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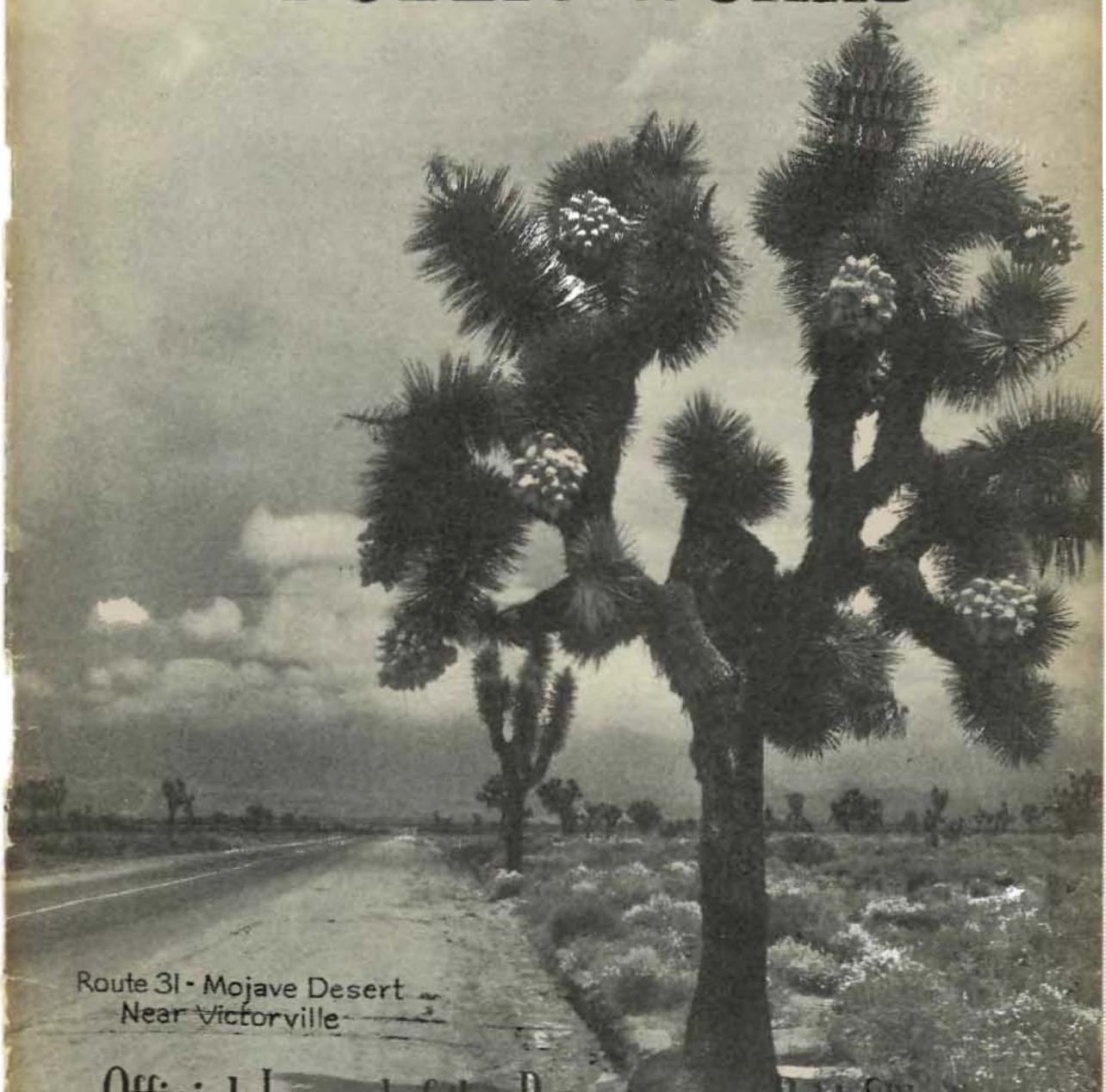

Route 31 - Mojave Desert
Near Victorville

Official Journal of the Department of Public Works
State of California

MARCH 1933

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$45,000,000 in Contracts to Start San Francisco -- Oakland Bay Bridge

First Bids Opened by Governor Rolph at Ceremonies in State Capitol February 28 for Building West Bay Crossing Substructures

THE greatest single construction job to be launched in the United States this year was brought near the stage of actual construction on February 28, when Governor James Rolph, Jr., opened bids for the first contract on the $78,000,000 San Francisco-Oakland Bay Bridge.

This contract calls for the construction of the substructures for the West Bay Crossing, supporting the supension type bridge between San Francisco and Yerba Buena Island. The eyes of the engineering world were directed upon this contract, for it entails the pouring of concrete at a depth below water greater than heretofore attempted. While there are no unusual engineering risks attached to this job, yet it will establish a new record in the pouring of concrete some 218 feet below the surface of San Francisco Bay. The deepest point at which concrete has been poured below water to date is approximately 185 feet.

TWO MILLION SAVING

Four bids were submitted on the contract for the West-Bay substructure. One bid did not conform to proposal requirements and was rejected. The bids opened were as follows:

Trans-Bay Con. Co., $6,957,100.68
Bridge Builders Inc., $7,278,014
Silas Mason Co., $8,311,653

The low bid represents a saving of over $2,000,000 on estimated cost of $9,000,000.

Certified checks accompanying the bids totaled $2,675,000.

The ceremonies attending this historic step were simple. Mayor C. H. S. Bidwell of Sacramento welcomed the visitors to the Capitol City and Mayor Angelo J. Rossi of San Francisco and Dr. John F. Slavich, Vice Mayor of Oakland, together with other representative officials and State leaders, made brief speeches on the occasion. Those who spoke included: George J. Presley, Executive Vice President of the San Francisco Chamber of Commerce; John M. Bonner, President of the Oakland Chamber of Commerce; Senator Roy Fellom, Senator Arthur H. Breed, James Reed, Manager of the Golden Gate Bridge District; Lieutenant Governor Frank F. Merriam; Speaker Walter J. Little; Rear Admiral G. W. Laws, Commandant United States Twelfth Naval District; Joseph R. Knowland, a member of the Financial Advisory Committee of the San Francisco-Oakland Bay Bridge; and His Excellency the Governor, James Rolph, Jr.

ASSEMBLY CHAMBER THRONGED

The Chambers of the Assembly in the State Capitol were filled to capacity with members of both branches of the Legislature and representative Californians when Governor Rolph, assisted by Earl Lee Kelly, State Director of Public Works, and Charles H. Purcell, Chief Engineer of the San Francisco-Oakland Bay Bridge, opened the bids submitted by outstanding contracting firms.

SIX CONTRACTS READY

In order that the utmost number of men may be employed at the earliest moment, Governor Rolph has ordered that work be started on as many sections of the bridge simultaneously as possible. In accordance with this injunction from the Governor, Director of Public Works Kelly and Chief Engineer Purcell provided for the opening of bids on six different contracts on February 28,

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Abolishing Sausalito Bottleneck Will Save 460,000 Car Miles, 46,000 Hours Yearly

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

WITH construction now under way on the Waldo-Sausalito section of the Redwood Highway, next summer will see the completed improvement and realignment of what is perhaps the most thoroughly disliked short section, in so far as the traveling public is concerned, of heavily traveled highway to be found anywhere in the State.

Not only is the present road narrow, providing accommodation for two traffic lanes only, but it abounds in right angle turns and short kinks which make it impossible for the motorist to see more than 50 feet ahead at these locations, and positively prevents any passing of vehicles going in the same direction.

This condition of congested traffic is greatly accentuated due to the fact that this is the terminal stretch approaching the ferries at Sausalito, which run regularly on 20-minute service. Every 20 minutes finds a ferry load of automobiles freely interspersed with mammoth milk and produce truck trains en route to Marin dairies or Petaluma poultry districts, released to proceed northward; while a similar, though not so closely jammed caravan, proceeding in the opposite direction, approaches the ferry periodically, heading for San Francisco.

JNO. H. SKEGGS

The regular ferries between San Francsico and Sausalito carry from 80 to 90 automobiles and trucks, and such is the length of the average northward procession of cars. During the summer months, particularly on Sundays and holidays, the ferry service is increased to as high as fifteen to sixteen ferries per hour, carrying an average of 50 vehicles per ferry; at which time, the caravan of vehicles in both directions becomes a continuous compact slow-moving procession.

For both average and maximum traffic, however, the first truck or car regulates the pace of the entire column, and the resulting impatience of motorists bound northward, by the time they have turned the corner of Nevada and Bolinas Avenue, is usually so great that they become more or less reckless in passing and cutting in on this narrow stretch; and it is not until they have passed the limits of the present project at Waldo Point that they find real relief on the 40-foot surfaced width of improved highway to the north.

This condition of restriction is intensified by parked automobiles and pedestrian travel, since no well-planned provision has been made for either along the present route.

FILLS IN MUD FLATS

The present project offers the most varied problems of construction, engineering and economics. From the construction and engineering standpoint, there are involved the difficulties of sinking fills through over 40 feet of mud in the tide flats adjacent to Bolinas Avenue.

The greatest depth of mud is encountered between Monterey and Eugene Streets, adjacent to Bolinas Avenue, a natural settling basin for a large drainage area to the west, where it is reported that deep sea vessels once landed. Here the present roadway has subsided to such an extent that it is inundated approximately one foot by the occasional extreme high winter tides, and the adjacent spur track of the Northwestern Pacific Railroad to the Mason Distillery is repeatedly washed out.

The project called for the removing, rehabilitating or demolishing of some fifty-four buildings, reconstructing public utility pipe lines, caring for industrial waste lines without interruption of operation, reconstructing

(Continued on page 12)

No. 1—Beginning of fill across tidal flats of Richardson Bay near Waldo Point. Dotted line shows approximate new alignment adjacent to present Bolinas Avenue across a natural settling basin where fill must be sunk through 40 feet of mud. New route cuts through hills in background.

* * *

No. 2—This close-up view of the fill started across the tidal flats shown in the above picture illustrates some of the difficulties the engineers are encountering with the 40-foot of mud overlaying the fill foundation. Tons of displaced mud carrying large rocks from the main body of the fill are being forced to the surface.

* * *

Nos. 3-4—The terminal stretch of the Redwood Highway approaching the ferries in Sausalito is a narrow two-lane way abounding in right angle turns, each a danger point because of greatly restricted vision. Two of these are shown in picture No. 3 while No. 4 shows how a truck and trailer can hold up the whole parade.

* * *

No. 5—On Saturdays and Sundays in summer 16 ferries per hour averaging 50 vehicles each add 800 cars and trucks to the northward procession through Sausalito usually encountering a similar southward procession bound for San Francisco.

Bridges of Ridge Route Alternate Typify Latest Engineering Advances

By **W. B. JAMES**, Assistant Construction Engineer, Bridge Department

THE advanced technique in modern highway design and construction is illustrated in the four bridges over Piru Creek on the Ridge Route Alternate in Los Angeles County, now under construction. In the early days a highway bridge was regarded as more or less an independent unit or link in the route and the highway was just built up to it. Curvature was something to be avoided and only in cases of actual necessity was it ever even considered.

A grade on a bridge was likewise something out of the ordinary. That was taken care of in the approach or approaches. As for a superelevation on a bridge, that was something not even thought of. About the only deviation from a straight away was a skew, and bridges were rarely built that way.

In present day highway design the highway bridge is considered as an integral part of the roadway. With the development of high speed traffic, curvature, grade and superelevation are important elements in the technique of design. If a bridge happens to be on a curve in the alignment of the roadway it is made to conform to the radius of curvature. If it is on a grade it conforms to the grade. And if the curve has a radius which calls for superelevation that is taken care of in the design and construction of the bridge.

LAST WORD IN DESIGN

The Ridge Route Alternate is designed for fast traffic. It is being built to obviate the dangerous curves and grades and high altitude of the present Ridge Route over the mountains. The Alternate is, therefore, the last word in modern highway design with a roadway carried through deep cuts and over deep fills and bridging meandering streams to secure the most feasible direct route.

All four of the Piru bridges are built on grades, three of them on curves and one part curve, and one on a vertical curve as well as a horizontal curve. On one of them built with a curvature of 1000-foot radius there is a superelevation of the roadway of three feet.

All four of the Piru Creek bridges are of the same general type, with concrete piers and abutments and steel plate girders and steel floor beams carrying a reinforced concrete deck. The main spans are 80 feet with lesser ones 50 and 60 feet in length. The 80-foot girders are 7 feet in depth and the 50-foot girders are 5 feet in depth. They are heavily braced. Under an optional specification 22-inch Bethlehem steel beams are being used for floor beams. They are spaced 10 feet on centers with the ends projecting over the girders, which are set 26 feet apart on centers.

ROADWAYS THIRTY-FOUR FEET WIDE

The concrete decks are 9½-inch thick, reinforced longitudinally with ⅝-inch round bars. Expansion joints are placed approximately 20 feet apart. The roadway is 34 feet in width between the curbs on either edge of the deck. All the bridges will have guardrails of redwood with the posts set in the curbs.

Concrete slope paving is provided for protection of the abutments on all the bridges. This is carried to a height of about 20 feet to take care of a maximum flood of about 15 feet.

The bridges are designated by the stations at which they are erected. The one at Station 31, the farthest south, is 250 feet long and consists of three 80-foot spans. It is built on a curve with a radius of 2600 feet and has a grade of 1.44 per cent. The piers and abutments average about 50 feet in height. Excavation was carried through boulders to a depth of about 15 feet below the stream bed where a good foundation of shale rock was found.

The bridge at Station 122 is 290 feet long and consists of three 80-foot spans and one 50-foot span. This structure has a grade of 1.97 per cent and is built with a curvature of 1000-foot radius.

SUPERELEVATED BY FILLETS

On this bridge the roadway has a superelevation of 3 feet. This will be produced by constructing concrete fillets on the under side of the concrete deck slab and extending along the top of the steel floor beams which are set level, this fillet tapering from 3 feet on the outside of the curve to zero at the

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LIKE ORIENTAL SHRINES extending up the rugged canyon in groups these bridge piers looked when this photograph was made of the construction projects along the Ridge Route Alternate in Piru Gorge. Four bridge sites are visible in the picture as indicated by arrows.

MASSIVE PREPARATIONS are here shown for a bridge in Piru Gorge. The slope of the huge fill is paved to protect the embankment and piers are being built through boxes extending down to the foundations.

Test Made of Aerial Photography to Speed Topographic Mapping Program

By **EVERETT N. BRYAN,** Supervising Hydraulic Engineer

CAN THE aeroplane and camera be profitably substituted for the plane-table to speed the topographic mapping program of California? That is the question for which the State Engineer's office and the office of the U. S. Geological Survey are now seeking an answer. With 75,000 square miles, or nearly half the area of the State to map, and appropriations for the work such that with the use of standard ground methods it will probably require 14 years to complete the job the engineers in charge have set out to find whether or not aerial methods should be substituted in whole or in part.

While stereo-topographic mapping processes have been successfully employed for some years both in this country and abroad in the production of large scale maps the small image angle and long focal distance of existing cameras have prevented the profitable application of aerial methods to the production of topographic maps of scales of 1:62500 and smaller, such as are standard with the U. S. Geological Survey.

AN AERIAL EXPERIMENT

Accordingly when a comprehensive program was adopted by the State Engineer's office and the U. S. Geological Survey in September, 1931, looking toward the topographic mapping of all unsurveyed areas in California, and the revision of existing topographic maps which were altogether obsolete and unsatisfactory, it was determined to experiment with a view to evolution of some aerial method which might be successfully employed to speed the program.

The Lakeport quadrangle was selected for the test because fairly representative of the varying conditions which are experienced throughout the State in the way of altitude, topography, and vegetative cover. It is a 15-minute sheet covering some 238 square miles and centers approximately 100 miles north of San Francisco. The altitude ranges from a minimum of 1300 to a maximum of 5000 feet above sea level, the topography ranges from bold to moderate, and the vegetative cover varies from dense to barren.

A contract for the aerial work was let to the Curtis Wright Flying Service of Glendale who used a Curtis Wright Robin plane with Challenger motor, which had seen similar previous service in the vicinity of Memphis and Kansas City. The Geological Survey furnished a Hugershoff camera and German film, the contractor being bonded for $4,700 to insure against loss of the camera or damage thereto. Alameda airport approximately 100 miles to the south was used as a base and weather reports were furnished through the courtesy of the U. S. Forest Service. Lt. Col. H. A. Erickson did the engineering and photographic work and Mr. J. M. Menifee acted as pilot.

Flying started August 20, 1932, was completed one week later, and the films were shipped September 1st. It required only 14 actual flying hours, the work being hampered by prevalence of forest fires. On one day 32 different fires were counted.

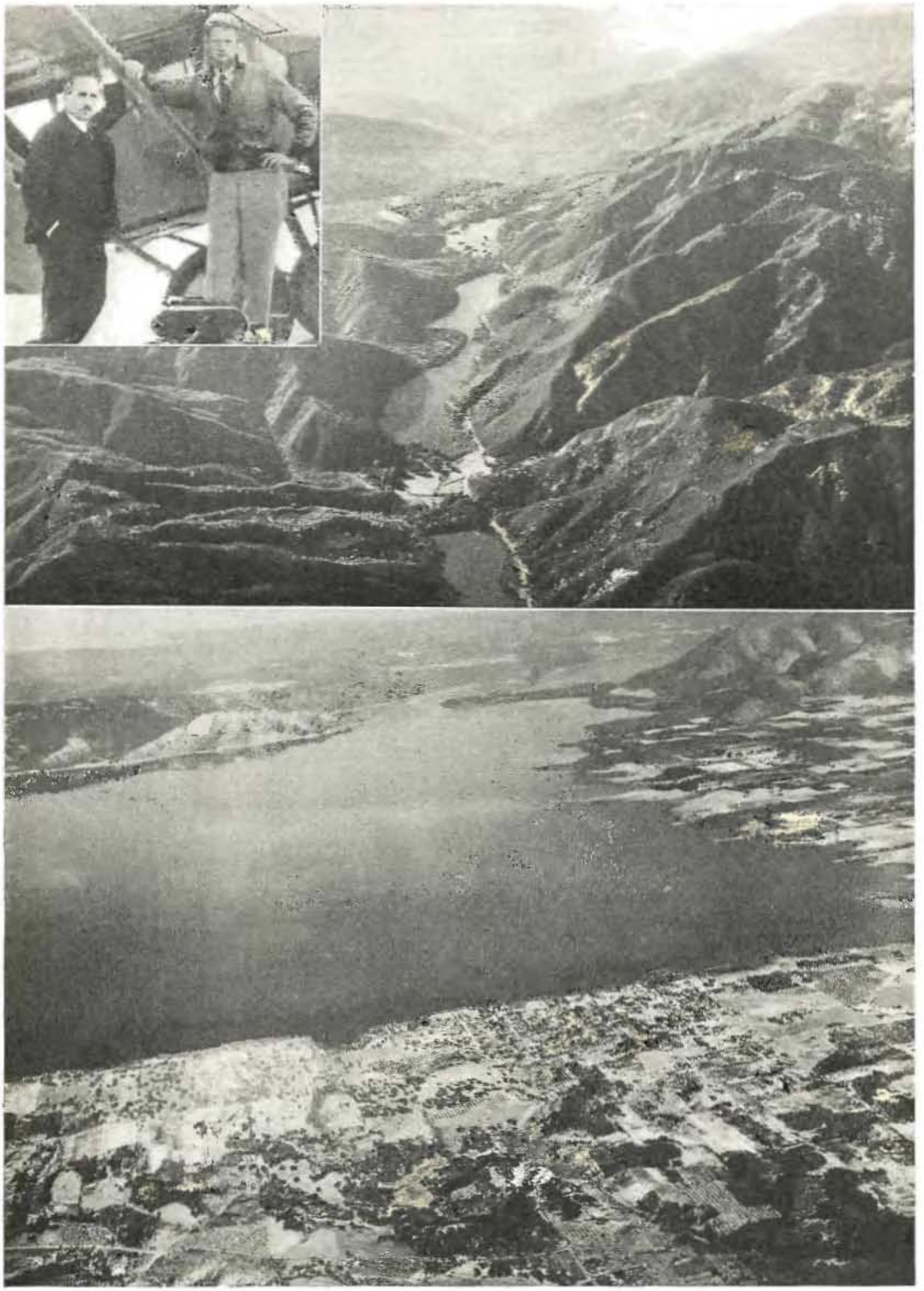
AT FREEZING HEIGHTS

The work was done at an elevation of 10,000 to 13,500 feet, the elevation being checked by Paulin altimeter in conjunction with centigrade thermometers. As is commonly the case in similar work some difficulty was experienced with the cold, Col. Erickson freezing one heel on the last day of operations.

It required 455 negatives or approximately two exposures per square mile to complete the job. The films were immediately dispatched to the headquarters office of the Geological Survey at Washington, D. C., where some 450 points were spotted on the prints for which the elevation must be determined by ground methods, and in 200 cases the position as well. The method tested does not materially reduce the ground work in connection with horizontal and vertical controls but the need for sketching contours in the field is eliminated.

A complete record of the cost is being kept and the results will be carefully checked as to accuracy, speed and economy. If a successful method is evolved it may be possible to speed California's topographic mapping program.

Nannette—"I caught my husband flirting."
Jennnette—"That's how I got mine, too."



AERIAL MAPS of Lakeport quadrangle—Upper photo of Blue Lakes region shows how a slide dammed up this gorge and caused the origin of Clear Lake pictured below. Inset of Lt. Col. Erickson, photographer, and Pilot Menifee.

Bay Bridge Entirely Self-Liquidating

(Continued from page 1)

March 7, March 8, March 28 and March 29, calling for the construction of the major portion of the entire bridge project. These contracts will total approximately $45,000,000. Work will start, it is estimated, by May 15, employing an average number of 6500 men during the course of construction.

In opening the bids on the first contract Governor Rolph pointed out that this project, the greatest to be launched in the United States this year, is entirely self-liquidating and will not burden the taxpayer to the extent of one additional dollar.

"So great is the project," Governor Rolph said, "that the steel industry estimates that 6.7 per cent of the entire steel output of the United States in 1933 will be used by the San Francisco-Oakland Bay Bridge."

CITIES WILL CHANGE

The effect upon San Francisco and Oakland of the improved transportation to be brought by the bridge was the subject for speculation by Governor Rolph, Joseph R. Knowland and other speakers. San Francisco, it is believed by traffic engineers, is destined to become a city of skyscrapers, and single family dwellings are almost certain to be eventually crowded out. Oakland and its suburban areas, it is predicted, will increase in residential population and the residential areas will extend far back into the East Bay Hills as the average San Franciscan comes to select his home as far as 20 miles from his work. The easy traffic movement from San Francisco to Oakland will, it is believed, unify the communities around the bay.

The ceremony attending the bid opening was a state-wide event, managed by the Governor's Committee for the Opening of Bids, which consisted of civic leaders from all parts of California.

Director Kelly in describing the magnitude of the project said:

VISIONING MATERIAL MASSES

"The bridge will require 30,000,000 board feet of lumber, or sufficient to build 3000 five-room dwellings, estimating 10,000 feet of lumber to a dwelling.

"The concrete and steel utilized in the bridge would build 35 Russ Buildings (San Francisco), 35 City Halls (Los Angeles), or more than 35 L. C. Smith Buildings (Seattle).

FIRST BID opened by Governor James Rolph, Jr., on a construction contract for the San Francisco-Oakland Bay Bridge is handed to Chief Engineer C. C. Purcell for tabulation while Director of Public Works Earl Lee Kelly assists at the proceeding.

"Individual towers supporting sections of the bridge are more than 500 feet high from their base in the rock below the surface of the bay to the top, and each represents a greater construction job than any skyscraper on the Pacific Coast.

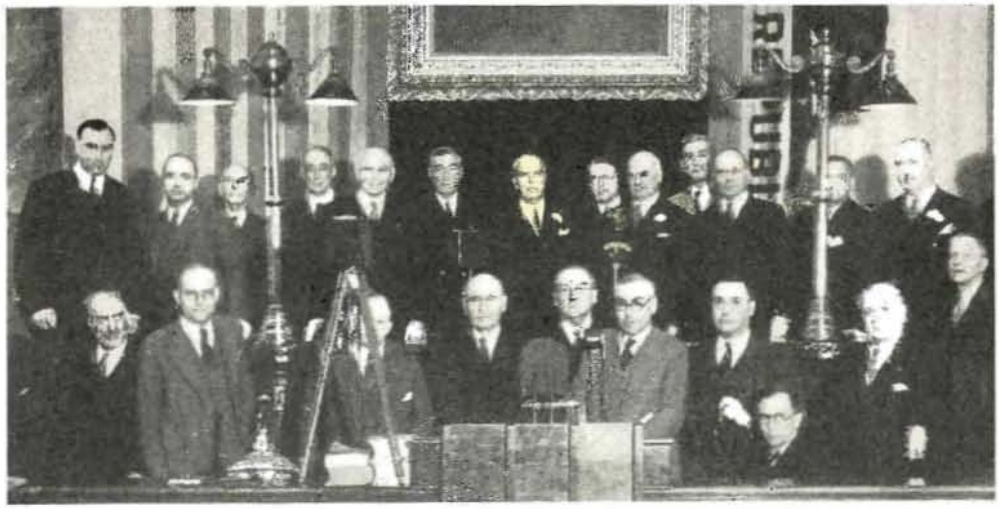
LINKS TWO COASTS

"Tourists from all over the United States will be attracted by the San Francisco-Oakland Bay Bridge, crossing this historic bay, and completing the last link in the Atlantic to Pacific Highway.

"The bridge is a self-liquidating project, financed out of its tolls, and does not add one dollar of property tax burden on the State of California."

The contract for the West Bay substructure, officially known as Contract No. 2, calls for the construction of five concrete piers between the San Francisco shore line and Yerba Buena Island.

The construction of these piers involves the building of great caissons in bay shipyards.



MAKING CALIFORNIA HISTORY: Men distinguished in civic, political and official life of State and Nation gathered in the Assembly chamber to open the first bids on the San Francisco-Oakland Bay Bridge project. Top row, left to right: Director Kelly, Senator Fellom, P. H. McCarthy, Senator Breed, Lieutenant Governor Merriam, Rear Admiral Laws, U. S. N.; Governor Rolph, Speaker Little, Mayor Rossi, San Francisco; Vice Mayor Slavich, Oakland; Mayor Bidwell, Sacramento; Vice President Presley, San Francisco Chamber of Commerce; President Meherin, Harbor Commission.

Lower row left to right, Attorney McKevitt, Highway Commission; Engineer Bock, A. J. McCleary, Mark Requa; Publisher Knowland, Oakland Tribune; Chief Engineer Purcell, Bridge Engineer Andrew, G. T. Gunston; Supervisor Roncovieri, Mayor Ament, Berkeley.

These caissons are like huge box-shaped ships with an area of half a city block.

They will be floated to the pier sites weighted down with concrete and sunk with an under-water concrete seal, open dredge method to form the foundations for the piers.

Each caisson has a cutting edge which is forced down through the mud and sand to rock bottom by the weight of the concrete placed in the cells of the caisson.

Each of these five yiers will be a structure of skyscraper height and the larger piers will require as much concrete as a great modern office building.

The remaining major contracts on which bids were scheduled to be opened by March 8 are as follows:

Cont. No.	Covering	Est. Cost
4 & 4A	East-Bay Substructure	$6,240,000
6 & 6A	West-Bay Superstructure	16,600,000
5	Yerba Buena Island Crossing	2,261,000
3	San Francisco Anchorage	1,580,000
7	East-Bay Superstructure	10,191,000

I know a woman who was so down-in-the mouth, she had her face lifted.

"I see you've given up teaching your wife to drive."
"Yes, we had an accident."
"What happened?"
"I told her to release the clutch and she let go of the steering wheel."—*The Humorist.*

Adding 70 Miles to International Route

Another section of the International Pacific Highway in the State of Oaxaca, Mexico, some 410 miles south of Mexico City, is to be opened up for motor travel, according to recent official report.

The particular section to receive immediate attention says the report, extends for about 70 miles through a rough, mountainous region from the Rio Tehuantepec southeasterly to the Isthmus of Tehuantepec.

Oaxaca is the second State south of the State of Mexico, which includes the capital district. The report received declares that Oaxaca will proceed at once to open up all of the impassable stretches along the international route within its borders, starting with the 70-mile Tehuantepec strip.

It was a dark night and the motorist was lost. Presently he saw a sign on a post. With some difficulty he climbed the post, struck a match and read: "Wet Paint."

Collegiate: "I beg your pardon, Miss, but would you care to take a ride?"
Coed: "Sir! I'll have you know I'm a lady."
"Collegiate: "I know that. If I wanted a man, I'd go home and get my father."

Relocation of Bridge Saves $40,000, Eliminates Four Grade Crossings

By **GENE WELCH**, Assistant Designing Engineer

AN example of the economical use of available material for the satisfaction of immediate and future requirements was the recent relocation of an old bridge over the Mad River near Arcata, Humboldt County.

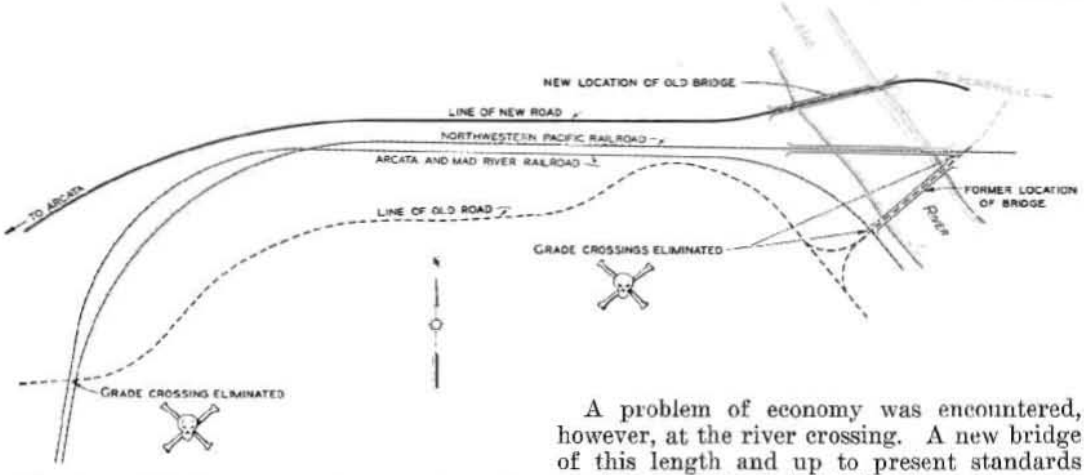
In the earlier days of road building, the location of roads and bridges was governed not so much by standards of grade and alignment as by the contours of the ground and low construction cost. The old county road from Arcata to Mad River and up the river to the lumber town of Korbel followed closely the foot of the hills. The tortuous alignment with sharp, blind curves and numerous railroad grade crossings had fallen far behind the present day standards expected by the motorists, even on secondary roads.

Since becoming a part of the State Highway System this road has been extended east to Weaverville and a connection with the road from Redding, thus forming a link between the Redwood Empire and the upper Sacramento Valley, and providing access to large recreation areas in Trinity and Humboldt counties. The traffic is largely seasonal and, except for some local trucking, is principally tourist or pleasure cars.

GRADE CROSSING MENACES

The old road had many curves with radii as short as 50 feet. There were two railroad grade crossings with the Northwestern Pacific and the Arcata and Mad River railroads, respectively. At Mad River the stream was crossed with an old county bridge of 285-foot steel span with 15-foot roadway. This structure had railroad grade crossings at each end, both of which were blind. The hazard created by these railroad crossings made a very dangerous situation.

To correct this situation a new road has been constructed entirely on the north side of the railroads, as shown on the sketch, thereby eliminating four grade crossings and substituting wide curves for the short turns.



A problem of economy was encountered, however, at the river crossing. A new bridge of this length and up to present standards would cost at least $50,000. Since the traffic on this route is comparatively small and the loads light, the possibility of using the old steel span was considered. It was found that although the old span had been in place for over 25 years and through exposure to salt air and fog had rusted badly in spots, it could be repaired and used for this crossing for many more years.

JOB LOOKED DIFFICULT

This plan was adopted and a contract was made for the removal and replacement of the span on new pile piers on the new line, some 250 feet downstream. This arrangement involved moving a 285-foot steel span over, under, or around a railroad bridge and setting it up on new piers. At first

Old Structure Was Skidded Down River To Another Crossing

thought the difficulties of moving such a large structure, and in addition crossing a railroad without blocking traffic, appear almost insurmountable.

Actually the work was accomplished quickly and easily by removing the connecting pins, taking down the truss members, piece by piece with tall gin poles, skidding the pieces down the river bar to the new site where they were hoisted into position and pinned.

Because of the efficient handling, the dismantling was completed in six days and the reerection in seven days. A small percentage of steel and the expansion rollers were replaced. A large percentage of the timber deck and timber in the approach spans was used at the new location so that only a small expenditure for new material was required.

The result of this procedure was that the State has provided a suitable bridge across the river, which will serve for many years, at a cost of about $11,000 or a saving from the cost of a new bridge of about $40,000. Such economies are not only in keeping with these times but would appear advisable at any time to avoid the waste of junking still serviceable material and to postpone the much greater investment for the permanent structure until actually required by traffic.

D. E. Marsh was the resident engineer.

DECREASE IN CHILD TRAFFIC DEATHS DUE TO EDUCATION

Definite evidence that the answer to the traffic accident problem lies in safety education is found in the decrease of 25 per cent in traffic deaths among children of school age in Los Angeles city and county last year, as compared with a mere 2 per cent reduction in motor vehicle fatalities among all persons.

This remarkable decline in number of children killed in traffic is shown in final figures just compiled by the Public Safety Department of the Automobile Club of Southern California. It means many young lives saved in the six-to-fifteen age classification, through instruction in traffic safety now conducted in the elementary and secondary schools.

Lawyer (handing check for $100 to client who had been awarded $500)—There's the balance after deducting my fee. What are you thinking of? Aren't you satisfied?

Client—I was just wondering who got hit by the car, you or me.

Rebuilt to Serve Future Generations

Practical economy is represented in this old Mad River Bridge moved to a new location, abolishing four railroad grade crossings.

Santa Barbara Line Changes Under Way

Surveys are in progress in Santa Barbara County for the reconstruction of a portion of the Coast Highway along the ocean between Tajiguas Creek and Arroyo Quemada, and from Arroyo Honda to one mile north of Gaviota, a total distance of 8 miles. The proposed changes are to correct unsatisfactory alignment and vertical curves on which the sight distance is so short as to be a menace to traffic.

Surveys are completed for the relocation of the Coast Highway over the Nojoqui Grade. This is to correct unsatisfactory alignment and grades.

Surveys are in progress for the reconstruction of a portion of the San Marcos Pass Road from the Summit of the San Marcos Pass to the city limits of Santa Barbara. This is a portion of the secondary road taken over from Santa Barbara County about two years ago.

FOUR NEW BRIDGES BUILT

On the Roosevelt Highway, the road has been reconstructed with a 20-foot oiled rock surface on a 30-foot roadbed between Cambria and one mile north of San Simeon, a distance of 9.7 miles.

Within the limits of the above project two steel and concrete bridges have been completed across San Simeon Creek and at Station 141. Two similar structures are under construction across Pico and Little Pico creeks.

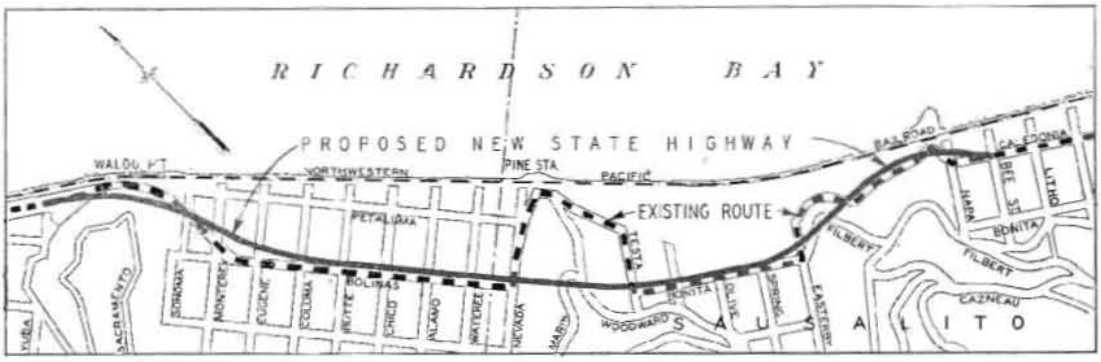
Sixteen Curves Eliminated in 1.3 Miles

(Continued from page 2)

city streets to conform to the existing improvement, with all attendant problems inherent in constructing a boulevard or highway through a municipality.

ACUTE TRAFFIC PROBLEM

Furthermore, due to the crossing and recrossing of the existing route, the problem of maintaining traffic is an acute one. This is particularly true at Nevada Street, where the new grade is some 16 feet above the old one, and a temporary construction bridge must be built in order to insure no interruption to this heavy traffic.



The northerly 0.6 miles of the project is outside the city limits of Sausalito, 0.7 miles lying within the city limits. Approximately half the project is mountainous, the other half being across tide flats or marsh lands.

From the economic standpoint, the project appears to be a bold one until carefully analyzed. To widen the existing route would involve as much capital investment as the location chosen, due to the mountainous, shore-line character of the country traversed, and property improvements more or less concentrated along the existing location. The new route has utilized all possible salvage values of the existing highway, namely those portions along Bolinas Avenue, Bonita Avenue and Caledonia Avenue.

SIXTEEN CURVES ELIMINATED

The project under construction presents the following advantages over the old highway, the surface of which within the limits of Sausalito has reached such a state of wear and disintegration as to call for immediate resurfacing: the present highway has 22 curves, equaling 2½ complete circle turns, with a maximum radius of 600 feet and a minimum prevailing radius of 50 feet. The new highway has only 6 curves, equaling one-half circle turn, with a maximum radius of 3000 feet and one curve of 500-foot radius; and, although the project is only 1.3 miles in length, it saves one-quarter mile in distance over that of the present route.

This road carries an average year-round traffic of over 5000 vehicles a day; and, while economic savings to its users might be subject to some discussion, due to wide variation in costs of operating automobiles and commercial vehicles, the following figures are pertinent and interesting:

The new highway will save to its combined users:

460,000 vehicle miles of travel distance per year
40,000 gallons of gas per year
4,000 quarts of oil per year
120 automobile and truck tires per year
46,000 hours, or 5700 eight-hour days of vehicle time per year
92,000 hours, or 11,400 days of one person's time time per year
3,650,000 complete circle vehicle turns per year

Peace of mind and general satisfaction of traveling a road paved 40 feet in width, with asphaltic concrete, and with 8-foot shoulders on either side, as against the present variable width, maximum two-lane, and confined crooked roadway—is a compensation for psychologists to figure, not engineers. Suffice it to say that from an economic standpoint this project is well justified, and from an engineering standpoint it is a logical, necessary and highly beneficial improvement.

Marketing of Fruits, Vegetables Increased by Motor Trucking

CONSUMPTION the year around of fresh fruits and vegetables by American families is climbing in many parts of the country to new peak levels with the increasing movement and distribution of these commodities over good highways by motor truck, according to data developed by the United States Bureau of Agriculture in a study, which is not yet complete, of the functions and efficiency of the motor truck in marketing.

According to the National Highway Users Conference, it is found that motorized transportation in the movement of these products is coming into direct competition with railroad facilities in only a limited degree. Much of the truck hauling is for short distances and in less than carload quantities over territories that surround the large markets and terminal points in the railroad handling of these products.

In its larger aspect, the truck movement of fruits and vegetables is found to be essentially a service that is supplementary and auxiliary to the transportation that is being provided by the railroads, and in its normal development, fitting into coordination with railroad facilities.

SHORT HAUL BUSINESS

The great bulk of the truck movement of fruits and vegetables is from farms and gardens to consuming centers of 100 miles or less distant, or from railroad concentration points over surrounding areas.

An additional fact brought out by the Bureau of Agricultural Economics in its survey is that the more perishable fruit and vegetable crops are moving by motor truck in greater quantities to large markets at a distance than are bulkier and less perishable products. This is attributed to more rapid and direct delivery to markets or consumers that can be made with motor trucks and to reduced loss in less frequent handling.

MOVING SECOND GRADES

While long distance movement of fruits and vegetables by motor truck is on the increase, especially from Florida and other southern States during the winter months, yet much of the movement is of secondary grades of fruits and vegetables which are seldom moved by railroad because of the high ratio of freight costs to prevailing market prices.

These second grades are being handled in expanding quantities by motor truck, and, in many cases, finding wholly new markets and outlets in small towns and villages and in outlying industrial communities, where, in the past, citrus fruits and winter vegetables have had only a negligible consumption.

Projects Under Way on 20 Miles of Road in Monterey County

ON THE Coast Highway between 1 mile south and 6 miles south of San Ardo, the road is being reconstructed with a 20-foot reinforced concrete pavement on a 36-foot roadbed. This project is financed through the Federal Emergency Relief Construction Act of 1932. Work was started in January and the project is to be completed in June of this year.

On the Roosevelt Highway, between San Remo Divide and the Carmel River, a distance of 3.7 miles, the road is being reconstructed with a 30-foot and 36-foot roadbed with a surface of selected material, treated with bituminous binder, 22 feet in width by 4 inches thick. This project is through the Carmel Highlands, a highly improved residential section. The project is about 50 per cent complete.

Within the limits of the above project, there is under construction a reinforced concrete bridge across Wild Cat Creek, consisting of one 57-foot span and two 39-foot spans on concrete piers and abutments. The project is about 25 per cent complete.

Plans are in progress for the reconstruction of the Coast Highway between Camphora and Chualar, a distance of about 11 miles. The present pavement is too narrow to satisfactorily handle the traffic. The surface has become broken and the maintenance cost is running so high that economy dictates the necessity for an immediate improvement.

ACCIDENT TOLL REDUCED BY 9500 LIVES IN 1932

A total of 9500 Americans were alive and well today who would have been killed if the accidental death rate had not been checked in 1932, the National Safety Council recently announced.

Motor vehicle deaths dropped more than 4200.

Public accidents dropped from 20,000 to 18,000. This classification includes drowning, firearms accidents, and the like.

Home accidents dropped from 29,000 to 28,000.

Industrial deaths dropped from 17,500 to 15,000.

Seventeen Projects Put Under Way for Spring Work to Cost $2,078,400

WITH the passing of the winter months the Division of Highways is bending its efforts to getting work under way early in the spring. It is planned to advertise 12 projects during March, which, with the 5 projects set under way during the month of February, make a total of 17 projects for the opening of the spring drive. These 17 projects involve the construction of 18.6 miles of permanent type of pavement, 24.8 miles of bituminous treated crushed gravel or stone surfacing, two bridges and two grade separation structures, and the total estimated cost of this highway improvement work is approximately $2,078,400. A detailed list of the projects proposed and a summary of the work by types is given herein.

The following descriptions of a few of the more important of the proposed projects give details and the locations of the work covered by them.

On the Sacramento-Placerville lateral a new 40-foot roadbed is to be constructed and a 20-foot pavement placed between Mills and Nimbus, in Sacramento County, a distance of 4.5 miles. This improvement will extend the pavement placed a year ago between Sacramento and Mills to within a short distance of Folsom.

INTERSTATE ARTERIAL

This State highway not only serves the traffic into Placerville but also carries a large volume of recreational traffic to resorts in the American River Canyon and to Lake Tahoe as well as all interstate traffic using the Lincoln Highway. The section now to be improved follows the alignment of the existing road and will provide a highway with modern standards of grade and width.

Further improvement to the northerly section of the Bayshore Highway is noted with the advertising on February 28th for the paving of 3.1 miles of this route from the south city limits of San Francisco to South San Francisco in San Mateo County. While this section of the Bayshore was the first to be graded the placing of the pavement has been withheld until the heavy fills had reached their final settlement.

The work now to be undertaken will include the placing of a 40-foot pavement on a sixty-foot roadbed, with the shoulders on each side of the pavement surfaced with bituminous treated crushed rock. The completion of this project and work now under way will provide a 40-foot pavement on this boulevard from San Francisco to Lawrence Station Road in Santa Clara County, with the exception of the 40-foot bituminous treated surface between San Mateo and Redwood City. The status of the 35 miles of this broad highway which is completed or under construction will then be 28 miles of pavement and 7 miles of bituminous treated crushed rock surfacing.

ELIMINATES "GRAPEVINE"

In Kern County a radical improvement of far-reaching effect is to be made to the section of the Los Angeles-Bakersfield arterial between Oak Glen and Grapevine Station, a distance of 3.7 miles.

This improvement involves construction of this section of State highway on a revised alignment which will eliminate from the system the crooked and notorious "Grapevine." The existing road has many short radius sharp curves. The present minimum radius being only 80 feet and the total curvature between these two points is 2183° or 6.1 complete circles. The revised alignment will provide a minimum radius of 1000 feet and the total curvature will be only 342° or less than one complete circle. The existing roadbed is graded to 24 feet wide while the proposed construction will provide a 36-foot road with a 20-foot pavement.

Another important improvement to the heavily traveled Golden State highway between Bakersfield and northern California is to be made between Goshen and Plaza Garage in Tulare County. This project involves the construction of the highway on revised alignment for a distance of 4.2 miles and is to be made in conjunction with the construction of a grade separation under the tracks of the Southern Pacific Railroad at Plaza Garage.

The new highway will pass to the westerly side of the railroad through the grade sep-

(Continued on page 16)

New Projects Advanced to Bids

The following list of improvements advertised by the Division of Highways last month and planned for advertising this month includes work in sixteen counties involving 2 bridges and 2 grade separations and road jobs totaling 43.4 miles.

ADVERTISED IN FEBRUARY

County	Location	Miles	Type
Sacramento	Mills to Nimbus	4.5	Pavement
Inyo	Bishop to Round Valley Road	7.0	Bit. Tr. Cr. Rock Surf.
Lake	Manila Ranch to Bartlett Springs Road	3.2	Bit. Tr. Cr. Rock Surf.
San Diego	Across San Diego River	640 ft.	deck plate girder bridge
San Mateo	San Francisco to South San Francisco	3.1	Pavement

PROPOSED MARCH ADVERTISING

Merced	Approaches to Merced River Bridge	0.9	Pavement
Kern	Oak Glen to Grapevine Station	3.7	Pavement
Los Angeles	At Brea Canyon Summit	1.3	Pavement
Tulare	Goshen to Plaza Garage	4.2	Pavement
Contra Costa	In Valona	0.2	Pavement
Fresno	Church Ave. to California Ave. in Fresno	0.7	Pavement
Lassen	Susanville to Johnstonville	2.0	Bit. Tr. Cr. Rock Surf.
Shasta	Redding to Jenny Creek	1.1	Bit. Tr. Cr. Rock Surf.
Placer	Gold Run to Airport	11.5	Bit. Tr. Cr. Rock Surf.
Lake	Across Morrison Creek	60 ft.	Rein. Conc. Slab. Br.
Santa Barbara	At Elwood		Overhead Grade Separation
Santa Clara	Near Morgan Hill		Madrone Crossing Gr. Sep.

SUMMARY

February and March

Type	Miles	Amount
Permanent Pavement	18.6	$1,412,400
Bit. Treated Crushed Rock Surfacing	24.8	389,900
Bridges and Grade Separations	(4)	276,100
Total		$2,078,400

Paving Finishes Interstate Lateral

(Continued from page 14)

aration and connect with the existing highway just north of Goshen. **This improvement will eliminate two grade crossings from the State highway system—the one at Goshen and the crossing of the Hanford-Visalia lateral at Plaza Garage.** The new highway will provide a graded roadbed 36 feet to 56 feet wide and pavement 20 to 40 feet wide. The grade separation will be constructed under a separate contract.

ALONG CLEAR LAKE

In Lake County the Ukiah-Tahoe Lateral is to be improved for a distance of 3.2 miles along the northerly shore of Clear Lake. This work will consist of constructing a graded roadbed 28 feet wide and placing a bituminous treated crushed rock surfacing 20 feet wide on a crusher-run base 22 feet wide. The project extends from Manila Ranch, 3.5 miles east of Upper Lake, to Bartlett Springs road 2.7 miles westerly of Lucerne. The work marks another step in providing an adequate surface on this highway which connects the coastal redwood country with the high Sierra.

The present project will complete the surfacing on this route between the Coast Route at Ukiah and the Pacific Highway at Williams with the exception of the 3.5 miles from Upper Lake to Manila Ranch and the 2.7 miles from the easterly end of this project to Lucerne. Both of these sections are in fair condition so that traffic will experience no difficulty on the portion of this cross-state road between the Redwood Highway and the Sacramento Valley.

Grading on the new alignment of the Sacramento-Truckee road between Gold Run and the airport, westerly of Emigrant Gap, is nearing completion and it is now proposed to place a 20-foot bituminous treated crushed rock surface on a crusher-run base on the 11.5 miles of new roadbed.

NEW ALIGNMENT

With the completion of this surfacing project the entire highway from Sacramento to the Nevada line, just west of Reno, will have been brought to modern standards of construction and surfacing. The new alignment of this portion of this important and heavily traveled interstate route leaves the existing road at Gold Run and, lying to the southeast of the present road and railroad follows up the course of Canyon Creek. At Towle the highway passes under the tracks of the Southern Pacific Railroad via the new grade separation and then connects with the recently completed highway at the airport.

This lateral highway is one of the most important routes in northern California. It carries a large volume of interstate and transcontinental traffic which enters California via Reno. The history of the country which the route traverses is intimately associated with the earliest covered-wagon pioneering and settlement of the State, which in addition to its famed Sierra and Lake Tahoe scenery, draws thousands of vacationists and tourists.

The third unit in the cooperative improvement of the State highway routing along the West Atlantic Street Extension in the city of San Diego is noted by the advertising on February 7th of a project for the construction of a 640-foot deck-plate girder bridge on concrete piers and abutments with pile foundations across the San Diego River. Work is now under way on the construction of two smaller bridges, one across Cudahy Channel and the other across Tecolote Creek, and a contract has just been awarded for grading the roadbed between Barnett Avenue and Balboa Avenue.

COAST ROUTE IMPROVEMENTS

This improvement to the Coast Route within the city limits of San Diego will do much to aid in the movement of the large volume of traffic using the route from San Diego and the north.

The construction of an important grade separation on the Coast Route will be set in motion with the advertising for bids for the Madrone Crossing subway under the tracks of the Southern Pacific Railroad near Morgan Hill in Santa Clara County. The subway will be located to the southeast of the present grade crossing and the contract will include the construction and paving of the approaches and the construction of the reinforced concrete abutments of the structure itself. The railroad will furnish and place the steel plate girders to carry the tracks over the highway.

Piru Gorge Bridges Constructed With Grades and Curves

(Continued from page 4)

inner side. Piers of this bridge were put down through gravel and boulders and carried a short distance into the shale rock which had been worn down to a smooth surface by the rock and gravel washed down the stream.

At Station 130 the bridge is 360 feet in length, consisting of three 80-foot spans and two 60-foot spans. This structure has a grade of 1.76 per cent and one end of it is on a 1000-foot radius curve. The piers here are 50 to 60 feet high and have a solid web. Piers for the other bridges have a web in the lower section with an arched opening above. The piers are founded on rock.

The bridge at Station 145, the one farthest north, consists of two 80-foot and two 60-foot spans. This bridge has both horizontal and vertical curvature, the former being on a radius of 10,000 feet and the latter on a radius of 1000 feet. The grade ranges from 1.76 per cent to 3.72 per cent. There is a small superelevation of the roadway.

F. W. Panhorst is the acting bridge engineer, California Division of Highways, Sacramento. Victor A. Endersby of the Los Angeles office of the Bridge Department had supervision of construction and R. W. Van Stan is the resident engineer.

A Los Angeles company has the contract for the four Piru Creek bridges at $154,611. Work was started October 1, 1931, and the time limit expires September 13, 1933. The contractors are now well ahead of their schedule and expect to complete the work by the latter part of June.

The steel is being fabricated in Los Angeles.

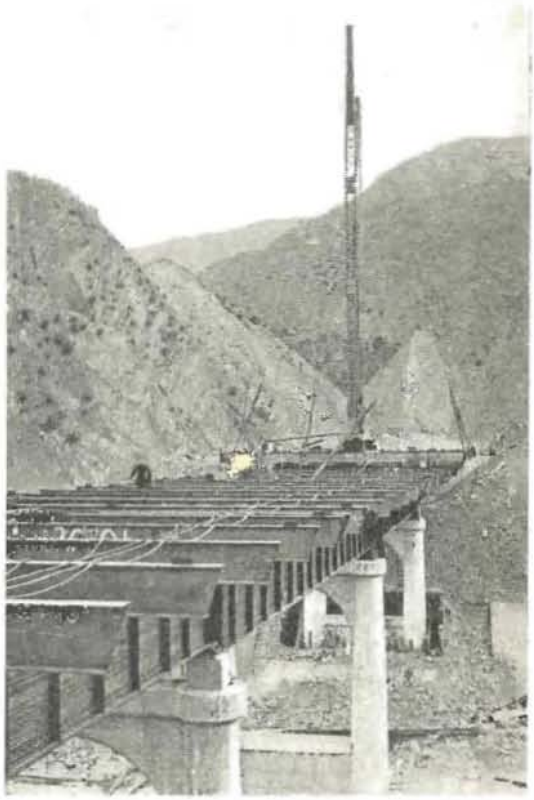
BELIEVE IT OR NOT

Although many freak accident reports come to the Automobile Club of Southern California, none has quite equaled a coincidence occurring at Amersham, England.

When two motorists who had collided at a dangerous corner got out and came face to face, they discovered that they worked in the same office, were both foremen on the same job, and were both responsible for the painting of the white line and danger signs on the road.

"Your name is Kuwatch, is it? Are you, by any chance, the Kuwatch who absconded with $250,000 and was never caught?"

"Unfortunately, no.—*Fliegende Blatter.*



TRAVELING DAYS are nearly over for the steel floor beams being picked up and laid down by a moving derrick on this Piru Gorge bridge.

Report Compiled on Compaction of Fills

C. S. Pope, Construction Engineer, served on a joint committee, composed of members of the American Road Builders Association and the Highway Research Board of the National Research Council appointed to compile a report on compacting fill material of various types.

The report was submitted at the recent convention of the American Road Builders Association in Detroit. It involved a searching review of literature on the mechanics of earths, as well as a study of State highway specifications of embankments. The report pointed out the wisdom of tests to determine when satisfactory compaction has been reached and made specific recommendation for the prevention of economic loss in this fundamental step in street and highway construction.

Surveys Finished for American Canyon Cut-off, Old Stage Route to Vallejo

By **R. E. PIERCE**, District Engineer

LOCATION surveys are now practically completed, and it is hoped that work can be started early next summer on the so-called "American Canyon" cut-off, a project that has been under consideration for a long time.

R. E. PIERCE

This is a part of the improvement of the present road from Oakland to Sacramento and will connect up with the newly paved cut-off recently completed between Cordelia and Fairfield. Recent summer traffic counts have indicated a peak count of over 4000 autos a day. It seems reasonable to assume that this will be materially increased with the improvement of this route and return of normal times.

OLD STAGE ROUTE

This project will save a greater mileage than any other single change now contemplated on this route, and the time saved will be greater than the saving in distance would indicate, due to less congestion and greatly improved alignment.

In early days, the stage road between Vallejo and Sacramento followed the American Canyon, as it was the most direct route. Since the paving of roads from Vallejo to the Sacramento Valley via the Jameson Canyon, practically all through travel has stopped using the American Canyon, as the present road is not much better than a trail through the hills, impassable in wet weather due to the unsurfaced adobe soil through which the road runs for considerable distances.

When the State highway system was originally laid out, the only method of crossing the Carquinez Straits with autos in traveling between the Sacramento Valley and Oakland was by means of the Southern Pacific train ferry between Benicia and Port Costa. This fixed the location of the primary route between Oakland and Sacramento passing through Benicia and in consequence most of the vehicular traffic used that route between the Capital and Bay region.

The State highway route connecting the Sacramento Valley with Napa and north coast points passed through Jameson Canyon north of the American Canyon with only a county road connection to Vallejo from the "Y" a few miles south of Napa.

When an automobile ferry operating from near Vallejo to the south side of the Carquinez Straits was put into operation, practically all the auto traffic between the bay region and the Sacramento Valley used this route, and with the completion of the Carquinez Toll Bridge a few years ago, still more traffic was attracted to this route.

The American Canyon lying south of the Jameson Canyon and offering the opportunity for large saving in distance and excellent alignment with easy grades has long been considered as the logical routing for this important road.

NO GRADE SEPARATION

Travel using the present route between Cordelia and the Carquinez Bridge must cross five different railroad grade crossings. The new location intersects a railroad only once and here a subway is proposed which will eliminate any crossings at grade.

A comparison of distance and curvature on the present route with those on the proposed relocation follows:

	Present route	American Canyon	Saving
Length	17.4	11.4	6.0
Number of curves	46	14	32
Minimum radius curves	30'±	2500'	
Total central angles	859°	293°	566°
Railroad grade crossings	5	None	
Maximum grade	12%	6%	5

Funds allotted for the next biennium provide only for grading. Unless money not now in sight is provided, the completion of this important road must be deferred until the biennium beginning July 1, 1935, when it is hoped additional funds will be allocated or otherwise made available.

WHERE COVERED WAGONS trundled and express stages dashed at breakneck speed over the old trail between Sacramento and Vallejo, surveyors of the Highway Division have been at work. They have completed location studies for a modern highway on new alignment through American Canyon for the so-called American Canyon cut-off. It will save mileage and time between the Capital and the Bay District. The present unsurfaced dirt road through the scenic canyon is impassable in wet weather.

New 1933 Road Map Just Published by Division of Highways

THE 1933 edition of the California road map has been published by Earl Lee Kelly, Director of the Department of Public Works. This new map has been prepared by the Division of Highways under the direction of C. H. Purcell, State Highway Engineer.

The map conforms to standards adopted by the Western Association of State Highway Officials. These standards for the preparation of State road maps control the size of the map, the colors, style of lettering and legend used, so that road maps published by all States which are members of the association are uniform in character.

PRINTED IN COLORS

The size of the map is 28" x 34", it shows the entire State as a unit and is printed in four colors. The roads shown on the map include the primary and secondary routes of the State Highway System and the principal county roads. Three different widths have been used in delineating the roads according to their classification as Federal aid routes, United States highways, State roads or county roads.

All principal towns and cities are shown and the mileage between points is clearly indicated. The type of surfacing which obtains is shown by colors on both State and county roads.

One of the features of the map which makes it particularly valuable for touring purposes is the notations indicating the United States Highways by number. United States Highways are the main transcontinental, both east-west and north-south, and principal interstate routes officially numbered by the American Association of State Highway Officials.

CITY AREAS SHOWN

Printed on the reverse side are large scale maps of the chief metropolitan areas in California, showing the principal arterials and through streets. These local maps show areas in the vicinity of Los Angeles, San Francisco Bay, San Diego, San Jose, San Bernardino, Sacramento, Stockton, Fresno and Bakersfield. There is also a small scale map of the 11 western States with the U. S. numbered highways shown thereon.

Copies of this latest California road map may be secured from the Bureau of Publications and Documents, Department of Finance, State Capitol, Sacramento, at a cost of thirty-five cents.

ELECTED CHAIRMAN OF SNOW CONFERENCE EXECUTIVE BOARD

H. M. Stafford and S. M. Munson of the Division of Water Resources attended the first Western Interstate Snow Survey Conference held on the campus of the University of Nevada, Reno, on February 18. They report that the conference was well attended by those interested in snow survey work from Utah, Nevada, and California. Present problems and methods for improving both operative and research work were discussed in sessions from ten in the morning until eleven p.m. Mr. Stafford was elected chairman of the conference executive committee for the next year.

Angelica: "Joe's new speedster is awfully cute."

Betty: "Yes, you ought to see it play dead on a lonely road."

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official journal of the Division of Highways of the Department of Public Works, State of California; published for the information of the members of the department and the citizens of California.
Editors of newspapers and others are privileged to use matter contained herein. Cuts will be gladly loaned upon request.

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

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

Vol. 11 MARCH, 1933 No. 3

KEEPING FAITH

The good word comes from California that the Highway Commission down there has allowed $136,000 for construction on the Weed-Klamath highway, beginning at the State line and going south as far as the money will go.

The stretch of road between the State line and Dorris, about four miles, is perhaps the worst piece of road on the whole route. New construction there will be a great improvement to the whole Weed-Klamath road program, and the California appropriation adds strength to the hope that work will be authorized soon on the Oregon side of this important highway.

In the Klamath County budget there is an appropriation for $20,000 for right of way for the Weed road, to be used if the State and Federal Government see fit to go ahead with construction on the Oregon side this year.

California has repeatedly promised to do its share in the Weed road program. It has already done much in keeping maintenance funds available for the road and in construction work there. The latest report indicates California's determination to keep faith in helping to bring to completion one of the most important highway links on the coast.
—Klamath Herald of Klamath Falls, Ore.

PERU BUILDING ROADS

A program of highway construction, including roads over some of the world's most rugged country and at great altitudes, has been inaugurated by the government of Peru, according to a report received by the California State Automobile Association. A total of about 3800 miles are to be built, at the rate of 250 miles a year. The cost will be about $60,000,000.

Judge: "What's the charge against this man, officer?"

Cop: "Arson, Your Honor, burning up the road."

Highway Jobs in 1932 Provided Livelihood For 4,000,000 People

"HIGHWAY construction is the most effective job creator among public works. For that reason Federal aid for roads assumes an importance warranting immediate action by Congress."

This is the view expressed in a statement by C. H. Moorefield, President of the American Association of State Highway Officials, discussing the relation of highway construction programs to the unemployment situation. The statement continues:

"Highway work offers a distribution of labor perhaps unequaled by any other large industry. The United States Bureau of Public Roads learned in a thorough study that ninety cents of the road dollar goes to labor.

State highway programs, aided by Federal appropriations, in 1932 provided employment for more than 333,000 men directly on roads. This figure is taken from contractors' pay rolls. Another 660,000 men were kept busy supplying materials and equipment. With dependents, State road building gave a means of livelihood to at least 4,000,000 people.

Highway building brings to the people the country over something they need and something which does not have to be sold before used. For these reasons, highways have been given first rank as a provider of jobs.

Immediate action should be taken by Congress on Federal aid authorizations for the next two fiscal years, as the current authorization ends July 1. This done, the States can lay plans to proceed with their full 1933 programs and men can resume their jobs. Then the country will have at least one large industry proceeding in its normal course."

MONEY FOR CALIFORNIA

Motorists bound for winter resorts are rolling over midwest highways in greater numbers than last year, according to the Automobile Club of Southern California. It is observed by the club that a possible increase in motor tourists this year would greatly increase new money coming into southern California through expenditures during motoring vacations.

NEW OVERHEAD CROSSING

Plans are complete for a change of line about one mile in length and a new structure over the Southern Pacific tracks at Elwood, on the Coast Highway, about ten miles west of Santa Barbara. This change will eliminate a rather dangerous condition at the approaches to the present overhead structure.

State Honors First Navel Orange Tree

THE first official State marker erected to designate an historical landmark was dedicated at Riverside on February 17th at the site of the parent navel orange tree, the progenitor of the State's greatest industry.

The dedication ceremonies, attended by State, city, county and civic officials signified the inception of a program for suitably marking with standard official location and directional signs places and objects of historic interest and importance. This program is being carried out through the cooperation of the California Highway Commission, the Department of Public Works, the California State Chamber of Commerce, the Department of Natural Resources and the automobile clubs.

GOVERNOR SENDS GREETINGS

DeWitt V. Hutchings, member of the State Chamber of Commerce Committee, and chairman of the day, read a telegram from Governor James Rolph, Jr., expressing his regret in not being able to be present and congratulating the city on its historic connection with the great navel orange industry of California.

The speakers included Ora E. Monette, chairman of the Historical Marker Committee of the State Chamber of Commerce; Lt. Governor Frank F. Merriam; State Highway Commissioners Frank A. Tetley, Riverside, and Timothy A. Reardon of San Francisco; Daniel H. Blood, Director of Natural Resources; A. D. Shamel, U. S. Bureau of Plant Industry and Mayor E. B. Criddle of Riverside.

Mr. Monette, who has taken a very active interest in organizing the historic marker program, in his speech, emphasized the significance of the movement from the standpoint of the sentiment and idealism back of it. He said it was the idea of signing places in which were inherent the elements of history, chronology, growth and progress.

STARTED BY WOMAN

A narration of the facts concerning this parent navel orange tree, prepared by the Riverside Chamber of Commerce, says:

"The navel orange industry of today has back of it a romantic story that dates to a time nearly sixty years ago, when men lost heart and laughed at a woman's efforts to save and bring to life two scrubby sickly-looking little orange plants. Had it been left to those men the navel industry never would have been known in the southwest, the only spot in the United States to which the navel takes kindly.

"In 1873 Mrs. Eliza C. Tibbets received from a friend of hers two navel orange trees which had been imported from Brazil. These were sent by mail to Mrs. Tibbets at Los Angeles, and Mr. Tibbets made a three-day round trip from Riverside to Los Angeles to get them from the post office. These trees were set out in the garden of the Tibbets home, and Mrs. Tibbets watered and cultivated and nursed them along until they began to put on a healthy growth and

(Continued on page 36)

AN ORANGE SHRINE, the parent navel tree of California, was officially marked for future generations to visit by the erection and dedication at Riverside, February 17, of this first historical landmark sign. The young ladies are just adding pulchritude to the picture.

Desert Trail Becomes a Highway For Transcontinental Tourist Traffic

THE gray-green of mesquite and dusty purple of pungent sage shimmered in the scorching heat of a pitiless desert sun, a chimera, away to the blue mists of barren and gullied mountains.

Following the faint tracks of a vague trail through the dry chaparral, Thomas Blythe came to a muddy river gouging its channel deep into the desert crust. Before his eyes stretched a valley, some ten miles long and five miles wide, along the western bank of the muddy stream. The rich alluvial soil was covered with feed for cattle: Here was water; here was feed; here was a site for a stockman's homestead.

And here was the embryo of that southern California garden spot — the Palo Verde Valley.

Settlement of the Palo Verde Valley dates back to 1856 with the coming of Thomas Blythe to California. About 1877 Samuel Blythe acquired some 40,000 acres of land under the swamp and overflow act. Cattle raising was the chief activity until 1904 when the Palo Verde Land and Water Company purchased the Blythe holdings and commenced extensive irrigation. In 1923 the Palo Verde Irrigation District was formed. The community has steadily developed and of the 89,000 acres within the district, some 33,000 acres of rich alluvial soil are now under water, producing thousands of bales of cotton, and tons of alfalfa, grain and fruits annually.

IN SYSTEM SINCE 1919

Prior to the construction of the California Southern Branch of the Santa Fe through Blythe, the old desert wagon trail leading westward served as a road to Mecca and the Southern Pacific Railroad. With the universal use of motor cars and the advent of modern trucks this old road became an important outlet from the prospering Palo Verde district to the coast. The third State Highway Bond Act of 1919 included the 91 miles between Mecca and Blythe as a unit in the State highway system.

Extending through the vast arid stretches of the eastern half of Riverside County, the State highway known as the Mecca-Blythe lateral, connects the fertile Palo Alto Valley which lies along the bank of the Colorado River, with the El Centro-San Bernardino highway, and serves as a link of the transcontinental U. S. Route 60 into which feeds another transcontinental route, U. S. 70.

FROM THE ATLANTIC

These transcontinental routes originate on the Atlantic seaboard, No. 60 at Newport News, Virginia and No. 70 at Beaufort, North Carolina. Coming into California via the Ehrenberg Bridge near Blythe, U. S. 60 serves as the shortest route between Phoenix and the southern California coast, being approximately sixty miles shorter than any other route.

In 1928 the Ehrenberg toll bridge was constructed across the Colorado River about four miles east of Blythe, replacing the ferry which had operated for many years as a connecting link between California and Arizona. Under the authority of the Toll Bridge Act of 1929 the Department of Public Works, in 1931, acquired the control of this structure and it became a part of the State road system. The 1931 Legislature, in adopting additional secondary routes, included within the State system the connection between Blythe and the bridge and a connection with the El Centro-San Bernardino road at the westerly end of the lateral.

Subsequent to the inclusion of this road across the desert in the State highway system, the Division of Highways has steadily advanced improvement from Blythe westward until, with the completion of a contract now under way, some 71 miles of this highway from the bridge westerly will have been constructed to the modern standards set for desert highways.

SOLVED DESERT PROBLEM

The placing of a permanent highway across desert lands presents construction problems which are difficult of solution. While rainfall in the deserts of southern California is only 4 or 5 inches annually, it falls in two or three storms of cloudburst proportions, which play havoc with the loose desert sand and gravel.

Road Protected from Flood Waters

(Continued from preceding page)

Water channels shift from one storm to another and a roadbed built without adequate protection is liable to serious damage on many sections.

The Division of Highways has developed a means of protection in the construction of desert roads which has proved to be eminently successful in combating the destructive violence of desert storms.

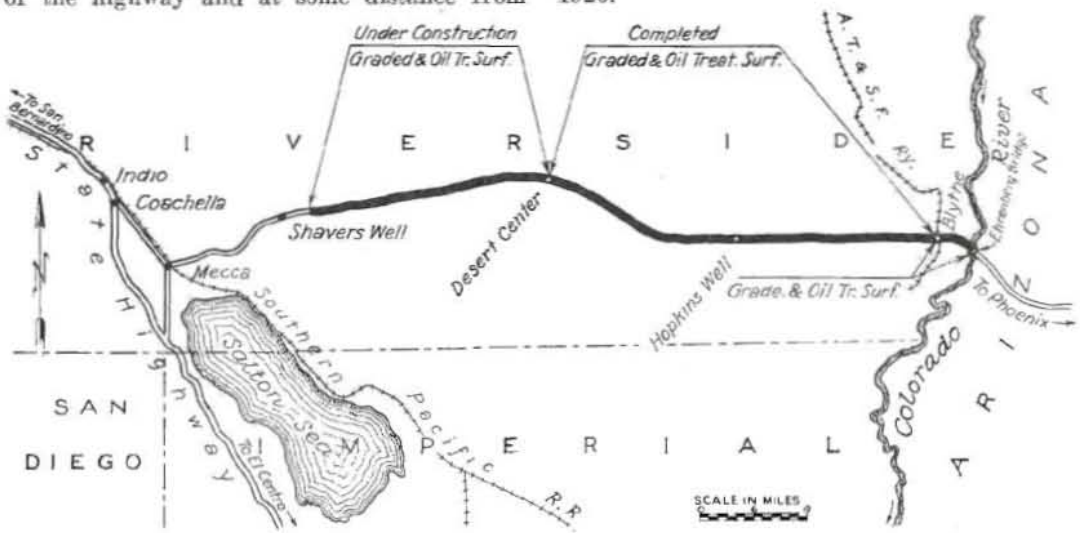
The protective method which has been adopted in both San Bernardino and Riverside counties consists of constructing wide, deep channels and dikes parallel to the line of the highway and at some distance from the road. These ditches cross the path of flow and direct the water into a lead channel which carries it under a bridge set in the roadbed.

This method of combating the fury of the waters of desert floods has proven so successful on the State's highways that damage to the roadbed has become practically negligible.

In the construction of the Mecca-Blythe lateral the method of ditch and dike protection has been used from Black Butte westerly, where the road crosses the vast desert north of the Chuckawalla Mountains. The program of improvement to this route has included six contracts up to the present time, which, with a comprehensive maintenance program on the portions not improved, are giving this section of southern California a highway which renders adequate service.

DITCH AND DIKE

The first contract to be awarded by the State for work on this highway, involved the worst section and included the grading of 21 miles between four miles west of Hopkins Well and Desert Center. The second contract called for grading and surfacing the 9.5 miles across the Palo Verde Valley from Blythe to Black Butte. This work was completed in 1926.



Next came the construction of the highway between Black Butte and 9.5 miles west of Hopkins Well, a distance of 22 miles. It was on this project that the ditch and dike construction was begun as a protection to the roadbed against damage from desert cloudbursts. The extent of this protective work may be judged from the fact that the construction of the ditches and dikes involved over 300,000 cubic yards of excavation and 17 timber bridges across the main channels which passed through the roadbed. This improvement was made in 1928 and 1929.

The fourth project carried the new road westerly to Desert Center, a distance of 16.2 miles. This stretch of highway was completed in July, 1931, and the construction of

(Continued on page 30)

Highway Bids and Awards for January in Eight Counties

IMPERIAL COUNTY—At Brawley, 0.4 of a mile grading and paving with Portland cement concrete. Dist. VIII, Rt. 26, Sec. H. United Concrete Pipe Corp., Los Angeles, $26,555; Walter Trepte, San Diego, $27,988; H. E. Cox & Son, Pasadena, $26,984; Matich Bros., Elsinore, $26,672. Contract awarded to B. G. Carroll, San Diego, $20,856.

KERN COUNTY—Between Union Ave. and Minkler Spur, 2.9 miles grading paving realignment with asphalt concrete. Dist. VI, Rt. 4, Sec. G. Peninsula Paving Co., San Francisco, $145,953; Heafey-Moore Co., Oakland, $138,619; Fred W. Nighbert, Bakersfield, $162,355; Hall-Johnson Co., Alhambra, $165,808; Valley Paving & Const. Co., and John Jurkavich, Fresno, $157,361; Union Paving Co., San Francisco, $137,620; Lee Moor Contracting Co., El Paso, Texas, $175,630; Weymouth Crowell Co., and E. Penn Watson, Jr., Los Angeles, $160,260; J. F. Shepard, Stockton, $183,866; A. Teichert & Son, Sacramento, $158,515; D. McDonald, Sacramento, $167,380; Von der Hellen & Pierson and Southwest Paving Co., Los Angeles, $164,847; Basich Brothers, Torrance, $140,129; Fredrickson & Watson, Oakland, $147,004. Contract awarded to Gogo & Rados, Los Angeles, $118,547.

LOS ANGELES COUNTY—In Redondo Beach, 1.4 miles grading and paving with asphalt concrete. Sully-Miller Contract Co., Long Beach, $51,184; Southwest Paving Co., Los Angeles, $56,528; Hall-Johnson Co., Alhambra, $53,260; Gogo & Rados, Los Angeles, $52,933; J. L. McClain, Los Angeles, $59,828; Oswald Bros., Los Angeles, $52,712; Artukovich Bros., Hynes, $58,379. Contract awarded to Griffith Company, Los Angeles, $51,705.

ORANGE COUNTY—Between Irvine and Tustin, 5.6 miles grading and paving with Portland cement concrete. Dist. VII, Rt. 2, Sec. C. Southern California Roads Co., Los Angeles, $99,938; United Concrete Pipe Corp., Los Angeles, $89,351; Artukovich Bros., Hynes, $94,059; Gogo and Rados, Los Angeles, $88,435; Oswald Bros., Los Angeles, $91,077; J. L. McClain, Los Angeles, $89,588; Daley Corporation, San Diego, $90,581. Contract awarded to Griffith Company, Los Angeles, $85,420.

RIVERSIDE COUNTY—Between Edom and Indio, 11 miles to be graded and paved with asphalt concrete. Dist. VIII, Rt. 26, Sec. E. A. Teichert & Son, Inc., Sacramento, $203,118; United Concrete Pipe Corp., Los Angeles, $244,881; Griffith Company, Los Angeles, $172,819; Basich Brothers, Torrance, $179,302; Southwest Paving Co., Los Angeles, $177,562; Gogo & Rados, Los Angeles, $192,880. Contract awarded to Oswald Bros., Los Angeles, $171,115.

SAN BERNARDINO COUNTY—Between Vineyard Ave. and Sierra Ave., 10.2 miles to be graded and paved with Portland cement concrete. Dist. VIII, Rt. 26, Sec. D. Basich Bros., Torrance, $324,672; Matich Bros., Weymouth Crowell Co., & Penn Watson, Jr., Los Angeles, $342,920; Hall-Johnson Co., Alhambra, $349,165; E. H. Bashaw, Los Angeles, $338,505; Griffith Co., Los Angeles, $321,284; Southern California Roads Co., Los Angeles, $365,331; Sander Pearson, $333,685. Contract awarded to United Concrete Pipe Corporation, Los Angeles, $309,386.

SAN JOAQUIN, SOLANO AND YOLO COUNTIES—Applying oil to 108.8 miles roadside vegetation. Dist. X. Rts. 5, 7, 8, 53. Peninsula Paving Co., San Francisco, $1,872; Basalt Rock Co., Napa, $2,268; Oilfields Trucking Co., Bakersfield, $1,980; C. F. Fredrickson & Son, Lower Lake, $1,980; Lee Immel, Berkeley, $1,609; Dee Strong, Sacramento, $1,620; Highway Builders, Ltd., San Anselmo, $2,007; A. Teichert & Son, Sacramento, $2,601. Contract awarded to R. M. Sheldon & Son, Suisun, $1,404.

SANTA CLARA AND SANTA CRUZ COUNTIES—Between Saratoga Gap and Black Road, 6.4 miles to be graded and oiled. Dist. IV, Rt. 55, Sec. A. MacDonald & Kahn, Ltd., & D. McDonald, San Francisco, $421,233; Granfield, Farrar & Carlin, San Francisco, $301,559; Merrit-Chapman & Scott, San Pedro, $355,814; S. J. Graves & Sons, Los Angeles, $460,882; Clyde W. Wood, Stockton, $358,649; Von der Hellen & Pierson, Castaic, $344,065; Guy F. Atkinson Co., San Francisco, $376,432. Contract awarded to Union Paving Co., San Francisco, $288,468.

U. S. Road System Will Suffer by Withdrawal of Federal Support

WARNING that withdrawal of Federal aid in road building will immediately prove costly to motorists and taxpayers and will throw the highway system of the nation into such confusion that it will not recover for years, was recently issued by H. P. Gillette, editor of *Roads and Streets*, and a leader in the good roads movement.

"Federal aid created a nation-wide highway system out of the unorganized and unconnected road building efforts of the various States," said Mr. Gillette. "Before the Federal program was initiated in 1916 less than a dozen States had efficient highway departments.

"Routes connecting all parts of the country have been established. Standard types and qualities of roads, varied of course, to fit local conditions, have been adopted. Efficient and economical methods of construction and maintenance have been put in operation.

MOTORISTS PAYING IT

"All this has been done with the Federal government paying only 8 per cent of the cost of road building the country over. Motorists now are returning to the Federal treasury in gasoline taxes and excise taxes on automobiles and equipment, more than the amount of the annual Federal aid appropriation, which in recent years has been $125,000,000. Recent 'increases' in this appropriation have not added to taxes, being merely advances to be returned to the national government by the States from future normal appropriations.

"Far more than the annual Federal appropriation is saved each year through lowered costs of road construction and maintenance brought about by the standards set up by the Federal Road Bureau. This saving extends down to county and township roads."

ARCHITECTURAL AWARDS

for January and February

MENDOCINO STATE HOSPITAL, Talmage. Dairy Units: Contract for general work, to Oliver S. Almlie, Merced, $44,900; for electrical work, to Eddy Electric Company, Stockton, $886; for refrigeration work, to Cycoys Iron Works, San Francisco, $2,898; for plumbing and heating work, to Hateley & Hateley, Sacramento, $6,066.

CAMARILLO STATE HOSPITAL. Water storage system: Contract awarded to Harry F. Miller, Los Angeles, $15,287.

A low winter stage for streams in the Sacramento and San Joaquin valleys with a snow pack 50 inches less in depth on the Sacramento watershed summit than last year is disclosed in the report of State Engineer Edward Hyatt covering the activities of the Division of Water Resources for February. Other features of the report include two applications for water released from Hoover Dam to irrigate acreage totaling 1,450,000 acres in Imperial and Coachella valleys; a decrease in depth and water content of snow on the Sierra slopes with an average precipitation below normal in northern stream basins and a general average of 10 per cent above normal for southern areas. The report in detail is as follows:

On account of the appearance of elements detrimental to plant growth in some of the deep wells used for irrigation in the Hollister irrigation district, there appears to be danger of damage to some of the orchards in the district. It is claimed that the only remedy for this condition is the substitution of gravity water for well water, at least until such time as a very considerable rise in the ground water in certain localities can be brought about. There is a small amount of water available for winter irrigation for these lands from the natural flow of local creeks and from the San Benito River, but it is thought that if any permanent benefit is to be had it will be necessary to store winter run-off for summer use. In connection with the feasibility of such storage, and at the request of the farm advisor and others interested, a visit was paid to the district and a number of minor storage sites were investigated with the result that it was recommended that a small site on the lower San Benito River be surveyed and detailed study be made by those interested in the development of gravity water.

DISTRICTS SECURITIES COMMISSION

The California Districts Securities Commission met on February 10. The refunding plans for the West Stanislaus Irrigation District were approved. This district has 5½ per cent bonds outstanding in the principal amount of $1,165,000. The proposed plan involves the extending of maturities over a longer period and a reduction of interest for the first 10 years.

A modification of the plans heretofore approved by the Commission for the replacement of Cuyamaca flume was approved. This flume is the conduit through which water from the San Diego River is delivered to the La Mesa, Lemon Grove and Spring Valley irrigation district in San Diego County, and the major portion of it has been in use since 1888. It is now proposed to reconstruct about 12½ miles of the conduit by replacing the same with 36-inch to 48-inch concrete pipe. The irrigation district has reasonable assurance that the R. F. C. will advance funds to finance the work, the estimated cost of which is $419,000.

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento Flood Control Project.

Routine maintenance work has continued with regular crew of 12 men, in connection with levees, structures, pumping plants, drains and repairs to equipment. The works are now in satisfactory condition.

At the Sutter yard a new timber pile driver frame is being constructed to take the place of the one worn out in service during the past two years. The road on the east levee of the Sutter By-pass, in Sutter County, has been bladed, in cooperation with the county.

Sacramento Flood Control Project—Bank Protection.

The unit of work to be done by the State in connection with the program for permanent bank protection in cooperation with the California Debris Commission, at Tyndall Mound 12 miles above Knights Landing, was completed on February 16. Approximately 3500 tons of rock were placed on a prepared bank 650 feet long.

Two hundred eighty-seven tons of rock were placed for bank protection repairs on the Sacramento River at Oak Hall Bend, in cooperation with Reclamation District No. 535.

The Commission is preparing to protect approximately 2000 feet of river bank along Reclamation District No. 744 at Portuguese Bend. Quarry rock will be used.

Emergency Flood Protection and Rectification of Rivers.

This Division has set up and equipped a camp for 30 men on the Santa Ynez River 15 miles east of Lompoc. This is an unemployment relief project in cooperation with Santa Barbara County, for the performance of clearing work in the channel of the Santa Ynez River. The camp will be in operation about four months.

Russian River Jetty.

Maintenance work on the jetty at the mouth of the Russian River has continued during this period, with a crew of 11 men working approximately four days per week. Several severe storms occurred during the period and some damage was done to the track and

Irrigation Asked for 1,300,000 Acres

(Continued from page 25)

steel trestle. The funds on hand will permit this work to continue until about March 15.

Weather Conditions.

Up to the present time no serious storms have occurred in the Sacramento and San Joaquin valleys and the streams are now only slightly above the summer stage. A recent storm covered certain parts of the Sacramento River watershed with snow to an unusually low elevation, and for a time added to the prospect of flood, had a warm rain occurred. This snow has largely disappeared and the pack at the summit now has a depth of 82 inches, which is 50 inches below that of the same time last year.

WATER RIGHTS

Supervision of Appropriation of Water.

During January, 16 applications to appropriate water were received; 10 were denied and 11 were approved by the issuance of permit. In the same period, 16 permits were revoked and 8 passed to license.

Included among the applications were two of the largest ever received by the office, one an application by Imperial Irrigation District to appropriate 10,000 cubic feet per second released from Hoover Dam on Colorado River for the irrigation of 1,300,000 acres in the Imperial Irrigation District and adjacent areas, and the other an application by Coachella Valley County Water District to appropriate 2000 cubic feet per second of the waters released from Hoover Dam on the Colorado River for the irrigation of 150,000 acres in that district.

ADJUDICATIONS

Eagle Creek (Modoc County). The report covering the distribution of the waters of Eagle Creek in accordance with the trial schedule of allotments adopted for the 1932 season is being circulated among the interested parties.

South Fork Pit River (Modoc County). The report covering the field work on the investigation of the water supply and use of water on the South Fork Pit River has been completed.

Hat Creek (Shasta County). The stipulation for judgment prepared by the Division is being circulated by counsel among the interested parties.

Deep Creek (Modoc County). The report on the trial distribution of the waters of Deep Creek during the 1932 season has been completed.

Franklin Creek (Modoc County). Report on trial distribution of the waters of Franklin Creek during the 1932 season has been completed.

Pine Creek in Surprise Valley and Cottonwood Creek (Modoc County). Reports on these court reference cases have been commenced.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

During the recent storms the flow of the Sacramento River at Sacramento reached 27,000 second-feet but on February 14 it had receded to 12,000 second-feet. The increased flow to the delta has been instrumental in crowding salinity well down into Suisun Bay as shown by the following tabulation of salinity on February 6, 1933, for some of the upper bay and delta stations. The comparative figures given for the salinity on February 6 in 1932 and 1931 indicate considerably more favorable conditions for 1933 than the similar comparison showed in last month's report prior to the recent storms.

	Salinity in parts of chlorine per 100,000 parts of water		
Station	*2/6/33*	*2/6/32*	*2/6/31*
Point Orient	1300	1080	1470
Bullshead	280	320	680
Bay Point	270	90	465
O. and A. Ferry	19	7	66
Collinsville	3	4	20
Emmaton	1	4	2
Antioch	4	7	12
Jersey	7	8	4
Central Landing	2	2	4
Middle River P. O.	11	5	15

CALIFORNIA COOPERATIVE SNOW SURVEYS

The monthly surveys at key snow courses throughout the State were completed in the latter part of January and early February and the results were published in the season's first regular bulletin sent out February 11, 1933.

In general, the surveys in the major stream basins of the western Sierra slope indicate depth and water content of the snow in early February averaging from 10 to 50 per cent less than a year ago, with a general average of about 30 per cent less. On the eastern slope, snow courses of Truckee and Carson basins show an average depth and water content 50 per cent less than last year; Mono basin 25 per cent less; and Bishop watershed of Owens basin almost equal to last year. Of seven courses surveyed for which the period of record has permitted and development of normals, four in the south Yuba basin show an average depth and water content amounting to 64 per cent of the entire seasonal normal (up to April 1st) and Blue Lakes on the Mokelumne-Carson divide, Rhinedollar Lake close to the Tuolumne-Mono divide and Sawmill at 10,000 elevation east of the Bishop-Kings-San Joaquin divide show percentages of the entire seasonal normal amounting to 49, 54 and 60 per cent, respectively. Last year at this time the corresponding percentages for Summit on the Yuba-Truckee divide, Blue Lakes and Rhinedollar Lake were 115, 93 and 80 per cent, respectively.

The data from the precipitation stations indicate, in general, that this season's precipitation to Feb-

Precipitation Above Normal in South

(Continued from preceding page)

ruary 1st averages 30 to 40 per cent below normal from the upper Sacramento to the Mokelumne River basin, 10 to 20 per cent below normal from the Stanislaus to the upper San Joaquin River basin, about 20 per cent above normal in the Kings, Kaweah and Kern River basins, and from normal to 20 per cent above, with a general average of 10 per cent above normal in the Los Angeles, San Gabriel and Santa Ana basins. Tahoe-Truckee, Walker and Mono basin stations average about 30, 20 and 40 per cent, respectively, below normal and Owens basin percentages vary from an average of 20 per cent below normal for upper Owens and Bishop drainages to an average of 40 per cent above normal for two stations further south in the basin.

DAMS

Certificates of approval of 568 dams have been issued to date, and six certificates of approval of removal.

To date there have been received 818 applications for approval of dams built prior to August 14, 1929, of which 689 are now under jurisdiction; 109 applications have been received for approval of plans for construction or enlargement; and 382 for approval of plans for repair, alteration or removal.

Fourteen dams are under construction and 120 are under repair or alteration.

Application Filed for Approval for Alteration.

Dam	Owner	County
Littlerock	Littlerock and Palmdale Irrigation Dist.	Los Angeles

Plans for Construction Approved.

Dam	Owner	County
Paragon	Paragon Gravel Mine	Placer

Work on the various large projects in southern California is progressing satisfactorily. Bouquet Canyon, an earthfill dam being built by the city of Los Angeles is nearing completion. El Capitan Dam, owned by the city of San Diego, is showing material progress—the sluicing of hydraulic fill having just started. San Gabriel No. 2, a rockfill structure under construction by the Los Angeles County Flood Control District, is about 40 per cent complete. Pouring of concrete at the Pine Canyon Dam of the city of Pasadena has been temporarily halted pending completion of excavation of the abutments to bedrock.

FEDERAL COOPERATION

Topographic Surveying and Mapping.

Vertical controls were run in connection with the Corona sheets in Riverside and San Bernardino counties and the Healdsburg and Kelseyville sheets in Sonoma, Mendocino and Lake counties and triangulation work was carried on in connection with Bogus and Dorris sheets in Siskiyou County, the Hopland sheet in Mendocino County and the Lakeport, Sebastapol, and Venado sheets in Lake, Sonoma and Colusa counties. Transit work proceeded in connection with the Cucamonga and San Bernardino sheets in San Bernardino County and topographic mapping in connection with sheets in Kern, Fresno and western Kings counties.

The final lithographed sheets of Angle, Lang and Moon Mountain quadrangles of the U. S. Geological Survey, Topographic Branch, are now available, as are also the advance sheets of the Tustin and Newport Beach quadrangles.

The Angle and Lang quadrangles were surveyed in 1929–30 by the U. S. Geological Survey in cooperation with Los Angeles County and are published on a scale of 1:24,000 with contour intervals of 5 and 25 feet, respectively.

The Moon Mountain quadrangle covers an area spanning the Colorado River with only a small corner in California, the work being done by the U. S. Geological Survey in cooperation with the State of Arizona. This quadrangle is published on a scale of 1:62,500 with a contour interval at 25 feet.

The Tustin and Newport Beach quadrangles cover areas in Orange County and the work was done by the U. S. Geological Survey in cooperation with the State of California. The surveys were made in 1932 and the sheets are published on a scale of 1:31,680.

WATER RESOURCES

Ventura County Investigation.

Intensive surveys were initiated on the dam sites in Piru Creek preparatory to making a report on the conflict between highway and reservoir utilization of part of the streambed. Work continued on the final report on the entire investigation of Ventura County.

Santa Clara Valley Investigation.

Measurements were made on Coyote River below Coyote during the month of January for the purpose of establishing the absorption rate in various sections of the channel. In the office work proceeded in connection with assembling data for publication.

South Coastal Basin Investigation.

A summary report discussing the effect of the rainfall of the winter of 1931–32 on the water supply of the South Coastal Basin was issued by the Division during the present month. The South Coastal Basin is the coastal area of Los Angeles, Riverside, San Bernardino and Orange counties. Rainfall was above normal throughout the area in the winter of 1931–32, and while stream flow was below normal, yet it occurred in such a way that the contribution to usable water supply is believed to be larger than normal. The result was that the continued drop in water levels and underground storage which has occurred in that area for many years past was stayed and there was a considerable replenishment to underground storage. This replenishment was large enough so that at the end of the calendar year of 1932 the water levels in the upper part of the basin near the mountains still stood higher on the average than they were at the end of the irrigation season in 1931.

In some areas a rise was as much as 50 to 75 feet and rises of 10 to 15 feet were frequent. This benefit was felt largely in the upper valleys.

Vital Statistics on Dam Applications and Improvements

APPLICATIONS FILED

Application for approval of plans and specifications for construction or enlargement of dam filed with the State Department of Public Works, Division of Water Resources during the month of February, 1933.

LOS ANGELES COUNTY—Eaton Wash Debris Dam No. 32-20. Los Angeles County Flood Control District, Los Angeles, owner; rolled earth fill, 37½ feet above streambed with a storage capacity of 1040 acre-feet, situated on Eaton Wash tributary to Rio Hondo, located in Rancho Santa Anita. For storage purposes for debris, flood control and conservation use. Estimated cost $441,376. Fee paid $2,706.88.

Application for approval of plans and specifications for repair or alteration of dam filed with the State Department of Public Works, Division of Water Resources during the month of February, 1933.

LOS ANGELES COUNTY—Littlerock Dam No. 57. Palmdale & Littlerock Irrigation District, Palmdale & Littlerock, owners; multiple arch dam situated on Littlerock Creek in Sec. 27, T. 5 N., R. 11 W., S. B. B. and M.

PLANS APPROVED

Plans and specifications for the construction or enlargement of dams approved by the State Department of Public Works, Division of Water Resources during the month of February, 1933.

PLACER COUNTY—Paragon Dam No. 328. Paragon Gravel Mine, Forest Hill, owner; timber and rock, 30 feet above streambed with a storage capacity of 25 acre-feet, situated on Volcano Canyon tributary to North Fork Middle Fork American River in Sec. 30, T. 14 N., R. 11 E., M. D. B. and M. For degris storage.

TEHAMA COUNTY—Ditch Creek Crib Dam No. 263, Heiser Crusade Placers, San Francisco, owner; log crib-gravel fill; 60 feet above streambed with storage capacity of 12 acre-feet, situated on Ditch Creek tributary to Deer Creek in Sec. 17, T. 26 N., R. 3 E., M. D. B. and M. For storage of debris.

Plans for the repair or alteration of dams approved by the State Department of Public Works, Division of Water Resources during the month of February, 1933.

VENTURA COUNTY—Lake Sherwood Dam No. 765, Lake Sherwood Country Club, Hollywood, owner; wall and buttress, situated on Triunfo Creek tributary to Malibu Creek in Sec. 27, T. 1 N., R. 19 W., S. B. B. and M.

LOS ANGELES COUNTY—Littlerock Dam No. 57. Palmdale & Littlerock Irrigation Districts, Palmdale & Littlerock, owners; multipe arch, situated on Littlerock Creek in Sec. 27, T. 5 N., R. 11 W., S. B. B. and M.

TRAFFIC DEATHS DECREASE

Motor vehicle deaths declined 221 or 9 per cent in California during 1932, indicating that drivers are at last beginning to heed the oft-repeated admonition to "drive carefully."

The total number killed in motor mishaps as reported by the California Highway Patrol was 2370 in 1932 as compared with 2591 in 1931.

Another factor was the drop in traffic and in motor vehicle registrations.

We are of the opinion that if some one had sounded an auto horn at the psychological moment, America wouldn't have lost that Olympic high jump.—*Thomaston (Ga.) Times.*

State Board Reports Alarming Decrease in Fuel Tax Returns

GASOLINE tax revenues for January showed an alarming decrease over similar revenue in January of 1932, according to a statement issued by the State Board of Equalization.

A loss of 12.4 per cent was reported, with revenue for January of this year totaling but $2,669,278 compared with a figure of $3,035,629 in the same month of 1932. The difference between these totals was $336,351.

"This loss in revenue is most discouraging," the statement asserted. "When figures for the entire year 1932 were compiled a loss of but 3.6 per cent was noted, compared with the 1931 revenue. We had hoped this would indicate a change in the downward trend in the gasoline industry."

ABNORMAL LOSS

"Faced with this abnormally high loss for the first month of 1933, it is obvious that our optimism must be tempered with caution."

Sales of gasoline totaled 90,884,805 gallons in January. The board added 1/99th to sales records for the month to arrive at the production figure as required by law. The tax was calculated on this figure, subject to a 1 per cent shrinkage deduction, making the net tax three cents a gallon.

Just what the returns will show for February will not be known till the last of this month as the companies are not obliged to make their returns until March 15.

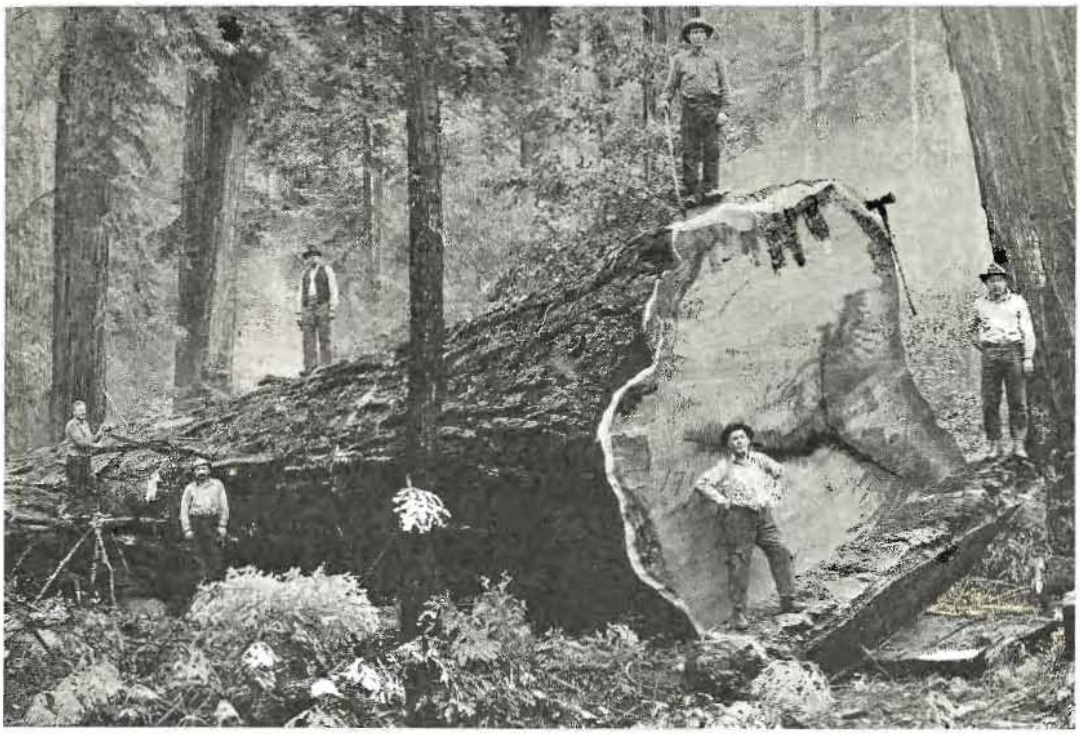
DOWNWARD TREND

The chart for last year shows a continuing downward trend of gasoline consumption as reflected by the tax assessments all through January to a low point of $2,987,000 in the first few days of February. Then followed a sharp rise through February to a high point of $3,425,000 at the end of the month.

The January chart for this year shows a much sharper decline into the February column with no sign of flattening out for the upswing of the usual spring increase in consumption.

Motor vehicle registration and the juvenile population in schools throughout the country are nearly equal in number, according to the Automobile Club of Southern California. This leads to the conclusion that every driver should exercise care in traveling near schools or playgrounds in order to protect every child from accident.

Redwood Lumber for Yolo Causeway



GREAT WAS THE FALL thereof when this giant redwood was laid low, giving employment to woodsmen and mill workers of Fort Bragg, Mendocino County, engaged in getting out lumber for the Yolo Causeway Project. It is 18 feet in diameter at the stump and by actual ring count was 2512 years old. It will furnish 170,000 board feet of lumber.

WHEN the project of widening the Yolo Causeway was announced last fall and the news went out that redwood was specified for the majority of the piling and superstructure lumber to be used in constructing the additional twenty-foot width for the three-mile trestle there was great rejoicing throughout the Redwood Empire in the northern part of the State where a great lumber industry had been prostrated by the general business depression.

Six million feet of redwood was required for the structural lumber on the causeway and a quarter million feet of fir timber was needed in addition to the redwood. That meant widespread relief to unemployment in a large area of the northern counties where the logging industry was the principal means of livelihood to thousands of workers.

Lumberjacks long idle were sent into the forests and mills long closed or running only on part time were soon operating on full schedule. Literally thousands of workers in the mills and woods and on the logging railroads have been employed throughout the winter in getting out this large order for materials required on the big project.

The accompanying photograph of one of the great redwood trees that was fallen on January 10 by employees of a lumber company at Fort Bragg in Mendocino County was sent to the Department of Public Works by C. W. Sauer, president of the Fort Bragg Chamber of Commerce. In his letter President Sauer says:

"I call your attention to the number of woodsmen in the picture who actually prepared the bed on to which the tree fell and will say that they are certainly real men put back to work through the inauguration of one of the State projects. The tree is now being sawed into material for the Yolo Causeway."

Relief Camp Work Proves Healthy for Itinerant Workers

IT'S a healthy life working for the State in the unemployment relief camp maintained by the Division of Highways in the Arroyo Seco area of Los Angeles County.

The camp averages an enrollment of 250 men from the Los Angeles area, all single itinerants who work for their board and lodging. A recent check-up made by Superintendent C. C. Rossi shows that over a six weeks period most of the men have gained in weight anywhere from 7 to 31 pounds and only four men lost weight.

The result of the check-up was as follows:

1 man gained 31 lbs.
1 man gained 27 lbs.
3 men gained 19 lbs.
3 men gained 18 lbs.
150 men gained an average of 7¾ lbs.
12 men gained about 15 lbs.
46 men gained about 10 lbs.
3 men lost 1 lb.
1 man lost 2 lbs.

A potent reason for this gain in avoirdupois in addition to the stimulus of vigorous exercise in the open air is the good food served. A specimen day's menu is as follows:

Breakfast	Dinner	Supper
Oranges	Pea soup	Soup
Farina	Prime rib of beef	Salad
Fried ham	Mashed potatoes	Irish stew with dumplings
Fried potatoes	String beans	String beans
Toast	Bread and butter	Hot biscuits
Coffee	Coffee	Pie Tea

In return for their board and keep the men have done the following work from October 15 to February 25 in preparing the right of way for an extension of the Arroyo Seco highway:

Cleared 49 acres.
Built 5 miles of trails.
Burned 23 acres.
Moved 1000 yards of roadway excavation.
Moved 3500 yards of slides.
Built terraces for erosion control on 6½ acres of hill slope.

"The Americans," we are told, "want to get rid of prohibition." A bargain; hardly been used at all.—*Punch* (London).

Rastus Jackson, a thoroughly married darky, was one day approached by a life insurance agent.

"Better let me write you a policy, Rastus," suggested the agent diplomatically.

"No, sah," declared Rastus emphatically. "Ah ain't any too safe at home as it am!"—*Typing Tips.*

DON'T UPSET HIGHWAY SYSTEM, HYDE WARNS

Former Secretary of Agriculture, Arthur M. Hyde, in a recent address to State highway officials, emphasized the danger to property owners inherent in the "uniformed propaganda" directed at upsetting the carefully established and highly successful system now in operation.

Said Secretary Hyde, "Since the financing of State road construction is almost wholly now from taxes paid by the road users through motor fuel and license taxes, plus Federal aid, and the support of the local road systems largely from taxes on property, it is obvious that the expansion of Federal and State highway systems has resulted in the relief of property taxation through the taking over of roads which have hitherto been largely financed from the source of taxes on property."

DESERT TRAIL BECOMES A HIGHWAY

(Continued from page 23)

the dikes and ditches involved the movement of nearly 260,000 cubic yards of material and the construction of 16 bridges.

The most recent contract to be completed on this desert lateral comprises the construction of the most easterly section of the route, the 3.7 miles between Blythe and the Ehrenberg Bridge.

NEW ALIGNMENT

Construction of the 19.5 miles between Desert Center and Shavers Summit is now under way and the completion of this contract is expected about August 1st of this year. Much of the section of the road is on a new alignment which lies to the south of the existing road. The new location skirts along the southerly edge of the Chuckawalla Valley between the proposed location of the Hayfield Reservoir of the Colorado River Aqueduct and the Chuckawalla Mountains.

The excavation for the ditches and dikes on this project is estimated to be nearly 500,000 cubic yards and the plans call for the construction of 46 timber bridges, involving the driving of approximately 3000 piles.

The plan of steady improvement to this route which has been adopted by the Division of Highways is giving to southern California another modern desert highway which will adequately serve in carrying both interstate travel and traffic to and from the fertile Palo Verde Valley, and with the completion of the contract now under way there will remain only the modernizing of the few miles necessary as the connecting link to the El Centro-San Bernardino highway.

Rocky Creek Span on Monterey Coast

A FEW weeks ago several hundred Monterey citizens and highway officials gathered at Bixby Creek to open to traffic and dedicate a wonderful new bridge. The celebration was inspired not only by the completion of the new Bixby Creek Bridge, the longest concrete arch bridge in the West, but also by the fact that the bridge opened to travel many miles of new high speed highway providing easy and comfortable access for the motorists to a long stretch of a hitherto remote section of the Monterey coast.

The more spectacular features of the larger structure have quite eclipsed the shorter but none the less beautiful bridge built in an equally picturesque setting across Rocky Creek one-half mile north of Bixby Creek.

TWO HUNDRED TWENTY-FIVE-FOOT ARCH

Rocky Creek Bridge also crosses high over a narrow rocky canyon which opens directly on the ocean beach, a stone's throw distant. Niches were cut and massive concrete abutments were set deep into the rocky canyon walls to take the reactions of the 225-foot concrete arch ribs which carry the roadway over the canyon 150 feet above the creek.

In addition to the arch span, five approach spans on the south end and one on the north make a total length of bridge of 497 feet. The bridge has the 24-foot roadway width which is standard for this route. Construction involved 2000 cubic yards of excavation, over 2000 cubic yards of concrete, and about 140 tons of reinforcing steel. The concrete was mixed in the plant at the south end of Bixby Creek Bridge, transported by highline bucket across Bixby Creek, thence by truck over the half mile between the two bridges and again by highline to position in the forms at Rocky Creek. The cost of the Rocky Creek Bridge was approximately $60,000.

FIVE BRIDGES REQUIRED

Rocky Creek Bridge is the fourth to be completed of a series of arch bridges on this new road and is exceeded in length only by Bixby. The Granite and Garrapata arches were completed earlier and were of shorter span and lesser height.

A fifth arch bridge is now being constructed across Wildcat Creek about five and one-half miles south of Carmel. That bridge consists of three short arch spans.

$40,499,000 Cost of Abolishing Most Dangerous Grade Crossings in State

By **STEWART MITCHELL**, Construction Engineer of Bridges

A REPORT which deals with the grade crossing problem in California has been prepared by the California Railroad Commission and the Division of Highways of the Department of Public Works jointly as required by Assembly Concurrent Resolution No. 23, Chapter 45, Statutes of 1931.

As stated in the report, its main purpose has been "to outline the magnitude of the grade crossing problem in the State and furnish the necessary information so that the Legislature may have before it sufficient data to plan such programs of improvement as to it may seem proper under the circumstances, looking toward a betterment of the situation based upon such expenditures as can be reasonably justified and financed."

In order to classify all grade crossings according to their relative importance as to potential danger and hindrance to safe travel, they were rated by a formula which took into account the volume of traffic on both the railroad and highway, average speed of such traffic, tracks crossed, accident record, and the protection now provided.

HIGH SEPARATION TOTAL

By this formula all grade crossings were grouped into five classes, the most important one being designated as Class I comprising 464 crossings. The outstanding feature of the report is that while the Class I crossings are only 3.83 per cent of the total main and branch line railroad grade crossings in the State, it would cost $40,499,000 to separate their grades, the resulting annual cost being $2,770,000.

The report also segregates all crossings according to whether they are over steam or electric railroads, shows the number on the different railroads operating in the State and groups them according to the jurisdiction of the highway on which they occur; viz, city streets, county roads, and State highways.

There are a total of 12,099 grade crossings over main and branch line railroads in the State with 2403 spur track crossings in addition which are not classified in this study for practical reasons. Of the 12,099 grade crossings, 7750 are over steam lines and 4349 over electric lines; 6355 are within the corporate limits of cities and towns, 5515 are on county highways and only 229 are on the State highway system.

STATE COST INCREASING

At the beginning of 1932, there were 580 grade separations in the State, 427 of which represent an expenditure of about $21,000,000. The other 153 separations were effected by passing under existing bridges and trestles. These separations were financed 55 per cent by the railroads, 20 per cent by cities, 12 per cent by counties and 13 per cent by State funds; but in recent years, the proportion borne by the railroads has decreased to 41 per cent and the cost of separations built by State funds has risen to 26 per cent.

The report covers the various means by which grade crossing hazards may be reduced, which are:

By proper protection such as gates, warning signals, lighting, etc.

By suitable grade separation structures.

By abandoning and closing crossings through relocation of the highway or by diverting traffic to adjacent crossings which are safer.

Practically all grade crossings have the standard crossing sign and about 25 per cent of them have additional protection such as flagmen, gates, or automatic signals. The total installation cost of this protection in the State is $2,444,859 and the annual maintenance cost is $657,322.

It would cost nearly $9,000,000 to provide single automatic signals at main and branch line crossings not now provided with special protection and the annual cost of maintenance would be over $700,000. Double automatic signals would cost to over $10,000,000.

ANNUAL BILL $30,159,000

The cost of separating all crossings which are considered practical of separation without running into unreasonably large costs for property damage and rearrangement of existing facilities in city districts, is given as $501,424,000. This is for separating 7997

(Continued on page 34)

Water Applications and Permits

APPLICATIONS FILED

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

SAN JOAQUIN COUNTY—Application 7494. E. E. Hahn, R. 4, Box 153X, Stockton, Cal., for 0.50 c.f.s. from French Camp Slough, Tributary to San Joaquin River, to be diverted in Sec. 6, T. 1 S., R. 7 E., M. D. B. and M. For irrigation purposes (30.70 acres). Estimated cost $1,500.

PLUMAS COUNTY—Application 7495. Carl G. Hankel, Quincy, Cal., for 30 c.f.s. from South Fork of Feather River, tributary to Feather River, to be diverted in Sec. 8, T. 22 N., R. 10 E., M. D. B. and M. For mining purposes. Estimated cost $1,000.

SAN BERNARDINO COUNTY—Application 7496. Aubrey Wardman, c/o John M. Kemmerer, 130½ N. Greenleaf Ave., Whittier, Cal., for 2 c.f.s. from springs and underground water in Henderson Canyon, tributary to Santa Ana River, to be diverted in Sec. 9, T. 1 N., R. 6 W., S. B. B. and M. For irrigation and domestic purposes (250 acres). Estimated cost $1,000.

LOS ANGELES COUNTY—Application 7497. Thomas W. and May Kneen, Topanga, Cal., for 5000 gallons per day from spring and water well tributary to Garapito Creek, thence Topanga Canyon, to be diverted in Sec. 7, T. 1 S., R. 16 W., S. B. B. and M. For domestic purposes.

EL DORADO COUNTY—Application 7498. United States. El Dorado National Forest, c/o E. F. Smith, Supervisor, Placerville, Cal., for 1600 gallons per day from unnamed stream tributary to South Fork of American River to be diverted in Sec. 22, T. 11 N., R. 16 E., M. D. B. and M. For domestic purposes. Estimated cost $250.

EL DORADO COUNTY—Application 7499. United States, El Dorado National Forest, c/o E. F. Smith, Supervisor, Placerville, Cal., for 0.0015 c.f.s. or approximately 1000 gallons per day, from unnamed spring tributary to South Fork of American River, to be diverted in Sec. 22, T. 11 N., R. 16 E., M. D. B. and M. For domestic purposes. Estimated cost $317.20.

EL DORADO COUNTY—Application 7500. C. M. Carter, R. D. Nicol and W. P. Austin, c/o R. D. Nicol, 1733 Jefferson Street, Oakland, Cal., for 100,000 acre-feet per annum from South Fork of American River, tributary to American River, to be diverted in Sec. 21, T. 11 N., R. 9 E., M. D. B. and M. For municipal purposes. Estimated cost $3,000,000.

EL DORADO COUNTY—Application 7501. B. W. Stone, 161 Ellis Street, San Francisco, Cal., for 500 c.f.s. and 125,000 acre-feet per annum from Rubicon River, Pilot Creek, Gerle Creek, Loon Lake, Buck Island Lake-Rock Bound Lake, Little South Fork Rubicon River, tributary to American River drainage area, to be diverted in Sec. 9, T. 13 N., R. 16 E., Sec. 11, T. 12 N., R. 12 E., Sec. 24, T. 13 N., R. 13 E., Secs. 11, 31, 34, T. 14 N., R. 14 E., Sec. 4, T. 13 N., R. 15 E., Sec. 2, T. 13 N., R. 13 E., M. D. B. and M. For municipal purposes.

HUMBOLDT COUNTY—Application 7502. Geo. E. and Ora E. Parrish, Bishop Pine Lodge, Trinidad, Cal., for 30,000 gallons per day from McNeill Creek, tributary to Pacific Ocean, to be diverted in Sec. 11, T. 8 N., R. 1 W., H. B. and M. For irrigation and domestic purposes (1 acre).

RIVERSIDE COUNTY—Application 7503. M. E. Hopper and C. E. Wilson, c/o C. E. Wilson, 204 Fourth Street, San Bernardino, Cal., for 0.025 c.f.s. from Cottonwood Canyon, tributary to Salton Sea drainage area, to be diverted in Sec. 14, T. 5 S., R. 11 E., S. B. B. and M. For mining and domestic purposes. Estimated cost $100.

SANTA CRUZ COUNTY—Application 7504. Theodore J. Hoover, Office of the Dean, Stanford University, Cal., for 1/6 c.f.s. from Waddell Creek, tributary to Pacific Ocean, to be diverted in Sec. 35, T. 9 S., R. 4 W., M. D. B. and M. For irrigation purposes (30 acres). Estimated cost $25,000.

MONO COUNTY—Application 7505. C. L. Brown, 310 W. First Avenue, La Habra, Cal., for 200 gallons per day from small stream tributary to Lake George, thence Mammoth Creek and Owens River, to be diverted in Sec. 17, T. 4 S., R. 27 E., M. D. B. and M. For domestic purposes. Estimated cost $50.

PLACER COUNTY—Application 7506. Tahoe Treasure Mining Co., c/o Murle C. Shreck, Attorney, Capitol National Bank Bldg., Sacramento, Cal., for 2 c.f.s. from unnamed stream tributary to Lake Tahoe, to be diverted in Sec. 13, T. 14 N., R. 16 E., M. D. B. and M. For mining and domestic purposes.

MONO COUNTY—Application 7507. R. E. Wood, 158 E. Eighty-eighth Place, Los Angeles, Cal., for 0.025 c.f.s. from Lake George, tributary to Mammoth Creek and Owens River, to be diverted in Sec. 17, T. 4 S., R. 27 E., M. D. B. and M. For domestic purposes. Estimated cost $1,000.

MENDOCINO COUNTY—Application 7508. H. O. Cleland, c/o W. P. Thomas, Attorney, Ukiah, Cal., for 2.5 c.f.s. from Eden Creek, tributary to Elk Creek, thence Middle Eel River, to be diverted in Sec. 24, T. 21 N., R. 12 W., M. D. B. and M. For irrigation and domestic purposes (40 acres).

HUMBOLDT COUNTY—Applicatien 7509. Thomas Nelson McDaniel, 2004 Fourth Avenue, Seattle, Wash., for 300 c.f.s. from Willow Creek, tributary to Trinity River, to be diverted in Sec. 11, T. 6 N., R. 4 E., H. B. and M. For mining and domestic purposes. Estimated cost $300,000.

SAN BENITO COUNTY—Application 7510. Alice Pierce Fischl, 1560 University Avenue, Palo Alto, Cal., for 3 c.f.s. from North Fork Larios Creek, to be diverted in Sec. 36, T. 17 S., R. 11 E., M. D. B. and M. For mining and domestic purposes.

PERMITS ISSUED

Permits to appropriate water issued by the Department of Public Works, Division of Water Resources, during the month of February, 1933.

SIERRA COUNTY—Permit 4060, Application 7314. Oregon Creek Company of Camptonville, Yuba County, Cal., February 11, 1933, for 50 c.f.s. from Oregon Creek, in Sec. 34, T. 19 N., R. 9 E., M. D. B. and M. For mining purposes.

STANISLAUS COUNTY—Permit 4061, Application 7452. J. M. De Souza, Rt. 3, Box 944, Modesto, Cal., February 16, 1933, for 0.5 c.f.s. from Tuolumne River, in Sec. 12, T. 4 S., R. 7 E., M. D. B. and M. For agricultural purposes on 40 acres of land. Estimated cost $100.

SANTA BARBARA COUNTY—Permit 4062, Application 7339. Mary Kinevan, Santa Barbara, Cal., February 17, 1933, for .01 c.f.s. from unnamed spring in Sec. 18, T. 5 N., R. 28 W., S. B. B. and M., for domestic purposes. Estimated cost $600.

SHASTA COUNTY—Permit 4063, Application 7011. Division of Highways, Department of Public Works, Sacramento, Cal., February 20, 1933, for 0.025 c.f.s. from unnamed spring in Sec. 23, T. 32 N., R. 6 W., M. D. B. and M., for domestic and recreational purposes.

SAN BERNARDINO COUNTY—Permit 4064, Application 7428. L. M. Bailey, Vidal, Cal., February 24, 1933, for 1 c.f.s. from underground flow in Dunkirk Wash, in Sec. 24, T. 2 N., R. 23 E., S. B. B. and M., for mining and domestic purposes. Estimated cost $2,000.

SAN BERNARDINO COUNTY—Permit 4065, Application 7429. L. M. Bailey, Vidal, Cal., February 24, 1933, for 2 c.f.s. from underground flow in Dunkirk Wash, in Sec. 24, T. 2 N., R. 23 E., S. B. B. and M., for industrial and domestic purposes. Estimated cost $3,000.

SACRAMENTO COUNTY—Permit 4066, Application 7147. Division of Highways, Department of Public Works, Box 1103, Sacramento, Cal., February 25, 1933, for 0.004 c.f.s. from Read Spring, in Sec. 4, T. 6 N., R. 18 W., S. B. B. and M., for industrial and domestic purposes. Estimated cost $1,500.

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Grade Crossings on State Highways Lead In Accident Totals

(Continued from page 32)

crossings and the annual cost of so doing amounts to $30,159,000.

Various surveys referred to in the report show that many of the existing crossings could reasonably be closed for want of sufficient public necessity for their continued use, which would justify the expense necessary for their protection or separation.

Accident records of each crossing have been carefully kept by the California Railroad Commission since January, 1926, and the report shows that during the six years succeeding that time, there has been an average of about one accident per crossing but that there were actually 64.7 per cent of the crossings at which no accident occurred. The records show that the grade crossing situation is being constantly improved as is evidenced by a decrease in the number of accidents occurring annually notwithstanding the fact that the total number of accidents occurring on public highways has been steadily increasing.

MORE HIGHWAY FATALITIES

Fatalities occurring at grade crossings are only about 7 per cent of the total highway fatalities. The report gives a large amount of statistics relative to the conditions and locations under which crossing accidents occur and shows that while the number of grade crossings on State highways is relatively small, the average number of accidents and casualties per crossing is considerably higher than is the case on county highways and city streets.

As a final word of caution or advice, the report states as follows:

"In considering the grade separation problem in individual cases or in connection with a comprehensive plan of improvement, the question of the economical justification should be carefully studied. Two important elements in such a study are the elimination of accidents and interference to the free flow of traffic on the highway and railroad.

HIGHWAY LOCATION FACTOR

Where a crossing of highway and railroad falls within the limits of a major highway improvement, which is frequently the case, the study should include not only consideration of a suitable plan of constructing and financing a grade separation but also changes in the highways necessary to obtain adequate and direct highway routes leading to such a separation. These related matters when considered together permit of the most practical and economical method of effecting a permanent improvement in the highway with particular reference to a crossing over the railroad.

The construction of grade separations and the attendant highway construction frequently require cooperation on the part of various political subdivisions and always require negotiations with the railroad company and final approval by the California Railroad Commission. Therefore, considerable time must be allowed between the inception of a grade separation project and the actual start of construction work."

High Vehicle Taxes Operating Against Use of the Highways

ERNEST N. SMITH, Executive Vice President of the American Automobile Association recently carried a warning to members of the Ways and Means Committee of the House of Representatives, when he appeared before the committee in opposition to the continuance of the Federal tax on gasoline, beyond the one year period for which it was established.

Federal, State and local taxes collected on motor vehicles and their use in 1932 amounted to one-fourth of their average value, and reached the highest point in highway history, according to Mr. Smith. This record breaking level of motor vehicle taxation, he added, has reached the stage where it is operating against the use of the highways and with diminishing aggregate returns to the States from this source of revenue.

"In 1932, motor vehicle property in the United States paid a tax of $1,099,293,844 on a total valuation of $4,505,625,600. This is equivalent to an average per vehicle of $45.28. It is equal to an annual tax of 24.4 per cent on the average value of the vehicle. This would mean that over its life period of seven years, the average car owner would pay in taxes 170.8 per cent of the average value of his car."

A flea and an elephant walked side by side over a little bridge. Said the flea to the elephant after they had crossed over: "Boy, we sure did shake that thing!"—*The Safe Driver.*

Doctors Operate on 'Hangman's Tree' by Bret Harte Cabin

By **H. DANA BOWERS**, Landscape Engineer

A HALF century or more before Columbus began pleading with the court—pleading before Queen Isabella for the necessary doubloons and sailing ships to discover new lands which he felt sure existed across the sea to the west—there was growing a mighty oak. Standing alone in a little meadow surrounded by pines and cedars, with a small brooklet fed by springs winding an aimless way across its feet, this oak was destined to play a very important part in the lives of men.

For centuries it has struggled for existence against the elements. The battle for survival of the fittest has been waging for over 400 years against the winds, rain and snow, heat and cold, lightning and fire, until the last few years has finally brought defeat, and slowly this forest giant is succumbing to the ravages of time. Disease and decay have destroyed the limbs, making them soft and pithy, an excellent storage place for the woodpecker's winter supply of acorns on which the worms feast, to be later feasted upon in turn.

USED AS GALLOWS

Unfortunately for some, the highway ran directly under a very prominent and sturdy limb, just a little higher from the ground than the combined height of a horse and rider. When gold and horses disappeared from their rightful owners to such an extent that something had to be done about it, this extending limb began to attract considerable attention as to its possibilities, and it was not long before it was put into use as a means of persuading other would-be gold and horse thieves to change their method of living.

As time passed this famous "quick justice" was replaced by more lengthy court procedure for such cases, and the more modern stagecoach began to replace the saddle for means of conveyance.

The bark began to grow over the rope scars on the upper side of the limb, but at the same time began to disappear from the lower side. A stick of dynamite remedied this however, blowing the limb off and reducing the hazard to stagecoach drivers' heads.

BECAME A HAZARD

Thus this mighty forest giant has stood for years, its use to mankind a thing of the past and only gazed upon with curiosity and awe by tourists who stand in wonder and listen to tales of "the days of old, the days of gold——."

HANGMAN'S TREE shorn by doctors

It became necessary, for the safety of the traveling public, to remove the decayed limbs, as they were falling continually. The State highway tree surgeons have recently removed these hazards, leaving as much of the framework of the tree as possible, to remain as an historical monument to the pioneers.

This will stand for several years before its entire removal will be necessary. The circumference of this giant is 17.4 feet, with its top limb exceeding 50 feet in height.

Close by stands the Bret Harte Cabin, where Chamberlain and Chafee lived, or "Tennessee and His Partner," as Bret Harte called them in his book of that name, which was written there.

TWENTY YEARS AGO

J. B. Woodson, sixth division engineer, will submit to the State Highway Commission his report of a test made of the quality of the concrete base on the new State Highway north of Fresno. He will report that the four-inch base "will stand any reasonable loads."—*Sacramento Bee.*

"Have you a skeleton in your closet?"

"No, it's out in the garage. I forgot to lock the doors last night and somebody took everything except two wheels and the frame."—*National Motorist.*

Motor Vehicle Fees for 1932 Apportioned

The Department of Motor Vehicles announced on January 30th the apportionment of $5,927,294.77 to the State Department of Public Works and the various counties of California for road building and maintenance purposes.

The apportionment represents the return of the California motorist's money to him in the form of more and better roads as the sum apportioned is the net amount of all motor vehicle license fees collected in 1932 after deductions are made for handling all registration matters and for operation of the California Highway Patrol.

Of the total collected one-half or $2,963,647.38 goes to the Division of Highways of the Department of Public Works to be expended on the road-building program. The other half goes to the various counties of the State in proportion to motor vehicle registration from each.

The apportionment was made on a basis of a total fee-paid registration for the year of 2,041,824 vehicles including 1,865,333 automobiles, 8,039 solid tired trucks, 98,244 pneumatic tired trucks, 8338 motorcycles, 7118 solid trailers and 54,752 pneumatic trailers.

Fee paid motor vehicle registrations in California during 1932 totaled 2,041,824, a loss over the preceding year of 65,451.

STATE HONORS FIRST NAVEL ORANGE TREE

(Continued from page 21)

developed into magnificent specimens that produced a new variety of orange in this country.

FOUNDED AN INDUSTRY

"The fruit quickly became popular as it was large in size, handsome in appearance, and luscious in flavor. The news spread, the orange growers came, and from these two trees sprang all the early buds that were used in the production of navel oranges in the State.

"Because of the careful attention given these first two trees, there are today in California more than 10,000 navel orange groves, whose income amounts to something over forty million dollars annually.

"In 1903 both parent naval trees were removed from the Tibbets homestead to places in the city, one being planted at the head of Old Magnolia Avenue at Arlington Avenue."

In Memoriam

The executives of the Department of Public Works and Division of Highways as well as his immediate associates in District IV were shocked by the news of the tragic death of Everett M. Stearns, Jr., as the result of an unusual accident while engaged on work with a surveying party in that district on February 18.

Mr. Stearns was employed on a construction survey in Dublin Canyon, in Alameda County. John F. Nelson and Wade Hendricks two other members of the party were working with him. The steel tape they were using came in contact with a power line which apparently had escaped the notice of all members of the party.

Mr. Stearns was instantly killed while both Nelson and Hendricks were rendered unconscious by the terrific electric shock.

Mr. Stearns was a young man of sterling character who had earned the high regard and affection of all his associates and his passing, in his years of early promise, is deeply felt throughout the district and by his many friends outside of the State service. The Division of Highways extends its sincere sympathy to the beloved ones who mourn his loss.

He is survived by his mother and sister, of Weed, California and his brother Raymond, an engineer of District VII.

WATER APPLICATIONS AND PERMITS

(Continued from page 33)

HUMBOLDT COUNTY—Permit 4067, Application 7373. Thomas K. Walker, Weitchpec, Cal., February 23, 1933, for 0.025 c.f.s. from Diamond Creek and 5 Taylor Springs in Sec. 17, T. 10 N., R. 5 E., H. B. and M. For domestic purposes. Estimated cost $300.

HUMBOLDT COUNTY—Permit 4068, Application 7374. Mrs. Anna Fries Walker, Weitchpec, Cal., February 25, 1933, for 0.5 c.f.s. from Diamond Creek and 5 Taylor Springs, in Sec. 17, T. 10 N., R. 5 E., H. B. and M. For placer mining purposes. Estimated cost $300.

LAKE COUNTY—Permit 4069, Application 7051. John R. Connolly et al., 326 Ochsner Building, Sacramento, Cal., February 24, 1933, for 0.1 c.f.s. from unnamed spring in Sec. 32, T. 15 N., R. 8 W., M. D. B. and M. For domestic purposes. Estimated cost $2500.

HUMBOLDT COUNTY—Permit 4070, Application 7234. J. S. Rivers, c/o W. Ernest Dickson, First National Bank Building, Eureka, California, February 27, 1933, for 8.0 c.f.s. from Hennessey and Lake creeks, in Secs. 10 and 3, T. 5 N., R. 6 E., H. B. and M. For mining purposes. Estimated cost $3000.

EL DORADO COUNTY—Permit 4071, Application 7478. C. T. Oeste, c/o E. O. Anderson, Youngs, Cal., February 27, 1933, for 0.25 c.f.s. from Middle Fork of Cosumnes River, in Sec. 23, T. 9 N., R. 11 E., M. D. B. and M. For irrigation and domestic on 20 acres of golf course. Estimated cost $2,000.

With more than 20,000,000 passenger automobiles in operation in the United States there is one car to about each six persons.

And here's one culled from a book of "Breaks" by W. A. Scott: "By an unfortunate typographical error we were made to say on Tuesday that Mr. Blank was a member of the defective branch of the police force. This, of course, was intended to read "the detective branch of the police farce."

STATE OF CALIFORNIA

Department of Public Works

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

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EARL LEE KELLY----------Director

ERIC CULLENWARD----------Deputy Director

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HEADQUARTERS

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

DIVISION OF CONTRACTS AND RIGHTS OF WAY

C. C. CARLETON, Chief
FRANK B. DURKEE, General Right of Way Agent
C. R. MONTGOMERY, General Right of Way Agent

DIVISION OF PORTS

Port of Eureka—William Clark, Sr., Surveyor
Port of San Jose—Not appointed
Port of San Diego—Edwin P. Sample

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