

California Highways
and Public Works

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Autotog in December on the Peninsula Highway,
San Mateo County, California.

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Rolling the road.



State highway between Ontario and Riverside, in Riverside County.



Turning a truck upon a road turntable.

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California's Mountain Highways

By FRED S. MOODY, Member of the California Highway Commission.

KNOW California's mountains! This is my counsel to the people of California. It is founded on years of intimate acquaintanceship with the mountains of this state, strengthened by some knowledge of the most famous of Europe's mountain passes.

In the past there may have been some excuse for those who did not get out into the high places of California. But today, when mountain scaling is possible of accomplishment in the cushioned comfort of an automobile, there is no reason why every Californian should not come to live on intimate terms with our mountain areas.

I was greatly impressed some years ago with a statement that caught my eye while preparing for a trip through Europe. I still remember the sentence. It read: "For pure enjoyment there is nothing to compare with mountain pass climbing in a car." The sentence referred to the mountain passes of Europe. So impressed was I with the facts with which the writer amplified his statement, that I included in my European itinerary automobile trips through some of Europe's most celebrated mountain passes. Since Governor Young honored me with appointment as a member of the California Highway Commission, I have been interested in making mental comparisons of the roads through the mountain passes of California with those of Europe.

COMPARISON WITH EUROPE

The charm of California's mountains carries an appeal that grows from wonder to delight and from delight to love. Nevertheless I am frank to say that I do not believe we have been as alert in locating our mountain roads to take full advantage of their scenic interest as have been the people of Europe.

It must be recognized, of course, that in the

early days mountain roads were built by the pioneers for the very necessary and practical purpose of getting the easiest road from the mountains into the valleys. The mountain roads then were essentially and wholly commercial highways. Scenery did not fit into the picture as one of its necessary parts.

Today traffic into our mountain areas is largely recreational travel, attracted there by the beauty and the inspiration that the mountains always offer and never fail to give. Scenery today is an essential factor in determining location of mountain roads.

The chief criticism that I would offer of many California mountain roads, and this criticism is offered with constructive intent, is that through the sameness of the scenery, beautiful and charming as it may be, our mountain roads tend to become monotonous.

URGES SCENIC DIVERSIFICATION

My own thought, and I am simply expressing my personal opinion, is that in the location of mountain roads, particular attention should be given to obtaining a greater diversification of the views that mountain roads offer. The more or less standardized rules of location should not have the dominating and deciding

influence in locating mountain roads that they rightly have when the location concerns business and commercial traffic lanes.

May I carry this thought a point further?

It is my opinion, and again I am voicing personal views, that the location of a mountain road should also be studied with reference to other roads traversing neighboring areas of similar topography and scenery.

The purpose of this would be to keep the amount of "repeat" scenery within the bounds of tourist interest. And I might add that all this must be read with the proviso, "as far as it is possible so to do"; for even with all the



FRED S. MOODY.

things expected from the gasoline tax, we can not rebuild mountains.

STATE SCENERY DIFFERS

Let me again emphasize the fact that I am speaking of contiguous mountain areas in California, where the scenery, generally speaking, is much the same. Undoubtedly, if California's mountain areas are to be considered as a whole, there is enough of scenic variety to satisfy everybody and, for example, there are the "furnace pits" of the Mountain Springs grade as one leaves the Imperial Valley for San Diego.

By way of contrast in central California, we find the precipitous slope of the Mount Whitney section, the nearest approach to the Alps to be found in California.

Still further to the north are the more gentle tree covered slopes of the Northern Sierra, with their rollicking streams, lashing from gem-like lakes, through the canyons to the Sacramento Valley below.

And in the coastal areas of northwestern California are the mountains covered with the world-wonderful redwood forests.

It would seem that here is variety enough for anyone. The fact must not be forgotten, however, that the usual trip into the mountains, covering generally a short vacation period, does not extend from one end of the state to the other, but is generally confined to some one section of the mountains. Hence the need for giving a changing scenic attractiveness by itself, and to each of its neighboring roads, considered in relation to it.

MORE "INDIVIDUALITY" FOR ROADS

Putting the matter tersely, I believe that there is need in California for a greater degree of what might be termed scenic individuality on our mountain highways. By that I mean the development on every road of the unique features of scenic or historic interest that they may possess.

So much for the location of mountain highways.

Now as to the roads themselves.

HIGHWAY WIDTH IMPORTANT

Mountain roads must be wide. No tourist

can enjoy scenery, however magnificent it may be, if there is any feeling of lack of safety or security. Nor should the fact be forgotten that the average visitor in the mountains is timid when riding on a narrow road.

In the matter of width of mountain roads, and the impression of security that they convey, it is my impression that, generally speaking, the mountain roads of Europe are far better than our mountain highways.

In fact, Europe overdoes, if anything, this desire to make the highways through its mountain passes so safe that they are practically fool proof. This is particularly noticeable in the matter of parapet construction along the outer side of the roads.

It may be that California autoists are better drivers than those of Europe or that they are schooled in driving on unprotected mountain roads. Certainly it is almost laughable to see the places, absolutely devoid of any indication of danger, that European road builders have protected with massive parapets to keep autoists from "going over the grade."

In places where we in California would not even consider a "Drive Carefully" sign necessary, mammoth and imposing parapets will be found in Europe. But with all due allowance for this, there is yet considerable of sound judgment in the European view and practice that the feeling of security on a mountain road is as important a factor as scenic attraction in drawing the much desired tourist travel to it.

Thus far this article has centered about "the perfect" mountain road.

BUILDING POLICY ADVOCATED

Let me now say that I do not believe that construction and improvement of highways in our mountain counties should be delayed until the "perfect" road becomes attainable.

Many roads in California's mountain counties, now unimproved, can be widened, graded, graveled, oiled, and made useable for the enjoyment of the present generation. And while present roads are being enjoyed, the perfect roads will come into being as funds become available for their construction. These

(Continued on page 24)



An Alpine highway. Seven miles of road in the Stelvio Pass.

"HIGH"-WAYS IN CALIFORNIA



1—Pacific Highway—McCloud River



2—Redwood Highway—Eel River



3—Causeway on South Fork
Eel River



4—Along Lake Tahoe



5—Pacific Highway—Sacramento
Canyon



6—Along Klamath River



7—In the Kern River Canyon



8—On the Mountain Springs Grade

Building Homes for the State's Fish

*Showing How the Departments of
State "Tie-In" In Caring for and
Developing One of California's
Greatest Sporting Resources*

By P. T. POAGE, Assistant Architect,
Division of Architecture

IN ITS relation to the construction program of the Fish and Game Commission, the Division of Architecture occupies the position of both architect and consulting engineer. The work of the division in this relation consists primarily of construction and engineering development in connection with



P. T. POAGE

the various fish hatcheries throughout the state, and includes also such projects as the development of the State Game Farm at Yountville, the buildings of the Bureau of Commercial Fisheries at San Pedro, and certain major repairs and improvements at various other stations maintained by the Fish and Game Commission.

TYPICAL HATCHERY DEVELOPMENT

As an illustration of the operations of the division in carrying out this work, let us take a typical hatchery development project. The hatchery building with its troughs, teeming with thousands of small fish, is always the center of attention, and being a great public attraction is generally located where most easily accessible to the traveling public. In the design of the building an effort is made to make it blend into the natural setting, often effecting this partly by the use of local materials, as exemplified in the Mt. Whitney, Lake Tahoe and Yosemite hatcheries, in which natural stone, logs and bark are used extensively.

As adjuncts to the hatchery will generally be included a cottage for the superintendent, quarters for employees, generally in the form of a separate building, but occasionally included in the hatchery building—and

OUT FISHIN'

A feller isn't thinkin' mean—out fishin';
His thoughts are mostly good and clean—
out fishin';
He doesn't knock his fellow men,
Or harbor any grudges then;
A feller's at his finest when—out fishin'.
The rich are comrades to the poor—out fishin';
All brothers of a common lure—out fishin';
The urchin with the pin and string
Can chum with millionaire an' king;
Vain pride is a forgotten thing—out fishin'.
A feller gets a chance to dream—out fishin';
He learns the beauties of a stream—out fishin';
An' he can wash his soul in air
That ain't foul with selfish care,
And relish plain an' simple fare—out fishin'.
A feller has no time for hate—out fishin';
He ain't eager to be great—out fishin';
He ain't thinkin' thoughts of self,
Or goods stacked high upon a shelf,
But he's always just himself—out fishin'.
A feller's glad to be a friend—out fishin';
A helping hand he'll always lend—out fishin';
The brotherhood of rod an' line,
An' sky an' stream is always fine;
Men come real close to God's design—out fishin'.
A feller isn't plottin' schemes—out fishin';
He's only busy with his dreams—out fishin';
His livery's a coat of tan;
His creed's to do the best he can;
A feller's always mostly man—out fishin'.

—By Edward A. Guest

garages and other necessary service buildings, all designed in the same feeling as the main building.

WATER QUALITY IS BIG FACTOR

The quality of the water supply for hatching purposes is the largest single factor in the selection of a hatchery site. The source of supply is generally a stream in which is built a dam or other form of diversion structure leading the water into a pipe or flume from which it is discharged into a settling tank designed to remove floating and suspended matter. In some cases it may be necessary to run this pipe line or flume several thousand feet, in order to obtain the proper head. From the settling tank the water goes to the hatching troughs, passing through and returning to the stream from which it came.

As the fish will live only a comparatively short time if the flow of water is stopped, every precaution is taken to see that the supply is constant, and in certain instances emergency service is provided from a pump or other source.

Lack of head to supply sufficient pressure, or possible pollution of a stream may require the development of a separate source of supply for the domestic uses of the attendants and the visiting public. This is frequently

accomplished by developing springs and occasionally by digging a well.

FEEDING THE FISH

Electric energy is practically essential for lighting and power purposes, the latter use being for grinding food for the fish and for pumping water where necessary. In some instances the site is far removed from a public utility service line and it then becomes necessary to generate power, which may be done by a water wheel, if satisfactory water supply is available, or by a gas engine and storage battery set.

The disposal of sewage from the hatchery buildings is commonly cared for by a septic tank, which though quite small must be carefully designed and located so as to prevent pollution of any stream or other source of water adjacent to the site.

MAJOR PROJECTS HANDLED BY DIVISION

The following is a brief description of the major projects which have been handled by the Division of Architecture for the Fish and Game Commission, or which are under construction or contemplated at the present time.

Mt. Whitney Hatchery

This hatchery, erected in 1917, is located at Independence, Inyo County, at the eastern base of Mt. Whitney. Architecturally it is one of the most interesting of the hatcheries in the state, the native field stone of which it is constructed giving it the appearance of growing out of the rocky desert on which it is located. The desert, however, is only a foreground to the vast bulk of Mt. Whitney and its neighboring peaks in the background. It is this great mountain range which has permitted and made effective the transplanting of an architectural style from Norway to a desert in California.

Lake Tahoe Hatchery

This hatchery was constructed in 1920, near Tahoe City on the northern shore of the lake. In its construction field stone from the site forms the lower portion of the walls. The cedar bark forming the covering of the upper walls is intended to tie the building in with the tall timber in which it stands and the unusually steep roof is expressive of the snow country in which it is located.

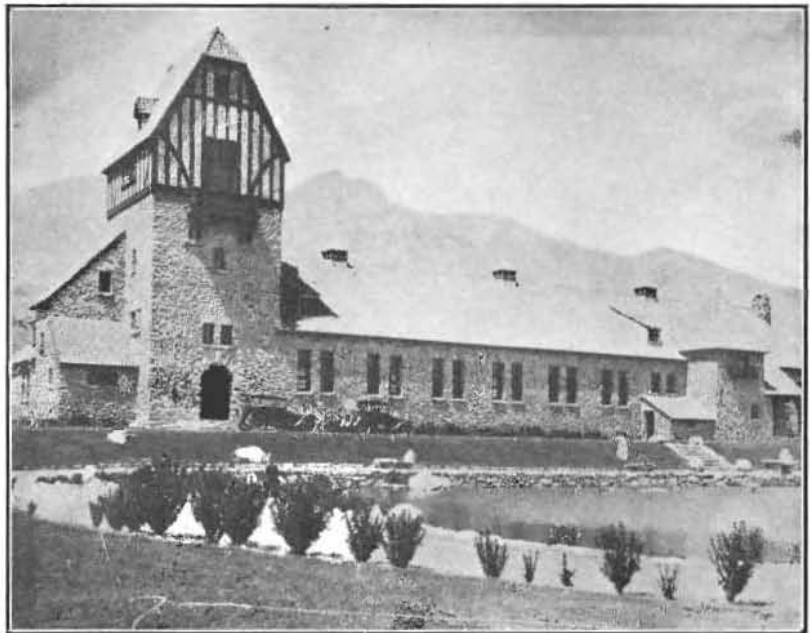
Adjacent to the hatchery there have been completed during 1927 a cottage for the superintendent and another building containing quarters for employees, garages and work space.

Bureau of Commercial Fisheries at San Pedro

This station consists of two masonry buildings, housing the offices and laboratories of the Bureau of Commercial Fisheries, to which is delegated the regulation and control of commercial fishing throughout the state. The buildings were erected in 1921 and are examples of the modern adaptation of Spanish architecture.

Feather River Hatchery

This hatchery was erected in 1924, replacing a temporary hatchery which had been operating in a tent previous to that time. It is located at Clito, Plumas County, and supplies fish for one of the finest angling regions of the state.



Fish hatchery, Mt. Whitney, built by the State Department of Architecture.

Blackwood Creek

As a supplement to the Tahoe Hatchery, a small hatchery was erected at Blackwood Creek, a few miles distant, in 1926.

Big Creek Hatchery

Largely on account of increasing pollution of the water supply, it became necessary for the Fish and Game Commission to abandon the hatchery occupied at Brookdale, Santa Cruz County, and in 1927 a new hatchery was constructed near Swanton, in the same county. This project as completed consists of the hatchery building and two cottages; one for the superintendent and one for employees. The material used in the construction is for the most part redwood, of which great quantities are cut in this region. The water supply is from Big Creek, which flows through the site.

(Continued on page 30.)

San Gabriel Water Problems

Legal and Physical Issues Involved in One of California's Most Important Water Hearings

By HAROLD CONKLING, Chief, Division of Water Rights.

ONE OF THE most important hearings in the history of the Division of Water rights was that held in November in Los Angeles, in which the issues involved diversion of water from the San Gabriel River in Los Angeles County. In view of the importance of the issues involved, the many cities and communities and the large number of people directly concerned in the disposition of this case, a statement of some of the legal and physical problems that the case involves we believe will be timely, and of interest to the people of California.

For the benefit of the lay reader, it might be well to summarize as follows in question form these legal and physical problems:

LEGAL POINTS

(1) Are riparian owners entitled to have the flood waters of streams of the character of the San Gabriel flow by them undiminished in quantity?

(2) Do the lands overlying that portion of the underground water supplied in part by the river have the same or similar riparian rights as those bordering the stream?

(3) If flood waters which would be injurious if unregulated, are stored for purposes of flood control, what is the character of rights to such stored flood waters when they are released from flood control reservoirs?

(4) To what extent, if any, is the storage of water for flood protection purposes subject to the provisions of the Water Commission Act?

(5) Do lands riparian to the stream or overlying the area the ground water of which is replenished by percolation from the river, have a preference in rights to acquire waters released from flood control reservoirs or are such waters equally available for requirement for use outside of that area?

(6) Can rights to waters which assist in causing percolation, but which themselves would waste into the ocean, be acquired if provision is made for restoring

percolation equivalent to that which would have occurred under natural conditions?

(7) Are rights to store water for flood control purposes limited to such parts of the stream flow as cause actual injury to lands adjacent to the stream?

PHYSICAL PROBLEMS

On the physical side the questions which arise are:

(1) Is it possible under the varying conditions of waterplane and flow to work out an equation or curve from work so far done, on the relation of discharge from canyon to percolation into the stream bed below, which will be applicable over the entire range of conditions?

(2) What are the future needs of the valley and what steps can be taken to conserve the surplus of the wet cycles to fill the deficiencies of the dry cycles?

(3) What are the present and future needs of the various applicants?

GEOGRAPHY OF BASIN

The position of the area may be described as follows:

San Gabriel Basin joins Los Angeles on the east and north-east. The valley area is divided into two portions; the upper is called San Gabriel Valley, covering 200 square miles of valley floor and including 14 incorporated cities from Pasadena on the west to La Verne on the east. The valley is bounded on all sides by hills or mountains.

Through the southerly range of hills, San Gabriel River, augmented by tributaries, has cut a pass called Whittier Narrows or Paso de Bartola and there debouches into the Coastal Plain, containing several towns and cities, the principal of which is Long Beach.

RUN-OFF FIGURES

San Gabriel River supplies 76 per cent of the mountain run-off tributary to San Gabriel

(Continued on page 42.)



San Gabriel River in Flood—This picture was taken on February 18, 1927, just below the mouth of San Gabriel Canyon. Discharge 18,000 cubic feet per second. The river was measured at four points by means of cables stretching across the river on which ran cars capable of carrying two men. These were equipped with electric lights for night work. One of these stations is just above the point shown in the picture. Percolation was about 1700 cubic feet per second average for day.

SAVE THE BEACHES

By C. C. YOUNG, Governor of California.

DOES THE PUBLIC realize that California, with her many hundreds of miles of picturesque and beautiful coast line—a coast line which ought to be a heritage for all future generations—is rapidly throwing away this heritage?

Does it realize that of her beaches, the greater part has passed into private development and is denied to the pleasure of all our people? Does it know that of the little that is left some of the fairest parts are in danger of defacement through private commercializing and exploitation?

This is a plea to the public, to the members of our automobile associations, to the leaders of the oil industry, that they unite in creating a sentiment which will stay the hand of the oil promoter until some plan can be worked out which may protect his legitimate interests, and at the same time preserve for California one of her greatest charms.

Not so very many years ago, California's redwood forests were in similar danger of destruction. Trees that had taken untold centuries to grow, whose beauty had charmed and delighted the nations of the earth, were being converted into grape stakes and railroad ties, leaving only unsightly patches of scarred and denuded ground.

An organization was formed to "Save the Redwoods," particularly along our main trunk highway system.

Members of the California Highway Commission and other state and county officials cooperated to the utmost. Private organizations and patriotic citizens joined in the effort to save these mighty forests. A Park Commission has just been organized which will help complete this work.

But with all due credit to these private individuals and public organizations who joined hands in this task, the fact remains that the redwoods were saved largely because the owners of these forests stopped cutting along the highways until time was accorded public and private organizations and patriotic citizens to formulate a practical plan for saving the trees, thereby earning the everlasting commendation of the people both of California and the whole world.

Now the necessity has arisen to "Save the Beaches."

The wondrous and spectacular charm of California's beaches is menaced by the activity of oil interests.

It is the same old question that arose in the redwoods.

It is a question of temporary profit taken against a permanent scenic and spiritual enrichment.

It is a question of pennies now against dollars in the future.

It is a question of this generation against the generations that are to come.

There was no question when the redwoods were imperilled what the people of California thought. Neither is there any question as to what the people of this state think as far as its beaches are concerned.

Oil is one of California's greatest and most beneficent resources. The recovery of oil constitutes a glorious chapter in California's industrial history.

But granting all this, the fact remains that first values must come first. The permanent scenic value of the beaches of California are immeasurably greater than the value of all the oil that their sands can ever contain.

We commend to the oil interests of California the example of the owners of the redwood forests.

Let drilling be stopped until a method of saving these beaches can be worked out.

This method may come in several ways.

It may be that the state can aid in the situation by the extension of the rights of way of its highways.

It may be that the law under which drilling on tidelands is being carried on will be declared unconstitutional. If such is the case, the effect will be to stop drilling when such determination is reached.

It may be that the oil wells can be drilled on the high beaches away from the highway, thus securing practically all the oil and at the same time saving the beaches.

It may be that public spirited men and women will join together to purchase and dedicate to the state the rights of oil operators, if the tideland lease law is held to be constitutional. Memorial groves in the redwoods, dedicated in perpetuity to the enjoyment of the people of the world, is proof that such public spirit exists.

Certain it is that whatever the method of relief may be, if time only is given, some way will be found of preserving these beaches, their beauty unmarred and their charm unimpaired, as a heritage to humanity for all time to come.

Governor Young Moves to Save Recreational Areas to California

INTIMATELY associated with the extension of good roads in California is the preservation of the natural parks and playgrounds that either lie among the present state highways or that can be made available to the people of California.

Governor C. C. Young has appointed a group of five men as the State Park Commission to "make a comprehensive survey of the state as a basis for the development of a well-balanced park system." This board will also administer the \$6,000,000 bond issue. If the issue is approved by the voters of California, at the next general election, this money is to be voted for parks in California, with the proviso that each dollar of this fund shall be matched by another dollar from other sources. On this Commission are:

William E. Colby, Berkeley, associate of John Muir.

Dr. Ray Lyman Wilbur, Palo Alto, president of Stanford University.

Henry W. O'Melveny, Los Angeles, former member of the City Park Commission of that city.

Major Frederick Russell Burham, Los Angeles, explorer of international reputation.

Ex-Senator W. F. Chandler of Fresno, an authority on recreational conditions in the interior valleys of California.

Present state parks as are follows:

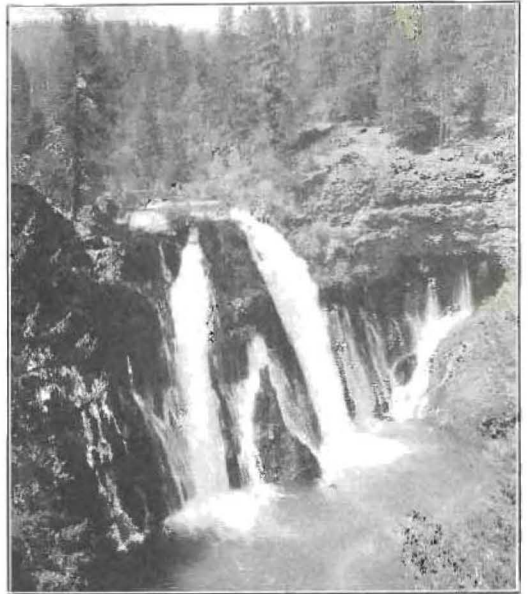
California Redwood Park—Located in the Big Basin in Santa Cruz County; area 9380 acres.

Bidwell State Park—Consists of approximately 100 acres on the boundaries of Big Chico Creek in Butte County.

Burney Falls Park—Contains 335.25 acres in Shasta County.

Mount Diablo State Park—Consists of 639.87 acres of land near the summit of Mt. Diablo in Contra Costa County.

Humboldt State Park—Consists of 1560.51 acres of some of the choicest redwood lands in Humboldt County, purchased by the state through the cooperation of the Save-the-Redwoods-League, the California Federation of Women's Clubs and other interested agencies. In addition to this 1526.98 acres have been secured by gifts of lands or by cash donations for the purchase of lands. Also in addition to both of the above a tract of U. S. Govern-



Beautiful Burney Falls in Shasta County.

ment land, containing 83.35 acres, was secured for the state by an exchange of land. While the original act provided only for the acquisition of land in Mendocino and Humboldt counties, land has been acquired by gift both in Del Norte and Mendocino counties outside of the area designated by the act. This area has been administered thus far under the name of the Humboldt State Park.

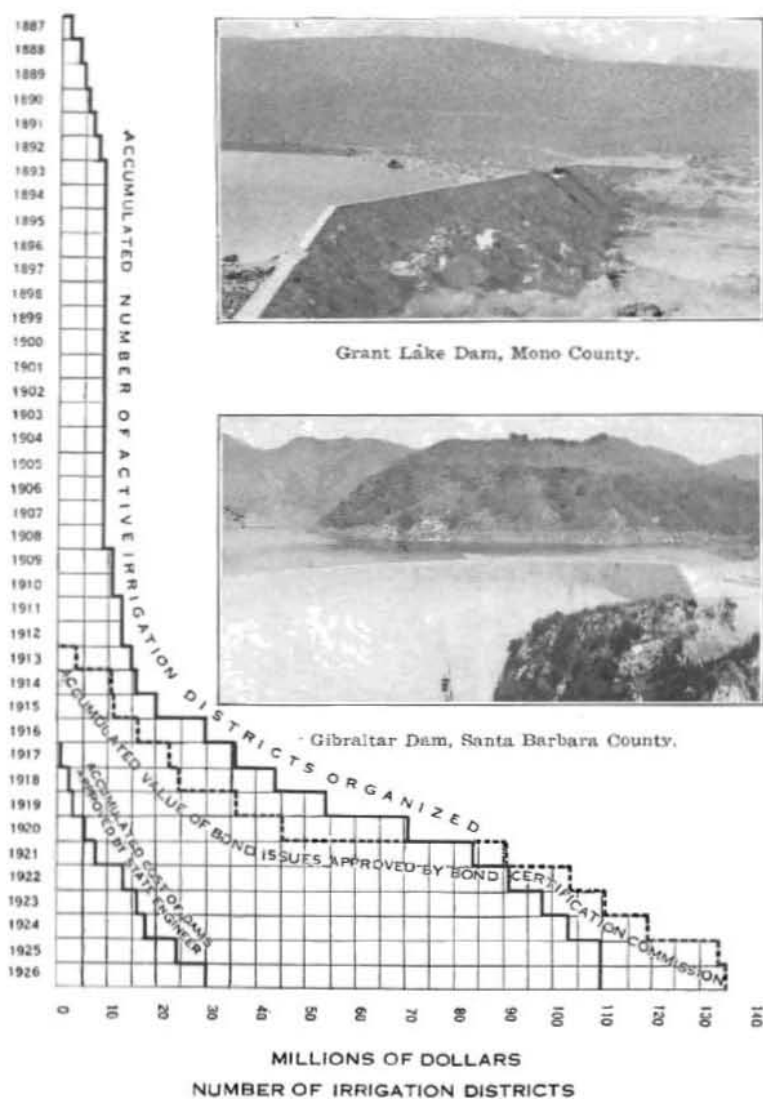
Governor Young's letter naming the members of the Commission was widely commented upon over the state for the keen realization that it displayed and the interest that it evidenced in the importance to California of the development and extension of the recreational areas of the state. The letter follows:

In the appointment of the State Park Commission, which I am today naming, I have given a great deal of time and very especial care. This is a new commission, having charge of the recently created Division of Parks, and operating in the State Department of Natural Resources. Its object is to unify the administration of all parks, sites of historical interest, and the like, which are owned and controlled by the state, or may be hereafter acquired, and to make a comprehensive survey of the state as a basis for the development of a well-balanced state park system.

California is growing very rapidly, and its sites of natural beauty suitable for parks and public

(Continued on page 29.)

Tells Story of State's Growth



The above plate represents the growth of activities under three of the most important statutory functions of the Division of Engineering, viz: Investigation of feasibility and organization of irrigation districts, reporting on propriety of proposed bond issues for irrigation development, and approval of plans for dams and the supervision of their construction. Here is a story that it tells:

In 1887 there were 7 irrigation districts in California; in 1926 there were 110 irrigation districts.

In 1912 the State Bond Certification Commission began its work. In 1926 the accumulated value of the bonds issued by that commission was \$136,000,000.

In 1917 the duty of approving plans for dams and supervising their construction was vested in the Division of Engineering. In 1926 the accumulated cost of dams approved by the State Engineer was \$30,000,000.

Building a Highway While 6000 Automobiles Move Along the Road

By C. N. AINLEY, Resident Engineer Division of Highways, State Department of Public Works.

A state highway paving contract interesting in the problems which it presented and the wide range of construction involved was that for the Rincon road extending from Ventura to Benham subway, 12.5 miles. This contract was let in October, 1926, to J. F. Knapp of Stockton, and was recently completed, construction work having covered a period of about 11 months.

Most important of the problems involved was that of carrying on the paving work expeditiously and keeping the road open to traffic at all times. Detours could not be arranged, as the highway lies between the Southern Pacific Railroad tracks paralleling the beach and closely hemmed in at many places by bluffs and hills. Thus it was necessary to pave half the roadway at a time and keep the other half open to traffic. As from 4000 to 6000 vehicles daily traverse this section during the summer months, the difficulties of keeping the ordinary traffic moving were enough without adding to them. It was this situation which impelled the contractor to use an industrial railway for handling materials between the bunkers and the paving mixer so as to keep his trucks out of the controls as much as possible. While it was necessary to shift the track from one side of the road to the other and to cut out a bed for it in places on the railroad right of way, use of the industrial railway was a big factor in the successful handling of the job, both from the standpoint of economy and of facilitating operations.

The new seawalls were built by Otto Parlier of Tulare under a subcontract.

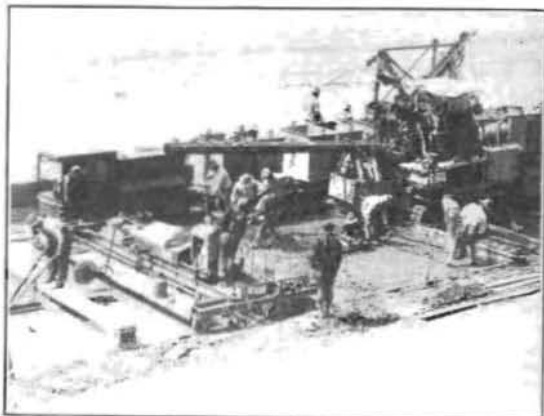
The speed with which Mr. Parlier carried on the work saved the highway at this point from the fury of the January storms.

During one series of extra high tides one section of the cofferdam was washed out three times in three days. Other sections of the cofferdam were washed out, but the wall being up to roadway level no damage was done except to delay the placing of the top section.

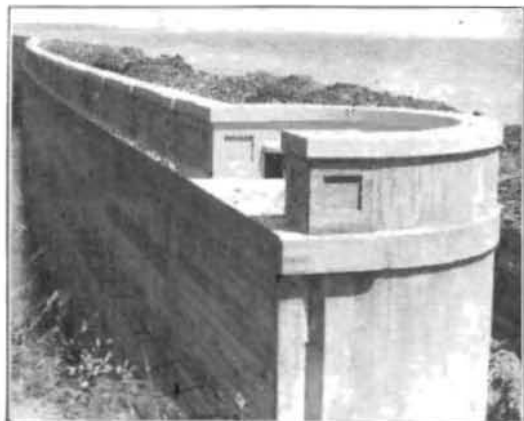
The handling of the heavy traffic through this contract with as little inconvenience and delay to the public as possible, was quite a problem. In the early part of the work, while the grading was going on, the mud and sand had to be heavily surfaced with rock to carry the heavy trucks and trailers. Heavy trucks,



The line of automobiles.



Placing of concrete pavement.



The completed wall.

often underpowered and overloaded, and with trailers, were continually getting out of the beaten track, often tying up the traffic for hours. It was necessary to keep a tractor handy at all times to pull them out.

With the coming of summer there was a large increase in traffic. The usual accumulation of cars, during the hours of heavy traffic, and a long control, was 60 to 100. On Sunday the accumulation was 100 to 200 cars. On May 30, Decoration Day, with a long control, the string of cars was two miles long at times.

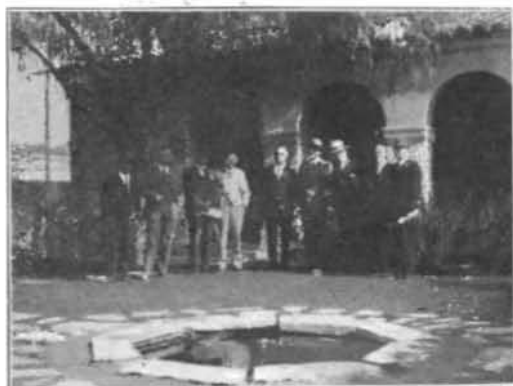
At the beginning of the work, when it became necessary to put sections of the road under control with one-way traffic, flagmen were put on at each section. When the flagmen were situated so that they could see each other, signals were used, but at other sections a flag was used which was given to the last car to be handed to the flagman at the other end. The method of passing the flag on the last car with a long control and heavy traffic, which included slow moving trucks, was very unsatisfactory. Some drivers unfamiliar with the system would try to hand the flag to everybody along the road, others would forget to hand the flag back and carry it on, and others would deliberately throw the flag away or carry it by. This caused many delays. When the flag did not come through on time, there was always a doubt as to whether the flag was lost or a truck was broken down or traveling slowly. With several sections under control, so that there would be several stops and often delays, there was considerable dissatisfaction and complaint.

The system was then changed and one long control put on which included all the short sections, and a riding flagman put on to carry the flag on the last car instead of giving it to the driver. There was an immediate improvement in traffic conditions. Traffic was speeded up, and the annoyance of numerous delays eliminated. If there was a blockade in the line, the riding flagman went ahead to straighten it out. It was convenient to have several of the flagmen deputized and wear badges, but it was found that men could not be deputized indiscriminately without causing trouble.

Actual length of the pavement built was 12.2 miles, part of it being "second story" with an existing 15-foot concrete pavement as a base and part of it new construction. The standard width was 20 feet, which was increased to 30 feet behind seawalls. In connection with the paving two new seawalls were built, one 510 feet and the other 558 feet in length, and the old seawalls, constructed in 1914, were extended and raised to provide better protection to the highway and to the traveling public.

This contract was in charge of S. V. Cortelyou,

District Office Garden At San Bernardino Wins Praise for its Beauty



Group of State Highway officials in the garden of the San Bernardino office.

The district grounds and garden in San Bernardino were signally honored when honorable mention was accorded them in a City Beautiful contest sponsored by the San Bernardino Chamber of Commerce. The following letter received by District Engineer E. Q. Sullivan is self explanatory:

November 10, 1927.

State Highway Commission,
San Bernardino, California.
Gentlemen:

The City Beautiful contest sponsored by the San Bernardino Chamber of Commerce was closed when the final awards were made by the judges.

The judges were very favorably impressed with your entry, and requested that you be given a special honorable mention.

We congratulate you, and thank you for your cooperation in making the contest a success, and in adding to the beauty of the city. San Bernardino is becoming very widely known as a city of beautiful homes and gardens. There is nothing, we believe, which adds more to the attraction of a city and is more pleasing to the eye than a home surrounded by flowers and shrubbery and well-kept lawns. The beauty of our city is one of its greatest assets. It must be a source of considerable pride to you to know that you have helped in this connection.

Assuring you of our appreciation of your untiring efforts, I am

Very cordially yours,

SAN BERNARDINO CHAMBER OF COMMERCE,
(Signed) J. L. MACK, President.
(Signed) R. H. MACK, Secretary.

division engineer Division VII, with headquarters in Los Angeles. C. N. Ainley was the resident engineer. Ezra Kaufeld was superintendent on the job for the contractor, J. F. Knapp.

Elephant Owners, Take Notice! Contractor Hauser Through with Burying Them

[From *The Humboldt Times*, Eureka.]

W. H. Hauser of the Hauser Construction company, has demonstrated that he is a successful contractor, but when it comes to burying elephants, he is a failure, that is from a financial viewpoint.

This became known Wednesday when one of Hauser's friends unintentionally "let the cat out of the bag."

Several weeks ago "Big Diamond," the prize elephant of a circus that was touring this part of the country, collapsed after he had labored the greater part of the day pushing trucks through places where they were unable to travel under their own power, and died a few days later.

He passed away just north of Orick where the new Redwood highway is being constructed. There are two contracting companies working on this new highway, but Big Diamond died on the section that is being constructed by Hauser.

The problem that confronted the manager of the show and also Hauser was to bury the elephant.

The manager of the show stated that he had engagements to fill in Blue Lake and other towns along the coast and he could not afford the time to bury Big Diamond. He stated that the elephant's hide was worth about \$600 or \$800 and told Hauser that if he would see the elephant was buried he could have the hide.

The contractor took him up on the proposition and put several men to work with axes, peeling off the hide, which was about two inches thick, and then brought one of his big steam shovels, which was working about two miles away, and dug the grave. The elephant weighed about seven tons. After the hide was removed, two tractors brought to the scene, hooked onto the carcass and pulled it into its last resting place.

The hide, which weighed more than a ton,



The elephant and Mrs. Hauser.

was loaded onto a truck and brought to the Eureka Tannery to be tanned. The tannery informed Hauser that the plant was not equipped to tan elephant hides and Hauser was up against it again. The hide soon began to give off an unpleasant odor and he was asked to come and remove it. A truck was

dispatched to the tannery for the hide. By this time it was in such a state that tanning would have been impossible. It was therefore taken back to the place where the carcass was buried, the steam shovel dug another grave, and the hide was deposited in it.

The intentions of the show manager were no doubt of the best and the hide was no doubt worth what he said it was, but Hauser is said to have lost between \$300 and \$400 on the proposition.

And the moral is: Never accept a dead elephant.

RECORD IS CLAIMED

Concerning this elephant episode CALIFORNIA HIGHWAYS AND PUBLIC WORKS is in receipt of the following article from the headquarters of Highway District One at Eureka:

Probably on no other state highway contract in California has the contractor had to bury an elephant. The contract north of Orick was a very fitting place for an elephant to lay down and die, it being in a real California jungle and among the big Redwoods.

Imagine the thrill one would get driving along through this jungle over the old narrow county road, and early on a foggy morning and suddenly, without warning, see two large elephants approaching. Such was the thrill of Resident Engineer Hubbs.

The elephants belonged to a circus traveling the highway.

In passing over the contract the heavy circus wagons could not get through the mud, so "Big Diamond," the large elephant, willingly pushed the circus trucks through the mud and after the last truck was safely over, he lay down and died.

The rest of the story is told in the article from *The Humboldt Times*, quoted above.

"Surface Treatment" Method of Oiling Roads

By T. E. STANTON, Assistant Highway Engineer.

The present extensive use of fuel oil on the Pacific Coast is the direct outcome of experimental work conducted in 1923 by the Oregon



T. E. STANTON.

State Highway Commission followed in 1924, 1925 and 1926 by several hundred miles of bituminous treatment. Success in the Oregon experiments in 1923 and of later work was due in a large measure to the prior development of an efficient maintenance organization.

The favorable results in Oregon in the preservation of modern crushed rock and gravel surfaces by the use of fuel oil led to similar experimental work in California in 1925, followed by the construction of 245 miles of oiled state highway in 1926 and over 600 miles in 1927.

The Washington and Idaho State Highway Departments also constructed experimental oil treated sections in 1927, using methods adopted from Oregon practice.

SPECIAL STUDY MADE

So important does the Bureau of Public Roads consider this matter that it last year,



Oiled road in El Dorado County.

in cooperation with the California State Division of Highways, initiated a special investigation of the subject, through the Regional Office, San Francisco, in charge of Dr. L. I. Hewes, Deputy Chief Engineer.

As a result of this investigation, a complete and valuable report has been drawn up by



Oiled section of the Pacheco Pass road in Santa Clara County.

Mr. C. L. McKesson, Material and Research Engineer of the California Division of Highways, and Mr. W. N. Frickstad, Highway Engineer of the Bureau of Public Roads.

Much of the data on which this article is based was obtained as a result of the above investigation and will be found set forth in detail in the report of the engineers.

SURFACE TREATMENT

Oregon uses the "surface treatment" method almost exclusively. In California probably 75 per cent of the roads oiled to date received the surface treatment and on the balance the oil mix method was used. There is no doubt, however, but that the oil mix method will be used to a greater extent in future work.

Surface treatment with light oil, as conducted in California, contemplates impregnation of the surface crust of a compacted road with asphaltic oil.

The type of rock surface which lends itself most readily to a good job of this type is the fine crushed rock surface, using rock of maximum one (1) inch size, which can be

(Continued on page 28.)

CALIFORNIA HIGHWAYS AND PUBLIC WORKS.

Official journal 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.

BERT B. MEEK Director
 GEORGE C. MANSFIELD Editor

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Vol. 4 DECEMBER, 1927 No. 12

Eighteen Years of Good Roads in California

It is a significant fact that California is preparing to spend a larger sum on its state highways in 1928 than the entire bond issue of \$18,000,000, voted in November, 1909, for these roads.

It is also significant as showing the growing appreciation in California of the value of good roads that the general opinion at the time the \$18,000,000 bond issue was voted was that that sum would complete California's state highway system. Today no one thinks for a moment that the approximate expenditure of \$25,000,000 on state highways in 1928 will even begin to satisfy the ultimate highway needs of the state.

The reason that the people of California are today willing to spend \$25,000,000 a year on state highways is because they know that there is a tremendous balance on the credit side of California's highway ledger. In this profit every man, woman and child, every county and community, every city and village in the state shares.

That refers to money alone and does not take into account the increased human happiness and well-being that good roads have brought with them.

Use Four Crops To Pay Dirt Road Cost

It takes Iowa's entire corn, oats, wheat and barley crops to pay her dirt road transportation bill, according to figures compiled by the highway commission of that state. The cost of operating the 699,000 motor vehicles registered in 1926 is estimated at \$314,608,000, while the value of the four principal crops that year was \$313,367,000.

As a means of reducing the transportation bill, the commission advocates paving all the main highways and graveling roads with light traffic. To prove this claim, figures are quoted

showing the saving on the three principal items, new cars, gasoline and tires, between dirt, gravel and paved roads.

Iowa spends \$120,000,000 annually for new automobiles, it is stated. The average life of a motor vehicle on dirt roads is given as five years, on gravel six years and on pavement seven years.

The annual bill for gasoline in the Hawkeye state is estimated at \$50,000,000. Most of it is used in propelling vehicles on dirt roads, and tests made by the Iowa agricultural college show that a gallon of gas will carry the average car 14 miles on a dirt road, 21 miles on a gravel road and 31 miles on pavement.

The annual expenditure for tires is figured at \$30,000,000. The annual cost of tires for an average motor vehicle is figured at \$31.65 on concrete pavement, \$63.30 on gravel and \$158.25 on average macadam.

Apparently the people of Iowa have come to the conclusion that the cost of riding on dirt is too high, for fifty-three counties have to date voted to authorize a total of \$60,085,650 in highway bonds. From January 1 to August 31, 200 miles of paving had been completed and considerable more will be finished before freezing weather comes. Contracts for 186 miles of paving were let during July, August and September. More contracts will be let later, and it is quite apparent that Iowa will be some distance ahead of Minnesota in paved road mileage by the end of 1928.

The Common Possession of Every Californian

The summary showing "what a Californian owns" circulated by Californians Inc., through millions of homes in all parts of the United States, is equally interesting for home consumption.

Climate: Year-round producing climate. The Californian can work, grow crops or play every month in the year.

Growth: From 3,500,000 to 5,000,000 population in six years—three times faster than the United States average. This builds value and stability for business, investments, markets, property, opportunity.

Wealth: Twice the national average of wealth, twice the average number of savings bank depositors and twice the average deposit. Only three states report more income tax returns; none has so many automobiles per capita.

Health: Six of the fifteen most healthful cities in the United States are in California. U. S. government investigations prove Cali-

ifornia children bigger around the chest and taller than the average.

Education: The Californian's schools share first rank only with Massachusetts in efficiency. Five states have larger enrollments; only two exceed California's expenditures.

Recreation: Four national parks, a thousand miles of ocean shore, a thousand-mile-long Sierra playground, 30,000 square miles of national forests, 42,000 miles of paved highways and improved roads. Year round motoring, golf, fishing, sailing, week-ending out of doors.

Crops: More than \$600,000,000 yearly. Six million acres under irrigation at a cost of \$200,000,000, with great mountain reservoirs supplying abundant water whenever needed during the long, sunny growing seasons.

Industry: One of the youngest states, California is eighth in value of manufactured products.

Markets: From San Francisco's great harbor, the largest on the Pacific coast, the Californian successfully sells his manufactures and crops throughout the western and eastern states, and exports enormously throughout the world.

"Good Old Days" Does

Not Apply to Roads

It is significant that the expression "good old days" is never used with reference to highways.

But just how bad those old days were, again referring to highways, never dawned upon us until the other day we began to delve in a history of New Hampshire of the date of 1792.

Here are some of the things that we discovered concerning highway building methods in that state at that time:

In surveying roads, the length of a man's arm to every half chain was allowed for inequality of surface.

In view of the fact that few surveyors were skilled in finding the variation in their compasses by the sun's amplitude, it was proposed that durable monuments should be erected in convenient places on a true meridian, by which all surveyors should be obliged to regulate their compasses. The general assembly voted down the proposal.

For crossing small streams beaver dams were found most convenient. New roads, therefore, were laid out to accord to the location of the dams built by those useful animals.

The expense of making and keeping roads in repair was generally borne by the inhabitants of the towns through which they passed, though in some instances roads were laid out at the public expense.

It was a custom for those who were at work on the highways to invite travelers to take a drink, and expect a gratuity in return. This custom, however, had largely been abolished in 1792.

JUST TEN YEARS AGO

By J. H. SKAGGS, District Engineer, in the Santa Cruz *Sentinel*.

A review of historical data in relation to highway construction invariably discloses some point of interest for "California Highways." In looking through the old files in the District IV offices of the Division of Highways at San Francisco, the following was found under the date of April 19, 1916. It is a plea from the Santa Cruz Chamber of Commerce that the newly graded road (the state highway from Los Gatos to Santa Cruz) be kept watered, so that the "splendid work done by the Highway Commission would be maintained." In order to emphasize the necessity of granting their request, a traffic count was kept.

S. A. Palmer, then president of the Santa Cruz Chamber of Commerce, and W. S. Moore, chairman of the Good Roads committee, in the letter reports the count as: 613 automobiles, 32 motorcycles and 29 buggies.

It is not quite definite from the above at just what point on the highway the traffic count was taken by the Santa Cruz Chamber of Commerce. Nevertheless, it is of particular interest at this time to compare the figures in this old count with the latest check made by the State Division of Highways, covering a 16-hour period on Sunday, July 17, 1927. This tabulation shows that at the city limits of Los Gatos 9616 automobiles passed during the 16-hour period of the count, while during the same period at the city limits of Santa Cruz, 7712 automobiles passed the observer.

The 1927 count makes no reference to buggies, indicating that the horse-drawn means of transportation has dropped to almost a negligible factor in present day highway traffic study.

(From the Brawley News.)

In the "Ten Years Ago Today" column of the *Calexico Chronicle* Wednesday, was the following excerpt:

"Hopes for a highway that will give an outlet for the irrigated section of the Imperial Valley to Los Angeles and to Yuma are brighter than at any time in the past, since the conference in San Bernardino yesterday between the state highway commission and the supervisors of San Bernardino, Riverside and Imperial counties."

Is it possible that only a decade has passed since the highway between Brawley and Banning was the "Rocky Road to Dublin"? Since the trip was a matter of a full day the state of the weather on the west side of the Salton sea was all important before embarking upon so hazardous an undertaking as passage over the Salton sea road.

Between Brawley and Yuma and between Brawley and Los Angeles extend ribbons of improved roads, over which the automobile driver may speed at the limit allowed—and more—if the roadway is clear.

Oliver Wendell Holmes wrote in 1857 after seeing an old fashioned bike with a high front wheel: "There seems to be nothing left to perfect in the way of human locomotion but aerial swimming which some fancy is to be a conquest of the future.—Motor Club.

California Highway News and Comment

IN ACCORDANCE with its policy of holding hearings on the ground and its meetings in different sections of the state, the California Highway Commission visited a number of southern California counties in November. A meeting of the Commission was held in Los Angeles.

Members of the Commission making the trip were Ralph W. Bull, chairman; Commissioners J. P. Baumgartner, M. B. Harris and Fred S. Moody. Commissioner Joseph M. Schenck was absent in the East. Other members of the party were B. B. Meek, Director of the State Department of Public Works; R. M. Morton, State Highway Engineer; E. Forrest Mitchell, secretary; George C. Mansfield, editor CALIFORNIA HIGHWAYS AND PUBLIC WORKS, and district engineers S. V. Cortelyou, E. Q. Sullivan and L. H. Gibson.

At a meeting held in San Bernardino, representatives of that county asked that the Commission concentrate upon grading, graveling and oiling the desert stretches of the highway between San Bernardino and Needles on the Arizona border and San Bernardino and Caluda on the Nevada border. This was asked to be completed before any permanent pavement projects were undertaken in southern California.

Imperial County desired the widening of present pavement in the Imperial Valley and the pavement of the uncompleted portion of the El Centro-San Diego highway.

San Diego County emphasized the completion of the latter highway as the most important phase of the state highway situation there.

A new location on the coast route between San Diego and a pavement north of La Jolla were also asked.

In Los Angeles members of the party were the guests of the Board of Directors of the Automobile Association of Southern California. Henry Keller, chairman of the Good Roads Committee, outlined the association's program for southern California. The relief of traffic congestion at the Newhall tunnel, a second and auxiliary route for travel now going by way of the Ridge Route, and the inclusion into the state highway system of gaps at both ends of the Mecca and Blythe route were major recommendations in this program.

In Ventura County an inspection was made

of oil drilling operations at the Rincon parapet.

In Santa Barbara discussion centered chiefly on ways and means of preserving the scenic values of the highways, with the suggestion that California should definitely undertake securing rights of way sufficiently wide to assure the preservation of places of particular beauty, whether such beauty consisted in stretches of beaches or a fringe or group of trees.

Santa Barbara also voiced its desire to further beautify the state highways in that county with tree and shrub planting. The Commission was also asked to give consideration to routing travel through cities away from and around congested traffic centers.

San Luis Obispo was chiefly interested in the continuation of active work upon the coast road from San Simeon to Carmel and further work upon the Cholame lateral.

Policies, problems and projects were discussed by members of the official party at the various conferences held.

INYO AND MONO COUNTIES HAVE NEW ROAD PROBLEM; IT'S THEIR "RELATIVES"

Humboldt County may have a unique highway problem in its elephant, writes F. G. Somner, highway engineer for the Ninth District, but Inyo and Mono counties have a road problem in relatives.

Here is the way Mr. Somner tells the story:

"EMBARRASSING MOMENTS"

After several narrow escapes from colliding with loose stock on the state highway in Owens Valley, Inyo County, it occurred to me that it was high time for action. After considerable trouble, I succeeded in identifying three herds and the district attorney's office was requested to prosecute the cases. Imagine my embarrassment upon being advised by my friend Jess Hession, district attorney, that warrants had been served on his first cousin, his wife's cousin and Sheriff Hutchinson's brother-in-law. He gamely remarked that I had "selected a good place to start."

I then decided to direct my efforts to the stray stock on the highways in Mono County. My embarrassment was complete when in response to the first complaint, was informed by Sheriff Dolan that, running true to form, my latest victim was the father-in-law of the superior judge of Mono County.

"Park" Influence Outside Says Commissioner Moody

"Park the influence you bring with you on the outside of the Highway Commission's door," is the substance of the advice that Commissioner Fred S. Moody gives to delegations seeking to consult the Highway Commission on road matters.

Speaking at a dinner tendered Director Meek and the members of the California Highway Commission at San Diego, Mr. Moody replied directly to one of the speakers, who complained of inability to "mass" sufficient "influence" to secure favorable action on a road project that he favored:

"You do not need influence," Mr. Moody said to him. Continuing, he declared that the policy of the Commission was that of the "open door," and "open decisions openly arrived at." The Commission, Mr. Moody declared, was not at all interested in "influence" as a factor in determining its action, but it was interested and interested alone in the merits of the proposal. An argu-

ment based upon merit, he declared, needed no influence to support it.

Reconnaissance Survey of Kings River Highway

At a meeting of the State Highway Commission held in Los Angeles on November 16th, the Commission authorized District Engineer Wallace of Fresno to proceed with a reconnaissance survey of the Kings River Canyon. The resolution of the Commission declared that if the reconnaissance developed the advisability of making a location survey at a later time that the offer of the Fresno board of supervisors to bear half the cost of such survey would be accepted.

Road Foreman Brings Sign Vandal to Punishment

Highway District Eight, with headquarters in San Bernardino County, has declared an open season on sportsmen who, rather than tramp the great outdoors in search of wild game, sit in the comfortable seats of their automobiles and fire upon automobile club road signs. This was evidenced during the month of October, when maintenance foreman Granville Harp came upon a person thus engaged.

It happened near Van Doran's Service Station, about five miles east of Newberry. Mr. Harp caught a party of three men parked by the side of the highway and shooting across the road at one of the official road signs of the Automobile Club of Southern California. "They responded angrily when I warned them," said Mr. Harp, "and boasted of the right to do as they pleased on the highway. When I told them they would have to pay for the damage they had done, they took flight in their automobile before I could acquire information for their arrest."

Mr. Harp started pursuit in a Ford truck. At Newberry he changed to his own private car and overtook the fugitives before they were released by the Agricultural Quarantine Station at Daggett. Here they were placed under arrest. One of the men pleaded guilty before Justice of Peace Van Dyke of Daggett, and was fined \$20 for the offense.

Big Slide Removed

Maintenance in District I has for the principal item of its work in December the removal of slides. The largest single slide of the season has been about 8000 cubic yards near the southerly end of the Klamath River bridge.

Associated Press Dispatch as Published in the
San Francisco Examiner.

'MEEK' KIDDIES BELIE NAME; TWO DISRUPT CABINET MEET

SACRAMENTO, Nov. 21.—(AP)—Two small curly-headed children all but broke up a peaceful session of Governor C. C. Young's executive cabinet here tonight.

The children were Bert and Laura Marie, 5½ and 4½ years old, respectively, son and daughter of Bert B. Meek, director of public works.

Everybody, including the governor and six other directors, several state officials and visitors, were sitting attentively listening to Meek when the quietness of the meeting was broken as a small curly-headed boy, carrying a toy rabbit, burst into the room and loudly informed his daddy "to hurry up."

Meek hurried, after first quieting the lad, but before he could finish his daughter came in and made known her wants. Meek then rushed to a close.



"Little" Bert and Laura Marie, whose joint job it is to direct the Director.

Mono County Wants Roads Kept Open Into Snow Sports Sections

Much enthusiasm is manifested throughout Owens Valley in preparations for winter sports in the foothills of the high Sierras and committees appointed by the several chambers of commerce throughout the valley are busily engaged with preparation of skiing, coasting and skating grounds. Inquiries from the southland indicate a growing interest and a request will be made for cooperation of the Division of Highways in keeping the snow-clad portions of the state highway open between Bishop and Long Valley, distance 28 miles.

Autoist Fined for Recklessness Toward Highway Workers

The judiciary of California is helping to give to the maintenance men who work on the highway the protection that they deserve by prosecuting those who negligently or carelessly endanger the lives of the workmen.

As an instance of this, Mr. A. Barker, a maintenance employee, was engaged in patching the highway about one-half mile north of Chualar on October 14, 1927, when a Chevrolet touring car, going north, driven by a Glendale resident in a reckless manner, almost hit Mr. Barker. The driver did not stop, but Mr. Barker secured a ride and followed him into Salinas, where he had him arrested. The judge imposed a fine of ten dollars.

"Slow" to be Painted on State Highways at Approach to Schools

The following order, intended to increase the factor of safety on highways near schools, has been issued to all district engineers by R. M. Morton, State Highway Engineer:

"A determined effort is being made throughout the state to reduce the traffic accidents involving children of school age. Both automobile clubs and various civic bodies are spending considerable sums of money each year in the education of school children to the dangers of modern traffic. A program of visual education is being conducted in 1218 cities in the forty-five northern and central counties depicting the major traffic hazards encountered by children proceeding to and from school.

"The Motor Vehicle Department is cooperating to the extent of having their men super-

Contented Trees is Boast of Stanislaus; Here is the Proof

Here is a visible and typical demonstration of what four years in California will do. The accompanying picture is a European sycamore, one of the group of trees planted in 1923



One of row of trees on state highway near Turlock

along the state highway north and south of Turlock, by the Chamber of Commerce of that city. They were cared for by State Highway Maintenance Foreman L. P. Laird of Modesto. The State Highway Commission and the Department of Public Works is now urging the importance of securing wider rights of way for highways in order that the

necessity may never arise whereby highway trees must be sacrificed to provide adequate traffic lanes.

In this connection it is interesting to note that the California Highway Commission has taken over or planted 60,000 trees during the past eight years and has acquired more than three times that number with rights of way, in addition to the forests through which the highways have rights of way 600 feet in width.

wise the use of highways by children attending rural schools fronting on highways.

"The Division of Highways' cooperation in this movement involves the painting of the words 'School—Slow' on the highways fronting these schools.

"Please arrange to have these signs painted at your earliest opportunity on all pavements fronting schools within your district, advising this office when the work has been completed."

A gasoline shortage is predicted for the year 2000, but by that time the cars will be so thick they can't move anyhow, so it doesn't matter.—St. Paul Pioneer-Press.

Mr. Spendix—"Any installments due today?"

Mrs. Spendix—"No, dear, I think not."

Mr. Spendix—"Any payments due on the house, the radio, the furniture, the rugs, or the books?"

Mrs. Spendix—"No."

Mr. Spendix—"Then I have ten dollars we don't need. What do you say if we buy a new car?"

The New Lake Almanor Causeway

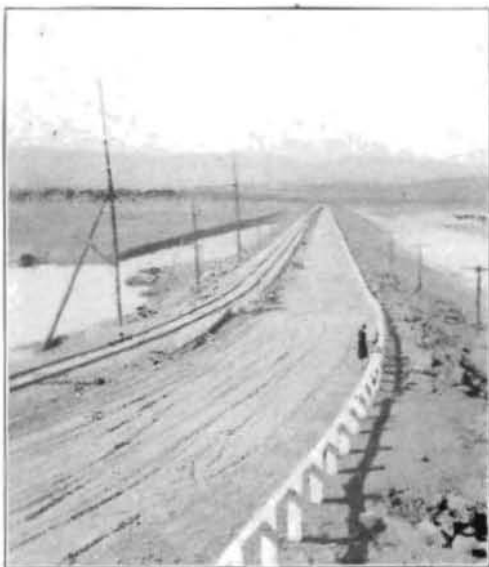
IN 1925 the Great Western Power Company decided to raise the dam at their reservoir, Lake Almanor, in Plumas County. The road from Red Bluff to Susanville crossed the bed of the proposed enlarged lake about ten miles above the dam site, and the enlarged lake would flood the country for a distance of more than four miles north of the road. The state highway location crossed the proposed lake close to the site of the existing road, at a point where, in view of the ultimate enlargement of the lake, the distance across this body of water would be the shortest. At the time of starting work on the enlargement of the reservoir, the power company suggested that the state highway be routed around the northerly end of the lake, but as this would have lengthened the road over four miles, it was decided that it was not feasible.

COOPERATIVE PROJECT

In addition to flooding the road, the enlargement of the lake would also submerge the main line of the Red River Lumber Company's railroad. In order to preserve both the road and the railroad company's main line, an arrangement was entered into at the time work started on the enlargement of the lake, between the power company, the lumber company and the State Highway Commission, to construct a causeway across the lake. Numerous schemes were investigated, including a concrete pile trestle, concrete crib construction filled with rock, and protected embankments. Comparative estimates of cost of the various types indicated that the embankment would be the most economical construction, and tests on the materials which would be borrowed from alongside to construct the embankment indicated that the steepest slope on which the material could be expected to stand in its submerged condition, without the aid of protection, would be a 3 : 1 slope.

DIVIDE MAINTENANCE

The lake is subjected to heavy winds during the winter time, from the south, and it was, therefore, decided that this side of the embankment must be protected from wave action. The northerly side, being subjected only to very light wave action, on account of the comparatively short reach of water on that side and the infrequency and lightness of winds from the north, might be constructed of the natural gravelly soil, on a 3 : 1 slope and left unprotected. This arrangement was made, since the Red River Lumber Company's engineers believed that it would be safe and the maintenance quite light, and the agreement was accordingly drawn up so that they would maintain that side of the embankment. As finally adopted, therefore, the cross-section of the embankment consists of a 2 : 1 slope protected with massive, heavy rock on the south side, and an unprotected gravel slope of 3 : 1 slope on the north side, and a roadway of 42 feet in width between shoulders,



Lake Almanor Causeway.

18 feet of which is occupied by the railroad and 24 feet by the highway. A standard state highway guard rail was provided along the northerly shoulder and a 5-foot steel fence between the railroad and the highway roadbeds.

7000 FEET LONG

The work started on the construction of the embankment in the fall of 1926 and the embankment was completed shortly after the first of the year 1927. The embankment is 7000 feet long and has a depth of 35 feet at the lowest point, near the easterly end, tapering out to the ground level at each end. It contains about 500,000 cubic yards of material.

UNUSUAL CONSTRUCTION PLAN

A rather unusual method of constructing
(Continued on page 30.)

Senator Oddie Urges That More Federal Aid Be Given by U. S. to Roads of States

SENATOR ODDIE (Republican), Nevada, speaking, November 11, at the dedication of the new Market street bridge at Wilmington, Delaware, discussed federal aid of road building, and said that the government is under an obligation to continue the program mapped out in the law of 1916. This program, he said, calls for annual federal appropriations of \$75,000,000 for federal aid and an additional \$7,500,000 to be spent on roads in national forests.

EXPANSION PROPOSED

Amendments to the present Federal Highway Act were suggested by Senator Oddie in the following respects:

To provide for a higher percentage of the cost of building roads in sparsely settled areas, to be paid by the federal government.

To eliminate the present limit of \$15,000 per mile upon federal payments for roads built jointly with the states.

Increase in federal appropriations to provide connecting links in the national road system; and

Elimination of private billboards, sign boards, and other roadside advertising along the national highways.

The road building program is of importance, he said, not only to the west, where there is great need for improved roads, but also to the eastern states, which, he predicted, will soon be face to face with the necessity of widening many of their principal roads and constructing many new highways to handle increasingly congested traffic.

Senator Oddie's speech, in part, was as follows:

Our modern highway system comprises approximately 3,000,000 miles, of which 450,000 miles have some form of surfacing. The value of the country's 22,000,000 motor vehicles, including the value of the highways, is \$26,500,000,000. The sum nearly equals that of our 250,000 miles of steam railroads and 50,000 miles of electric railroads, which, with their equipment, are valued at about \$27,000,000,000.

About 4,000,000 automotive vehicles were produced in the country in 1926, of a wholesale value of over \$4,000,000,000, which gave employment to 3,500,000 people. The annual operating cost of the country's highway expenditures are about \$10,000,000,000, which makes its yearly cost of motor transportation about \$11,000,000,000.

It is interesting to note that while the states built about 14,000 miles of new surfaced roads in 1926, the

automobile manufacturers during the same period built 16,000 miles of automobiles, allowing 20 feet to the car.

AID TO BUILD CUMBERLAND PIKE

In 1803, congress planned the Cumberland pike, running from Cumberland, Md., to Vandalia, Ill. A few years later it authorized the construction of this road with federal funds, at a cost of \$8,000,000.

In 1916 the federal government declared its policy of "aiding" the states in building a system of highways of national importance, and in 1921 the Federal Aid Highway Law was enacted, which provided that federal funds be allotted to the states to aid them in the building of roads, and that the Secretary of Agriculture give preference to such state road projects as will expedite the completion of an adequate and connected system of highways, interstate in character.

Under this law the states have designated a system of highways, not exceeding 7 per cent of their total highway mileage, and all of the federal apportionments must be spent on this system. The 7 per cent federal aid system is therefore limited to about 210,000 miles, of which 76,708 miles have been improved or are in process of improvement with federal aid, and an equal amount has been improved on this system without federal aid.

Today two-thirds of this system is in some state of improvement; the states having expended over \$2,000,000,000, while the federal government has expended about \$580,000,000, being nearly one-quarter of the cost, instead of one-half as originally contemplated in the law.

The federal government has collected in war excise taxes directly from motorists close to \$1,000,000,000. So from a bookkeeping standpoint it is nearly \$500,000,000 ahead, after deducting its expenditures on the federal aid highway system.

SYSTEM LAID OUT

When the Federal Aid Highway Act was passed the system of national highways was laid out, and the federal government agreed to aid the states in improving them. The states accepted the offer in good faith and sincerity and look to the federal government to continue its cooperation until all the roads on the system are improved to meet traffic needs.

The federal government incurred this obligation and committed itself to a policy which it must carry out. It must fulfill its obligation to the states and keep faith with them on this most important work.

The federal appropriations for the years 1928 and 1929 of \$75,000,000 annually to be spent on the roads of the states in the federal aid highway system and \$7,500,000 annually on roads in our national forests are most reasonable and necessary.

At least this much must be authorized for appropriation in the coming session of congress for carrying on this work during the years 1930 and 1931. A reduction in these appropriations will seriously handicap the states in carrying out their road-building programs and destroy their confidence in the promises of the federal government.

Very briefly, the federal aid system, when completed, will include every city and town in the country.

These Figures Reveal Interest of California In Federal Road Policies

FEDERAL AID TO STATE HIGHWAYS (December 1, 1927)

Projects completed or under contract—	Miles	Actual or estimated cost	Federal aid received or applied for
Agreements executed	1512.5	\$46,658,329	\$20,935,496
Projects under construction; federal aid applied for—			
Agreement not yet executed	68.6	2,418,354	1,585,274
Totals	1581.1	\$49,077,083	\$22,520,770

On the above basis money received from the Government alone would build 711 miles of road.

The basis of distribution of federal aid money among the states is as follows:

One-third in the ratio which the area of each state bears to the total area of all the states.

One-third in the ratio which the population of each state bears to the total population of all the states, as shown by the latest available federal census.

One-third in the ratio which the mileage of rural delivery routes and star routes in each state bears to the total mileage of rural delivery routes and star routes in all the states, at the close of the next preceding fiscal year, as shown by the certificate of the Postmaster General, which he is directed to make and furnish annually to the Secretary of Agriculture.

FOREST FUNDS (December 1, 1927)

Projects on State Highway System.

Projects constructed or advertised:	
Miles	210.8
Estimated total cost	\$6,394,324
State cooperation	\$1,388,000
County or local cooperation	\$373,713
Miles	210.8

This leaves \$4,632,611 expended or obligated forest funds on the state system which alone would build 152.7 miles.

The basis of distribution of forest funds is as follows:

One-half in the ratio that the area of national forest

land in any state bears to the total area of such land in all states.

One-half in the ratio that the value of national forest land in any state bears to the total value of such land in all states.

AMOUNT OF FEDERAL AID.

The amount of federal aid on any project shall not exceed 50 per cent of the total estimated cost of the project or exceed \$15,000 per mile, exclusive of bridges over 20 feet span, except that in the case of any state containing unappropriated public lands exceeding 5 per cent of the total area of all lands in the state, an increased percentage equal to one-half of the percentage which the area of unappropriated public lands in such state bears to the total area of such state, shall be added.

The following table shows the states profiting by this rule:

	Ratio of the area of unappropriated land plus nontaxable Indian land to the total land area of the state.	Percentage payable by the federal government	Maximum federal aid payment on basis of \$15,000 per mile
Arizona	0.4469	72.34	\$21,702 00
California	0.2010	60.05	18,015 00
Colorado	0.1215	56.98	16,824 00
Idaho	0.1949	59.75	17,925 00
Montana	0.1292	56.46	16,938 00
Nevada	0.7543	87.72	26,318 00
New Mexico	0.2686	63.45	19,029 00
North Dakota	0.2686	63.28	20,484 00
Oklahoma	0.1093	55.47	16,641 00
Oregon	0.2451	62.25	18,675 00
South Dakota	0.1125	55.62	16,686 00
Utah	0.5779	78.90	23,670 00
Washington	0.0875	54.38	16,314 00
Wyoming	0.2840	64.20	19,250 00

of 5000 inhabitants, and will pass within ten miles of 90 per cent of the population of the country. It is a plan of national highway unification, with local state control.

The road projects under this system are initiated, supervised and constructed by the states, with such federal participation as will insure continuity and articulation of the system.

NATIONAL ROAD NEEDS

A few of the national needs for the federal aid highway system should be mentioned briefly:

Good roads over which the Postal Service can carry the mails.

Good roads which promote commerce among the states.

Military highways for national defense.

To extend farm markets by improved roads and the use of motor equipment, which have enabled the farmers of the country to quadruple the economic range in their choice of markets.

To increase the efficiency and production of our country and the national wealth, and to eliminate enormous national waste.

In the public land states of the west, the federal government owns from a small percentage to nearly 90 per cent of all the land in the states. The law provides that the federal government shall increase its contribution to the cost of building and improvement of the highways above one-half, in proportion to the government's ownership of lands in these states.

A brief statement regarding the roads in the national forests and the necessity for them should be of interest. They comprise 160,000,000 acres of federal owned land in thirty-three states and in Alaska and Porto Rico, and contain about 600,000,000 feet of standing timber. The value of the timber, grazing and water power in these forests is estimated at about \$1,500,000,000, with other resources having a value of about \$500,000,000.

An adequate system of roads and trails is absolutely essential for the proper administration, protection and utilization of the federal land and resources within the national forests, for fire protection especially, and also for the protection of the nation's watersheds.

EASTERN ROADS IMPROVED

In the wealthier, more populous east, road improvement is much farther advanced, and easterners mistakenly suppose highway expenditures may shortly be reduced. The day of such reduction is as remote as the elusive saturation point in motor vehicle production and registration.

The growing traffic demands the constant improvement of highway facilities, the replacement of outworn surfaces, widening and strengthening of pavements and rights of way, the reduction of grades established according to less exacting standards of a few years ago, the elimination of railroad grade crossings, and the separation of grades at important highway inter-

(Continued on page 41.)

Some "Barks" from State Press Regarding "Hot Dog" Stands

"HOT DOG" stands, wider rights of way, and a discussion of the scenic values of highways have predominated in the highway news published in the newspapers of California during November.

The outburst of publicity dealing with these subjects followed public statements made by B. B. Meek, Director of Public Works, and members of the Commission pointing out the necessity for wider rights of way to protect highways against disfigurement by "hot dog" stands and unsightly shacks, and at the same time to assure the preservation to the highways of beaches, and group trees, or other places of unusual beauty adjoining the roads.

The press as a whole has given a loud and approving "bark" to the protest against the "hot dog" menace. Thus the *El Centro Press* expresses itself:

Glory be to the California Highway Commission in its promised warfare against California's black eye, the hot dog stand.

And included in the term "hot dog stand" are "Dad's Shack," "Pete's Place," "The Coffee Pot," "Bubbling Kettle" and all the rest of the thousand and one places bearing names designed to catch the eye and the dime of the passing tourist, but in reality doing nothing more than to mar the natural beauty of which Californians boast.

Time was when there was considerable pleasure in traveling along the main highways, and there still is, but it is marred every step of the way by tumble-down or even highly artistic shacks offering all sorts of edibles and drinkables but emphasizing chiefly—the hot dog.

We have nothing personal against the hot dog. We have eaten many of them and hope to eat more of them. But we do not believe that it is necessary to blot out the landscape and the beauties of nature with a lot of moronish signs just to tempt the appetites of those of us who do like hot dogs.

Some time ago the large oil companies and other leading firms in California awoke to a realization of just how inharmonious their signs along the highway were, and these signs in many instances were works of art compared to those that now greet the eye. These firms dispensed with their signs—an act that cost them no little sum.

But for every sign of this sort there are hundreds of these little mongrel signs. They are neither humorous, catchy, or inviting to look at—and we venture to say they are not such bowling successes as business getters.

Away with the whole blooming mess of them! The state has protected nature by passing a law against painting signs on rocks as the idiots used to do some years back. It should at least show the same amount of compassion on one of the noblest works of nature—the human eye—and protect it from this epidemic of

jazzomania that affronts "El Camino Real" and all the lesser "reals."

The *Salinas Index* also gives its editorial approval. Says that paper:

The ultimatum of Bert B. Meek, director of the state department of public works, issued in San Luis Obispo a few nights ago, to the effect that the ever-present "hot dog stands" along the state highway must eventually go, cannot fail to extract a sigh of relief from many who run across these entirely unnecessary and unsightly things at every turn in the road these days. At some points they have attained the dignity of "barbecue sandwich shops," and are generally run in connection with an oil and gas service station. The atmosphere about them is polluted with enough greasy smells to stifle one, and put the evils that befell Falstaff to shame.

There may have been a time when this type of eating place was desirable. That was back in the days of slow-moving "hawse an' wagon," or a man on horseback. But today, with the means of rapid transportation—the automobile and the airplane—there can be no reason for anyone starving to death before reaching the next town.

Down with hot dog stands, say we.

The *Palo Alto Times* suggests that the trading district along highways be zoned. Says that paper:

Purchase of state highway rights of way 100 feet or more wide to prevent scenic beauty from being hidden by hot dog stands and other disfiguring structures is to be the policy of the state in the future, according to Bert Meek, director of public works for California.

We who live on the peninsula where hot dog stands, eating "shucks," fruit vending booths and the like strung along both sides of our highway have destroyed much of the earlier charm of our regional landscape, can appreciate the importance of this newly declared state policy. While it may not be practicable to secure such protective rights of way along all the highways already built, the underlying motive of the state which has prompted the enunciation of this policy has much to commend it. People who go motor-ing into the suburban or rural regions do so to get a glimpse of real outdoors. If they merely want to view a succession of trading places, they would do better to stay in the cities and drive around the shopping districts where more numerous and much more imposing shops are to be found.

Clearing the landscape along the highways of billboards is only part of the work needed to be performed in the landscape rescue program. The hot dog stands are a symbol of another distinct menace.

But if such trading places must be provided along the highways, some restrictive arrangement should be devised, a zoning system, for example, which would permit such places to be operated only at specified mileage intervals. Such an arrangement would be a great boon to the beautification movement on the

peninsula. But we do not mean to infer by that remark that the menace complained of is peculiar to this region. Wherever there are highways—and scenery—disfiguring structures tend to bob up alongside them with mushroom-like quickness and weed-like multiplicity.

It is interesting in this connection to note what the *Highway Engineer and Contract* has to say on this subject in an article entitled "Highways of the Future." We quote from that magazine as follows:

"Hot dog" stands and gasoline stations at the roadside will be replaced by respectable road houses set well back from the highway in a grove of trees.

Road shoulders and ditches will be covered with grass and the roadside beautified with irregular trees not planted like telephone poles.

Here are some of the other developments from the future that the same magazine makes in the article referred to:

Roads may be considered in terms of the number of people and amount of goods hauled rather than width, length and character of surface.

Air rights over railroads will be used as elevated highways operated as toll roads, or in rural sections a parallel right of way will be used.

Congested sections of cities will have double-decked streets with street cars below the ground and bus lines operated on track-free streets at ground level.

Grades will be separated at congested highway crossings, thereby increasing by 50 per cent or more the road capacities at peak loads.

Country highways near cities will have a sidewalk on one side.

Motorists Responsible

For Grade Accidents;

U. S. Court Says So

The "Stop! Look! Listen!" signs at railroad grade crossings take on new significance through a recent ruling of the United States Supreme Court, says the *Literary Digest*. The public, we are reminded by the *New York Times*, "has been accustomed to throw the blame for all grade-crossing accidents on the railroads." But the Supreme Court, in a decision handed down by Associate Justice Holmes, holds that motorists, not railroad companies, are responsible for their own safety when crossing railroad tracks. The case, which was carried to our highest tribunal, was that of an Ohio automobile truck driver who approached a railroad crossing at five miles an hour, and was killed by a train going at the rate of sixty. His widow testified and the lower courts held that this driver had taken all the precautions required of him; the Supreme Court holds otherwise. Said Mr. Justice Holmes, in his ruling:

When a man goes upon a railroad track, he knows that he goes to a place where he will be killed if a train comes upon him before he is clear of the track.

ROUGH GOING

Ode to the Horse

O horse, you are a wonderful thing;
No buttons to push, no clutch to slip,
No sparks to miss, no gears to strip,
No license-buying every year.
No plates to screw on front and rear,
No gas bill climbing up each day,
Stealing the joy of life away.
No speed cop chugging in your rear,
Yelling summons in your ear.
Your inner tubes are all O. K.
And, thank the Lord, they stay that way.
Your spark plugs never miss and fuss,
Your motor never makes us cuss.
Your frame is good for many a mile,
Your body never changes style.
Your wants are few and easy met,
You've something on the flivver yet.

—Gouverneur (N. Y.) Free Press.

Said the flapper, after she had introduced her boy friend to her parents: "What side of the family do you think I take after?"

"Well, you have your father's eyes, nose and mouth," said the boy friend, "but you get your legs from your mother."—*Country Gentleman*.

A resident of Atlanta took out an accident insurance policy and then fell ill with pleurisy. Later he tried to collect from the insurance company but they refused a settlement. The man sued and in the municipal court it was ruled that pleurisy was not an accident but a visitation of God.

The superior court, however, reversed the decision on the ground that a visitation of God to a resident of Atlanta was an accident.

Si—"Sara, is there anything you want from town this mornin'?"

Sara—"You might stop in at one of them there stores and buy a jar of that there Traffic Jam I been ahearin' so much about."

"How long you in jail fo' Mose?"

"Two weeks."

"What am de cha'ge?"

"No cha'ge; everything am free."

"Ah mean, what has you did?"

"Done shot my wife."

"You all killed yo' wife and only in jail fo' two weeks?"

"Dat's all—then I gits hung."

"Work faithfully for eight hours a day and

Don't worry.

Then, in time, you may

Become the Boss, and

Work twelve hours a day

And have ALL THE WORRY."

He knows that he must stop for the train; not the train for him.

In such circumstances, it seems to us that if a driver can not be sure otherwise wherever a train is dangerously near, he must stop and get out of his vehicle, although obviously he will not often be required to do more than stop and look. It seems to us that if he relies upon not hearing the train, or upon any signal, and takes no further precaution, he does so at his own risk.

Making Highways Fool Proof; Object Lesson From San Diego



The old Del Mar grade crossing in San Diego County was a menace to the traveling public.

This motorist beat the locomotive to the crossing. When such races are ties we read about them in the papers.



Now we have a separation of grades at the crossing. It is safe for the motorist, and—

The train engineer can approach Del Mar without danger of heart failure.



Another step toward safer highways was taken recently when the Del Mar line change with its new overhead crossing of the Santa Fe tracks, and new twenty-foot pavement, was opened to traffic.

The new stretch of highway eliminates a very dangerous grade crossing, two sharp right angle curves, and a long stretch of fifteen-foot pavement. It speeds up travel and adds to its safety.

MOUNTAIN HIGHWAYS

(Continued from page 2)

present roads thus improved can be built at a cost that they can be scrapped at a later time; the use to which they have been put will show, even with their abandonment, a very considerable balance on the credit side of the ledger.

At a time when roads in California were built out of bond moneys and future generations thus obligated to pay for them, there may have been a reason why "permanent" location and the ability to build a "permanent" type of road may properly have been considered prerequisite to any construction. Today, however, we are out from under that obligation. We are building our roads on "pay-as-you-go" plan, and the people who are footing the highway bills should be entitled to road service within their lifetime.

Do not mistake me as advocating makeshift mountain roads. On the contrary I advocate that the most careful study be given of the final location of our mountain highways to the end that every advantage be taken of every feature, scenic and otherwise, that will lure more and more people out into the mountain areas of California. But I also believe that we can build or improve many miles of useable, travelable, and low cost roads into these mountains that will serve the people now living, while the "perfect" road is being built.

The roads through Europe's mountain passes have taken centuries to build. Ours can not be built in a day. I can not escape the thought, however, that here in California the improvement of our mountain roads has been unduly delayed through the mistaken thought that little work should be done on a road until the final and perfect highway can be built.

WHOLE STATE INTERESTED

And in conclusion, let me voice the opinion that every resident of California has a very great and a very immediate interest in the construction of these mountain highways.

Just as the mountain passes of Europe are the magnet that attract wealth from the entire world to Europe, so California's mountain areas can be made the means of bringing millions of "outside" money into California, money shared and distributed to residents of the cities and valleys in even larger measure than to our mountain peoples.

But this is only part of the story. There is rest, recreation, strength and inspiration in the mountains for our own people.

If in doubt, plan next summer to become better acquainted with California's mountains.

Policy Will Be to Give Publicity to Convict Camps, but not Personal Publicity to Convicts

REGULATIONS governing the conduct of prison camps on the state highway system have been announced by B. B. Meek, Director of the Department of Public Works.

The high points of the new plan are:

First, complete official publicity regarding the conduct of convict camps, but an elimination of publicity regarding personal activities of the prisoners. It is believed that turning the spotlight too much upon the prisoners tends to disturb camp discipline, and to imbue an attitude of hero-worship both on the part of the prisoners toward themselves and on the part of the public toward them.

"The convicts are in these road camps discharging a debt to the state," Director Meek states, "and it is healthful for them to realize that the obligation is on their part toward the state, rather than on the part of the state toward them. The men in the road camps are being given an opportunity denied to many other prisoners, and there should be no confusion in their minds on this score."

Second, an effort is being made to increase by a substantial sum the amount of money saved by the prisoners during their employment in the convict camps. Mr. Meek, who was for many years a member of the State Board of Prison Directors, believes that one of the most effective means of rehabilitating prisoners and restoring them to useful status is to increase the amount of money in their possession when they enter free life. Money on hand to tide them through the readjustment period following their release from imprisonment either in the penitentiary or the road camps is the best safeguard against temptation to again commit crime, he declares. Net earnings, after deduction of expenses of the prisoners in road camps, is the figure that Mr. Meek seeks to materially increase.

In this connection it is worthy of note that Director Meek, while representing Butte County in the Assembly in 1915, introduced the bill, later passed by the legislature, under which California began and continued its convict camp work for many years. Governor Young was speaker of the Assembly at this same session, and aided in the passage of the bill. Under the Meek bill, prisoners were given one day's credit on their sentence for

two day's work on the road. This bill remained unchanged until 1923, when the legislature supplemented it by providing that the prisoners should be paid, in addition to the credits on their terms, a gross of \$2.10 a day. From this gross there is deducted the cost of meals, kitchen help, freight on supplies, fuel, lighting, refrigeration, depreciation on cook house equipment, salaries of commissary men and clerks who work on convict records, camp physician, barber, shoemaker, guards, office rent, phones, telegrams, stationery, accident insurance for free employees, commissary supplies, including bedding, tobacco and toilet articles; cost of camp maintenance, transportation to and from prisons, rewards for escaped prisoners who have been recaptured and the expense of returning such escapes to prison.

An effort is being made to decrease administration expenses, and to increase the interest of the convicts in the more thrifty and economical use of camp supplies.

The location for prison camps is also being most carefully studied to the end that the camps be established in places where the work will be a maximum duration, thus again reducing costs charged to the convicts.

"It is difficult to say what can be accomplished in advance of actual accomplishment," Mr. Meek states. "However, we are earnestly trying to save money to the convicts, believing that actual 'pants-money' is the best safeguard against temptation when they enter free life.

"We are trying to guard them against any feeling of hero-worship either by themselves toward themselves or on the part of the public toward them. We do not want them to be 'sob-sistered' into any condition of self-pity.

"We want them to have the full value of the discipline that their offenses have merited, together with an appreciation of the fact that they are being given an opportunity to reenter free life on more advantageous terms than their fellows in prison.

"And I believe this reflects the desire of most of the men in camps themselves. They appreciate the opportunity to enter the road camps, but prefer to be left quietly there to work out the problems that they must face before their reentry into free life."

COMMUNICATED

*China Asks Road Aid
From California; Plans
7000 Miles of Highway*

DEPARTMENT OF HIGHWAYS
OF KWONG TUNG PROVINCE.

Canton, Kwong Tung, China,

October 27, 1927.

To the Commissioner,
California Highway Department,
Sacramento, California.

GREETINGS:

May we take this opportunity to relate to you that the Province of Kwong Tung is at present undertaking a very heavy program of road construction work. We have already laid out tentatively some seven thousand miles of road connecting various cities of importance and have been working, since the organization of this Department some three years ago, with the hope to complete the entire system in six or seven years. Since then the construction of a good part of the whole system had been completed and a good part is now under construction. A good many miles have been surveyed but on account of inefficient funds construction has not yet begun.

In order to carry out our financing and construction program, we have devised many methods. Some of them we have found practicable and some not. We are therefore still looking forward for further methods in order to hasten on the completion of the work of our program.

We have no doubt that your Commission, with riper experience, should have many good and practicable methods to carry out the different stages of road construction work. We shall, therefore, be most grateful if you would supply us information on the following subjects:

1. Method of highway finance.
2. Organization of the Highway Commission, including the executive and engineering staff.
3. Field survey methods.
4. System of accounting and cost keeping.
5. System of storekeeping.
6. Traffic rules and regulations.
7. Any other information that you believe of value to us.

If you have the above information bound up in pamphlet form and if you have any other regular publication pertaining to highway work, we shall be most grateful if you send them to us. If there is any cost in connection with the sending of the pamphlets, please inform us and we will reimburse you whatever expense incurred.

Allowing us in closing to extend to you our courtesies and to thank you in advance for the favor rendered.

Yours respectfully,

H. S. CHUCK, Commissioner,
Department of Highways of Kwong Tung.

[Complete information upon the matters requested was forwarded to Mr. Chuck by E. Forrest Mitchell, secretary of the California Highway Commission.]

*Magazines for Prison
Camps Are Requested*

Sacramento, California, November 25, 1927.

EDITOR CALIFORNIA HIGHWAYS AND
PUBLIC WORKS:

The several superintendents of our prison camps report that they could use a good many more magazines in their reading rooms at the camps, and have suggested that the many employees of the Division of Highways contribute their used magazines for this purpose.

The prison camp management is heartily in accord with this suggestion and if these magazines could be left in the office of the secretary, the camp management will see that they are transported to the camps.

Yours very truly,

E. FORREST MITCHELL, Secretary,
Department of Public Works,
Division of Highways,

By J. P. H., Deputy Secretary.

*Sanitary Condition
of Camps Wins Praise*

STATE COMMISSION OF
IMMIGRATION AND HOUSING
OF CALIFORNIA
State Building

Polk and McAllister Streets

SAN FRANCISCO, November 29, 1927.

State Highway Commission,
Sacramento, Cal.

GENTLEMEN:

On November 28th, our camp inspector, Mr. F. J. Rugg, inspected your Sullivan camp, located at Ridge Route, Los Angeles County. From our inspector's report it appears that this camp is in a good sanitary condition and adequate housing provided.

We wish to thank you for your interest and cooperation in the matter of camp sanitation.

Very truly yours,

E. A. BROWN,
Director of Camp Sanitation.

*Courtesy of State
Highway Workers Wins
Letter of Appreciation*

ELECTRICAL WEST
883 Mission Street
San Francisco

Editorial Rooms

November 30, 1927.

Mr. T. A. Bedford, Division Engineer,
California Highway Commission,
Willits, California.

Dear Sir:

This belated acknowledgment of courtesies received at the hands of members of your division should have been written last August but has been delayed on account of an accumulation of work.

Very late in July my husband and I were returning from Oregon by automobile. Just across the bridge over the Smith River at the foot of the convict camp, ten miles from Crescent City, our car broke down and a member of your organization, whose name we did not get but who was very kind in trying to assist us, was unable to remedy the trouble but suggested that perhaps Mr. Forbes at the convict camp might be able to tell us what the trouble was. My husband acted on this suggestion and Mr. Forbes was not only very courteous in trying to help us start the car but he was also very helpful in assisting my husband to communicate with the Automobile Association at Crescent City to arrange for tow service.

Later, on the road between Crescent City and Eureka, we again encountered most courteous treatment from all members of the highway organization engaged then in controlling and directing traffic over a bad stretch of road where it was necessary to do much blasting of tree stumps, etc. We had the pleasure of taking with us, in the lead car, the man with the red flag, who told us something of the work that was being done and whom we found a most agreeable companion and whose caution in regard to making a safe passage for the cars we thoroughly approved of. We also had the pleasure of talking with the inspector at the end of the first control who gave us an idea of the number of cars passing over the road and the care that was exercised to give them safe passage.

My husband and I felt that the work was being handled in a most efficient manner and that much credit was due the entire organization. We are both glad to have had the experience of learning at first hand something of the difficulties of highway construction work, which too often is taken entirely for granted, and it is with real pleasure that I express our appreciation.

Yours very truly,

ETHEL J. KNOWLTON,
News Editor.

ALONG THE CONCRETE

This from the menu of a fish cafe along the road:
Most any old fish can float, and drift along and dream,
But it takes a regular live one, to swim against the stream.

Just as you enter the sand hills between El Centro and Yuma a flaring sign announces: "This is Peg Leg's Los Angeles Dry Dock; Latest and Biggest Subdivision."

And, of course, without referring to Peg Leg, let us add that there is "some windjammer" parked in that dry dock.

There is at least one highway sign that justifies itself. It reads:

BOOST CALIFORNIA-MADE
MERCHANDISE THE SAME
AS YOU BOOST THE CLIMATE

"Let's swap smiles," reads the invitation of a roadside fruitery. Needless to say that the sign is "bearing fruit."

"Extraordinary" Number of Requests for Railroad Road Grade Crossings

The grade crossing situation as seen by the State Railroad Commission is discussed in a letter of transmittal to Governor Young of the annual report of the Railroad Commission for the fiscal year of 1926-27. This letter says:

The Commission kept up its efforts for the elimination, or separation of dangerous grade crossings by authorizing 21 grade separations. The reconstruction of an old overhead crossing with impaired clearances was denied. The Commission also granted 12 extensions of time in which to construct grade separations, and issued a number of orders amending or revising previous orders of this nature.

Although the commercial and industrial development of California has resulted in the filing of an extraordinary number of applications for grade crossings by railroad lines, spur tracks, industrial tracks, or other tracks, the Commission has investigated every application with scrupulous care, and has denied, dismissed, or ordered revised many applications, in order that the public safety may be conserved, and the needs of industry may not be infringed upon.

A survey of grade crossing separation possibilities was completed in the city of Palo Alto, and partially completed for the town of Sunnyvale.

GRADE CROSSING PROTECTION

During the last fiscal year the Commission issued General Order No. 75, providing standards of grade crossing protection of a uniform nature, and also revised its General Order regulating clearances along railroads, one of the effects of which will be to do away with the hazard created by the continual increase in the sizes of freight cars and locomotives.

GRADE CROSSING SURVEYS

Surveys of grade crossings were made on Southern Pacific lines through San Jose, through the East Bay cities, except Berkeley (which was surveyed during the previous year), through Buellington, and from Watsonville to Aptos on the Santa Cruz branch. A survey was also made of grade crossings through El Cerrito and Albany on The Atchison, Topeka and Santa Fe Railway line, and all crossings authorized by the Commission in Santa Clara and Merced counties were inspected to insure carrying out of the Commission's orders. An intensive study was also begun with respect to signal ringing circuits on the lines of Southern Pacific Company, The Atchison, Topeka and Santa Fe Railway Company, and the work was completed on the Santa Fe in Albany and Oakland.

The farmer and the lawmaker can both raise the value of their product by limiting output.—Christian Science Monitor.

So far, every photograph radioed from Europe looks as though it had encountered a rough crossing.—Arkansas Gazette.

Safety experts in Chicago estimate that we have twenty-five thousand deaths a year from accidents in the home. Despite this appalling record, foolhardy people still persist in loitering about the perilous place, and even children are sometimes found there.—The New Yorker.

"SURFACE TREATMENT" METHOD OF OILING ROADS

(Continued from page 13.)

thoroughly bladed and worked to secure a perfectly smooth surface of uniform texture prior to oiling.

To secure a good job by the penetration method it is essential that the surface be thoroughly sound and well compacted before oiling.

The first step, therefore, is the preparation of the base. If it has become rough and pitted under traffic, it is lightly scarified and trued up with a road grader, then sprinkled, dragged, and sometimes rolled, if there is too much loose material on the road.

When firm and smooth, the surface is thoroughly swept with a power broom supple-



Oiled road on the state highway in Orange County.

mented by a hand broom if necessary. All loose material and fines are removed and the rock in the surface is exposed.

The oil is then applied under pressure at the rate of one-quarter to three-tenths of a gallon per square yard and, when traffic can be detoured, allowed to penetrate without covering, the time required for penetration depending upon the texture of the surface and viscosity of the oil. Two or three days are usually sufficient.

CARING FOR TRAFFIC

It is usually necessary, however, to carry traffic through the work. In such cases the usual procedure is to oil one-half of the roadway at a time, handling traffic under control. Immediately after oiling one side, the oil is covered lightly with clean, dustless screenings, applied at a rate of from 50 to 150 cubic yards per mile of full width roadway, the

amount depending on the width, nature of material, traffic, etc.

As soon as the road is screened, traffic is diverted to the side just oiled and the opposite side then oiled and screened.

SUBSEQUENT TREATMENT

Following the first application of oil, the surface of the roadway is bladed and the oil-coated screenings are dragged into depressions in the road surface, in order that minor inequalities in the surface may be smoothed out. The oil collects in the minor depressions and furnishes sufficient cementing material to take up the screenings. Where large amounts of screenings are used and the traffic is carried through the oiling, the blade should be operated continuously until the oil has dried up or has been absorbed by the cover material. If necessary, imperfections in the surface are repaired with pre-mixed oil and mineral aggregate.

The second application of two-tenths to one-quarter of a gallon of oil per square yard is spread as before and, if possible, traffic kept off so as to allow for absorption. The road is then screened again before throwing open to traffic. High viscosity oils require more screenings than the thinner oils. Clean screenings only should be used, as fine material including dust absorbs the oil before it can penetrate the base, with the resulting formation of a thin oil mat on the surface, which lacks adhesion to the base and will not stand up under traffic.

APPLYING SCREENINGS

When traffic can be detoured entirely off the work, the screenings are not applied until after the second application of oil, as we have found by experience that the same results as regards smoothing up, correcting defects, etc., are secured by covering and dragging after the second application of oil as are secured by covering and dragging after each application and it is usually found possible to get by with materially less screenings when made in one application than in two with resultant lower cost.

ALTERNATE METHOD

An alternate method to the use of light oil for both applications is to use light fuel oil (60 to 70 per cent) on the first application in order to secure penetration and a heavy asphaltic road oil (90 to 95 per cent) on the second application. This process, however, requires a special heating plant for the heavy oil. In some cases emulsified heavy oil is being used, thus making it unnecessary to install a heating plant. The emulsified liquid contains 50 per cent of asphalt and 50 per cent of water, so that when the same amount of liquid per square yard is spread there is only one-half as much asphalt, the reduced quantity of asphalt thus at least partially offsetting the cost of emulsification. A number of miles have been oiled in California in this manner and the process is under close observation. The advantage to be gained by this process, if any, is the ability to spread light applications of heavy asphaltic oils without the use of expensive and troublesome heating equipment.

No recommendations can be formulated as yet relative to this special treatment method, though the results secured thus far have not been unsatisfactory.

PENETRATION

Maximum penetration of the oil into the compacted road surface should be one of the principal objectives. This penetration results in a gradual transition in

GOVERNOR YOUNG MOVES TO SAVE RECREATIONAL AREAS TO CALIFORNIA

(Continued from page 8.)

recreation are becoming scarcer and more valuable year by year. For instance, our beaches along the coast, which could have been easily acquired a few years ago, are now in private hands and in large measure shut off from the public. The same will soon be true of our redwood forests and similar natural resources, if prompt action is not taken toward their preservation.

A considerable number of nature lovers, both in this state and in the east, have evinced a desire to lend financial aid toward preserving these beauty spots in California. Already redwood parks have been purchased for the state in this way, and intimation has been given that a great deal more may be expected along this line, provided the state will only cooperate. Accordingly, the last state legislature provided for submission to the voters a park bond issue of \$6,000,000, the bonds to be issued only as each dollar of state money is matched by another dollar from these outside sources. Thus, by this \$6,000,000 bond issue, California will be able to invest for future generations \$12,000,000 in a wisely coordinated comprehensive state park system.

The importance of this effort naturally demanded from me the best I could do in the selection of a Park Commission. It demanded that the Commission should be strictly nonpolitical, and should be composed of nature lovers as well as men of preeminent ability and business capacity. Finally, it demanded that they should be so well and favorably known that in their efforts they will inspire the entire confidence of all our citizens.

texture of the top one or two inches of the crust from the rather rich condition of the surface to the lean condition found at the maximum depth of penetration without any distinct binding plane or plane of separation which is unstable under traffic.

MAINTENANCE

After the surface oiling operations have been completed it is essential that thorough and incessant maintenance set in immediately. Scarred places should be thoroughly cleaned, broomed out by hand and swabbed with oil followed by a dash of screenings. Each scar, no matter how small, should be treated.

If it is not possible to immediately treat scarred places they will soon develop into pot holes. In such cases a premixture of oil and rock should be thoroughly tamped into the pot hole after cleaning it out thoroughly and swabbing it lightly with oil.

TRAFFIC

On heavily traveled roads, it is generally found necessary to carry traffic through the work. This is not an unmitigated evil, however, as the traffic passing over the oiled surface, especially over the first or primary coat, reveals any weak places, which can be immediately repaired.

When traffic is allowed through the work, however, the cars are liable to become spattered with oil and the irate motorist is inclined to severely criticize the Department. In order to reduce the criticism to a minimum, printed cards are handed each motorist as he approaches the work, warning him that the road is being oiled and requesting that he maintain a speed through the work of not to exceed five miles per hour.

Following is the personnel of the new Commission, with a short sketch of each, showing the special qualifications which led to his appointment:

WILLIAM E. COLBY, who for many years has been active as an officer of the Sierra Club, is one of the outstanding park workers in California. He was at one time associated with John Muir in the cause of conservation of natural scenery, particularly with reference to national parks. One of his most notable contributions toward parks is the recent enlargement of the Sequoia National Park, which was effected largely through his efforts. He has a national, as well as an international, relation to park and recreational movements, having been a vice president of the American Forestry Association, and of the American Alpine Club, as well as being one of the presidents d'honneur, International Congress l'Alpinism, held in Monaco in 1920, a trustee of the National Parks Association, and a councillor of the Save-the-Redwoods League. Mr. Colby's home is in Berkeley. He is a law lecturer at the University of California, and an attorney with offices in San Francisco, specializing in mining law.

DR. RAY LYMAN WILBUR, president of Leland Stanford Junior University, has taken an active part in park and conservation matters in California and in the nation. He was one of the original councillors of the Save-the-Redwoods League when it was founded in 1918. During the war he was Chief of the Conservation Division of the United States Food Administration. As a former president of the California Conference of Social Agencies and of the Council of Social and Health Agencies of San Francisco, and as president of one of our large universities, President Wilbur brings to the Park Commission a broad understanding of the recreational as well as the aesthetic phases of the park program in California.

HENRY W. O'MELVENY, an outstanding attorney of Los Angeles, who has practiced his profession in that city for over forty-six years. He is recognized as one of the leading advocates of parks and recreation centers in southern California, and is credited with possibly a more intimate knowledge of the park problems of that part of the state than is possessed by any other one man. He has served Los Angeles in many capacities, being chosen as City Park Commissioner in 1910. He is a great lover of the out-of-doors and is particularly interested in trees and botanical matters generally.

MAJOR FREDERICK RUSSELL BURNHAM, of Los Angeles, is an explorer of international note. His recently published book, "Scouting on Two Continents," tells of his picturesque and eventful career as cowboy, guide, miner and deputy sheriff in the west, and as Chief of Scouts of the British army in South Africa and explorer in French Nigeria and German East Africa. He has to his credit archaeological discoveries of the Maya civilization in Yucatan and the Yaqui country in Mexico. He was a friend of President Roosevelt, and has of late years been associated with John Hays Hammond in important engineering enterprises. He is an out-of-doors man par excellence, with an intimate knowledge of southern California, particularly of its mountains and desert regions.

EX-SENATOR W. F. CHANDLER, of Fresno, has to his credit a long career of service to the State of California as a public official. He served as a member of the assembly in 1900, 1904, 1906, 1910 and 1912, and as a senator in 1914 and 1916. He is particularly conversant with conditions in the interior valleys of the state where he has large agricultural interests. He is especially interested in archaeological explorations and

discoveries, as well as in the development of parks and other natural resources of California.

These five distinguished citizens of California, representing not only all portions of the state, but also many walks of life and diversified interests, serving as California's first State Park Commission, will have in their hands the important task of formulating a park policy for the state. Under their direction will be carried out the state park survey, authorized by the last legislature to determine what areas in the State of California are suitable and desirable as additions to our state park system. Upon them will devolve the task of administering the funds which will be provided for the acquisition of further state park properties if the voters act favorably upon the \$6,000,000 State Park bond issue, passed by the last legislature and appearing on the ballot for ratification by the voters in November, 1928.

THE NEW LAKE ALMANOR CAUSEWAY

(Continued from page 19.)

the embankment was adopted, consisting of the use of Bucyrus drag lines which swung the material directly from the borrow pits into the embankment, where the separation was not too great. However, on the higher parts of the embankment, where the distance between toes of slopes was as much as 215 feet, it was necessary to handle the material as much as three times in order to deposit it in its final position. The equipment used was equipped with 70-foot booms, and could move the material about 130 feet at one lift, and on account of the depth of the borrow pits being limited by the height of the water table, which would not permit of excavation more than 20 feet in depth, it was necessary to start the borrow pits as much as 400 feet from the embankment and move the material two or three times successively in order to deposit it where it belonged. In spite of the double and triple movements of a large portion of the material, the cost was quite light, being less than \$0.19 per cubic yard for the completed embankment. The total cost of the completed project was something over \$200,000, of which the state paid the estimated cost of a ground level graded road, which it would have built across the lake bed had the water level not been raised by the power company, amounting to slightly less than \$15,000, while the remainder of the cost was divided between the power company and the railroad.

TO OPEN IN SPRING

The project was completed during the summer of 1927, and in order to connect it with the constructed highway which ended about a mile to the east of the lake, the state, during the past summer, constructed a connecting link, thus making usable for the public about 2.5 miles of constructed highway above the lake level, should the water from the lake rise this winter sufficiently to flood the existing road. For right of way reasons the project has not yet been opened to the public, but it is expected that these right of way matters will be ironed out during the winter, and the road will be opened for use of the public early next spring, or at the time the snow blockade on the adjacent mountain section is broken. The travel is exceedingly light through the winter on this section, in fact it is usually blocked off entirely by snow for about three months after the first of the year, so that there is little occasion for opening the work before next spring.

BUILDING HOMES FOR THE STATE'S FISH

(Continued from page 5.)

Yosemite Hatchery

The Yosemite Hatchery, located near "Happy Isles" in the upper end of the valley, was completed in the spring of the present year. In its construction stone and logs from the site and split sugar pine shakes were used on the exterior. Provision has been made in the building for an aquarium, in which will be displayed specimens of the different fishes of this region. In the few months since the completion of this hatchery it has been visited by thousand of people and has proven one of the centers of interest in the valley.

At the present time a cottage for the superintendent and one for employees are under construction adjacent to the hatchery building.

Cold Creek Hatchery

Construction on this project was started in November, 1927, and is now in progress. The site is in Mendocino County, adjacent to the state highway running from Ukiah to Upper Lake. The hatchery takes its name from the creek which will be the source of the water supply. This creek was selected on account of its unusually low temperature, most of the waters of the Coast Range Mountains being too warm for satisfactory propagation of fish.

The project consists of the hatchery building—in which are included quarters for employees—a cottage for the superintendent, and a garage and service building. The layout in general is quite similar to that of the Big Creek Hatchery in Santa Cruz County.

Kaweah Hatchery

Preliminary plans are being made at this time for a hatchery group at Hammond, on the Kaweah River, in Tulare County. The site is adjacent to the highway leading from Lemon Cove to Sequoia National Park. The proposed hatchery will replace a temporary hatchery which has been operated on this site for several years.

Miscellaneous

Under this heading are included various repairs and improvements which are too numerous and are of too little general interest to explain in detail. These items include alterations and additions to existing buildings, water supply and electrical development. If of minor importance they are generally handled directly by the Fish and Game Commission, but when the amount of money involved is large, or the details are such as to demand technical advice, they are handled by the Division of Architecture.

Under the laws of this country a man is innocent until he is proved guilty. Then he is usually insane.—Dallas News.

Seven states, California, New York, Pennsylvania, Ohio, Michigan, Illinois and Texas, have more than one million automobiles.

Golf is what letter-carrying, ditch-digging, and carpet-beating would be if those three tasks had to be performed on the same hot afternoon in short pants and colored socks by gouty-looking gentlemen who required a different implement for every mood.—New York Sun.

State Highway Work in Various Counties

PROGRESS REPORTS FROM THE FIELD

ALAMEDA COUNTY—The contract of N. M. Ball, Livermore to Dublin, is complete except cleanup. Resident Engineer M. C. Fosgate, is now in charge of the new contract between Warm Springs and Milpitas, at the same time taking care of the closing out of this job.

Dublin to Hayward, Contractor Ariss-Knapp, is well under way. The first two miles of waterbound macadam base complete; Castro Hill excavation complete; waterbound macadam base in progress. The heavy cut at Boomer Hill is clay and progressing slowly on account of occasional rains and insufficient equipment and organization of the contractor. In wet weather all traffic is detoured via Niles Canyon.

Warm Springs to South Boundary, Allied Contractors, Inc. Contract is well under way; grading all complete for concrete strip including 1 foot below subgrade. Backfill for subgrade in progress. Shoulders on right complete. Portland cement concrete batch boxes and bunkers complete. Asphalt concrete plant well under way. This section is included with a contract from the north boundary of Santa Clara County to Milpitas to form the entire contract. Under maintenance rock borders were completed on Altamont Pass road, north boundary to Livermore.

ALPINE COUNTY—All work in Alpine County has been suspended for the winter as the mountain passes are blocked with snow and most of the highway in that county is snowbound.

AMADOR COUNTY—A district contract will be advertised soon for grading a piece of highway between Jackson and Pine Grove. This is on what is known as the "Creek road." The contemplated work will eliminate the worst portion of this road between Jackson and Pine Grove.

On account of the heavy snowfall in the Sierra Nevada Mountains, the Alpine highway is only open as far as Bartons. Bartons is approximately ten miles above Pine Grove. The highway from Bartons to Ham Station is being reconstructed with a heavy grading outfit consisting of 30 and 60 horsepower caterpillars and 12 foot graders. This work makes the road impassable to traffic.

The section of the Mother Lode highway between Plymouth and the Cosumnes River is being rockd wherever any soft places develop, so the road is in fair shape for winter travel.

BUTTE COUNTY—Preliminary studies and investigations are being made for the proposed routing of a state highway between Oroville and Quincy. The highway now in use from Oroville to Quincy follows the old county road through Berry Creek and Bucks Ranch, a distance of 66 miles.

CALAVERAS COUNTY—The Big Trees highway is open as far as Big Trees only. Above that point, the road is blocked with snow.

Widening and daylighting operations will soon start on the Mokelumne River grade between the Mokelumne River and Mokelumne Hill. This work will be financed by the Minor Improvement and Betterment Fund.

COLUSA COUNTY—The work of placing rock borders along the pavement from Williams to Delevan, 12 miles, is about 50 per cent complete. Hemstreet and Bell are the contractors.

CONTRA COSTA COUNTY—Approaches to newly constructed Wildcat Creek Bridge, advertised for construction and rock surfacing, were opened at the District office December 6, 1927.

One mile south of Rodeo the encroaching waters of the overflow of Rodeo Creek have endangered the highway. A channel change for nearly a mile is contemplated before the severe winter weather sets in.

DEL NORTE COUNTY—The contract for grading and surfacing 3.5 miles, from the southerly Del Norte County line to the head of Richardson Creek, has just been advertised and J. E. Johnston of Stockton was the low bidder. His bid was \$168,000, or approximately \$18,000 under the engineer's estimate.

Plans are being rushed in order to let to contract 3.8 miles of grading and surfacing of the last piece of old county road between Orick and Crescent City. Upon the completion of this contract the bottleneck of the Redwood highway will be broken.

EL DORADO COUNTY—Reconstruction work between Pacific House and Riverton, a joint state and United States Forest Service project, is nearing completion. This work was marked by a tragic accident on November 29th, when F. F. Irey of Irey and Holden, contractors, operating a tractor, backed off the grade and sustained injuries in the fall which resulted in almost instant death. In this vicinity there are very precipitous slopes to the American River, there being in places an almost sheer drop of several hundred feet. Many will mourn the loss of Mr. Irey for he was a man of splendid character and tremendous energy, and the driving force of this project.

FRESNO COUNTY—A reconnaissance survey in the Kings River Canyon, in Fresno County, has been authorized by the general office, and a party will be in the field within the next two or three weeks.

GLENN COUNTY—C. K. Buchanan's contract for one mile of bituminous macadam pavement with rock borders, between Four Corners and Butte City, is practically complete.

HUMBOLDT COUNTY—The Kaiser contract for grading and surfacing between Fernbridge and Loleta is practically completed and it is expected to make acceptance in a few days.

This piece of work involved the realignment of the Northwestern Pacific Railroad in order to straighten the alignment of the highway, and the many difficulties in arranging a working agreement between the property owners, the county, the railroad, and the state have at last been overcome and the new highway is a reality.

The Hauser contract and the Engelhart contract for grading and surfacing between Orick and the northerly Humboldt County line are practically at a standstill, due to the heavy winter rains having started.

IMPERIAL COUNTY—About 2.1 miles of the San Diego-El Centro highway, near the foot of Mountain Springs grade, was destroyed by floods following the heavy rains in December, 1926. As soon as the flood

subsidized, a temporary road was oiled through the sand in the bottom of the wash. This temporary oiled road has been made to serve throughout the summer of the present year, but being in the wash bottom, it is in danger of being destroyed by other floods.

A new roadbed is being constructed to replace the road that was destroyed. The line is being changed to eliminate the flood hazard and to cross the San Diego and Arizona Railroad Company's tracks at a better place for an undergrade crossing.

INYO COUNTY—A contract was recently awarded to F. C. Payton for the grading of a road, standard specifications, from Coso Junction to Olancha, distance 21 miles. This improvement on a direct relocation, eliminating a multitude of abrupt turns, will be welcomed by next season's tourist travel.

A stretch of 10 miles of crushed rock and decomposed granite surface was completed this season—Alabama Gate to Independent.

From the north end of the oiled macadam road north of Bishop to the Inyo-Mono County line, distance 5.85 miles, surfacing with decomposed granite is nearing completion preparatory to oiling next season.

Plans recently submitted for grading and surfacing with crushed rock, Diaz Lake to Alabama Gate, distance 8.50 miles.

KERN COUNTY—Widening and drainage work is being started on the Kern River Canyon highway to Walker's Pass.

Three miles of rock borders on Route 4 south of Bakersfield have just been completed by day labor forces. A spreader box was used, and two men on the grade handled all of the spreading and spotting up of 190 tons per day.

Preliminaries under way toward improvement of the Freeman-Bakersfield road, including widening and straightening of the present road, Weldon to Walker Pass, and relocation, Walker Pass to Freeman.

KINGS COUNTY—A special crew with a heavy grader and outfit is widening roadway and improving drainage in Kings County from Hanford west.

LAKE COUNTY—A survey party is rushing the location between Upper Lake and the east county line. The convict camp is located about two miles east of Sweet Eollow summit and work is progressing satisfactorily. Stormy weather makes it necessary to approach this camp by way of Lower Lake.

No construction contracts are in progress.

Under maintenance the following work is under way or contemplated:

Two timber bridges are under construction on the Calistoga-Lakeport road and are about half completed.

On the Hopland-Lakeport road, ditching work under maintenance specific is well started and under major slides work is one-fourth completed.

LASSEN COUNTY—The work of resurfacing with fine crushed rock over the Fredonia Summit, between Westwood and Susanville, was completed this month, sufficient surfacing having been applied to carry this road through the winter in good condition for traffic.

Widening, some surfacing and other improvement work has been started on the section of road built by the state and Lassen County in cooperation a couple of years ago, between Long Valley Creek and the state line, on the Reno-Susanville road. This work will be continued as long as weather permits, and considerable improvement will be effected by the time

the summer traffic sets in next year. The gravel which has been placed will render this road more usable during the coming winter.

In anticipation of work in the near future, Lassen County is now engaged in securing the rights of way for the state highway across Big Valley, between Bieber and Adin. When this section of road is completed the distance between these two towns will be shortened by over four miles, as the new location will follow an almost direct course across the valley between these towns.

LOS ANGELES COUNTY—Three of the four proposed retaining walls now being constructed on the Arroyo Seco road north of Pasadena are completed and the fourth one is in progress. The walls are being constructed as a flood protection measure.

The construction of four concrete retaining walls along the state highway in the Arroyo Seco north of Pasadena has been completed and the earth embankment back of the walls is now in place. Flood waters in the canyon following the storm of February last washed away the highway in two places and threatened it to such an extent in other places that it was necessary to protect the highway embankment with concrete walls.

Good progress continues to be made on the improvement of the Ridge Route on the Los Angeles to Bakersfield highway. A special day labor crew, superintended by M. L. Sullivan, equipped with a gas shovel and fleet of trucks, is at work improving the alignment and widening sharp curves. Work which was commenced at the foot of the Ridge Route near the Castaic school house has advanced northerly to a point beyond the state's maintenance station at Liebre.

MADERA COUNTY—Test pits for bridges are being sunk at Ash and Berenda sloughs in Madera County. These bridges, when built, will eliminate the necessity for detours when sloughs are flooded, which often occurs during the rainy season.

MARIN COUNTY—Surfacing of the Redwood highway between Ross and Larkspur (through Kentfield) has been advertised, with bids opened at the District IV office, December 6, 1927.

Reconstruction of the Redwood highway between Ignacio and San Rafael is contemplated in the near future, plans and estimates being nearly ready for advertising. Realignment and regrading, second story concrete and asphalt surface will bring this section to modern requirements.

Specific maintenance job, on the Redwood highway, San Antonio Creek to San Rafael, consisting of draining the roadway by placing drain tile, has been completed.

MARIPOSA COUNTY—Briceburg grade, on the Yosemite highway, has been widened and surfaced with oil mixed macadam and Contractor Burnett is now erecting about two miles of standard guard rail. This will adequately protect motorists who are unfamiliar with the Briceburg Grade.

MENDOCINO COUNTY—A portion of this county has recently been added to District IV, and while no contract work is contemplated in the near future, considerable maintenance work is under way.

On the Redwood highway, between Ukiah and the south boundary line, stockpiling of rock dressing taken from the adjacent river, has been started.

Between Calpella and Ukiah, the repair of the six span reinforced concrete girder type bridge over Ackerman Creek is one-half complete. The first pier north of the south abutment of this bridge was undermined by flood water, part of the pier breaking off. A pro-

tection fence of posts, Elwood fencing and brush is being built and a new pier constructed.

Ditching of the Hopland-Lakeport road has been started.

MERCED COUNTY—The road for the west boundary of Merced County to the beginning of the concrete pavement, is under maintenance by District IV. The roadway is graded and rocked and has recently been oil treated.

A contract for nine miles of rock borders on the Pacheco Pass road from Los Banos east has been awarded to Larsen Bros. of Livermore.

MODOC COUNTY—The construction of the Rattlesnake Creek bridge, a mile and a half east of Alturas, was completed by Contractor Maurer early in December and the construction of the gravel fill approaches across the meadows for a distance of about 1500 feet was also completed at that time by state forces, so that this long standing obstruction to traffic was eliminated for those who use the road through the coming winter.

The state forces, under Superintendent Clarke, have just completed the elimination of two heavy pitches in the grade of the old road west of Cedarville, on the Alturas-Cedarville highway. The elimination of these two heavy pitches by the relocation and grading of the road will enable the residents of Surprise Valley to haul maximum loads from Surprise Valley to the railroad, as the grades do not now exceed 7 per cent on the entire road.

MONO COUNTY—The widening of concrete girder bridge spans and timber spans from 16 feet to 24 feet has been under way between the Sherwin Hill and Deadman Creek for some time and it is proposed to extend this work into the Owens Valley.

The widening of dangerous points on the Tioga road has been in progress during the past season, work deferred until next season owing to stress of weather conditions. On the Sonora road the same class of work has been under way together with the erection of log bridges at Silver Creek, Silver Falls, Wolf Creek and Soda Creek. The fording of these streams has always been a menace to travel and the Sonora road throughout notorious for its limited width, steep grades and dangerous turns. Although there is still much to be done, the improvements made during the past season are very much in evidence and the trip over the Sonora Pass may now be made with comparative comfort and safety.

MONTEREY COUNTY—The construction of a bituminous surface on 20 miles of rock border between Greenfield and San Lucas has recently been completed by state forces. It is intended to carry this work southward as far as San Ardo next spring. This work was handled by R. S. Peck, foreman.

Work was recently started and is now well advanced on the contract for the reconstruction of 1.9 miles of highway north of Salinas extending from the northerly city limits, passing the Rodeo grounds to the Santa Rita road junction. This contract, which was awarded to Charles W. Wimmer, of Santa Barbara, includes the tearing up of the macadam pavement, salvaging enough rock for the construction of rock borders and the construction of a new 20 foot concrete pavement.

Preparations are being made for the construction by convict labor of a portion of the San Simeon-Carmel highway. A survey party is now engaged working north from Salmon Creek along the Monterey coast in the south end of the county and preparations are now being made for the establishment of a convict camp for the beginning of construction next spring.

NEVADA COUNTY—Maintenance station facilities at Nevada City, consisting of truck and storage building, oil house, and sewage disposal are now complete.

ORANGE COUNTY—On the reconstruction job on the state highway in Orange County, between Galivan and Irvine, 5.7 miles long, all grading and culvert work has been completed. Good progress is being made on the pavement construction, there being about 2½ miles of half-width pavement now in place.

A strip of new concrete pavement 10 feet wide, half of the proposed width, has been completed and opened to traffic along the entire length, 5.7 miles, of the reconstruction of the state highway between Galivan and Irvine. Rough grading has been completed and all culverts are in place, while work proceeds rapidly on the second 10-foot strip of concrete pavement.

On the construction of the connection between the coast highway through Huntington Beach and Laguna, with the Los Angeles to San Diego highway, at Serra, all culverts are in place and grading is in progress. The two underpass crossings of the Santa Fe tracks are completed except for paving, and the railroad company is running trains over the new roadbed, their tracks having been elevated to permit of the underpass crossings of the highway.

In cooperation with the Olive and West Orange Protection District the state is constructing 2200 lineal feet of pipe and woven wire and brush bank protection work to prevent flood waters of the Santa Ana River from cutting away the approaches to the highway bridge on the state highway between Anaheim and Santa Ana.

PLACER COUNTY—Due to unfavorable weather Hy. Nelson, contractor, has discontinued placing standard gravel road surfacing between Baxters and Shelter House No. 1, east of Gold Run, and will stockpile the material for use next spring in the "oil mix."

The work of reflooring and strengthening the two trestles over the Southern Pacific Railroad at Bowman is under way, by F. R. Renter. About a month will be required to complete the job.

PLUMAS COUNTY—Early in November, Contractor Clendenning completed the construction of a 1-mile connection between the recently completed Lake Almanor causeway at Chester and the end of the constructed highway on the east of the lake. This section was surfaced with gravel by state forces, which work completes the construction of the entire state highway between Westwood and Chester, and will be of great service to next summer season's heavy traffic.

On account of additional improvements made to the county road between Morgan Springs and Chester this year, traffic over this section through the late fall and during the early spring, before and after the snow blockade, will find the road easier to negotiate under winter conditions than it ever was before.

Additional facilities, a cook house and sewage disposal, are being installed at Spanish Ranch maintenance station.

RIVERSIDE COUNTY—Last year a realty firm subdivided property adjacent to the highway opposite the town of Coachella. Before subdivision, upon consultation with the district engineer, they agreed to donate 32 feet of additional right of way, making the state highway 92 feet wide in front of the subdivision at this point. The foresighted action of these subdividers is now bearing fruit in the development of fine business property along their subdivision.

The maintenance forces between Mecca and Blythe are rejoicing in recent rains. Following the rains

they have dragged this eighty miles of earth road and it is, at present, in better shape than for many months.

Standard guard rail to the extent of 1891 feet has been completed around the sharp curve east of White-water bridge as a safeguard to traffic.

SACRAMENTO COUNTY—The concrete paving work at the approaches to the Ben Ali subway under contract to C. W. Wood is progressing. It is expected the subway will be open by Christmas.

The reconstruction work between Sylvan School and Roseville is well under way. Grades and line are being improved and roadway widened. A 20 foot asphaltic concrete pavement, 6 inches thick, is being placed as a reconstruction job. Where the present grade is followed the pavement will be widened and thickened with asphalt concrete to conform to the new work. Two feet by 4-inch rock borders will also be constructed. J. C. Compton is the contractor.

L. D. Moore, Sacramento, was awarded on November 30 the contract for placing 400 tons of standard crushed rock surfacing from the intersection of Del Paso boulevard and El Camino avenue, North Sacramento, to a point about two miles easterly. The portion now being paved at the Ben Ali subway excepted.

The Arno job, a line improvement between Sacramento and Galt, is just getting under way. Bids were opened November 7, and Mankel & Staring were low bidder. Eleven bids were received. On November 19, Contract 910EC2 was awarded to Mankel & Staring. The construction consists of grading and surfacing with standard road surfacing, crushed gravel or stone. The contract bid was \$38,331.30, while the engineer's estimate was \$44,202.90. A. K. Nulty, previously with this district, but more recently with District VI, has been assigned as acting resident engineer on this contract.

The long trestle north of Arno is being repaired by maintenance crews to place it in good shape prior to high water.

SAN BENITO COUNTY—A new concrete bridge built by the state with the cooperation of San Benito County has recently been completed across Pacheco Creek on the Pacheco Pass cut-off about seven miles north of Hollister. This was constructed by George J. Ulrich, contractor, under the supervision of the Bridge Department.

A section of the Hollister-Gilroy road is under the jurisdiction of District IV. The bridge across Pacheco Creek is completed and it is proposed to finish grading the approaches on the new alignment, regrade a section of same and construct rock surfacing. It is hoped to complete this work before the heavy winter rains.

SAN BERNARDINO COUNTY—The Foothill boulevard is the main artery for travel between the city of San Bernardino and Los Angeles. Traffic over this route is continually increasing and San Bernardino County has found it necessary to improve and maintain parallel roads on both sides of this highway within a distance of two miles.

The present pavement on this road was constructed between the years 1913 and 1915. Prior to this time this road consisted only of two well-worn wheel tracks in the sand with a few stretches of old broken oil cake.

The Foothill boulevard will soon advance to the third stage in its development. The 18-foot pavement laid in 1914 has served well for a period of 13 years, but it is breaking down under the hammering of the endless line of traffic. A project is now under way to repair this pavement and widen it to 30 feet, the first unit of the work being under construction by Contractor Steele Finley of Santa Ana.

The engineers are not unmindful of the necessity of a possible fourth, fifth or innumerable other stages of

this development in the future, hence the activity of our Right of Way Department which is securing deeds for a 100-foot right of way throughout. The property owners are to enjoy possession of the additional width thus acquired until such time as it is needed for highway purposes.

OCEAN TO OCEAN HIGHWAY, REDLANDS TO SAN BERNARDINO-RIVERSIDE—About five miles of the Ocean to Ocean highway, extending from the city limits of Redlands to the San Bernardino-Riverside County line is now being reconstructed. The first mile of the existing road is an old and broken cement concrete pavement 16 feet wide and extends to the Yucaipa junction. This will be repaired by placing a new 20-foot cement concrete pavement on top of the old pavement. The remainder of the road is now an old and worn oiled macadam. This will be torn up and replaced by a 6-inch cement concrete pavement 20 feet wide. The material in the old macadam will be salvaged and placed along the edges of the new pavement, thereby increasing the width which can be used for travel.

CREST ROUTE—The improvement of the Crest route from Running Springs Park has been under way since July, 1926. The new road is being constructed along a survey made by the United States Bureau of Public Roads and will form an extension of the proposed new high gear road from San Bernardino toward Big Bear Lake. A small crew operating a gas shovel has been employed and to date about four miles of grading has been completed.

SAN DIEGO COUNTY—All work has been completed on the La Mesa to El Cajon reconstruction job in San Diego County. The new 20-foot concrete pavement with broad shoulders replaces a stretch of 15-foot pavement with numerous sharp curves.

Placing of the concrete pavement on the line change which will carry the highway over the new overhead crossing of the Santa Fe tracks at Del Mar in San Diego County, has been completed. Work is now in progress placing bituminous macadam where the new fills were too deep to pave with concrete.

On the San Diego to El Centro highway between Sweetwater Bridge and Live Oak Springs, the maintenance crews are surfacing with disintegrated granite, stretches of highway aggregating over four miles.

A special maintenance crew working under a specific allotment recently completed the construction of 3000 lineal feet of pipe and woven wire and brush bank protection work along Pine Valley Creek and La Posta Creek where the San Diego to El Centro highway was damaged during the storm of February.

SAN FRANCISCO—The only work done in this county was the slide control work on the Skyline boulevard.

SAN JOAQUIN COUNTY—Grading work on the new northerly entrance to Stockton, under a contract awarded to Frey & Holden, is progressing as rapidly as weather conditions will permit. The grading is nearly completed and some gravel has been placed north of Cherokee Station. The contract calls for constructing a graded roadway and placing standard road surfacing, crushed gravel or stone. Jess Cole is resident engineer on this contract.

SAN LUIS OBISPO COUNTY—The reconstruction of the highway from San Luis Obispo to Pismo was recently awarded to J. F. Knapp, contractor. Grading and culvert work is moving ahead rapidly. The contractor's organization includes two shovel outfits, two culvert crews, a clearing and a fencing crew. The first portion of the road to be graded is the short

hill known as Ontario grade, near where the highway first reaches the ocean.

Extensive work is under way for realignment of bad curves throughout San Luis Obispo County. Four of the sharpest curves between Paso Robles and Templeton were recently replaced by long radius curves making easy alignment over this portion of the road. Plans have been prepared for the elimination of most of the sharper curves between San Luis Obispo and Santa Margarita and construction work is now starting on the realignment of two of these curves about three miles north of San Luis Obispo.

SAN MATEO COUNTY—The contract for grading roadway and constructing structure on the Bottleneck on the Peninsula highway, Colma to Cypress Lawn cemetery, Kaiser Paving Co. has been completed and final estimate and report submitted.

As a preliminary contract to the paving of this section, an extremely expensive and difficult piece of work, it has been brought to a successful conclusion to the satisfaction of the contractor and state.

The paving of this section by the Hanrahan Co. is nearing completion; 90 per cent of concrete has been poured and the asphalt concrete work is well started at street railway crossings.

The feat of opening most of this roadway to the heavy traffic of the annual California-Stanford football game, November 19, was a noteworthy one. The last of the necessary concrete, a 7-sack mix and calcium chloride, was poured in time to open to traffic at 8.30 a.m., November 19, 1927, both north and southbound traffic being split on their proper lanes.

The Bayshore highway is receiving considerable attention lately.

The section of original county road, San Francisco to South San Francisco, is being resurfaced and patched with asphalt concrete. Federal Construction Co., contractors. This is only temporary work, pending the complete construction of a new highway, plans and estimate for which are nearly complete and a contract for which should be let shortly.

The surfacing of the section from South San Francisco to Broadway Station is pending an award of contract and should progress rapidly.

The advertising of the grading and rocking of the section between Broadway Station and Fifth avenue, San Mateo, will soon be made and with the completion of this section a wide highway would be opened to relieve the congestion of the Peninsula highway.

The investigation for the purpose of determining the correct method of controlling a critical slide condition on the Skyline boulevard near the San Francisco-San Mateo County line, through the Olympic Club Golf Club grounds, has been three-fourths completed.

Considerable money has been spent endeavoring to control this situation as an extremely expensive relocation and construction of the highway will be necessary if this slide continues.

Under a Day Labor Maintenance Work Order the shoulders were widened on the Peninsula highway between San Mateo and Redwood City.

On the Peninsula highway, between Beresford and Redwood City, the concrete structures over Laurel and Cordilleras creeks were widened.

SANTA BARBARA COUNTY—An old concrete and masonry bridge over Badger Creek about one mile north of the city of Santa Barbara which has proved inadequate for modern loads has recently been strengthened by state forces working under J. S. Butler, foreman. This work included the placing of steel I beams intermediate between the existing girders, the new steel I beams being encased in gunite.

On the San Jose Creek bridge, about five miles north of Santa Barbara, repair of damage caused by the heavy floods of last winter has recently been completed by state forces under the direction of J. S. Butler, foreman.

The construction of a bituminous surface over the rock borders between Santa Barbara and Goleta has recently been completed by state forces under the direction of J. S. Butler, foreman.

The construction of a concrete highway 30 feet wide on a newly widened right of way 80 feet wide has recently been completed between Carpinteria and Summerland, south of Santa Barbara. This work was performed by Sam Hunter, contractor, with E. B. Brown and later C. M. Butts, as resident engineers.

Work has just been completed on grading and surfacing the approaches to the new concrete bridge in Gaviota Canyon. This construction follows a new alignment which eliminates two very dangerous curves. The work was performed under a district contract with Ira Hodson and E. P. Carter, contractors, and T. W. Voss, resident engineer.

Contract has recently been awarded to J. F. Collins, contractor, for the construction of 24 miles of rock borders in the northern part of Santa Barbara County between Orcutt and Zaca.

SANTA CLARA COUNTY—The Oakland-San Jose road, between the north boundary and Milpitas, is under construction, Allied Contractors, Inc., contractors. This section is included with the section in Alameda County. Grading for Portland cement concrete strip and shoulders on right is complete. Pouring of concrete strip should start soon. When the asphalt plant is complete and weather conditions allow, the asphalt pavement can be constructed, but at this time of the year that is problematical.

Plans for a grade separation on the Pacific highway near Sargent are under preparation, to be advertised in the near future.

The timber bulkhead to be constructed on the Peninsula highway near Redwood City has not been started, but material has been ordered.

Repair of storm damage in channel change on the Pacheco Pass road, about 9 miles east of Gilroy, at Cedar Creek, has been completed. This work consisted of widening and deepening channel and of strengthening the wire guard fence.

SHASTA COUNTY—Graveling on the Redding-Alturas road between Montgomery Creek and Round Mountain, which was completed this month, will greatly improve this section for the coming winter. Numerous sharp curves are being flattened and widened on the section east of Montgomery Creek, over Hatchet Creek Mountain which, when completed during the next month or two, will effect a considerable improvement on this section.

Work is just starting on the widening of some of the very narrow road which was constructed by convicts at Manzanita Hill, about 30 miles east of Redding. Although this work will not bring this portion of the highway up to modern standards, it will be a great help to traffic, as this section is one of the most narrow and dangerous pieces on this road.

Work is progressing nicely on the section of the reconstruction of the Pacific highway between LaMoine and Shotgun Creek. The grading work is more than 80 per cent complete, and rock surfacing will follow rapidly, so that this portion of the road will be in suitable condition for handling traffic this winter, although it is not expected that the entire contract will be completed before March.

The bridges across Dog Creek and Slate Creek on the 5-mile section south of LaMoine were completed, and opened to traffic early this month. The opening

of these two bridges shortens the distance between Redding and Dunsmuir by a full mile, due to the relocation of the highway connected with the bridges.

The convict camp which has been engaged on work in Del Norte County for the past two years, has now been moved to the Buckhorn Summit, about 20 miles west of Redding, and has settled down to work on that section. One hundred twenty men are engaged on this work, which is of a very heavy nature, and are making excellent progress.

SISKIYOU COUNTY—Widening of the graded section and the extension of culverts in connection therewith, along the pavement between Dunsmuir and Weed, was completed in November, by the state maintenance forces, and numerous narrow places were eliminated, making this road generally roomier and more comfortable for traffic.

The graded connections to the temporary bridge across Beaver Creek, on the Klamath River road, were widened and improved this month, and work of the same nature is going on on two or three other short stretches of this road, which will effect a noticeable improvement to those who use it.

SOLANO COUNTY—Plans and estimates have been submitted to our central office for grading and surfacing the road from the Napa County line to a point north of Cordelia. This road lies between Napa Junction and Fairfield. The proposed work consists of widening the roadway and improving grades through Jameson Canyon; also the construction of a road over new right of way north of Cordelia. The surfacing under this improvement will consist of widening and thickening the existing pavement with bitumen macadam and surfacing the new road with standard road surfacing, crushed gravel or stone.

Maintenance crews will soon start replacing all dead and defective trees along the state highway in Solano County.

SONOMA COUNTY—The construction and surfacing of approaches to the newly constructed bridge over Sonoma Creek on the Black Point cut-off near Schellville, has been advertised. This project is of great value and interest as the new alignment cuts out two very sharp curves on the road to Napa, and allows the use of a new, wide bridge instead of the old narrow county-built structure which is near failure.

The ditching on the Redwood highway between the northerly boundary and Cloverdale is well started under 94KI.

On the Redwood highway, between Cloverdale and Healdsburg, near Lytton, the guard rail is about half completed.

STANISLAUS COUNTY—Bids will be called for soon for the construction of a highway north of Ceres over new right of way. This line change will replace two sharp reverse curves with long easy curves. The proposed construction will consist of grading and placing asphaltic concrete pavement 20 feet wide on a crushed gravel or stone subbase.

The Sonora Pass road is open as far as Long Barn. Heavy snow and rain have closed the road above that point. Maintenance crews are doing some excellent work on the road between Long Barn and Strawberry to place it in shape for summer travel.

TEHAMA COUNTY—Bids were received early this month covering the application of additional rock surfacing on the county road which is under state maintenance, from Red Bluff to a point 2 miles east of Dale's Ranch, on the Red Bluff-Susanville road. It is planned to complete this work during the winter, allowing sufficient wet weather to compact the rock thoroughly, and to oil this section next summer, thereby

eliminating one of the roughest portions of this road for next season's traffic.

Work of widening the roadway, building up the shoulders, and improving the drainage has been going on between Corning and Red Bluff, and between Red Bluff and Cottonwood for the past two months, and the work contemplated at this time will be completed during the winter. This work will bring additional sections of these roads up to the modern 30-foot standard of width.

Numerous sharp turns on the highway between Mineral and Paynes Creek were flattened and widened during the past two months, which will effect a noticeable improvement for the heavy summer traffic which uses this road each season.

TRINITY COUNTY—Construction of a bridge across the Trinity River at Cedar Flat has reached such a point that there is now no danger of high water interfering seriously with the completion of the work. Even though the water does reach flood stage now, the work of completing the superstructure may proceed without interruption, and it is expected that this bridge, including the approaches, will be completed and open for traffic some time in February.

The work of widening and eliminating sharp turns on the road between Forest Glen and Mad River, a portion of the Red Bluff-Eureka road, was completed last month. After passing through the winter, the numerous grade changes made will have settled, and will be trimmed up in the spring, so that those using this portion of the road next summer will notice a decided improvement in it.

TULARE COUNTY—The outfit painting center line is now working on Route 4 in Tulare County. Progress is slow on account of wet weather and fog.

TUOLUMNE COUNTY—Widening and improving the alignment on the Big Oak Flat road near Berkeley Camp by maintenance forces is being financed by the Minor Improvement and Betterment Fund.

Maintenance crews are being kept busy removing slides on Priests grade which have been caused by recent heavy rains.

For the first time in the history of the Big Oak Flat road, traffic will have no difficulty in going as far as South Fork during the winter, as during the summer months that highway was rocked from Groveland to South Fork, placing it in good shape. We would not advise motorists to attempt to use the Big Oak Flat road above South Fork, as the heavy rains and snow have made this part of the road impassable.

VENTURA COUNTY—The construction of 650 feet of concrete retaining wall across a sand pocket in the slope between the state highway and the Southern Pacific Railroad near Sea Cliff, west of Ventura, has recently been completed by Hall Brothers, contractors.

Six hundred lineal feet of bank protection is being constructed along the west side of the Santa Clara River, on the coast highway between El Rio and Montalvo. The work, which is being done by a special maintenance crew, consists of the construction of thirty reinforced concrete skeleton tetrahedrons, tied together with 1-inch cables. This type of bank protection has been used with excellent results along the Santa Clara River since 1912.

YOLO COUNTY—Drainage conditions at the M street subway in West Sacramento have been greatly improved by the placing of an automatic pump and several hundred feet of tile drain.

The firm of Davies & James of Stockton are painting the guard rail on the Yolo causeway and approaches.

FROM OTHER STATES

ARIZONA—The Arizona highway commission has approved the budget for the highway department for the fiscal year ending June 30, 1928, calling for a \$5,200,000 program.

State Engineer W. C. Lefebvre and W. W. Lane, chief engineer, will commence at once to prepare plans and specifications for the project to be taken up at once under the budget, and to advertise for bids for those projects scheduled to be started first.

The first work to be done will be the completion of the two miles of the Apache Trail necessary to reopen it.

COLORADO—Pavement assaying three thousand dollars in gold to the mile was laid near Colorado Springs. Mine tailing from the Cripple Creek district, containing \$1.50 in gold to the ton, was found to be the most economical aggregate.

KENTUCKY—The eighth biennial report of the Highway Commission of Kentucky states that:

"The total receipts from all sources, federal, state and county, for the two fiscal years, 1925-26 and 1926-27, covered by this report were \$26,773,989.68. The total disbursements for the same biennium \$21,288,983.09. Of the latter amount \$7,666,766.48 was for construction and reconstruction work done under contracts made prior to the period, but completed in whole or in part during this period. The sum of \$6,113,120.70 was for construction and reconstruction contracted for within the period and finished in whole or in part during such period—a total for construction \$13,779,887.18. The total for maintenance, additions and betterments to roads and bridges, not including all reconstruction done under the head of maintenance, nor the expenditures of the Division of Equipment, was \$4,253,006.

"Construction has been so distributed that the principal gaps on all through routes have been closed, leaving only a scattered few yet to be let to contract for constructive improvement of a high standard. Much of the work of the past year and that of 1925-26 has been the surfacing of projects graded and drained in years previous."

MICHIGAN is preparing to include a larger mileage than ever before in its snow-removal program. Last winter 5705 miles was served at a total cost of \$302,474 or \$53.02 a mile.

MINNESOTA—Maintenance of paved roads in Minnesota averages between \$150 and \$300 per mile, about \$50 of which is spent on the concrete slab itself.

NEW YORK—The New York Assembly at its last session defeated a measure providing for the collection of a 2-cent gasoline tax. In a recent trade paper an official of the New York Automobile Merchants' Association explains why his organization persistently fought the measure. He states that raising funds for highway construction and maintenance by means of registration fees and gasoline tax, set at a figure proportionate to the highway budget, is fair and reasonable. The objection his association had to the New York program was that *only half* of the funds raised were to be spent for highway improvement, the balance to be used for other purposes.

OHIO—Motor trucks handle more freight than railroads from Columbus to cities within 40 miles, revealed the recent state-wide transportation survey. Highways bore 84.5 per cent of all freight traffic to destinations less than 20 miles distance, 54.7 per cent up to 40 miles, and 32, 24.2 and 2.3 per cent, respectively, to destinations in succeeding 20-mile zones.

UTAH—More than \$500,000 will accrue to the Utah state highway department from general property tax levied for state road purposes during 1927, according to official reports. This revenue will be available to supplement other sources of revenue in the construction and maintenance of the state road system. Its use principally will be to match federal aid in large construction projects and match state aid in some few instances in minor improvements. Under policies laid down by the department none of the money raised from state road taxes levied against general property may be used for maintenance purposes and under the state law the money must be expended in the counties wherein raised. The taxes are levied by the county commissions but are expended by the state department.

WASHINGTON, D. C.—Plans for adding to the system of outer and inner boulevards, parkways, plazas, and recreational centers have been announced by the Capital Park and Planning Commission.

WISCONSIN—With the signing of a bill passed by the legislature almost unanimously, that provides \$100,000 from the motor vehicle license fees with which to pay the state's share of the apportionable cost of grade crossing improvements, it is believed that the state has made a start in a campaign to force the gradual elimination of the grade crossing hazard on the main traveled highways in Wisconsin. There are about 9000 grade crossings in the state, about one-tenth of these being on the state trunk and federal highway systems.

The largest yearly construction program in the history of the highway department is rapidly nearing completion. The 1927 program of approximately 400 miles of concrete surfacing and 1500 miles of gravel and crushed rock surfacing has completed a large number of connecting links on important through highways and has also extended the trunk highway system of hard surfaced roads into sections of the state that have been virtually impassable, especially during the spring break-up due to frost boils and soil conditions. One of the notable features of the present year's program is the construction of a 20-foot width concrete pavement on one of Wisconsin's most important highways in four counties, totaling approximately 60 miles. Under the present plans, it is anticipated that this highway will be paved with concrete from Beloit to the north Marathon county line, a distance of approximately 220 miles, by 1930.

November Record of Bids and Awards

DIVISION OF HIGHWAYS

DEL NORTE COUNTY—Grading and surfacing 3.5 miles between Richardson Creek and southerly boundary. Dist. I, Rt. 1, Sec. A. Engineer's estimate \$185,983.75. Bids opened Nov. 21st as follows: Mercer-Fraser Co., Eureka, \$178,214.10; Pierson and Wm. Von Der Hellen, Medford, Ore., \$169,835.05; James T. Logan, Grants Pass, Ore., \$263,865.75; Jasper-Stacy Co., San Francisco, \$236,912.10; A. J. & J. L. Fairbanks, Inc., San Francisco, \$172,217.40; C. R. Adams, Yreka, \$172,420.80; Kaiser Paving Co., \$197,014.40; Engelhart Paving & Const. Co., \$198,865.50; J. E. Johnston, Stockton, \$168,322.40; Guerin Bros., San Francisco, \$169,771; W. H. Hauser, Oakland.

\$219,320; Tieslau Bros., Berkeley, \$188,104.55. Contract awarded to J. E. Johnston, \$168,322.40.

IMPERIAL COUNTY—Timber bridge across Bullhead Slough and another timber bridge across West Main Canal. Dist. VIII, Rt. 12, Sec. C. Engineer's estimate \$13,085. Bids opened Nov. 7th as follows: Greene Construction Co., Los Angeles, \$13,279.50; Pioneer Transfer Co. of Calexico, \$12,443.50; W. M. Ledbetter & Co., Los Angeles, \$14,736; Norman B. Conway, Los Angeles, \$15,454.50. Contract awarded to Pioneer Transfer Co. of Calexico, \$12,443.50.

MERCED COUNTY—Widening with rock borders 8.7 miles between Los Banos and easterly boundary. Dist. VI, Rt. 32, Sec. C. Engineer's estimate \$21,980. Bids opened Nov. 7th as follows: C. W. Wood, Manteca, \$22,260; Larsen Bros., Livermore, \$17,430; Valley Paving & Construction Co., Visalia, \$19,530; Stewart & Bland, Fresno, \$19,138. Contract awarded to Larsen Bros., Livermore, \$17,430.

ORANGE COUNTY—Dewatering system for Serra subway. Dist. VII, Rt. 60, Sec. C. Engineer's estimate \$7,480. Bids opened Nov. 5th as follows: F. H. Vehring, Long Beach, \$4,885; Thomas Haverly Co., Los Angeles, \$5,504; R. R. Bishop, Long Beach, \$6,701.50; Wheeler Co., Los Angeles, \$7,580; George Herz & Co., San Bernardino; \$8,877; V. R. Dennis Const. Co., San Diego, \$13,660. Contract awarded to F. H. Vehring, \$4,885.

SACRAMENTO COUNTY—Grading and gravel surfacing 1.8 miles one mile south of Arno to one mile north of Arno. Dist. X, Rt. 4, Sec. A. Engineer's estimate \$44,202.90. Bids opened Nov. 7th as follows: C. W. Wood, Manteca, \$46,379.10; M. A. Jenkins, Sacramento, \$46,480.50; J. F. Collins, Stockton, \$45,048.50; C. T. Malcom, Walnut Creek, \$47,724.00; Tieslau Bros., Berkeley, \$46,542; Mankel & Staring, Sacramento, \$38,331.30; P. L. Burr, San Francisco, \$50,351.80; M. J. Bevanda, Stockton, \$50,196.30; A. Teichert & Son, Inc., Sacramento, \$57,848.80; Edward K. Rice, Sacramento, \$51,395.50; Charles Harlowe, Jr., Oakland, \$47,892. Contract awarded to Mankel & Staring of Sacramento, \$38,331.30.

SAN MATEO COUNTY—Resurfacing with asphaltic concrete 4.5 miles between Visitation Valley and South San Francisco. Dist. IV, Rt. 65, Sec. A. Engineer's estimate \$13,200. Bids opened Nov. 1st as follows: Federal Construction Co., San Francisco, \$10,532; Fay Improvement Co., San Francisco, \$14,700; Eaton & Smith, San Francisco, \$13,500; A. G. Raisch, San Francisco, \$12,840; Haunahan Co., San Francisco, \$13,720; Christensen Construction Co., San Francisco, \$12,944; Pacific States Construction Co., San Francisco, \$11,940. Contract awarded to Federal Construction Co., \$10,532.

SAN MATEO COUNTY—Grading and surfacing with crushed stone 5.2 miles between South San Francisco and Broadway Station. Div. IV, Rt. 68, Sec. B. Engineer's estimate \$140,005. Bids opened Nov. 14th as follows: Granite Construction Co., Watsonville, \$123,498; Eaton & Smith, San Francisco, \$162,835; McDonald & Maggiora, San Francisco, \$137,110; Tieslau Brothers, Berkeley, \$128,127.50; Grantfield, Farrar & Carlin, San Francisco, \$108,210; C. W. Wood, Manteca, \$135,780; Jack Casson, Hayward, \$133,239; Allied Contractors, Inc., Omaha, Neb., \$127,221.60; Guerin Bros., San Francisco, \$131,454; Peninsula Paving Co., San Francisco, \$142,089; J. P. Holland, Inc., San Francisco, \$119,000. Contract pending.

SANTA BARBARA COUNTY—Widening with rock borders 24 miles between Orcutt and Zaca. Dist. V, Rt. 2, Sec. A. B. C. Engineer's estimate \$65,550. Bids

opened November 7th as follows: J. F. Collins, Stockton, \$59,340; Tieslau Brothers, Berkeley, \$79,350; M. Blumerkranz, Los Angeles, \$64,860; Pearson & Benson, Santa Monica, \$69,690; Nighbert & Carnahan, Bakersfield, \$65,550. Contract awarded to J. F. Collins, Stockton, \$59,340.

SHASTA COUNTY—Bridge across Shotgun Creek 3½ miles south of Sims. Dist. II, Rt. 2, Sec. D. Engineer's estimate \$19,435. Bids opened Nov. 17th as follows: E. B. Skeels, Roseville, \$19,902.50; Holdener Construction Co., Sacramento, \$23,375; Victor R. Gede, Oakland, \$24,567.50; E. M. Bordwell, Napa, \$20,231.25; A. Young, Yreka, \$21,670; J. P. Brennan, Redding, \$22,862.50; Noble Bros., San Jose, \$25,485. Contract awarded to E. B. Skeels of Roseville, \$19,902.50.

DIVISION OF ARCHITECTURE

NAPA STATE HOSPITAL—Pasteurizer and cooling equipment. Bids opened Nov. 10th as follows: Creamery Package Mfg. Co., San Francisco, \$3,513; Vulcan Iron Works, San Francisco, \$3,885; Cyclops Iron Works, San Francisco, \$3,900. Contract awarded to Creamery Package Mfg. Co., San Francisco, \$3,513.

NAPA STATE HOSPITAL—White tile and marble work. Bids opened Nov. 2d as follows: H. P. Fischer Tile & Marble Co., Sacramento, \$872; H. O. Adams, Sacramento, \$912; Art Tile & Mantel Co., San Francisco, \$995; Mangrum & Otter, Inc., San Francisco, \$1,130. Contract awarded to H. P. Fischer Tile & Marble Co., Sacramento, \$872.

SAN JOSE STATE TEACHERS COLLEGE—Repairs to roof of main building. Bid opened Nov. 8th. W. J. Porter, San Jose, \$1,439. Contract awarded to W. J. Porter.

PATTON STATE HOSPITAL—Tile roof on wards C and D. Estimate \$2,625. Bids opened Nov. 8th as follows: Sunset Tile Co., Redlands, \$1,584.69; R. G. Blessing, Alhambra, \$1,890; French & Meloney, Los Angeles, \$1,995; C. L. Passmore, Los Angeles, \$3,376. Contract awarded to Sunset Tile Co., Redlands, \$1,584.69.

CALIFORNIA POLYTECHNIC SCHOOL—Electrical work in boys' dormitory. Estimate \$1,580. Bids opened Nov. 15th as follows: Jacobs Electric Co., S. Pasadena, \$1,548; A. V. Cline, San Luis Obispo, \$1,678; Valley Electric Co., San Luis Obispo, \$1,773; Walter H. Smith, Long Beach, \$1,850; Matson-Seabrooke Co., Oakland, \$2,331; C. V. Hitchcock, Pacific Grove, \$3,397. Contract awarded to Jacobs Electric Co., \$1,548.

General work on boys' dormitory. Estimate \$29,310. Bids opened Nov. 15th as follows: Peter Sorensen, San Francisco, \$26,295; Lamb & Bobick, Sacramento, \$28,400; Alfred L. Vezina, Santa Barbara, \$28,440; Carl N. Swenson, San Jose, \$28,835; Roy L. Richardson, Santa Barbara, \$29,100; Ira C. Boss, Sacramento, \$29,190; W. J. Smith, San Luis Obispo, \$29,744; Theo. M. Maine, San Luis Obispo, \$29,800; Schuler and McDonald, Oakland, \$30,375; R. S. K. MacMillen, San Francisco, \$44,299. Contract awarded to Peter Sorensen, San Francisco, \$26,295.

Plumbing and heating work in boys' dormitory. Estimate \$6,570. Bids opened Nov. 15th as follows: Latourrette-Fical Co., Sacramento, \$7,390; E. M. Payne, San Luis Obispo, \$7,460; Walter H. Smith, Long Beach, \$8,306; Sweeney & Sons, Santa Barbara,

\$9,997. Contract awarded to Latourrette-Fical Co., \$7,390.

PRESTON SCHOOL OF INDUSTRY—Moving clubhouse. Bids opened Nov. 18th as follows: O. F. Brown, Sacramento, \$800; D. H. Moiser & Son, Sacramento, \$1,090. Contract awarded to O. F. Brown.

SACRAMENTO ARMORY—New wood floor. Estimate \$3,590. Bids opened Nov. 18th as follows: Layrite Floors, Oakland, \$2,980; McLean Hardwood Floor Co., Stockton, \$3,050; Royal Floor Co., San Francisco, \$3,072; Sacramento Valley Floor Co., Sacramento, \$3,195; Geary Floor Co., San Francisco, \$3,250; Sacramento Hardwood Floor Co., Sacramento, \$3,250. Contract awarded to Layrite Floors, Oakland, \$2,980.

PRESTON SCHOOL OF INDUSTRY—Return tubular boiler and equipment. Estimate \$12,000. Bids opened Nov. 22d as follows: Walter S. Leland, San Francisco, \$9,607; Alt. No. 1, \$11,465; E. L. McCurtain, San Francisco, \$10,470; Alt. No. 1, \$11,599; Latourrette-Fical Co., Sacramento, \$10,327; R. G. Meyler Corp., Los Angeles, \$11,300; Alt. No. 1, \$12,860. Contract awarded to Walter S. Leland, San Francisco.

VETERANS' HOME—Tile roofing Post Exchange. Bids opened Nov. 23d as follows. (Furnishing and laying.) W. L. Saxby, Oakland, \$1,750; Eckhardt & Ferrabee, Oakland, \$1,847; Homer H. Sosso, San Francisco, \$1,970; Malott & Peterson, San Francisco, \$2,120. (Furnishing only.) Gladding, McBean & Company, San Francisco, \$1,315; W. L. Saxby, Oakland, \$1,425; California Pottery Co., Oakland, \$1,451. Contract awarded to Gladding, McBean & Co.

MENDOCINO STATE HOSPITAL—White tile and marble work on Wards "D" and "S." Bids opened Nov. 25th as follows: H. O. Adams, Sacramento, \$2,175; H. P. Fischer Tile, Sacramento, \$2,238; Art Tile & Mantel Co., San Francisco, \$2,876; Mangrum & Otter, Inc., San Francisco, \$3,120; E. W. M. Evans & Sons, Petaluma, \$3,124. Contract awarded to H. O. Adams, Sacramento, \$2,175.

WATER PERMITS AND APPLICATIONS

Permits to appropriate water issued by the Department of Public Works, Division of Water Rights, during the month of November, 1927:

TRINITY COUNTY—Permit 2919, Application 5605; issued to J. H. Bannon, Hayfork, November 16, 1927, for 2.5 cubic feet per second from Morgan Gulch in section 18, T. 31 N., R. 11 W., for mining purposes in section 18.

Permit 2920, Application 5615; issued to J. H. Bannon, Hayfork, November 16, 1927, for 2 cubic feet per second from McCovey Gulch in section 8, T. 31 N., R. 11 W., for mining purposes in section 18. Estimated cost \$1,000.

LASSEN COUNTY—Permit 2927, Application 3232; issued to Homer C. Jack and Antone Avilla, Bieber, November 30, 1927, for 4910 acre-feet per annum from (1) Packwood, (2) Windmill Flats and (3) Juniper creeks in sections 29 and 16, T. 37 N., R. 9 E., and section 36, T. 38 N., R. 8 E., for irrigation of 2480 acres near points of diversion.

Permit 2928, Application 5609; issued to Max K.

Lambert, Doyle, November 30, 1927, for 1.5 cubic feet per second from Long Valley Creek in section 35, T. 26 N., R. 16 E., for irrigation of 120 acres in section 35. Estimated cost \$1,000.

NEVADA COUNTY—Permit 2909, Application 5337; issued to Chas. J. Lyser, agent for the Spanish Mining Company, c/o John F. Davis, 1404 Humboldt Bank Building, San Francisco, November 3, 1927, for 1.5 cubic feet per second from Devil's Canyon Creek in section 30, T. 18 N., R. 11 E., for power purposes in section 31. One hundred twenty-eight t.h.p. to be developed. Estimated cost \$5,000.

PLACER COUNTY—Permit 2917, Application 5673; issued to Arthur A. Halliker, Auburn, November 15, 1927, for 0.2 cubic foot per second from Antelope Ravine in section 8, T. 11 N., R. 7 E., for domestic and irrigation of 13.5 acres. Estimated cost \$500.

EL DORADO COUNTY—Permit 2923, Application 5686; issued to Moose Camp Ground of California, c/o Walter J. Morris, secretary, 2674 Twenty-fourth street, Sacramento, November 25, 1927, for 0.039 cubic foot per second from unnamed stream in section 22, T. 11 N., R. 16 E., for domestic purposes in sections 22 and 23. Estimated cost \$2,000.

Permit 2924, Application 5602; issued to Robert M. Price, Reno, Nevada, November 28, 1927, for 0.001 cubic foot per second from Celesta Creek in section 22, T. 12 N., R. 17 E., for domestic purposes in section 22.

Permit 2911, Application 5679; issued to Selden Ruger Sponsler, 1143 Fulton street, Palo Alto, November 4, 1927, for 0.002 cubic foot per second from unnamed stream in section 15, T. 12 N., R. 17 E., for domestic use in section 15. Estimated cost \$25.

YUBA COUNTY—Permit 2913, Application 5590; issued to Mrs. Mary A. Bean, Strawberry Valley, November 14, 1927, for 0.003 cubic foot per second from West Branch of Rich Gulch in section 29, T. 20 N., R. 8 E., for domestic and irrigation of 1 acre. Estimated cost \$600.

Permit 2914, Application 5677; issued to Mrs. Mary A. Bean, Strawberry Valley, November 14, 1927, for 0.025 cubic foot per second from West Branch of Rich Gulch in section 29, T. 20 N., R. 8 E., for operation of hydraulic ram. Estimated cost \$600.

Permit 2915, Application 5591; issued to John A. Bean, Strawberry Valley, November 14, 1927, for 0.003 cubic foot per second from East Branch of Rich Gulch in section 29, T. 20 N., R. 8 E., for domestic and irrigation of 1 acre. Estimated cost \$600.

Permit 2916, Application 5678; issued to John A. Bean, Strawberry Valley, November 14, 1927, for 0.025 cubic foot per second from East Branch of Rich Gulch in section 29, T. 20 N., R. 8 E., for operation of hydraulic ram. Estimated cost \$600.

BUTTE COUNTY—Permit 2912, Application 5137; issued to W. F. Nantz, 2752 Grove street, Oakland, November 7, 1927, for 2.5 cubic feet per second from Lateral A. A. of Reclamation District 833, in section 8, T. 18 N., R. 2 E., for irrigation of 100 acres in section 8. Estimated cost \$100.

GLENN COUNTY—Permit 2910, Application 5667; issued to Paul Kastner, Orland, November 4, 1927, for 0.09 cubic foot per second from unnamed stream in section 5, T. 21 N., R. 3 W., for irrigation of 7 acres. Estimated cost \$300.

Permit 2926, Application 5595; issued to Eugene Eagan, Orland, November 29, 1927, for 0.21 cubic foot per second from unnamed stream in section 34, T. 22 N., R. 3 W., for irrigation of 17 acres in section 34. Estimated cost \$200.

NAPA COUNTY—Permit 2921, Application 5613; issued to Claude L. Russell, Calistoga, November 21, 1927, for 0.5 cubic foot per second from Troutdale Creek in section 35, T. 10 N., R. 7 W., for domestic and fish propagation in section 35. Estimated cost \$50.

TULARE COUNTY—Permit 2925, Application 5541; issued to Soda Flat Water Association, Porterville, November 28, 1927, for 0.005 cubic foot per second from unnamed spring in section 34, T. 20 S., R. 31 E., for domestic purposes in section 34. Estimated cost \$150.

VENTURA COUNTY—Permit 2922, Application 4481; issued to Frazier Mountain Park and Fisheries Company, Glendale, November 25, 1927, for 0.15 cubic foot per second from a cienega in section 1, T. 8 N., R. 20 W., for domestic purposes. Estimated cost \$2,000.

SAN DIEGO COUNTY—Permit 2918, Application 5684; issued to Evarose Griffin Lloyd, 1307 West Sixty-eighth street, Los Angeles, November 15, 1927, for 0.1 cubic foot per second from unnamed spring in section 22, T. 16 S., R. 1 W., for domestic and irrigation of 7 acres. Estimated cost \$1,000.

Applications for permit to appropriate water filed with the State Department of Public Works, Division of Water Rights, during the month of November, 1927.

SISKIYOU COUNTY—Application 5746; Bull Pine Mining Corporation, 1134 West Thirty-ninth street, Los Angeles, for 3.00 cubic feet per second from Rogers Creek tributary to Klamath River. To be diverted in section 11, T. 12 N., R. 6 E., H. M., for mining purposes. Estimated cost \$2,000.

Application 5747; Bull Pine Mining Corporation, 1137 West Thirty-ninth street, Los Angeles, for 3.00 cubic feet per second from Rogers Creek tributary to Klamath River. To be diverted in section 11, T. 12 N., R. 6 E., H. M., for power purposes. Estimated cost \$4,000.

Application 5750; C. L. Lewis, care of Allen & McNamara, attorneys, Allen Bldg., Yreka, for 0.62 cubic foot per second from Mill Creek tributary to Scott River. To be diverted in section 22, T. 43 N., R. 10 W., M. D. M., for irrigation purposes on 50 acres. Estimated cost \$500.

LASSEN COUNTY—Application 5743; Gotthard Diethelm, Chilcoot, for 0.13 cubic foot per second from unnamed spring tributary to Long Valley watershed. To be diverted in section 29, T. 22 N., R. 17 E., M. D. M., for mining and domestic purposes near point of diversion. Estimated cost \$5,000.

TRINITY COUNTY—Application 5748; M. A. Senger, Weaverville, for 40.00 cubic feet per second from North Fork Trinity River tributary to Trinity River. To be diverted in section 24, T. 35 N., R. 12 W., M. D. M., for mining purposes. Estimated cost, \$46,000.

Application 5766; Grover Allen Gates, Hayfork, for 0.32 cubic foot per second from Little Corral Creek tributary to Hay Fork. To be diverted in section 14, T. 3 N., R. 7 E., H. B. and M., for irrigation and domestic purposes on 25½ acres.

MODOC COUNTY—Application 5764; The Red River Lumber Company, Westwood, for 55 cubic feet per second from Ash Creek tributary to Pit River. To be diverted in section 4, T. 38 N., R. 10 E., M. D. M., for power purposes; 3425 t.h.p. to be developed. Estimated cost \$250,000.

PLUMAS COUNTY—Application 5763; John Uhart, Carson City, for 0.97 cubic foot per second from Eureka Creek tributary to Feather River. To be diverted in section 12, T. 22 N., R. 11 E., M. D. M., for irrigation and domestic purposes on 77.6 acres. Estimated cost \$600.

SUTTER COUNTY—Application 5755; Sutter Basin Improvement Company, Robbins, for 21.05 cubic feet per second from West Dredger Cut of Sutter By-Pass tributary to Sacramento River. To be diverted in section 5, T. 14 N., R. 2 E., M. D. M., for irrigation purposes on 842.127 acres of rice. Estimated cost \$30,000.

Application 5754; Sutter Basin Improvement Company, Robbins, for 18.85 cubic feet per second from East Dredger Cut of Sutter By-Pass tributary to Sacramento River. To be diverted in section 13, T. 13 N., R. 2 E., M. D. M., for rice irrigation purposes on 753.91 acres. Estimated cost \$15,000.

NEVADA COUNTY—Application 5756; Wilson T. Allyn, 1617 O street, Sacramento, for 0.50 cubic foot per second from Rush Creek tributary to South Fork of Yuba River. To be diverted in section 32, T. 17 N., R. 8 E., M. D. M., for mining purposes.

EL DORADO COUNTY—Application 5752; Parnall Gold Mines Corporation, care of Clifton H. Wildman, C. E. O'Donnell Bldg., Placerville, for 2.50 cubic feet per second from Baltic Creek tributary to Camp Creek and Cosumnes River. To be diverted in section 14, T. 10 N., R. 13 E., M. D. M., for power purposes for mining machinery. Estimated cost \$1500.

Application 5753; Parnall Gold Mines Corporation, care of Clifton H. Wildman, C. E. O'Donnell Bldg., Placerville, for 7.50 cubic feet per second from Camp Creek tributary to Cosumnes River. To be diverted in section 15, T. 10 N., R. 13 E., M. D. M., for power purposes for mining machinery.

FRESNO COUNTY—Application 5757; Ernest Walling, 1314 Pacific-Southwest Bldg., Fresno, for 1.00 cubic foot per second and 50 acre-feet per annum from unnamed stream and dug wells, tributary to San Joaquin River. To be diverted in section 12, T. 10 S., R. 23 E., M. D. M., for irrigation and domestic purposes. Estimated cost \$20,000.

VENTURA COUNTY—Application 5751; Mrs. Maud M. Coker, R. F. D. No. 1, Box 359, Ventura, for 0.50 cubic foot per second, 40 acre-feet per annum, from Santa Ana Creek tributary to Ventura River. To be diverted in section 24, T. 4 N., R. 24 W., S. B. M., for irrigation purposes on 250 acres. Estimated cost \$20,000.

SANTA BARBARA COUNTY—Application 5745; Horace O. Ensign, Newport Beach, for 0.025 cubic foot per second from two unnamed springs tributary to Schoolhouse Canyon. To be diverted in section 21, T. 10 N., R. 28 W., S. B. M., for domestic purposes. Estimated cost \$1,200.

RIVERSIDE COUNTY—Application 5758; U. S. Forest Service, San Bernardino, for 0.016 cubic foot per second from unnamed springs tributary to no stream. To be diverted in section 18, T. 5 S., R. 3 E., S. B. M., for domestic purposes on fifty-two special use residence sites. Estimated cost \$1,600.

Application 5762; H. E. Weaver, care of Sarau & Thompson, attorneys, Citizens National Bank Bldg., Riverside, for 0.25 cubic foot per second from underground tributary to no stream. To be diverted in section 33, T. 2 S., R. 4 W., S. B. M., for irrigation and domestic purposes on 12 acres. Estimated cost \$500.

SAN BERNARDINO COUNTY—Application 5700; State of California, Department of Public Works, Division of Highways, P. O. Box 137, San Bernardino, for 0.01 cubic foot per second from a spring tributary to West Fork of City Creek. To be diverted in section 29, T. 2 N., R. 3 W., S. B. M., for domestic purposes.

Application 5749; Gustav G. Gocke, 301 Hermosa avenue, Long Beach, for 0.50 cubic foot per second from unnamed spring. To be diverted in section 32, T. 2 N., R. 2 E., S. B. M., for domestic and fish pond purposes. Estimated cost \$1,000.

Application 5765; Thos. E. Hunt, 322 S. Vendome street, Los Angeles, for 5 cubic feet per second and 20,000 acre-feet per annum from Rattlesnake Canyon and Arrastre Creek tributary to no stream. To be diverted in section 31, T. 4 N., R. 3 E., S. B. B. and M., for irrigation and domestic purposes on 9860 acres. Estimated cost \$225,000.

LOS ANGELES COUNTY—Application 5761; John Boyle, care of W. C. Petchner, 725 Title Insurance Bldg., Los Angeles, for 15,000 acre-feet per annum from Littlerock Creek tributary to Antelope Valley drainage. To be diverted in section 27, T. 5 N., R. 11 W., S. B. M., for irrigation and domestic purposes on 5000 acres. Estimated cost \$50,000.

Application 5759; F. H. Hoepfner, 602 Atlantic boulevard, Bell, for 0.4 cubic foot per second from springs and underground water tributary to Deadman Canyon. To be diverted in section 21, T. 6 N., R. 14 W., S. B. M., for irrigation and domestic purposes on 40 acres. Estimated cost \$1,500.

SAN DIEGO COUNTY—Application 5744; Arthur H. Nightingale, 1207 1/2 Tamarind avenue, Los Angeles, for 3 cubic feet per second from two springs in Palm Canyon tributary to San Felipe Creek, to be diverted in section 26, T. 10 S., R. 5 E., S. B. M., for irrigation and domestic purposes on 250 acres in sections 25 and 36, T. 10 S., R. 5 E., S. B. M. Estimated cost \$5,000.

SENATOR ODDIE URGES FEDERAL AID FOR ROADS

(Continued from page 21.)

sections, the installation of traffic signals, and the construction of additional highways as entrances to the large cities. The last is a problem that will shortly have to be faced in the environs of practically all large cities.

Our highways, laid out in the days of horse-drawn traffic of low density, converge as they approach most of the cities and discharge their heavy burdens of modern traffic collected from wide areas into a few already congested city streets. Modern traffic conditions demand a separation of these old-fashioned converging city approaches.

Instead of merging the highways as they draw near the cities, their number should be multiplied in order to distribute the traffic over a greater number of streets and to permit it to enter the city at points as near as possible to the destinations of the vehicles.

These are a few of the problems that will occupy eastern road builders and call for continued expenditures indefinitely in the east.

A proclamation issued in 1622, by King James I, ruled that only vehicles of not more than two wheels, drawn by not more than five horses, were to be allowed on certain roads in England, and all loads were not to exceed 2000 pounds.

Ruling Defines Federal Aid to Town Highways

Federal aid for highway construction within municipalities having a population of 2500 or more is not authorized except for a distance not exceeding the mile within the corporate limits on a particular highway, along which, for the entire mile, the houses average more than 200 feet apart, exclusive of the width of the houses.

This ruling has just been made to the Secretary of Agriculture by the Comptroller General of the United States, J. R. McCarl, with regard to a federal aid project at Stamford, Texas.

Mr. McCarl in his ruling also defined the proper method to be followed in determining the eligibility for federal aid of any portion of a municipal highway, in accordance with statutory limitations.

On this point the ruling reads:

"The phrase 'except that portion of any such highway or street along which within a distance of one mile the houses average more than 200 feet apart' obviously has reference to the conditions along an entire mile of the highway where any portion of that mile is proposed to be aided. The purpose of the exception was to allow federal aid in highway construction through the sparsely built up sections of municipalities and the test specified by the statute is whether there is such a lack of houses that in an entire mile of highway they average over 200 feet apart."

Analysis of Accidents at Grade Crossings is Made by Railroad Board

An analysis of grade crossing accidents occurring on twenty-four railroads in California from January 1, 1925, to May 10, 1927, has been made by the State Railroad Commission. The 2251 accidents analyzed were as follows: On crossings protected by crossing signs, 946; by wigwags, 654; by human flagmen, 290; by overhead crossing signs, 293; by gates, 34; by crossing bells, 34. These 2251 accidents resulted in 297 persons being killed and 1054 injured. Property damage only occurred in 1360 accidents.

Safety Campaign Progress.

Nearly 200,000 persons have pledged themselves to use courtesy and caution on the highways during the coming year, the American Road Builders' Association state.

"This 200,000 includes only those persons who have actually signed courtesy and caution pledges, and does not incorporate the members of some 5000 civic clubs, 10,000 churches, students of schools and automobile clubs throughout the nation who adopted the pledge in a body," the association stated.

SAN GABRIEL WATER PROBLEMS

(Continued from page 6.)

Valley. Rainfall on the valley floor approximates 18 inches on the average and the surrounding hills contribute a water supply.

When it leaves the mountains the river passes over a very coarse detrital mass which absorbs water readily. This percolating water, together with water which percolates from the tributaries and percolation from the rainfall, reaches the underground waterplane. The principal water supplies of the valley are derived by pumping from the underground water reservoir and this, of course, is supplied by percolation as above noted. As the underground water drifts south or downstream in the valley, it meets the southern range of hills and is forced to the surface, so that there is maintained a perennial stream of rising water at Whittier Narrows which is diverted by various companies. Below the Narrows is another percolating area which terminates about 5 miles below the point of maximum rising water. From there to the ocean, which is about 15 miles below, little or no percolation takes place and all water reaching that point flows practically undiminished to the ocean.

San Gabriel Valley slopes rather steeply from the mountains and hills on all sides toward the river and the Pass. The length of the valley is east and west, while the river flows southwest 13 miles across the width of the valley and is at the bottom of the broad trough of the valley except at its debouchure from the mountains where a cone has been built up slightly higher than land on each side. The waterplane slopes in the same direction as the surface, although less steeply and consequently the waters of the river which percolate can not extend laterally to all parts of the valley but involve an area of less than 60 square miles in the central part of the valley. In addition to this slope of the waterplane from all sides to the Narrows there are, along or near the foothills, underground formations—dikes and faults and alluvial unconformities—which hold the waterplanes in some cases as much as 250-300 feet higher above than below. Raymond Dike on the west is the most noteworthy of these. Above it there are more than 30 square miles of habitable area largely occupied by Pasadena and Sierra Madre.

COASTAL PLAIN

Below the Narrows the Coastal Plain is essentially similar in formation to the valley, as there is a barrier range of hills near the ocean paralleling the other hills and holding the water back. Because of its flatness it is

much more difficult to outline the area to which San Gabriel River water flows underground. It is possibly in the neighborhood of 100 square miles. It should be understood that San Gabriel River water, that is, water issuing from San Gabriel Canyon, is not the only water affecting this area or that similarly designated in San Gabriel Valley. It has been amplified and diluted by tributary percolation, by rainfall on the valley floor and by the waters coming in from all sides which have other sources. Nor are the overlying land-owners the only users from this area, as water is exported to perhaps 50 square miles in both the valley and the plain.

RAINFALL RECORDS

Rainfall records for the past 50 years and run-off records for 31 years indicate that for the 50-year period at least, precipitation has had a cyclic variation, the period being 22-24 years. Ten to 12 years, most of which were above normal, have been followed by 10 to 12 years in which most of the years were below normal. The waterplane fluctuates with the season and also with the cycle. The last dry cycle ended in 1904, after which water levels rose until 1916, when a dry cycle again set in. The lowest point reached was in 1926 over most of the valley. Except in two areas not affected by San Gabriel River, levels have risen since then. In the central part of the valley, water levels were seven feet lower in 1926 than in 1904, while in those parts not affected by San Gabriel River the decrease was much greater. In the Coastal Plain the decrease was in general greater than in central San Gabriel Valley.

RESERVOIR CONSTRUCTION

Prior to 1923 Los Angeles County Flood Control District had constructed three reservoirs on the headwaters of three of the smaller streams in the valley. In 1924 a bond issue of approximately thirty million dollars was authorized for construction of additional reservoirs of which two have been completed, one is under construction, and the largest, on San Gabriel River, is not yet started. These reservoirs will so modify the flow that more water will be caused to percolate in the stream bed in crossing the valley. They will also be used for direct conservation by holding over water stored in them.

PASADENA APPLICATION

In 1923 the city of Pasadena made application for permit to construct a reservoir in San Gabriel Canyon and a conduit leading to the city. An investigation was started in that year by the Division of Water Rights to determine the amount of water flowing into

the ocean. After four years' investigation it was believed that enough information had been gathered so that the division could pass intelligently on this as well as the applications of numerous other cities for diversion which had been made in the meantime, and the hearing noted in the first paragraph was held.

Only the summer or normal flow from the canyon is used directly. The winter run-off is characterized by wild and dangerous floods impossible to divert and of a very flashy nature. Their menace may be judged by the fact that the flood control district was formed and that expenditures so large as above noted have been authorized for their control.

WORK OF DIVISION OF WATER RIGHTS

The work of the Division of Water Rights has consisted largely of measuring the river and tributaries at strategic points to determine the percolation which naturally occurs with different stages of the river. Observations cover a wide range of discharge. The highest day's discharge on which a record of percolation was secured has been exceeded only three times in the 31 years of record and from this maximum many observations were secured at various stages down to the point where the entire discharge percolated.

The facts as to run-off during the four seasons covered by the investigation may be briefly summarized: In 1923-24 the mountain run-off was 18 per cent of normal; in 1924-25, 15 per cent of normal; in 1925-26, 70 per cent of normal; and in 1926-27, 84 per cent of normal. The average for the four years has been 47 per cent of normal. Waste of San Gabriel Canyon water from the valley during the four years has averaged 22,000 acre-feet, being almost negligible in the first two years and approximating 42,000 acre-feet in each of the last two years. The waste of San Gabriel Canyon water into the ocean has averaged approximately 20,000 acre-feet annually during the investigation. In addition there has been other waste from tributaries and from rainfall on the valley floor but this does not enter materially into the issues involved.

From the measurements made on the stream a curve has been drawn showing the relation between each day's average discharge coming from San Gabriel Canyon and the percolation which occurred with that particular flow.

WATER LEVELS

Water levels in the valley are lower than at the beginning of the investigation, but began rising in 1926 with a 70 per cent run-off from

the mountains, except as before noted in two areas not affected by San Gabriel River water.

DISPUTE JURISDICTION

At a hearing on applications made to the Division of Water Rights for diversion from San Gabriel River, held in Los Angeles on November 14-15, the principal protestants who were not also applicants disclaimed authority of the division and presented no evidence. Some of the applicants who were also protestants against other and prior applicants denied the authority of the division, but at the same time requested that their applications be considered. These presented no evidence. One applicant was undecided whether to allege lack of jurisdiction by the division or not and did present evidence through witnesses. A fourth group, the principal and prior applicants, foothill towns on the west side of the valley, presented their case in the usual manner.

From the diverse positions assumed by these various parties, it is evident that there is uncertainty concerning the legal aspects of the case and in fact, as will be found from a close reading of the list of questions involved, at the close of this article, some of the issues are unprecedented in water litigation. It is the purpose of this article not to discuss the legal situation but to point out the issues involved. Before doing so a brief description of the physical situation is in order as is also some of the history of the case.

The questions printed in the fore part of this article were raised either directly or indirectly at the San Gabriel hearing, or in briefs submitted prior to the hearing. Those applicants which protested the authority of the division but which at the same time elected to maintain their applications are those who believe themselves, because of location, to be benefited more if the stream, regulated by flood control reservoirs, is allowed to follow its natural channel with no adverse diversions, than by granting their applications subsequent to prior applicants. Those who maintained their applications in the belief that the jurisdiction of the division is not in question are those widely separated from the stream. The protestants which withdrew are water companies lying mostly within the area influenced more or less by San Gabriel River water or exporting from that area.

"What are you doing here?" asked a policeman of a woman who had stopped her automobile near a street corner and was preparing to alight.

"Parking my car," she replied. "I thought this would be a good place. The sign there reads, 'Safety Zone'."

California Leads U. S. In Revenues Derived From Tax on Gasoline

California led the states in the amount of revenue derived from a tax on gasoline during the first half of 1927, the Bureau of Public Roads of the Department of Agriculture has just announced.

The following table, prepared by the bureau, shows the rate of taxation in cents per gallon in the various states and the revenue derived by each state from a gasoline tax during the first six months of 1927:

	Tax rate on June 30	Rev. for first half 1927
Alabama	4	\$2,653,637
Arizona	3	518,599
Arkansas	5	1,560,559
California	2	9,035,934
Colorado	3	1,194,077
Connecticut	2	1,307,024
Delaware	3	267,091
Florida	4	5,355,217
Georgia	3½	3,071,528
Idaho	4	606,694
Illinois	0	-----
Indiana	3	4,564,711
Iowa	2	2,777,183
Kansas	2	1,891,245
Kentucky	5	2,472,015
Louisiana	2	1,411,554
Maine	3	742,925
Maryland	4	1,774,442
Massachusetts	0	-----
Michigan	2	5,033,798
Minnesota	2	2,274,327
Mississippi	4	2,136,296
Missouri	2	2,921,065
Montana	3	428,363
Nebraska	2	1,470,084
Nevada	4	199,497
New Hampshire	3	413,581
New Jersey	0	-----
New Mexico	5	614,200
New York	0	-----
North Carolina	4	3,932,544
North Dakota	2	395,933
Ohio	3	7,539,826
Oklahoma	3	3,196,376
Oregon	3	1,613,209
Pennsylvania	2	6,101,696
Rhode Island	2	300,971
South Carolina	5	2,210,636
South Dakota	3	960,630
Tennessee	3	1,983,139
Texas	3	5,975,553
Utah	3½	567,794
Vermont	3	275,536
Virginia	4½	3,122,518
Washington	2	1,631,226
West Virginia	3½	1,416,057
Wisconsin	2	2,526,058
Wyoming	3	256,998
District of Columbia	2	548,605
Total		\$101,250,841

Two-cent tax rates were effective in Illinois on August 1, 1927, and in New Jersey on July 1, 1927.

"Quit Your Shoving."

[From the *Christian Science Monitor*.]

"Quit shoving," the highway said to the hillside, but the hillside kept right on pushing until it tumbled a considerable section of the road over a 100-foot cliff and onto the railroad tracks below.

The road was an important one, leading to the huge Carquinez Straits bridge a short distance west of Crockett, so the Division of Highways proceeded to smooth off the slope by hand, somewhat reduce its extreme pitch, and then spread out an acre of "gunite," a type of concrete, over the offending area of shifting sand. The gunite was pumped through a hose to the spot. The measure was successful, and the hillside has ceased to harass the highway further.

Permission has been granted by the Railroad Commission to California Highway Commission to construct the state highway at grade across a spur track of Central California Traction Company north of Stockton, San Joaquin County.

A crew of men under the direction of the California Highway Commission transplanted shade trees along the highway between Proberta and Red Bluff in preparation for the widening of the roadbed from 20 to 30 feet. The trees varied from 10 to 18 feet in height.

If you work for a man, in Heaven's name work for him. If he pays you wages that supply your bread and butter, work for him, speak well of him, and stand by him and the institution he represents. I think if I worked for a man, I would work for him. I would not work for him part of his time, but all of his time. I would give my undivided service or none. If put to the pinch, an ounce of loyalty is worth a pound of cleverness.

If you must villify, condemn, and eternally disparage, why resign your position, and when you are outside damn to your heart's content.

But, I pray you, so long as you are a part of an institution, do not condemn it. Not that you will injure the institution—not that—but when you disparage the concern of which you are a part, you disparage yourself.—*Elbert Hubbard*.

No other state has such a combination of size and varied attractiveness as has California. No other state has large population centers so widely separated. In no other state of large population is the saturation point in vehicle registration so near. In no other region is the average motor vehicle driven so far each year.—*The Highway Magazine*.

Noting that cholera killed 1,500,000 pigs in this country last year started us wondering if there isn't some way of giving cholera to road hogs.

Beside the filling station now
The village smithy stands.
And many dollars fall into
His large and sinewy hands.

—*Florida Times-Union*.

Insurance Agent: "Come with me, you can get damages for this."

Negress (hit by truck): "Good Lawd, man, ah don't need no mo' damages. What ah needs is repairs."

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CALIFORNIA STATE PRINTING OFFICE
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Pacific Highway along Klamath River, Siskiyou County.



State Highway near Pine Valley, San Diego County.