March 30. The first trip involving inspection of thirty-one projects scattered throughout Inyo, San Bernardino, Riverside, Los Angeles, Orange and San Diego Counties was completed April 23.

The Division is already beginning to experience

the customary pressure of dry seasons in the way of requests for information with respect to water rights and for assistance in the settlement of controversies between rival claimants. There is at all times a demand upon the Division for assistance along these lines and this becomes accentuated during years of low stream flow.

**Adjudications.**

**Shasta River (Siskiyou County).** Case pending in the Superior Court of Siskiyou County.

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

**North Cow Creek (Shasta County).** Case pending in the Superior Court of Shasta County, awaiting the Court's pleasure in placing it on the calendar.

**Oak Run Creek (Shasta County).** Case pending in the Superior Court of Shasta County awaiting the entry of a decree in the North Cow Creek case.

**Clover Creek (Shasta County).** Case pending in Superior Court of Shasta County awaiting the Court's pleasure in placing it on the calendar.

**Butte Creek (Siskiyou County).** Case pending in the Superior Court of Siskiyou County awaiting action by the parties involved.

**Los Alamos Creek (Santa Barbara County).** At a conference held at Santa Maria on April 21, 1931, a stipulation for consent judgment was signed by all of the parties involved, with the exception of one.

**Davis Creek (Modoc County).** A tentative decree has been prepared for circulation among counsel prior to submission to court.

**Mill Creek (Modoc County).** Eighty per cent of the water users have signed the stipulation for consent judgment which was presented at the conference held at Lake City on March 17, 1931. The stipulation is now being circulated among the nonresident parties.

**Deep Creek (Modoc County).** Distribution of the waters of Deep Creek was continued throughout the month in accordance with the trial schedule of allotments which was adopted at the conference held at Cedarville on March 16, 1931.

**Franklin Creek (Modoc County).** Administration of the schedule of allotments for trial distribution during the 1931 irrigation season was continued throughout the month.

**New Pine Creek (Modoc County).** Field work on the investigation of the water supply and use of water on New Pine Creek was continued throughout the month.

**Water distribution:**

Cedar, Davis, Deep, Emerson, Franklin, Mill, New Pine, Owl and Soldier Creeks (Modoc County). Water master service on these streams was continued throughout the month.

**Pit River (Modoc and Lassen Counties).** Supervision of diversions from Pit River in Big Valley was continued throughout the month.

Supervision of diversions from Pit River in Hot Springs Valley was begun on April 11, 1931.

## COOPERATIVE SNOW SURVEYS

The main snow surveys for the season covering some one hundred sixty snow courses throughout the Sierra were completed during the last of March and first part of April, and the April 1st bulletin of snow survey and precipitation data and seasonal forecast was placed in the mail early in April.

A general summarization of all data shows:

The water content of the snow on April 1 of this year in per cent of the water content on April 1, 1930, varying from about 30 per cent for certain Owens Valley courses to about 70 per cent at courses in Merced basin with a general average throughout the Sierra of about 55 per cent.

For those few areas where snow surveys have been made for a sufficient number of years to permit the development of "normals," a water content of the snow in per cent of normal to April 1 almost as low as 10 per cent for one or two Owens Valley courses, nearly up to 50 per cent for Yuba basin courses and a general average of about 40 per cent.

The average precipitation to April 1 in per cent of normal to April 1 varying throughout the Sierra from 42 per cent for one station in Owens Valley to about 75 per cent for stations in Stanislaus basin with a general average of about 60 per cent, and an average for Los Angeles, San Gabriel and Santa Ana basins of 60 to 65 per cent.

The estimated 1931 seasonal stream flow in per cent of the 40-year mean (1889-1929) varying from 25 per cent for the Kings basin to 40 per cent for the Tuolumne basin with a combined figure of 33 per cent for the entire Sacramento and San Joaquin basins.

The data and estimates indicate for the Great Central Valley a water supply only better than the record low of 1924 by a small margin. It is to be anticipated, therefore, barring storms of most unusual magnitude and duration within the next few weeks, that conditions of minimum stream flow with resulting salinity encroachment in the case of the Sacramento-San Joaquin Delta, may approach those of 1924.

The bulletin presents the snow survey and precipitation data in detail as well as the forecast of seasonal run-off for each major stream basin. A tabulation is also included showing the water in storage on April 1 in some of the principal reservoirs.

### SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

During the past month most of the work in compiling the data for the 1930 report was completed and the regular field work for the 1931 season was started. The gages for recording stream flow and return flow throughout the Sacramento-San Joaquin territory have been installed and the engineers have made an inspection of all pumping diversions to insure that the proper diversion records are maintained. All new installations have been noted. The inspection shows that practically all of the pumping plants on the river are already in operation due to the extreme dryness of the season. It is apparent that practically no spring run-off of any proportions may be expected and with a continuation of the present heavy draft on the river, low flows may be expected very early in the season.

The salinity sampling has continued at thirty stations and tide gages have been maintained at eight points between Collinsville and Sacramento. The following are comparative salinity and stream flow data for 1930 and 1931. Corresponding stream flow data are also shown for 1924.

Station	Salinity in parts of chlorine per 100,000	
	4/13/31	4/14/30
Bullhead point	620	235
O. and A. ferry	*45	*5
Collinsville	16	4
Antioch	10	5
Jersey	4	5
Emmaton	1	2
Webb pump	*4	*5

\* April 10.

### Discharge measurements in second-feet

Station	1931	1930	1924
Sacramento River at Red Bluff	4/12 4390	4/12 7160	4/12 4010
Sacramento River at Verona	4/20 4660	4/20 27600	-----
Sacramento River at Sacramento	4/20 6400	4/20 33400	4/20 7300
American River at H St. bridge	4/18 2130	4/18 6000	-----
San Joaquin River near Vernalis	4/2 870	4/2 2940	4/2 1370

Within the last month there have been held at Sacramento two meetings of the Permanent Committee of the Sacramento-San Joaquin River Problems Conference to receive the reports of the State Engineer relative to the water supply to be anticipated and to consider steps to meet the situation. As a result of the meetings, two letters have been sent from the committee to the water users warning of the water situation and recommending as the best conservation measure for the present, the reduction or elimination of crop plantings which will require large amounts of water in July and August. Following the first meeting of the committee a similar letter was also sent to the water users by Major J. R. D. Matheson, District Engineer, Corps of Engineers, United States Army, calling for conservation in the interest of navigation maintenance. Likewise a letter was sent from the Division of Water Resources to the junior water right permittees calling attention to the position which they occupy with respect to water appropriations and warning of the possible necessity of a regulation or suspension of diversions under the later permits in the inverse order of priority. The Division through the Water Supervisor's office is cooperating closely with the water users as represented by the Permanent Committee of the Sacramento-San Joaquin River Problems Conference and is prepared to take whatever steps may be agreed upon to effect maximum conservation and best avoid conflict. The possibility of a temporary schedule of diversions has been considered.

### WATER RESOURCES

Pit River investigation (Modoc and Lassen Counties). Routine field work was continued throughout the present month.

Napa Valley investigation: Two new gaging stations have been established for the purpose of determining accretions on Dry Creek and Rector Creek, and miscellaneous measurements of flow have been made on Napa River, Conn Creek, Dry Creek and Rector Creek. Progress has been made in connection with a census of irrigated lands diverting from Napa River and Conn Creek below the upper gaging stations, and all wells which are under observation have been read.

Santa Clara Investigation: Streams have continued low without any possibility of obtaining additional data as to percolation.

South Coastal Basin investigation: This work has gone ahead in a routine way during the past month. A special investigation was made of the feasibility of determination of the possibility of salt water intrusion from the ocean into the pumping area of the Coastal Plain and effort is now being made by Orange County and the City of Long Beach to get together on a program for such work which requires extensive drilling of small wells.

Mojave River investigation: This work has continued in a routine way during the month.

Ventura County Investigation: An investigation was made of the reservoir sites on Piru Creek in connection with conflict between the Division of High-

ways and Santa Clara Valley Protective Association. The relocated ridge route will pass through two reservoir sites on Piru creek which the conservation association has regarded as necessary for conservation of the waters of that stream. A geological examination of the various dam sites and surveys of additional reservoirs have been made. The report is not yet completed.

Water resources reports: Progress has been made in completing the reports on the water resources investigation covering the State water plan for the coordination, development, conservation and utilization of the water resources of the State, authorized under the provisions of chapter 832 of the statutes of 1929.

The following publications relating to various phases of the investigation have been completed in printed form and are now available for distribution:

Bulletin 28-A, "Industrial Survey of Upper San Francisco Bay Area."

Bulletin 31, "Santa Ana River Basin."

Bulletin 32, "South Coastal Basin."

Bulletin 34, "Permissible Annual Charges for Irrigation Water in Upper San Joaquin Valley."

Bulletin 35, "Permissible Economic Rate of Irrigation Development in California."

The following bulletins are now in the hands of the State Printer and it is anticipated that they will be completed in printed form and ready for distribution within the next three or four weeks.

Bulletin 25, "Report to the Legislature of 1931 on State Water Plan."

Bulletin 33, "Rainfall Penetration and Consumptive Use of Water in Santa Ana River Valley and Coastal Plain."

Bulletin 36, "Cost of Irrigation Water in California."

The following bulletins are nearing completion and it is expected that the finished plates and text for these publications can be transmitted to the State Printer during the early part of May for publication.

Bulletin 26, "Sacramento River Basin."

Bulletin 27, "Salinity Control in Sacramento-San Joaquin Delta and Upper San Francisco Bay."

Bulletin 28, "Economic Aspects of a Salt Water Barrier Below Confluence with Sacramento and San Joaquin Rivers."

Bulletin 29, "San Joaquin River Basin."

**Progress Report  
STATE HIGHWAY  
As of May 1, 1931  
C. H. PURCELL, Chief.**

**Progress of employment Program:**

Projects now under contract.....	101
Estimated number of men employed by construction .....	2217
Men employed by Division of Highways on maintenance, day labor work and contracts .....	4169
<b>Total number of men employed.....</b>	<b>6386</b>

By April 27 projects totaling \$8,013,735 were either under contract, pending award or advertised for bids, which were originally scheduled for advertisement during the coming summer.

**Report for April:**

Contracts awarded and pending.....	\$2,965,300
Projects .....	1,982,800

Work anticipated to be advertised during May .....	4,685,800
<b>Total .....</b>	<b>\$9,633,900</b>

The types of construction and mileage of each type included in the above tabulation are given in the following summary:

<i>Type</i>	<i>Mileage</i>
Portland cement concrete pavement.....	17 9
Asphalt concrete pavement .....	17 6
Bituminous-treated crushed rock surfacing.....	103 1
Untreated crushed rock surfacing.....	6 5
Graded roadbed .....	14 8
Oiling to alleviate dust.....	654 6
Bridges .....	12
<b>Total .....</b>	<b>814 5</b>

**Progress Report  
MOTOR VEHICLES DIVISION  
As of May 1, 1931  
FRANK G. SNOOK, Chief**

**Registration statistics:**

Fees collected during first quarter of 1931 .....	\$8,151,165
Total paid registrations of motor vehicles for same period .....	1,906,543
Total exempt registration of motor vehicles for period .....	35,944
Applicants of nonresident motorists for nonresident permits for period.....	14,759
Applicants of nonresident motorists for California registrations .....	35,916

**California Highway Patrol report:**

Enforcement activities on vehicle lights is increasing.

Monthly report of light activities show 9721 stops made, and 4513 arrests.

Brake activities during March show brakes found defective to have been 7.92 per cent of those tested.

**Progress Report  
DIVISION OF ARCHITECTURE  
As of May 1, 1931**

GEORGE B. McDOUGALL, State Architect, Chief

**Projects in Field.**

The Division of Architecture now has under actual construction in the field approximately 50 major projects representing a total valuation of \$4,451,475. This construction valuation will provide employment for 1597 persons over a period of ten months.

Contracts awarded in April.....	\$181,170
Bids received; contracts pending.....	205,247
Projects out for bids.....	121,000
Contracts for supplementary work awarded in April .....	121,803

**Total .....** \$629,320

Major projects handled on basis of day labor for which drawings have been completed... \$371,000

Projects for which drawings have been completed for California National Guard..... 75,738

**Total .....** \$446,738

# Record of Pavement

(For Descriptive

PORTLAND CEMENT

District	County	Route	Section	Location	Miles	Contract	Contractor
I	Humboldt	1	E, G	At Scotia and between Fortuna and Loets	4.3	21TC8	J. V. Galbraith
I	Humboldt	1	G	Eureka-1/4 mile South	0.5	21EC6	Engelhart Paving Co.
III	Glenn	7	A	Logsdale-Willows	5.2	23EC1	Basich Bros. Const. Co.
III	Placer	3	A	Through Lincoln	1.7	23TC6	N. M. Ball
III	Yolo	7	A	At Mullen	0.2	23DN2	C. W. Wood
III	Yuba	3	A	Through Wheatland	0.9	23TC3	C. W. Wood
IV	Alameda	5	C	Hayward-Niles	8.7	24EC2	Hanrahan Co.
IV	Marin	1	A	Gallinas Creek-San Rafael	0.8	24EC5	Granfield, Farrar & Carlin
IV	San Mateo	68	A	Through S. San Francisco	0.9	24TC4	Basich Bros. Const. Co.
IV	San Mateo	68	B	S. San Francisco-Burlingame	5.0	24TC2	Basich Bros. Const. Co.
IV	Santa Clara	2	A	San Francisquito Creek-San Antonio Ave.	2.1	24EC6	Hanrahan Co.
IV	Santa Clara	2	A	San Antonio Ave.-Sunnyvale	2.8	24EC8	Hanrahan Co.
IV	Sonoma-Marin	1	C, A	Petaluma-Ignacio	7.4	24EC4	Hanrahan Co.
V	Monterey	2	G, H	Near San Ardo	1.5	25EC2 25TC1	Fredrickson & Watson Co.
V	San Luis Obispo	2	F	Santa Maria River-Los Berros Creek	7.2	25C81	J. F. Knapp
V	Santa Barbara	2	C	Zaca-Wigmora	4.0	25C82	Cornwall Construction Co.
V	Santa Barbara	2	A	1/2 mile N. of Santa Maria	0.6	25VC1	Cornwall Construction Co.
VII	Los Angeles	2	C	At Liberty Grade	1.2	27FC7	W. F. Peck Co.
VII	Los Angeles	4	E	Newhall Tunnel-Newhall	1.1	27VC3	McCray Co.
VII	Los Angeles	4	F	Tunnel Station-Santa Clara R.	8.5	27VC4	Jahn & Bressi
VII	Orange	60	A	Seal Beach-Sunset Beach	3.3	27FC13	T. M. Morgan Co.
VII	Orange	60	A	Sunset Beach-Newport Beach	5.0	27FC5	Macco Construction Co.
VII	Orange	60	C	Between Dana Point and Serra	0.2	27FFC1	Matich Bros.
VII	San Diego	2	D	San Clemente-San Onofre	0.9	27FC10	Matich Bros.
VII	San Diego	2	E	Balboa Ave.-Torrey Pines Road	5.4	27VC7	Jahn & Bressi
VII	San Diego	2	F	Kitchen Creek-La Posta	3.9	07VC7	Basich Bros. Const. Co.
VIII	Imperial	12	A	Myers Creek Bridge-3 mi. W. of Coyote Wells	2.9	28FC2	Basich Bros. Const. Co.
VIII	Imperial	26	A, H	Brawley-4 miles W. of Westmoreland	10.4	28VC6	A. M. Peck Co.
VIII	Imperial	27	C	El Centro-Holtville	9.0	28VC7	A. M. Peck Co.
VIII	Riverside	19	A	At Wineville	0.5	08VC6	Match Bros.
X	Solano	7	E	Through Dixon	0.7	210TC4	C. W. Wood
X	Sacramento	4	A	1 mile S. of Arno-Cosumnes River	2.6	210TC8	Fredrickson & Watson Co.
X	San Joaquin	4	C	Cherokee Station-Harney Lane	6.9	210TC5	T. M. Morgan Co.
Total					117.3		

## ASPHALTIC CON

District	County	Route	Section	Location	Miles	Contract	Contractor
III	Yolo	7	C	Bretona-Dunnigan	5.8	23EC3	Jones & King
IV	Alameda	5	C	Hayward-Niles	8.7	24EC2	Hanrahan Co.
IV	Santa Clara	2	A	San Francisquito Creek-San Antonio Ave.	2.3	24EC6	Hanrahan Co.
IV	Santa Clara	2	A	San Antonio Ave.-Sunnyvale	2.1	24EC8	Hanrahan Co.
V	San Luis Obispo	2	B	Atascadero-Paso Robles	9.5	25FC1	Steele Finley
V	San Luis Obispo	2	B	Through Atascadero	0.4	25F1	M. J. Bevanda
VI	Fresno	4	A, B	Fowler Switch Canal-Fancher Creek	7.5	26EC3	Peninsula Paving Co.
VI	Fresno	4	A, B	Through Fowler	0.9	26TC1	Peninsula Paving Co.
VI	Madras	4	C	Califa-Northerly Boundary	5.5	26EC2	A. Teichert & Son
VI	Tulare	4	A	Southerly Boundary-Pixley	12.2	26FC1	Valley Paving & Const. Co.
VI	Tulare	4	A, B	Pixley-Tipton	8.6	26C81	California Const. Co.
VII	Los Angeles	9	C	Claremont, Mt. Ave.-County Line	1.7	27V4	Griffith Co.
VII	Los Angeles	9	H	Citrus Ave.-Glendora	1.0	27VC5	Griffith Co.
VII	Los Angeles	60	C	Pier Ave.-Gould Lane, Hermosa Beach	0.6	27V3	Ed. Johnson & Sons
VIII	Los Angeles-Ventura	2	C, A, B	1 mile E. of County Line-Top Conejo Grade	0.2	27FFC2	Griffith Co.
VIII	Ventura	2	B	Conejo Creek-Camarillo	2.3	27FC6	Griffith Co.
VIII	Imperial	12	C	Dixieland-Seelye	5.0	28FC1	R. E. Hazard Co.
X	San Joaquin	5	B	South Banta Road-East Banta Road	1.9	210EC2	Heafey-Moore Co.
X	San Joaquin	4	D	Forest Lake-Northerly Boundary	1.4	210TC9	Clark & Henry
Total					77.9		



# Construction, 1930

Article, see page 22)

## CONCRETE PAVEMENT

Resident engineer	Street assistants	Average strength of concrete at 28 days, pounds per square inch.....	Average strength of special tests, pounds per square inch.....	Average yardage laid per day, cubic yards.....	Average daily variation in cement, in per cent.....	Roughometer, index of roughness in inches per mile.....	Type of equipment used		District
							Mixer	Finisher	
C. P. Sweet.....	J. A. Hutchinson, C. R. Hagberg.....	5,464	6,026	292.9	0.89	6.5	Footc.....	Ord (2).....	I
M. H. Hubbs.....	J. A. Hutchinson, C. R. Hagberg.....	5,114		165.7	1.12	8.0	Footc.....	Ord (2).....	I
E. J. Peterson.....	A. C. Briney, W. J. Braker.....	5,240	5,752	405.5	0.37	5.9	Ransome.....	Ord (2).....	III
J. D. Greene.....	W. D. Sedgwick.....	5,503	5,270	203.0	0.84	10.2	Koehring.....	Ord (2).....	III
C. A. Potter.....	J. Meyer.....	4,580		47.9	2.15	14.3	Paris Transit Mixer.....	Ord.....	III
J. D. Greene.....	A. C. Briney.....	5,421	5,458	240.2	1.37	8.8	Footc.....	Ord (2).....	III
W. A. Rice.....	R. A. Westbrook.....	3,952	4,760	274.1	1.00	9.7	Footc.....	Ord.....	IV
M. C. Foggate.....	D. N. Sapp.....	5,048		213.5	1.55	11.3	Footc.....	Ord (2).....	IV
W. A. Rice.....	R. A. Westbrook, V. R. Glass.....	4,392		385.9	1.04	7.3	Ransome (2).....	Lakewood, Ord.....	IV
W. A. Rice.....	R. A. Westbrook, V. R. Glass.....	4,391	4,807	788.3	0.88	6.2	Ransome (2).....	Lakewood, Ord.....	IV
C. F. Price.....	R. A. Westbrook.....	5,077	7,052	252.5	1.25	11.6	Footc.....	Ord (2).....	IV
C. F. Price.....	E. Carlstad, E. W. Herlinger.....	4,890		277.0	1.32	9.9	Footc.....	Ord (2).....	IV
E. E. Sorenson.....	E. Carlstad, E. W. Herlinger.....	5,706	5,957	257.4	1.32	10.5	Footc.....	Ord (2).....	IV
K. B. Grimm.....	J. S. Peterson, F. E. Bosch.....	4,161	4,210	222.9	0.32	13.4	Footc.....	Ord.....	V
T. W. Voss.....	E. F. Carter, R. P. Cann.....	5,355	5,525	313.7	0.64	7.5	Footc.....	Ord (2).....	V
F. R. Baker.....	E. W. Taylor, F. C. Weigel.....	5,145	4,776	236.8	0.86	8.9	Koehring.....	Ord.....	V
T. W. Voss.....	N. S. Hamilton, F. C. Weigel.....	6,192		137.7	0.25	4.8	Footc.....	Ord.....	V
W. J. Calvin.....	W. T. Lamb, H. D. Johnson.....	4,260		284.0	6.45	4.8	Koehring.....	Ord.....	VII
W. I. Templeton.....	H. B. Lindley.....	5,075		225.1	0.41	12.3	Koehring.....	Ord.....	VII
R. D. Kinsey.....	W. T. Lamb, H. D. Johnson.....	5,676	6,019	358.4	0.43	5.9	Koehring.....	Ord.....	VII
W. D. Eaton.....	C. J. McCullough.....	5,423		325.7	0.69	6.7	Koehring.....	Lakewood, Ord.....	VII
W. D. Eaton.....	C. J. McCullough.....	5,040		320.8	0.61	7.7	Footc.....	Lakewood.....	VII
H. B. Lindley.....	T. A. Roseberry.....	4,842		159.3	0.96	10.2	Hex.....	Lakewood.....	VII
H. B. Lindley.....	C. J. McCullough, C. T. Warren.....	6,218	6,497	258.0	0.28	6.1	Hex.....	Lakewood.....	VII
F. A. Read.....	C. J. McCullough, G. F. Allen.....	4,840	6,080	427.3	0.44	6.5	Koehring.....	Ord (2).....	VII
J. M. Lachey.....	C. J. McCullough.....	4,275	4,826	260.8	0.78	8.6	Hex.....	Lakewood.....	VII
B. A. Price.....	G. E. Malkson, T. C. Yeager.....	5,668		215.0	0.68	13.6	Hex.....	Lakewood.....	VIII
R. C. Payne.....	G. E. Malkson.....	4,643	4,547	334.9	1.12	10.6	Hex.....	Lakewood, Ord.....	VIII
J. M. Hollister.....	G. E. Malkson.....	4,349	4,580	305.1	0.41	8.4	Hex.....	Lakewood, Ord.....	VIII
L. E. Cole.....	G. C. Hardson.....	4,943		210.5	0.79	16.1	Hex.....	Lakewood.....	VIII
J. W. Cole.....	R. M. Parrish.....	5,740	5,640	202.5	0.95	8.6	Footc.....	Ord (2).....	X
G. R. Hubbard.....	J. S. Langenbach.....	5,221		296.8	0.51	8.9	Footc.....	Ord (2).....	X
G. R. Hubbard.....	R. M. Parrish.....	4,606	5,969	342.4	0.78	8.2	Koehring.....	Ord (2).....	X
Average.....				319.2					

## CRETE PAVEMENT

Resident engineer	Street assistant	Average tonnage laid per day.....	Average relative specific gravity of surface mix in per cent.....	Average stability of surface mix in pounds.....	Roughometer index of roughness in inches per mile		Type of equipment used		District
					Hand finish	Machine finish	Mixing plant	Finisher	
F. R. Baker.....	C. F. Child, W. J. Braker.....	603.7	92.9	3,609		9.1	Madsen.....	Ord.....	III
W. A. Rice.....	R. A. Westbrook.....	417.4	96.5	2,425		14.2	Geiger.....	Ord.....	IV
C. F. Price.....	A. W. Carr.....	384.8	96.0	2,410		12.8	Geiger.....	Ord.....	IV
C. F. Price.....	E. Carlstad, A. W. Carr.....	420.0	93.0	2,794		9.5	Geiger.....	Ord.....	IV
C. T. Schultz.....	E. D. Davis, J. C. Adams.....	575.2	95.8	2,522		11.5	Home-made.....	Ord.....	V
C. T. Schultz.....	E. D. Davis, J. C. Adams.....	254.2	95.4	2,156		11.5	Home-made.....	Ord.....	V
H. B. La Forge.....	L. J. Low.....	1040.9	96.8	3,600		7.4	Geiger.....	Ord (2).....	VI
H. B. La Forge.....	L. J. Low.....	783.9	96.8	3,660		7.4	Geiger.....	Ord (2).....	VI
E. Evers.....	C. I. Harkins.....	479.7	95.3	3,007		10.2	Geiger.....	Ord (2).....	VI
H. B. La Forge.....	W. B. Skagerson, J. A. Whyte.....	679.9	95.1	3,187		8.3	Union Iron Wks.....	Ord.....	VI
W. T. Rhodes.....	L. J. Low, P. A. Boulton.....	888.3	91.7	2,967		7.4	Geiger.....	Ord (2).....	VI
J. M. Lachey.....	L. R. McNeely.....	594.6	94.8	4,053	25.1	16.5	Totman.....	Ord.....	VII
J. M. Lachey.....	L. R. McNeely.....	487.0	92.2	4,435		11.4	Totman.....	Ord.....	VII
L. R. McNeely.....	H. S. Barhite.....	357.0	96.6	2,230	21.2		Madsen.....	Hand.....	VII
R. D. Kinsey.....	H. D. Johnson.....	235.0		3,950	29.4		Totman.....	Hand.....	VII
R. D. Kinsey.....	H. D. Johnson.....	352.9		2,797		14.9	Totman.....	Ord.....	VII
H. O. Ragan.....	T. B. Landers, T. C. Yeager.....	413.0	94.3	1,970		17.7	Madsen.....	Lakewood.....	VIII
J. W. Cole.....	C. M. Hanson.....	370.6	94.1	3,088		9.7	Geiger.....	Lakewood.....	X
A. K. Nulty.....	C. M. Hanson.....	445.2	94.7	3,431		11.8	Madsen.....	Ord.....	X
Average.....		582.9							

# 1930 Construction Record Tabulation

(For Descriptive Article, see page 22)

## YEARLY COMPARISONS BY DISTRICTS

District	Miles constructed						Average compressive strength, pounds per square inch, 28-day age						Average roughness, inches per mile						District
	1925	1926	1927	1928	1929	1930	1925	1926	1927	1928	1929	1930	1925	1926	1927	1928	1929	1930	

### PORTLAND CEMENT CONCRETE PAVEMENT

I	6.6					4.9	4,980					5,426	11.7					6.8	I
II	1.5				8.6		4,055				3,453		28.7				11.3		II
III	0.6		0.4	1.1	9.6	8.0	3,425		3,810	3,190	4,449	5,314	43.0		5.6	9.5	7.6	7.4	III
IV	7.7	7.2	10.5	4.6	16.5	27.7	5,110	4,915	4,845	4,980	4,706	4,539	29.5	5.7		8.4	8.0	9.4	IV
V			5.9	10.0	6.6	13.3			4,790	3,810	3,895	5,200			5.1	10.6	8.6	8.5	V
VI	5.0				6.5		4,070				3,523		11.7				7.5		VI
VII	8.6	44.6	37.2	2.0	37.4	30.4	3,690	4,145	4,410	4,735	3,925	5,168	10.0	5.8	8.1	9.6	7.0	7.0	VII
VIII	12.5	3.0		4.8	14.0	22.8	3,945	3,800		3,955	3,601	4,667	10.0	15.4		11.0	10.2	10.2	VIII
IX																			IX
X	9.0	0.5		11.1	3.2	10.2	4,490	3,960		4,485	4,149	4,845	10.5	6.5		7.5	9.0	8.4	X
State	51.5	55.3	54.0	33.6	102.4	117.3	4,311	4,214	4,510	4,235	3,930	4,042	14.3	7.1	7.8	9.3	8.2	8.6	State

### ASPHALT CONCRETE PAVEMENT

District	Miles constructed										Average roughness, inches per mile										District				
	1925		1926		1927		1928		1929		1930		1925		1926		1927		1928			1929		1930	
			Hand	Machine	Hand	Machine	Hand	Machine	Hand	Machine	Hand	Machine			Hand	Machine	Hand	Machine	Hand	Machine		Hand	Machine	Hand	Machine
I																								I	
II																								II	
III	1.8	1.1	3.1		0.7	1.2					5.8	90.6	21.4	25.0		34.2	20.3						9.1	III	
IV	1.9	0.7	2.5		2.7	3.4	3.9	2.8		13.1	13.1	24.7	62.0	35.2		31.3	18.7	20.9	13.0				13.2	IV	
V	1.6	7.3						13.7		10.0		27.2	24.2						8.6				11.5	V	
VI	8.4	4.5	10.1	12.2	0.7	12.6	0.1	16.3		34.9		18.9	19.2	19.9	14.6	21.6	10.7	23.4	8.3				8.2	VI	
VII			1.0		2.3	3.5		6.9	0.8	5.0				17.6	34.1	8.7			13.8			23.9	14.2	VII	
VIII		21.3	9.0		1.0	16.5		23.9		5.0			23.3	30.8		25.7	17.7		20.0				17.7	VIII	
IX																								IX	
X	2.6	12.8			0.2					3.3		50.4	25.4			29.5							10.6	X	
State	16.3	47.7	25.7	12.2	7.6	37.2	4.0	63.6	0.8	77.1		33.2	24.1	25.2	14.6	30.9	14.7	20.9	13.6			23.9	10.6	State	

BITUMINOUS MACADAM

District	County	Route	Section	Location	Miles	Contract	Contractor	Resident Engineer	Street Assistant	Roughness index of roughness, inches per mile	District
I	Humboldt.....	1	I	Mill Creek-Trinidad.....	10.7	21TC3	Heafey-Moore Co.....	E. A. Wolfe.....	C. R. Hagberg.....	27.1	I
I	Humboldt.....	1	K	1 mile S. of Orisk-Northerly Boundary.....	15.1	21TC5	Heafey-Moore Co.....	E. A. Wolfe.....	J. E. Kinyon.....	21.0	I
IV	Marin.....	1	A	San Rafael-Gallinas Creek.....	1.9	24EC5	Granfield, Ferrar & Carlin.....	M. C. Fosgate.....	D. N. Sapp.....	33.5	IV
IV	Marin.....	1	C	San Rafael-Alta.....	4.4	24EC7	Granfield, Ferrar & Carlin.....	M. C. Fosgate.....	D. N. Sapp.....	21.4	IV
IV	Marin.....	52	A	Belvedere Crossing-Tiburon.....	1.3	24WC3	Granfield, Ferrar & Carlin.....	M. C. Fosgate.....	W. Thomas.....	25.4	IV
IV	Sonoma-Marin.....	1	C, A	Petaluma-Ignacio.....	4.5	24EC4	Hanrahan Co.....	E. B. Sorenson.....	J. H. Williams.....	26.2	IV
VI	Kern.....	33	A	Westerly Boundary-Junction Pumping Station.....	15.5	26XC2	Valley Paving Co.....	C. G. Kolster.....	J. A. Whyte.....	29.8	VI
VI	Kern.....	33	C	5 miles-7 miles E. of Lost Hills.....	2.0	06XC5	Hartman Construction Co.....	C. G. Kolster.....	R. M. Cooley.....	44.6	VI
VII	Los Angeles.....	4	B	1.3 miles to 13.9 miles N. of Castaic School.....	12.6	27FC11	Southwest Paving Co.....	R. D. Kinsey.....	T. A. Roseberry and L. F. Phillips.....	27.0	VII
Total.....					68.0						

ARMOR COAT

III	Nevada.....	15	C	Nevada City-1 mile W. of Washington Road.....	11.7	08CN1 09FC3 29VC3	C. R. Adams.....	J. Upham.....	C. F. Child.....	63.0	III
IX	Mono.....	23	G-H	Mattly Ranch-Leevining.....	2.0		C. Miies.....	V. E. Pearson.....	P. E. Evans.....	59.3	IX
Total.....					13.7						

## 1930 Construction Record Tabulation—Continued

## PLANT OIL MIX

District	County	Route	Section	Location	Miles	Contract	Contractor	Resident Engineer	Street Assistant	Roughness index of roughness, inches per mile	District
VI	Kern.....	57	B, C	7 miles E. of Pentland Jct.-San Emigdio Road	12.2	26XC1	Los Angeles Decomposed Granite Co.....	J. N. Bidwell.....	H. Hawkins.....	10.2	VI
VI	Kern.....	57	C	San Emigdio Road-Route 4.....	9.7	26XC3	V. E. Dennis Co.....	C. F. Marshall.....	W. L. Lovering.....	36.9	VI
VI	Kern.....	57	F, G	1½ miles E. of Coltonwood Creek-Democrat Springs.....	13.9	26XC4	A. Teichert & Son.....	W. T. Rhodes.....	P. B. Boulton.....	33.3	VI
VIII	San Bernardino.....	31	G, H	Barstow-1 mile E. of Yermo.....	13.0	28VC3	Geo. Herz & Co.....	O. B. Brinkerhoff.....	J. C. Locey.....	15.1	VIII
VIII	San Bernardino.....	58	H, J	2 miles W. of Argos-1½ miles W. of Siberia.....	16.5	28VC4	New Mexico Const. Co.....	J. M. Hodges.....	W. Ford.....	12.6	VIII
VIII	San Bernardino.....	58	J, K	1½ miles W. of Siberia-6 miles E. of Amboy.....	22.4	28VC5	New Mexico Const. Co.....	J. M. Hodges.....	W. Ford.....	9.3	VIII
IX	Inyo.....	23	G	Little Lake-Coso Jct.....	3.7	29CS1	F. W. Nighbert.....	B. M. Gallagher.....	W. F. Kaill.....	20.0	IX
IX	Inyo.....	23	G	Southerly Boundary-Little Lake.....	9.8	29VC2	F. W. Nighbert.....	B. M. Gallagher.....	W. F. Kaill.....	22.7	IX
IX	Inyo.....	23	H, I	Coso Jct.-Clancha.....	21.3	29VC4	Allied Contractors, Inc.....	S. C. Risley.....	R. H. Ostrander.....	15.1	IX
IX	Kern.....	23	C, D	Cinco-7 miles N. of Ricardo.....	15.0	29VC5	Geo. Herz & Co.....	W. Mathews.....	W. F. Kaill.....	7.8	IX
IX	Kern.....	23	D	7 miles N. of Ricardo-Freeman.....	10.2	09VC4	G. W. Ellis.....	V. E. Pearson.....	R. Ostrander.....	17.3	IX
IX	Kern.....	23	E	Freeman-Northerly Boundary.....	13.8	29VC1	Bartlett & Matthews and Black & Hagey.....	V. E. Pearson.....	D. J. Bouch.....	15.0	IX
				Total.....	164.5						

## ROAD OIL MIX

I	Del Norte.....	1	A	Southerly Boundary-Wilson Creek.....	12.7	21TC10	Hemstreet & Bell.....	E. A. Wolfe.....	Paul Steenstrup.....	20.6	I
X	San Joaquin.....	5	B	French Camp-Stockton.....	1.8	210TC7	Larsen Bros.....	A. L. Tschants, Hahn.....	L. E. Ford.....	37.6	X
				Total.....	14.5						

## HIGHWAY BIDS AND AWARDS

For the Month of April

**ALAMEDA COUNTY**—Between Stanton Ave. and Foothill Blvd. About 0.6 mile to be graded and paved with Portland cement concrete. Dist. IV, Rt. 5, Section B. M. J. Bevanda, Stockton, \$39,147; contract awarded to Jones & King, Hayward, \$34,595.

**AMADOR COUNTY**—Treating with light and heavy fuel oil between Chapman's and Silver Lake. Thirty-four and three-tenths miles. Dist. X, Rt. 34, Section E, F, G and H. Pacific Tank Lines, Inc., Los Angeles, \$10,024; C. W. Wood, Stockton, \$9,648; Edw. A. Peres, Richmond, \$10,367; contract awarded to Basalt Rock Co., Inc., Napa, \$7,881.25.

**BUTTE AND PLUMAS COUNTIES**—Treating with light fuel oil, portions between Miners Ranch and Quincy, 47.8 miles. Dist. III, Rt. 21, Section A, B and C. Pacific Tank Lines, Inc., Los Angeles, \$9,888; Clyde W. Wood, Stockton, \$7,840; Basalt Rock Co., Inc., Napa, \$8,640; contract awarded to D. McDonald, Sacramento, \$7,616.

**HUMBOLDT COUNTY**—Between Loleta and one-half mile south of Eureka. Five and three-tenths miles to be surfaced with bituminous treated gravel or stone and 4.7 miles to be widened with bituminous treated crushed gravel or stone borders. Mercer Fraser Co., Eureka, \$71,197; Heafey Moore Co., Oakland, \$62,770; Smith Bros. Co., Eureka, \$69,762; contract awarded to Hemstreet & Bell, Marysville, \$62,685.

**IMPERIAL COUNTY**—In Imperial County through the S. D. & A. R. R. Co. Undergrade crossing about 0.2 mile in length, graded and paved with Portland cement concrete. Dist. VIII, Rt. 12, Section A. Martin Green, San Bernardino, \$9,469; Charles E. Farrell, El Centro, \$7,833; R. E. Hazard Contracting Co., San Diego, \$8,864; contract awarded to Matich Bros., Elsinore, \$7,520.

**KERN COUNTY**—Furnishing and applying heavy fuel oil as a dust palliative on 31.2 miles of State highway between Mojave and the San Bernardino County line. Dist. IX, Rt. 58, Section A and B. U. B. Lee, San Leandro, \$6,394; Fred W. Nighbert, Bakersfield, \$6,220; Pacific Tank Lines, Inc., Los Angeles, \$5,872; Basalt Rock Co., Inc., Gilmore Oil Co., Ltd., Los Angeles, \$6,960; California Road Oil Service Co., Ltd., Wilmington, \$7,786; L. C. Pulley, Long Beach, \$7,264; contract awarded to Square Oil Company, Inc., Los Angeles, \$5,220.

**LAKE COUNTY**—Applying light fuel oil as dust palliative on 10.9 miles. Dist. III, Rt. 15, Section B. D. McDonald, Sacramento, \$1,584; Basalt Rock Co., Inc., Napa, \$1,686; contract awarded to Chas. Kuppinger, Lakeport, \$1,314.

**LOS ANGELES COUNTY**—Between 4 miles north of La Canada and Colby Canyon. About 5 miles to be graded. Dist. VII, Rt. 61, Section A. Vonden Heller & Pierson, Castaic, \$415,959; M. S. Ross, Los Angeles, \$424,217; O. A. Lindberg, Stockton, \$497,640; George Pollock Co., Sacramento, \$465,684; H. W. Rohl Co., Los Angeles, \$415,372; Macco Construction Co., Clearwater, \$421,258; C. G. Willis & Sons, Los Angeles, \$486,649; Merritt Chapman & Scott Corp., San Pedro, \$597,276; contract awarded to T. M. Morgan Paving Co., Los Angeles, \$399,220.

**LOS ANGELES COUNTY**—Between Baileys Ranch and Neenach School. About 7.5 miles to be graded and oiled. Dist. VII, Rt. 59, Section A. C. G. Willis & Sons, Los Angeles, \$71,970; Steele

Finley, Santa Ana, \$50,254; Dan G. Munro, Los Angeles, \$62,617; McCray Co., Los Angeles, \$67,125; Frank W. Hammer, Los Angeles, \$60,032; Macco Const. Co., Clearwater, \$55,425; Hartman Const. Co., Bakersfield, \$61,940; Chas. A. Ladavege, South Gate, \$61,262; P. J. Akmadzich, Los Angeles, \$60,405; Owl Truck Co., Inc., Compton, \$55,967; Dimmitt & Taylor, Los Angeles, \$52,322; Fred W. Nighbert, Bakersfield, \$59,655; J. G. Donovan & Son, Los Angeles, \$69,785; contract awarded to Gibbons & Reed Co., Burbank, \$48,749.

**LOS ANGELES COUNTY**—Between Canton Creek and Piru Creek. About 7.3 miles to be graded. Dist. VII, Rt. 4, Section H and I. Fredrickson & Watson Const. Co. and Fredrickson Bros., Oakland, \$551,007; Gibbons & Reed Co., Burbank, \$678,510; Granfield, Farrar & Carlin, San Francisco, \$505,682; Vonder Hellen & Pierson, Castaic, \$534,262; H. W. Rohl Company, Los Angeles, \$530,659; George Pollock Co., Sacramento, \$539,456; contract awarded to Will F. Peck Co., Los Angeles, \$422,221.

**MADERA COUNTY**—At Berenda Slough. A concrete girder bridge consisting of eighteen 26-foot 6-inch spans on concrete pile bents. Dist. VI, Rt. 4, Section C. A. W. Kitchen, San Francisco, \$33,575; Mead Const. Co., Wilmington, \$36,847; Liner & Allen, Merced, \$32,515; Fredrickson & Watson Const. Co. and Fredrickson Bros., Oakland, \$36,282; Robinson-Roberts Co., Los Angeles, \$41,905; L. C. Clark and C. E. Doughty, Visalia, \$34,507; Oberg Bros., Los Angeles, \$37,582; Geo. J. Olrich Const. Co., Modesto, \$32,435; Neves & Harp, Santa Clara, \$32,114; contract awarded to Thermotite Const. Inc., San Jose, \$30,734.

**MENDOCINO COUNTY**—Furnish and apply light fuel oil as dust palliative between McDonald and Flynn Creek. Dist. IV, Rt. 48, Section A, B and C. Basalt Rock Co., Inc., Napa, \$8,400; Peres & Gatto, Richmond, \$9640; Edw. M. Dearborn, Redwood City, \$10,200; Jack Casson, Hayward, \$8,640; C. W. Wood, Stockton, \$9,000; contract awarded to C. F. Fredrickson & Sons, Lower Lake, \$8,400.

**MERCED COUNTY**—About 2½ miles east of Merced. Overhead crossing consisting of thirty-one 40-foot spans and seven 20-foot spans with Portland concrete cement. Deck on steel-pile bents. Dist. VI, Rt. 18, Section A. J. F. Knapp, Oakland, \$108,825; Barrett & Hilp, San Francisco, \$112,684; Guy F. Atkinson Company, San Francisco, \$112,905; Mercer-Fraser Co., Eureka, \$120,280; Bodenhamer Const. Co., Oakland, \$105,481; Oberg Bros., Los Angeles, \$111,820; A. W. Kitchen, San Francisco, \$110,484; Merritt-Chapman & Scott Corp., San Pedro, \$109,715; Gutleben Bros., Oakland, \$107,351; Frederickson & Watson Const. Co. and Frederickson Bros., Oakland, \$108,452; David G. Johns, Santa Monica, \$110,777; C. W. Wood, Stockton, \$113,383; Lingren & Swinerton, Inc., Sacramento, \$107,298; Ralph McLeran & Co., San Francisco, \$113,644; Rocca & Caletti, San Rafael, \$106,789; contract awarded to M. B. McGowan, San Francisco, \$102,400.

**MONO COUNTY**—Between 2 miles west of Bridgeport and Sonora Junction, about 14.2 miles to be graded. Dist. IX, Rt. 23, Section J. Kennedy-Bayles Construction Co., Biggs, \$165,533; C. Emil Force, Piedmont, \$231,604; Morrison-Knudsen Co., Boise, Idaho, \$193,522; Hemstreet Bell, Marysville, \$183,306; H. W. Rohl, Los Angeles, \$188,149; Gist & Bell, Arcadia, \$197,385; G. W. Ellis, Los Angeles, \$193,837; C. G. Willis & Sons, Los Angeles, \$176,231; MacDonald & Kahn Co., Ltd., \$220,353; Triangle Rock & Gravel Co., San Bernardino, \$192,474; Nevada Construction Co., Fallon, Nevada, \$199,186; contract

awarded to Robinson-Roberts Co., Los Angeles, \$129,631.

**PLACER COUNTY**—About one-half mile west of Auburn. Constructing six 19-foot timber spans and one 40-foot steel span bridge across the Auburn Ravine. Dist. III, Rt. 17, Section B. J. W. Hoopes, Sacramento, \$11,543; A. Young, Yreka, \$10,898; M. B. McGowan, San Francisco, \$11,754; Clinton-Stephenson Const. Co., Ltd., San Francisco, \$11,436; F. H. Nielson, Orland, \$12,490; Robinson-Roberts Co., Los Angeles, \$11,674; Geo. J. Ulrich Const. Co., Modesto, \$9,791; W. H. Houser, Oakland, \$11,486; contract awarded to Peter F. Bender, North Sacramento, \$9,764.

**PLACER AND EL DORADO COUNTIES**—Treating with light fuel oil. Between Auburn and Placerville and between El Dorado and Cosumnes River, 31.9 miles. Dist. III, Rt. 65, Section A, B and C. D. McDonald, Sacramento, \$5,080; Carl Mankel, Sacramento, \$6,147; E. F. Hilliard, Sacramento, \$5,698; Pacific Tank Lines, Inc., Los Angeles, \$5,883; Basalt Rock Co., Inc., Napa, \$5,557; Clyde Wood, Stockton, \$4,912; Jack Casson, Hayward, \$4,238.

**PLACER COUNTY**—Across Coon Creek. Reinforced concrete girder bridge. Six 34-foot 6-inch spans on reinforced concrete pile bents. Dist. III, Rt. 3, Section B. Holdener Const. Co., Sacramento, \$20,006; A. T. Howe, Santa Rosa, \$21,198; Peter F. Bender, North Sacramento, \$21,345; contract awarded to Geo. J. Ulrich, Modesto, \$18,973.

**PLUMAS AND LASSEN COUNTIES**—Between Chester and Willards. About 25.3 miles to be surfaced with crushed gravel or stone. Dist. II, Rt. 29, Section A and B. Finnell Co., Inc., Sacramento, \$121,636; C. W. Wood, Stockton, \$119,308; Hemstreet & Bell, Marysville, \$109,821; Fred W. Nighbert, Bakersfield, \$129,781; Tiffany, McReynolds, Tiffany, San Jose, \$114,675; D. McDonald, Sacramento, \$119,171; Granite Const. Co., Watsonville, \$110,717; N. M. Ball, Porterville, \$125,367; contract awarded to Irving L. Ryder, San Jose, \$96,533.

**PLUMAS COUNTY**—Between Spanish Creek and one mile south of Keddie. About 1.4 miles to be graded. Dist. II, Rt. 21, Section B and C. Nevada Contracting Co., Fallon, Nevada, \$91,937; C. G. Willis & Sons, Inc., Los Angeles, \$143,178; Morrison-Knudson Co., Boise, Idaho, \$84,320; Clarence Young, Oakland, \$87,746; Kennedy-Bayles Const. Co., Biggs, \$126,483; H. H. Boomer, San Francisco, \$89,561, contract awarded to Chigris-Sutsos, San Francisco, \$69,134.

**SAN DIEGO COUNTY**—Across San Dieguito River—R. C. girder bridge, eleven 54-foot spans on concrete piers and abutments with wing walls on pile foundations. Dist. VII, Rt. 2, Section A. Bodenhamer Const. Co., Oakland, \$140,657; Merritt-Chapman & Scott Corp., San Pedro, \$139,900; R. R. Bishop, Long Beach, \$154,379; Robinson-Roberts Co., Los Angeles, \$166,869; Lynch-Cannon Engineering Co., Los Angeles, \$157,625; Herbert M. Baruch Corp., Ltd., Los Angeles, \$143,725; J. F. Knapp, Oakland, \$139,600; Macco Const. Co., Clearwater, \$147,579; R. H. Travers, Los Angeles, \$157,452; J. S. Metzger & Son, Los Angeles, \$151,810; B. B. Boyd, San Diego, \$173,064; Owl Truck Co., Compton, \$164,844; Oberg Bros., Los Angeles, \$147,632; contract awarded to David G. Johns, Santa Monica, \$138,678.

**SAN DIEGO COUNTY**—Between La Posta Creek and Campo Road Junction. About 8.8 miles to be paved with Portland cement concrete. Dist. VII, Rt. 12, Section E. Sander Pearson, Santa Monica, \$308,103; Geo. H. Oswald, Los Angeles, \$286,545; Ed Johnson & Sons, Los Angeles, \$298,062; Daley

Corp., San Diego, \$285,755; Griffity Co., Los Angeles, \$235,627; Central California Roads Co., Southern California Roads Co., Los Angeles, \$269,748; Matich Bros., Elsinore, \$268,962; Basich Bros. Const. Co., Torrance, \$242,273; contract awarded to E. Paul Ford, San Diego, \$240,751.

**SAN DIEGO COUNTY**—At Bostonia, about 1.5 miles to be graded and paved with Portland cement concrete. Dist. VII, Rt. 12, Section C. V. R. Dennis Construction Co., San Diego, \$43,669; Griffity Co., Los Angeles, \$43,694; B. G. Garrot, San Diego, \$44,817; Basich Bros. Const. Co., Torrance, \$45,447; Sander Pearson, Santa Monica, \$48,400; contract awarded to Matich Bros., Elsinore, \$42,505.

**SAN MATEO COUNTY**—Between Burlingame and San Mateo. About 3 miles to be paved with Portland concrete cement. Dist. IV, Rt. 68, Section B-C. Hanrahan Co., San Francisco, \$217,447; Fredrickson, Watson Construction Co., and Fredrickson Bros., Oakland, \$233,029; C. W. Wood, Stockton, \$241,792; contract awarded to Basich Bros. Const. Co., Torrance, \$212,933.

**SAN MATEO COUNTY**—Between Rancho San Mateo and Half Moon Bay Road. About 6.6 miles to be surfaced with crushed rock and screenings to be stockpiled. Dist. IV, Rt. 55, Section B. Beerman & White, Belmont, \$33,300; contract awarded to H. E. Casey Co., San Mateo, \$30,225.

**SANTA BARBARA COUNTY**—Between Wigmore and Los Alamos. About 3.7 miles to be graded and paved with Portland cement concrete. Dist. V, Rt. 2, Section C. Maceo Const. Co., Clearwater, \$125,235; Cornwall Construction Co., Santa Barbara, \$122,229; W. A. Dontanville, Salinas, \$138,063; contract awarded to Basich Bros. Const. Co., Torrance, \$118,066.

**SANTA CLARA COUNTY**—Bridge across Carnadero Creek. Four 35-foot spans on concrete bents and 0.35 mile to be graded and paved with Portland cement concrete. Dist. IV, Rt. 2, Section C. Thermolite Const., Inc., San Jose, \$51,121; A. J. Raisch, San Jose, \$51,426; A. W. Kitchen, San Francisco, \$56,098; David G. Johns, Santa Monica, \$62,500; M. B. McGowan, San Francisco, \$53,853; Barrett & Hulp, San Francisco, \$65,755; Fredrickson & Watson Const. Co., and Fredrickson Bros., Oakland, \$54,464; Peter McHugh, San Francisco, \$59,554; Neves & Harp, Santa Clara, \$55,134; contract awarded to Oberg Bros., Los Angeles, \$50,158.

**SANTA CRUZ COUNTY**—Furnish and apply light fuel oil as dust palliative between California Redwood Park and Waterman Switch. Dist. IV, Rt. 42, Section A. Jack Casson, Hayward, \$3,852; Basalt Rock Co., Inc., Napa, \$4,050; Granite Const. Co., Watsonville, \$4,230; Edw. W. Dearborn, Redwood City, \$3,870; C. W. Wood, Stockton, \$3,330; J. P. Holland, Inc., San Francisco, \$5,400; contract awarded to Edward A. Peres, Richmond, \$3,240.

**SANTA CRUZ COUNTY**—Between Waterman Switchback and Saratoga Gap. About 6.5 miles in length, three-fifths miles to be graded and surfaced with crusher run base and 6.5 miles to be paved with bituminous macadam. Dist. IV, Rt. 42, Section A. Fredrickson & Watson Const. Co. and Fredrickson Bros., Oakland, \$212,838; O. A. Lindberg, Stockton, \$222,152; Geo. Pollock Co., Sacramento, \$245,860; Granfield, Farrar & Carlin, San Francisco, \$241,733; Frank C. Cuffe, San Rafael, \$259,313; Dan C. Munro, Los Angeles, \$228,200; Robinson-Roberts Co., Los Angeles, \$265,924; Granite Const. Co., Watsonville, \$232,820; contract awarded to Healy-Libbitts Const. Co., San Francisco, \$207,483.

**SIERRA AND LASSEN COUNTIES**—Treating with heavy fuel oil between 2 miles west of Milford and Doyle and between Long Valley Creek and the Nevada State line. Forty-two and two-tenths miles. Dist. II, Rt. 29, Section D, E and A. Jack Casson, Hayward, \$10,682; D. McDonald, Sacramento, \$10,682; contract awarded to Basalt Rock Co., Inc., Napa, \$10,029.75.

**SISKIYOU COUNTY**—Treating with heavy fuel oil. About 21 miles. Between Shasta River and Walker Station. Dist. II, Rt. 46, Section D. Basalt Rock Co., Inc., Napa, \$5,604; contract awarded to D. McDonald, Sacramento, \$5,477.

**SONOMA COUNTY**—At Lyllon Overhead. About 1.1 miles to be graded and paved with Portland concrete cement. Dist. IV, Rt. 1, Section A. Clark & Henery Construction Co., San Francisco, \$15,239; contract awarded to J. V. Galbraith, Petaluma, \$14,399.

**TEHAMA COUNTY**—Between Dales Ranch and Paynes Creek. About 7.3 miles to be surfaced with bituminous treated crushed gravel or stone. Dist. II, Rt. 29, Section A. Fred W. Nighbert, Bakersfield, \$60,060; C. W. Wood, Stockton, \$65,035; Granite Const. Co., Ltd., Watsonville, \$77,956; N. M. Ball, Porterville, \$74,884; Finnell Co., Inc., Sacramento, \$64,640; D. McDonald, Sacramento, \$64,724; contract awarded to Hemstreet & Bell, Marysville, \$59,487.

**TULARE COUNTY**—Between Goshen and Kingsburg. About 12.1 miles to be graded and paved with asphalt concrete. Dist. VI, Rt. 4, Section E. Geo. H. Oswald, Los Angeles, \$336,662; Peninsula Paving Company, San Francisco, \$320,722; Clark & Henery Const. Co., San Francisco, \$363,644; Gibbons & Reed Company, Burbank, \$345,166; David H. Ryan, San Diego, \$308,256; Valley Paving and Const. Co., Fresno, \$307,506; Hanrahan Company, San Francisco, \$318,568; contract awarded to Union Paving Co., San Francisco, \$305,561.

**TUOLUMNE COUNTY**—About 1.9 miles new hog-tight property fence to be constructed from Keystone to 1½ miles west. Dist. X, Rt. 13, Section A. E. C. Fisher & Sons, Vacaville, \$1,499; Anchor Post Fence Co. of California, San Francisco, \$1,866; Edw. R. Jameson, Sacramento, \$1,302; contract awarded to B. C. Burnett, Turlock, \$1,299.

**TUOLUMNE AND MARIPOSA COUNTIES**—Treating with light and heavy fuel oil between Priest's Hotel and Yosemite National Park, 38.9 miles. Dist. X, Rt. 18-40, Section A, B, C, D, E, F and A. Pacific Tank Lines, Inc., Los Angeles, \$12,421; C. W. Wood, Stockton, \$12,359; contract awarded to Basalt Rock Co., Inc., Napa, \$11,890.

**YUBA, NEVADA, SIERRA COUNTIES**—Treating with light fuel oil, between 7 miles north of Rough and Ready and between Nevada City. Dist. III, Rt. 15-25, Section Yub-Ne-15-A, B and Nev-Yub-Sie-25-A. Jack Casson, Hayward, \$7,879; D. McDonald, Sacramento, \$8,015; Pacific Tank Lines, Inc., Los Angeles, \$10,336; Basalt Rock Co., Inc., Napa, \$8,917; contract awarded to Clyde W. Wood, Stockton, \$7,461.

The amount of Federal-aid funds allocated for road-building projects during February was the largest on record for any month, and was about two and one-half times the largest amount set aside in any February since 1925, according to an oral statement March 16 by R. E. Royall, senior highway engineer of the Bureau of Public Roads.

Don't throw the conversation into high until the brain is turning over.—Charles H. Barr.

## WATER APPLICATIONS AND PERMITS

Applications for permits to appropriate water filed with the Department of Public Works, Division of Water Resources, during the month of April, 1930.

**SAN DIEGO COUNTY**—Application 6928. Victoria I. Edwards, Route 1, Box 851-D, San Diego, Calif., for 0.25 c.f.s. from Beaver Creek tributary to Sweetwater River. To be diverted in Section 25, T. 16 S., R. 1 E., S. B. B. and M., for irrigation and domestic purposes (30 acres). Estimated cost \$1,000.

**TUOLUMNE COUNTY**—Application 6929. F. W. and Stella G. Ross, 2253 East Church Street, Stockton, Calif., for 0.08 c.f.s. from four unnamed springs and an unnamed stream tributary to Moccasin Creek and Tuolumne Creek. To be diverted in Section 35, T. 1 S., R. 16 E., M. D. B. and M., for irrigation and domestic purposes (5 acres). Estimated cost \$100.

**MENDOCINO COUNTY**—Application 6930. Amanda P. Day, Cummings, Calif., for 0.087 c.f.s. from Bear Creek tributary to Dann Creek, thence S. Fork Eel River. To be diverted in Section 7, T. 23 N., R. 16 W., M. D. B. and M., for irrigation and domestic purposes (5 acres).

**PLACER COUNTY**—Application 6931. Fred E. Lazenby, 3965 Washington Avenue, Ogden, Utah, for 3 c.f.s. from seven unnamed springs. To be diverted in Section 1, T. 13 N., R. 9 W., M. D. B. and M., for irrigation and domestic purposes. Estimated cost \$500.

**RIVERSIDE COUNTY**—Application 6932. Sidney E. Bartlett, 606 Pacific Southwest Bldg., Long Beach, Calif., for 0.5 c.f.s. from unnamed seepage or waste water tributary to Santa Ana River. To be diverted in Section 36, T. 3 S., R. 5 W., S. B. B. and M., for irrigation purposes (10 acres).

**SUTTER COUNTY**—Application 6933. D. C. Smith, Meridian, Calif., for 3 c.f.s. from Butte Slough tributary to Sacramento River. To be diverted in Section 36, T. 18 N., R. 1 W., M. D. B. and M., for irrigation purposes (238.2 acres). Estimated cost \$1,200.

**ALPINE COUNTY**—Application 6934. George Hussman, Gardnerville, Nevada, for 135 acre-feet per annum from Nobel Lake tributary to Carson River. To be diverted in Section 4, T. 8 N., R. 20 E., M. D. B. and M., for irrigation purposes (300 acres).

**NEVADA COUNTY**—Application 6935. Central Pacific Railway Co., c/o Frank Thunon, Atty., 65 Market St., San Francisco, Calif., for 1.5 c.f.s. and 140 acre-feet per annum from Donner Creek tributary to Truckee River. To be diverted in Section 16, T. 17 N., R. 15 E., M. D. B. and M., for industrial (General Railroad Purposes) and domestic purposes. Estimated cost \$30,000.

**SAN JOAQUIN COUNTY**—Application 6936. O. C. Cutts, c/o Ohm and Raab, Engineers and Surveyors, 517 E. Market St., Stockton, Calif., for 1.0 c.f.s. from San Joaquin tributary to Suisun Bay. To be diverted in Section 21, T. 1 N., R. 6 E., M. D. B. and M., for irrigation purposes (79 acres). Estimated cost \$10,000.

**SISKIYOU COUNTY**—Application 6937. California Oregon Power Co. Inc., c/o Brobeck, Phleger and Harrison, Atty's., Crocker Bldg., San Francisco, Calif., for 3,000 c.f.s. from Klamath River tributary to Pacific Ocean. To be diverted in Section 9, T. 47 N., R. 5 W., M. D. B. and M., for power purposes (54,545 H.P.). Estimated cost \$4,500,000.

**FRESNO COUNTY**—Application 6938. Consolidated Irrigation District, Selma, Calif., for 1000 c.f.s. and 200,000 acre-feet per annum from San Joaquin River tributary to San Francisco Bay. To be diverted in Section 5, T. 11 S., R. 21 E., M. D. B. and M., for irrigation and domestic purposes (143,560 acres).

**KERN AND VENTURA COUNTIES**—Application 6939. Florence Louise Cuddy, Lebec, Calif., for 500,000 gallons per day from four unnamed springs tributary to Cuddy Canyon, thence San Joaquin Valley. To be diverted in Sections 3 and 10, T. 3 N., R. 20 W., S. B. B. and M., and Section 28, T. 9 N., R. 20 W., S. B. B. and M., for recreational and domestic purposes. Estimated cost \$3,000.

**PLACER COUNTY**—Application 6940. Pacific Gas and Electric Co., Attention: P. M. Downing, 1st Vice President and General Manager, 215 Market St., San Francisco, Calif., for 120 c.f.s. from the augmented flow of Bear River tributary to Feather River. To

be diverted in Section 22, T. 15 N., R. 9 E., M. D. B. and M., for irrigation purposes.

**PLACER COUNTY**—Application 6941. Pacific Gas and Electric Co., Attention: P. M. Downing, 1st Vice President and General Manager, 245 Market St., San Francisco, Calif., for 50 c.f.s. from augmented flow of Bear River tributary to Feather River. To be diverted in Sec. 3, T. 13 N., R. 8 E., M. D. B. and M., for irrigation purposes.

**EL DORADO COUNTY**—Application 6942. David M. Rounds, Camino, Calif., for 0.075 c.f.s. from Iowa Creek tributary to South Fork of American River. To be diverted in Sec. 33, T. 11 N., R. 12 E., M. D. B. and M., for irrigation and domestic purposes (15 acres).

**NEVADA COUNTY**—Application 6943. Gaston Gold Mines, Ltd., c/o Geo. St. John, 2801 Telegraph Ave., Berkeley, Calif., for 300 acre-feet per annum from South Fork of Poorman's Creek tributary to South Fork of Yuba River. To be diverted in Sec. 21, T. 18 N., R. 11 E., M. D. B. and M., for power purposes.

**SONOMA COUNTY**—Application 6944. Sonoma State Home, Department of Institutions, State of Calif., c/o J. M. Toner, M.D., Director, Sacramento, Calif., for 0.55 c.f.s. and 250 acre-feet per annum from Sonoma Creek tributary to San Pablo Bay. To be diverted in Sec. 22, T. 6 N., R. 6 W., M. D. B. and M., for irrigation and domestic purposes (131 acres to be irrigated). Estimated cost \$7,500.

**BUTTE COUNTY**—Application 6945. K. Jacobsen, Box 303, Gridley, Calif., for 3 c.f.s. from Main Drain of Reclamation District 2054 tributary to Sacramento River. To be diverted in Sec. 16, T. 17 N., R. 2 E., M. D. B. and M., Sec. 21, T. 17 N., R. 2 E., M. D. B. and M., for irrigation purposes (312 acres). Estimated cost \$300.

**TRINITY COUNTY**—Application 6946. Colon F. Whittier, c/o Geo. Hordenholt, 6327 W. 5th St., Los Angeles, Calif., for 100 c.f.s. from Soldier Creek tributary to Trinity River. To be diverted in Sec. 25, T. 33 N., R. 11 W., M. D. B. and M., for mining and domestic purposes.

**DEL NORTE COUNTY**—Application 6947. Frank Johnston, Box 268, Crescent City, Calif., for 2 c.f.s. from unnamed creek tributary to Middle Fork of Smith River. To be diverted in Sec. 18, T. 17 N., R. 3 E., H. B. and M., for mining and domestic purposes. Estimated cost \$300.

## DAM APPLICATIONS, APPROVALS FOR APRIL

Permits to appropriate water issued by the Department of Public Works, Division of Water Resources, during the month of April, 1931.

**LASSEN COUNTY**—Permit 3672, Application 6398. Antone Avilla, Adin, Calif., April 3, 1931, for 33 acre-feet per annum from Quaking Asp Gulch in Sec. 7, T. 36 N., R. 10 E., M. D. M. for stock watering purposes. Estimated cost \$2,000.

**LASSEN COUNTY**—Permit 3673, Application 6417. Antone Avilla, Adin, Calif., April 3, 1931, for 30 acre-feet per annum from Quaking Asp Gulch in Sec. 13, T. 36 N., R. 9 E., M. D. M., for stock watering purposes. Estimated cost \$2,000.

**PLACER COUNTY**—Permit 3674, Application 6328. Archie L. Ware, Lincoln, Calif., April 3, 1931 for 0.25 cubic feet per second from (1) a spring (2) unnamed stream in Sec. 1, T. 13 N., R. 6 E., M. D. M., for irrigation and domestic purposes on 33.17 acres. Estimated cost \$1,000.

**EL DORADO COUNTY**—Permit 3675, Application 6680. H. V. Madden, Placerville, Calif., April 4, 1931 for 2 acre-feet per annum from Emigrant Ravine in Sec. 4, T. 10 N., R. 11 E., M. D. M., for irrigation purposes on 35 acres. Estimated cost \$2,000.

**MENDOCINO COUNTY**—Permit 3676, Application 6854. C. D. and Anna D. Flowers, Ukiah, Calif., April 8, 1931 for 0.3 cubic feet per second from Russian River in Sec. 4, T. 14 N., R. 12 W., M. D. M., for irrigation purposes on 24 acres. Estimated cost \$2,800.

**MENDOCINO COUNTY**—Permit 3677, Application 6855. J. C. Crawford, Ukiah, Calif., April 8, 1931 for 0.6 cubic feet per second from Russian River in Sec. 4, T. 14 N., R. 12 W., M. D. M., for irrigation purposes on 53.61 acres. Estimated cost \$2,800.

**BUTTE COUNTY**—Permit 3678, Application 6204. Paradise Irrigation District, Paradise, Calif., April 9, 1931 for 5000 acre-feet per annum maximum rate of diversion not to exceed 50 cubic feet per second from Little West Branch in Sec. 32, T. 24 N., R. 4 E., M. D. M., for irrigation purposes on 11,000 acres. Estimated cost \$362,000.

**HUMBOLDT COUNTY**—Permit 3679, Application 6850. Frederick Bradshaw, Weaverville, Calif., April 9, 1931 for 125 cubic feet per second from Horse Linto Creek in Sec. 15, T. 7 N., R. 6 E., H. M. for mining purposes. Estimated cost \$200,000.

**PLUMAS COUNTY**—Permit 3680, Application 6784. Mt. Lassen Area Council Boy Scouts of America, Chico, Calif., April 9, 1931 for 0.2 cubic foot per second from Yellow Creek in Sec. 7, T. 26 N., R. 7 E., M. D. for recreational purposes. Estimated cost \$2,000.

**LAKE COUNTY**—Permit 3681, Application 6863. Leavitt Mead McQuستن, Upper Lake, Calif., April 10, 1931 for 0.31 cubic foot per second from Clover Creek in Sec. 6, T. 15 N., R. 9 W., M. D. M., for irrigation purposes on 25 acres. Estimated cost \$250.

**RIVERSIDE COUNTY**—Permit 3682, Application 6815. Charles A. Black, Banning, Calif., April 10, 1931 for 0.006 cubic foot per second from unnamed spring in Sec. 7, T. 4 S., R. 2 E., S. B. for domestic purposes. Estimated cost \$175.

**SANTA CRUZ COUNTY**—Permit 3683, Application 6813. Theodore J. Hoover, Swanton, Calif., April 13, 1931 for 4.79 cubic feet per second from Waddell Creek in Sec. 35, T. 9 S., R. 4 W., M. D. for irrigation purposes. Estimated cost \$25,000.

**RIVERSIDE COUNTY**—Permit 3684, Application 6825. Edward Molitor, Keen Camp, Calif., April 15, 1931 for .05 c.f.s. from unnamed stream in Sec. 26, T. 5 S., R. 3 E., S. B. for irrigation and domestic purposes on 20 acres. Estimated cost \$600.

**MONO COUNTY**—Permit 3685, Application 6879. Edith Raymer, Bishop, Calif., April 17, 1931 for 0.005 cubic foot per second from Convict Creek in Sec. 14, T. 4 S., R. 28 E., M. D., for domestic purposes. Estimated cost \$500.

**HUMBOLDT COUNTY**—Permit 3686, Application 6832. Emmett Lewis, Korbel, Calif., April 17, 1931 for .062 cubic foot per second from unnamed stream in Sec. 7, T. 3 N., R. 4 E. H., for irrigation and domestic purposes.

**RIVERSIDE COUNTY**—Permit 3687, Application 6843. Arthur Nightingale, Hollywood, Calif., April 17, 1931 for 0.009 cubic foot per second from Ormstott Creek in Sec. 10, T. 7 S., R. 5 E., S. B., for domestic purposes. Estimated cost \$500.

**BUTTE COUNTY**—Permit 3688, Application 6755. A. A. McMullen, Yuba City, Calif., April 18, 1931 for 0.1 cubic foot per second from branch of Ram Creek in Sec. 32, T. 22 N., R. 6 E., M. D., for irrigation and domestic purposes on 8 acres.

**RIVERSIDE COUNTY**—Permit 3689, Application 6848. Grace L. Williams, Lake Arrowhead, Calif., April 18, 1931 for 2160 gallons per day from unnamed spring in Sec. 2, T. 6 S., R. 2 E., S. B., for domestic purposes. Estimated cost \$250.

**INYO COUNTY**—Permit 3690, Application 6860. W. C. Parcher, Bishop, Calif., April 20, 1931, for 2.5 cubic feet per second from Green Creek in Sec. 2, T. 9 S., R. 31 E., M. D., for power purposes. Estimated cost \$250.

**INYO COUNTY**—Permit 3691, Application 6861. W. C. Parcher, Bishop, Calif., April 20, 1931 for .008 cubic foot per second from Green Creek in Sec. 2, T. 9 S., R. 31 E., M. D. for domestic purposes. Estimated cost \$265.

**EL DORADO COUNTY**—Permit 3692, Application 6851. John J. Schener, Placerville, Calif., April 21, 1931 for 0.025 cubic foot per second from unnamed spring in Sec. 18, T. 10 N., R. 11 E., M. D. for domestic purposes.

**ORANGE COUNTY**—Permit 3693, Application 6881. C. C. Cravath, Laguna Beach, Calif., April 21, 1931 for 200 gallons per day from spring in Sec. 33, T. 6 S., R. 6 W., S. B. for domestic purposes. Estimated cost \$10.

**DEL NORTE COUNTY**—Permit 3694, Application 6878. Walter G. Muncy, Crescent City, Calif., April 21, 1931 for 2000 gallons per day from Kelly's Gulch in Sec. 27, T. 17 N., R. 2 E., H., for irrigation and domestic purposes on 2 acres.

**MODOC COUNTY**—Permit 3695, Application 6518. I. C. Everly and Roy V. Everly, Davis Creek, Calif., April 21, 1931 for 383 acre feet per annum from (1) Fletcher Creek (2) Drainage area of Everly Reservoir in Sec. (1) 15 (2) 26, T. 47 N., R. 12 E., M. D.,



for irrigation purposes on 320.6 acres. Estimated cost \$1,000.

**SISKIYOU COUNTY**—Permit 3696, Application 6885. W. A. Sergeant, Dorris, Calif., April 28, 1931 for 2 cubic feet per second from Cottonwood Creek in Sec. 7, T. 47 N., R. 2 E., M. D., for irrigation purposes on 160 acres. Estimated cost \$50.

**Applications for approval of dams built prior to August 14, 1929, filed with the State Department of Public Works, Division of Water Resources, during the month of April, 1931.**

**MODOC COUNTY**—Barn's Dam No. 146-2. Hoy and Cristen, Alturas, owners; 12 feet above streambed with a storage capacity of 100 acre-feet, situated on Pit River tributary to Sacramento River in Sec. 8, T. 4 N., R. 12 E., M. D. B. and M., for diversion purposes, for irrigation use.

**MODOC COUNTY**—Spicer Dam No. 146-3. Hoy and Cristen et al, Alturas, California, owners; earth and rock, 10 feet above streambed with a storage capacity of 200 acre-feet, situate on Pit River tributary to Sacramento River in Sec. 9, T. 42 N., R. 12 E., M. D. B. and M., for diversion purposes, for irrigation use.

**MODOC COUNTY**—Claussen Ranch Dam No. 168. Modoc County Bank, Alturas, California, owner; rock crib dam, 4.33 feet above streambed, situated on Pit River tributary to Sacramento River in Sec. 1, T. 41 N., R. 10 E., M. D. B. and M., for diversion purposes, for irrigation use.

**MODOC COUNTY**—Green Dam No. 167. A. M. Green, Canby, California, owner; rock crib-flashboards, located in Sec. 2, T. 41 N., R. 10 E., M. D. B. and M., for diversion purposes, for irrigation use.

**SAN JOAQUIN COUNTY**—Davis Dam No. 572. Mrs. Laura M. Davis, Linden, owner; earth dam, located in Sec. 6, T. 2 N., R. 9 E., M. D. B. and M., for storage purposes for irrigation use.

**Applications for approval of plans and specifications for construction or enlargement of dams filed with the State Department of Public Works, Division of Water Resources, during the month of April, 1931.**

**NEVADA COUNTY**—Donner Creek Dam No. 311-17. Central Pacific Railway Company, San Francisco, owner; earthfill, 14 feet above streambed with a storage capacity of 140 acre-feet, situated on Donner Creek tributary to Truckee River in Sec. 16, T. 17 N., R. 15 E., M. D. B. and M., for storage and diversion purposes for railroad use. Estimate cost \$1,100. Fees paid \$20.

**Applications for approval of plans and specifications for repair or alteration of dams filed with the State Department of Public Works, Division of Water Resources during the month of April, 1931.**

**NEVADA COUNTY**—Upper Rock Lake Dam No. 97-48. Pacific Gas and Electric Company, San Francisco, owner; earth and rock, situate on small creek tributary to South Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. B. and M.

**NEVADA COUNTY**—Upper Lindsay Lake Dam No. 97-46. Pacific Gas and Electric Company, San Francisco, owner; earth and rock, situated on Texas Creek tributary to South Yuba River in Sec. 21, T. 18 N., R. 12 E., M. D. B. and M.

**NEVADA COUNTY**—Lower Rock Lake Dam No. 97-38. Pacific Gas and Electric Company, San Francisco, owner; earth and rock, situated on Texas Creek tributary to South Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. B. and M.

**SANTA CLARA**—Williams Dam No. 622-4. San Jose Water Works, San Jose, owner; gravity, situated on Los Gatos Creek, located in Rancho Soquel Augmentation.

**NEVADA COUNTY**—Blue Lake Dam No. 97-12. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on Rucker Creek tributary to South Yuba River in Sec. 9, T. 17 N., R. 12 E., M. D. B. and M.

**NEVADA COUNTY**—Floriston Dam No. 305-2. Crown-Willamette Paper Company, San Francisco, owner; crib dam, situated on Truckee River in Sec. 30, T. 18 N., R. 18 E., M. D. B. and M.

**SHASTA COUNTY**—Coleman Forebay Dam No. 97-32. Pacific Gas and Electric Company, San Fran-

cisco, owner; earth and rock dam, located in Sec. 32, T. 30 N., R. 2 W., M. D. B. and M.

**NEVADA COUNTY**—Culbertson Dam No. 97-17. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on Texas Creek tributary to South Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. B. and M.

**LOS ANGELES COUNTY**—Live Oak Dam No. 32-7. Los Angeles County Flood Control District, Los Angeles, owner; gravity arches dam, situated on Live Oak Creek tributary to San Jose Creek in Sec. 32, T. 1 N., R. 8 W., S. B. E. and M.

**LOS ANGELES COUNTY**—San Dimas Dam No. 32-10. Los Angeles County Flood Control District, Los Angeles, owner; gravity arches, situated on San Dimas Creek tributary to Puddingstone Creek in Sec. 24, T. 1 N., R. 9 W., S. B. E. and M.

**LOS ANGELES COUNTY**—Saw Pit Dam No. 32-12. Los Angeles County Flood Control District, Los Angeles, owner; arch, situated on Sawpit Creek tributary to San Gabriel River in Sec. 13, T. 1 N., R. 11 W., S. B. E. and M.

**PLACER COUNTY**—Mammoth Dam No. 97-39. Pacific Gas and Electric Company, San Francisco, owner; earth dam, located in Sec. 12, T. 11 N., R. 7 E., M. D. B. and M.

**Plans and specifications for the construction or enlargement of dams approved by the State Department of Public Works, Division of Water Resources, during the month of April, 1931.**

**HUMBOLDT COUNTY**—Benbow Dam No. 106. Benbow Power Company, Benbow, owner; ambursen, 17½ feet above streambed with a storage capacity of 780 acre-feet, situated on South Fork Eel River tributary to Eel River in Sec. 36, T. 4 S., R. 3 E., H. B. E. and M., for storage purposes, for power use.

**Plans for the repair or alteration of dams approved by the State Department of Public Works, Division of Water Resources, during the month of April, 1931.**

**PLACER COUNTY**—Kidd Lake Dam No. 97-25. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on a small creek tributary to South Yuba River in Sec. 29, T. 17 N., R. 14 E., M. D. B. and M.

**TUOLUMNE COUNTY**—Motelot Dam No. 97-75. Pacific Gas and Electric Company, San Francisco, owner; earth dam, located in Sec. 1, T. 2 N., R. 14 E., M. D. B. and M.

**TUOLUMNE COUNTY**—San Diego Dam No. 97-82. Pacific Gas and Electric Company, San Francisco, owner; earth dam, located in Sec. 13, T. 2 N., R. 14 E., M. D. B. and M.

**SANTA CLARA COUNTY**—Williams Dam No. 622-4. San Jose Water Works, owner; gravity, situated on Los Gatos Creek in Rancho Soquel Augmentation.

**NEVADA COUNTY**—Blue Lake Dam No. 97-12. Pacific Gas and Electric Company, San Francisco, owner; earth and rock, situated on Rucker Creek tributary to South Yuba River in Sec. 9, T. 17 N., R. 12 E., M. D. B. and M.

**PLACER COUNTY**—Lower Peak Dam No. 97-37. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on a small creek tributary to South Yuba River in Sec. 30, T. 17 N., R. 14 E., M. D. B. and M.

**NEVADA COUNTY**—Meadow Lake Dam No. 97-40. Pacific Gas and Electric Company, San Francisco, owner; earth and rock, situated on a small creek tributary to Fordyce creek in Sec. 27, T. 18 N., R. 13 E., M. D. B. and M.

**NEVADA COUNTY**—Rucker Lake Dam No. 97-44. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on Rucker Creek tributary to South Yuba River in Sec. 8, T. 17 N., R. 12 E., M. D. B. and M.

**PLACER COUNTY**—Upper Peak Lake Dam No. 97-47. Pacific Gas and Electric Company, San Francisco, owner; earth and rock, situated on a small creek tributary to South Yuba River in Sec. 32, T. 17 N., R. 14 E., M. D. B. and M.

**NEVADA COUNTY**—Floriston Dam No. 305-2. Crown-Willamette Paper Company, San Francisco, owner; crib, situated on Truckee River in Sec. 30, T. 18 N., R. 18 E., M. D. B. and M.

NEVADA COUNTY—Lower Rock Dam No. 97-38. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on Texas Creek tributary to South Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. B. and M.

NEVADA COUNTY—Upper Lindsay Lake Dam No. 97-46. Pacific Gas and Electric Company, San Francisco, owner; earth and rock, situated on Texas Creek tributary to South Yuba River in Sec. 21, T. 18 N., R. 12 E., M. D. B. and M.

NEVADA COUNTY—Upper Rock Lake Dam No. 97-48. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on a small creek tributary to South Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. B. and M.

SHASTA COUNTY—Coleman Forebay Dam No. 97-57. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, located in Sec. 22, T. 30 N., R. 2 W., M. D. B. and M.

NEVADA COUNTY—Culbertson Dam No. 97-17. Pacific Gas and Electric Company, San Francisco, owner; earth and rock dam, situated on Texas Creek tributary to South Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. B. and M.

## ARCHITECTURAL AWARDS

### For Month of April

SAN DIEGO STATE TEACHERS COLLEGE—Club Building and Scripps Cottage; to H. Mayson, Los Angeles, \$20,958.

AGRICULTURAL PARK (State Fair Grounds), Sacramento—General work on Poultry Building, to Guth & Fox, Sacramento, \$48,826; for electrical work, to J. W. Thomas, Sacramento, \$1,750; for plumbing work to Carpenter & Mendenhall, Sacramento, \$5,974.

CALIFORNIA POLYTECHNIC SCHOOL, San Luis Obispo—General work on Boys' Dormitory No. 4, to Wigg Construction Co., Redondo Beach, \$23,195; for plumbing work to American Engineers & Contractors, Los Angeles, \$3,169; for heating work to W. A. Aschen, Oakland, \$2,629; for electrical work to Electric Company, Santa Barbara, \$1,164.

FOLSOM STATE PRISON—Mechanical equipment for four sewage aerators to Water Works Supply Company, San Francisco, \$6,000.

DISTRICT FIVE OFFICE BUILDING, San Luis Obispo—General work to H. J. Smith, San Luis Obispo, \$21,939; for plumbing work to Carl T. Doell Company, Oakland, \$2,654; for heating work to Thomas Haverly Company, Los Angeles, \$2,342; for electrical work to California Electric Company, Santa Barbara, \$1,196.

NORWALK STATE HOSPITAL—Quarters for Night Attendants, Quarters for Day Attendants and Assistant Physician's Residence—For general work to C. Haverlandt, Long Beach, \$53,861; for plumbing and heating to Coony & Winterbottom, Los Angeles, \$11,124; for electrical work to R. R. Jones Electrical Company, Pasadena, \$2,520.

Census Taker: "What is your husband's name?"

Mrs. Murphy: "Pat."

Census Taker: "I want his full name."

Mrs. Murphy: "Well, when he's full, he thinks he's Gene Tunney."

Here's how the average man spends his "three score and ten":

Sleeps 23 years and four months. Works 19 years and eight months. Plays and prays ten years and two months. Eats and drinks six years and ten months. Dresses and undresses two years. Travels four years. Sick and convalesces four years. Total, 70 years.—*Exchange.*

## CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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

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

COLONEL WALTER E. GARRISON..... Director  
GEORGE C. MANSFIELD..... Editor

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

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## GOVERNOR ROLPH OPENS NEW UNIT OF BAYSHORE HIGHWAY

(Continued from page 2.)

San Francisco to Redwood City, to nearly \$4,000,000. These figures are exclusive of the construction of the Bayshore Boulevard within the city limits of San Francisco, which gives access to the heart of the city at almost any point desired.

### BRIDGE COMPLETED

The bridge across Redwood Slough, at Redwood City, has been completed. A bridge across San Francisquito Creek, the county line between San Mateo and Santa Clara counties, is now being constructed; and an underpass under the Dunbarton branch of the Southern Pacific Railway will be under construction inside of a few weeks. The surfacing of the section between Redwood City and Willow Road—the latter being the county highway connecting to the Dunbarton Bridge a short distance east of the Bayshore Highway—and the grading and surfacing between Willow Road and Oregon Avenue will be commenced this summer for early completion, at which time there will be another seven-mile strip opened to the use of the traveling public.

### PURPOSE OF ROAD

The Bayshore Highway has been designed for the primary purpose of fast express travel between the cities of San Francisco and San Jose, and for this reason it skirts the edge of the bay by passing the business sections, in so far as possible, of all cities and towns along its route. However, the construction of the new Western Pacific line east of this highway into San Francisco, and the consummation of harbor facilities and developments already in progress, or contemplated for the near future, will assure the rapid industrial development of the entire section which this important highway traverses.

STATE OF CALIFORNIA  
**Department of Public Works**

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