

Public Works

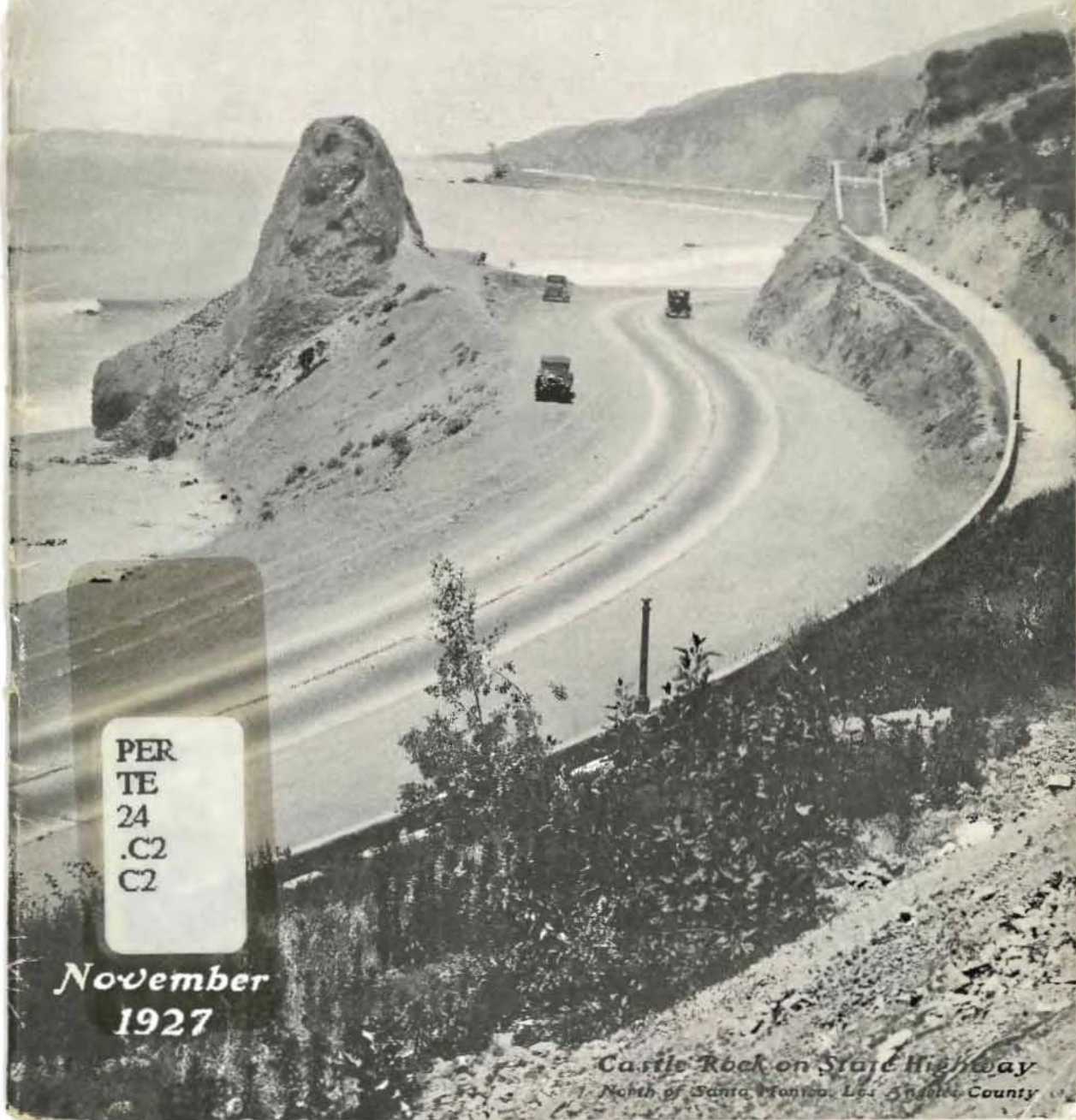
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CALIFORNIA  
DEPARTMENT

# CALIFORNIA HIGHWAYS and PUBLIC WORKS

Official Journal of the Department of Public Works  
State of California



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November  
1927

Castro Rock on State Highway  
North of Santa Monica, Los Angeles County



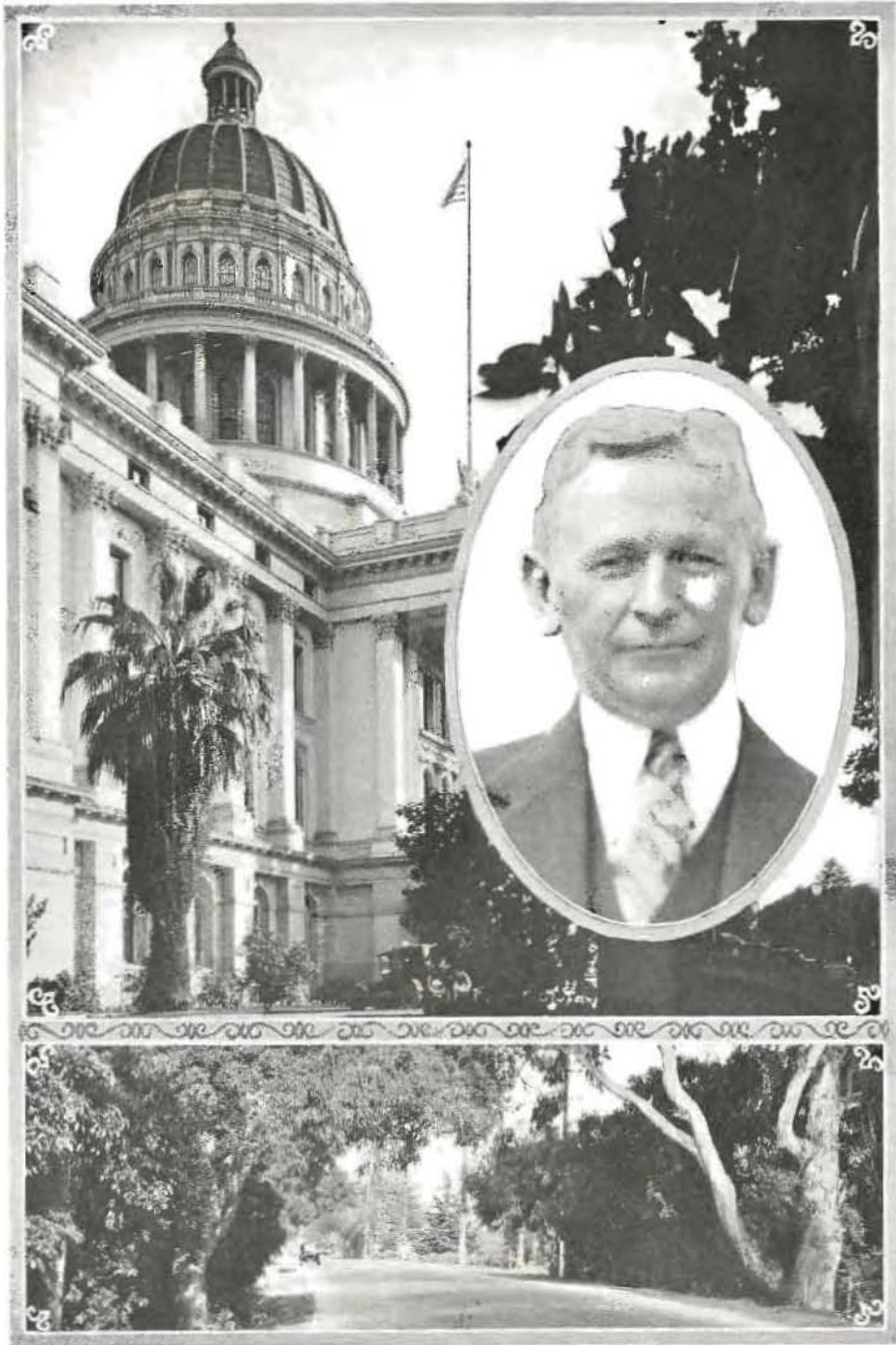
ALONG THE KERN RIVER.

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DONNER MEMORIAL BRIDGE.



You and I have a splendid task before us. We have gone a long way forward in California—gone forward inspired by the hearty approval of a people whose heart is fundamentally sound, whose ideals are fundamentally high. In fairness to that people, there must be no backward step. We must hold all the ground we have gained in the past. We must press on to new achievements for the future. We must keep pace with the growth of a growing world.—From Governor Young's Inaugural Address.

# The Why of Coordination

By C. C. YOUNG, Governor of California.

**T**HE creation of the Department of Public Works represents an effort to bring about a better coordination of various divisions of the government of California, the activities of which are more or less allied. Through such coordination it is hoped that cooperation can be increased and duplication decreased; that efficiency can be promoted and waste reduced to a minimum.

The newly created Department of Public Works assembles in itself those agencies of the state government which are largely concerned with engineering problems, and which maintain engineering staffs commensurate with the activities with which they are entrusted. The better coordination of these agents permits the mass concentration of engineering and technical forces of the state upon perplexing problems that may arise within any division.

The advantage of this will become apparent when the agencies of the state government included in the department are enumerated. These are:

- Division of Highways.
- Division of Engineering and Irrigation.
- Division of Water Rights.
- Division of Architecture.

In addition to these major divisions the department is also entrusted with the enforcement of the provisions of the State Carey Act, which provides a procedure for the reclamation of desert public lands, and also provides for engineering investigations in cooperation with the United States. The department also is charged with the care of the ports of Eureka, San Diego and San Jose, and, for the next ten years, with the maintenance work of the State Reclamation Board.

The vital interest of this department to the people of the State of California should be apparent at a glance. The coordination of the various governmental agencies enumerated above into one department should reduce, and is reducing, the amount of lost motion, eliminating useless duplication both in money and

in labor, and increasing the efficiency with which the work of the state is being conducted.

The plan fits admirably into the newly established cabinet, or council, system of California, as it enables the activities of these various divisions to be clearly and comprehensively presented to the attention of the Governor of the state and the members of his council.

The creation of the Department of Public Works is but a part of the general revision of California's government that this year has seen. The general reason for this reorganization of the activities of the state can be seen at

a glance. In this connection, it may be in order to repeat here what I have recently said elsewhere:

"As the state's activities became more and more complex a very large number of boards, commissions and institutions were created, and a very large number of officials employed, all operating independently of one another, all appointed by the Governor and responsible to him, all theoretically

under his direction, but so many and so varied that no one of them has been able to receive any adequate share of his attention. Finally there had arisen more than a hundred of these governmental agencies, each of them performing a function so essential that it must of necessity be maintained, yet, when taken together, so many in number that proper supervision seemed impossible.

Moreover, there was much wasted effort, since many of these agencies were so interrelated in their nature that their functions often overlapped. There was also frequent conflict when work done by one agency failed to harmonize with the work carried on by another. Then too there were natural rivalries among the various agencies as to the relative amount of state support to which each was entitled. Altogether it presented an impossible situation for which a

**GOVERNOR C. C. YOUNG** believes thoroughly in the doctrine of putting more business into government. He tells here the reasons for the creation of the State Department of Public Works and for the other coordinated departments of California's state government, created by enactment of the last legislature in bills suggested and signed by him.

## Our Job

Building California is the job of the Department of Public Works, says Director Bert B. Meek. It requires a big effort and a big consecration. In the article below, Mr. Meek tells what he thinks of the work. It is not a task, he says, for "Yes-men" and "Amen-ers," but for men and women of informed opinion and independent judgment, devoted to the service of California.

By B. B. MEEK, Director, Department of Public Works,  
State of California.



B. B. MEEK

**T**HE THOUGHT that I would convey to every official and every employee of the Department of Public Works in this, the first issue of CALIFORNIA HIGHWAYS AND PUBLIC WORKS, is that YOU form the BUILDING branch of the state government of California.

To be a builder is a great thing.

To be a BUILDER OF CALIFORNIA should be sufficient to enthrall the imagination, arouse the ambition and enlist the energy and the efforts of every one to whom has been given the privilege of such service.

For IT IS a privilege to have an active part in building California into the great commonwealth that geography and nature both intended it to become.

And as the privilege is great, so is the responsibility.

To those of us to whom is now entrusted the responsibility of building the highways of the state; of developing its water resources; of planning, designing and constructing its public buildings, the thought should ever come that if we do our work well, the prosperity, the well being, the happiness of the people of this state for centuries to come will reflect the fact that our service was well and honorably performed.

And it is in these terms of human value that I would ask those who are connected with the department to view their tasks.

When pouring concrete or spreading asphalt, we are building not roads alone, but we are also building happiness, contentment, comfort, patriotism and loyalty into the lives of a whole people.

And so it is with every activity of every division of this department. It is PEOPLE whom we are building and not things.

I never pass through the capitol grounds, but my hat is off to the men who designed the beautiful state capitol, and who mapped out and planted the wonderful capitol park.

They were men of vision.

At a time when architecture was marked with elaborate design and when ornateness ran rampant, these men saw the permanent beauty and enduring charm of simple stateliness.

And then there were the other men, the builders of the capitol park, who planted shrubs, vines and trees for the enjoyment of generations then unborn.

Few of us know their names, but all of us are richer in our lives by reason of their service.

And so to you, Builders-of-the-California-

That-Is-To-Be, I would commend vision to see and the wisdom to know the importance and permanence of the work in which you are engaged. Give to California the best of whatever, ABILITY, AMBITION and DETERMINATION that is in you to give.

Coordination, cooperation has been the very proper and wise demand that Governor Young has made upon me. It is also my request to you.

Cooperation in coordination must mean to you the very certain and definite things that it means to Governor Young and to me. I might enumerate specifically what this, the keynote and the slogan of our work, demands from us.

It means that—

The department is entitled to your best and independent judgment on all matters that affect your work here. This is no place for "Yes-men" or "Amen-ers."

We must be willing, yes anxious, to work with others, knowing that the job is too big for any one person.

We must give some thought to the other fellow's problems, and in our turn must be willing to accept suggestions from the other fellow. An outside viewpoint sometimes corrects an opinion, faulty by reason of being formed from "too close a close-up."

We must recognize that the interest of this glorious state of ours always comes first.

We must realize that primarily we are dealing with human values.

We must BELIEVE in the California that has been, that is, and that is to be.

Therein is the code for the conduct of our duties.

Accept it as a challenge or receive it as a religion, as you wish.

Be that as it may be, it is the steel tape by which the usefulness of each and every one of us engaged in this work must and will be measured.

## THE WHY OF COORDINATION

(Continued from page 2.)

remedy was obviously demanded. Some years ago California made a preliminary study of this problem to determine whether it might not be possible to organize these agencies into governmental departments. At that time only a beginning of the work was accomplished, and since that time until this year nothing of the kind has been attempted. This year however, our chief constructive task has been this reorganizing and departmentalizing of the state government.

Already nine of these departments have been organized and are actively at work. It is proposed to complete this program by adding two more at the next session of the legislature. Except for a very few boards which can be departmentalized only by constitutional amendment, the hundred or more independent activities which existed a few years ago will hereafter all be merged into eleven well defined, coherent departments of the state. Please do not understand me to claim that by the organization of these departments and the creating of this council I have automatically solved all the governmental problems which will come before me. I do know, however, that in no other way could I have gained such intimate knowledge of these problems, or such a feeling of confidence that by the help of my fellow workers a proper solution for each may ultimately be found. I feel that by this reorganization we have gone a long way toward putting the business of the state on a sound and business-like basis."

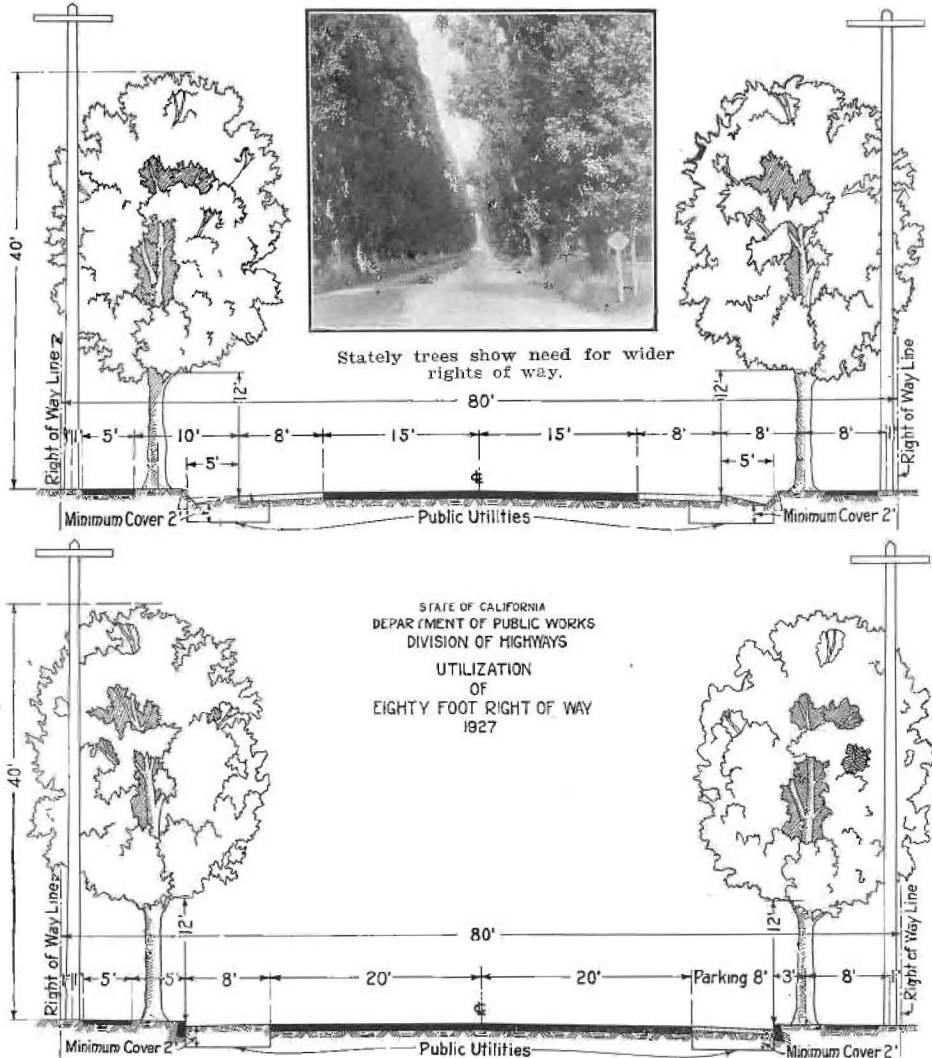
So much for the organization of the various departments of our state government, including the Department of Public Works. Now for the personnel of the latter; for the best system of government that human ingenuity can devise will fail if it is not properly operated. The human equation in government always has been and always will be the factor which determines whether government is good or bad, economic or wasteful.

It gave me great pleasure to name as Director of the Department of Public Works, Mr. B. B. Meek of Oroville. Mr. Meek has a wide acquaintanceship with California and its people. He has a long record of honorable and able public service, both in the state legislature and as a member of the State Board of Prison Directors. He is experienced in the administration of large business affairs. He has been successful in the conduct of his own business, a most excellent recommendation for any public servant.

Given the loyal support of the men and women working with him in the Department of Public Works, I believe that the next few years will be not only years of outstanding progress, but also that, when Time writes the final story of the accomplishments and achievements of the department, the tale will be told in terms of a service to the state so well and so honorably performed that the people of California will be its beneficiaries for all time to come.

# Tree Planting and Public Utilities

By the Maintenance Department.



THE Maintenance Department of the Division of Highways has under its supervision all matters relating to permits for work or encroachment on the state highways. Very little publicity is given this branch of administrative work, but its extent may be realized from the fact that some four thousand permits were issued during 1926, the cost of special investigation by the district offices and necessary detail being \$13,000. The limitations imposed by these permits on overloads and private encroachments

insure a protection to the highways and their development which amply justifies the expense involved.

Regulations governing the placement of roadside trees and public utilities are of particular interest, presenting as they do a conflict of the aesthetic and commercial when located within narrow rights of way.

Many individuals and organizations have interested themselves in highway beautification, some 685 miles of highways having been

(Continued on page 30.)

# State Highways—Past, Present, Future

By RALPH BULL, Chairman of the California Highway Commission.

**D**ESPITE the intermittent manner in which the state highways of California have been financed in past years, the state has proceeded to construct highways to an extent unthought of when the first state highway bond issue was passed.

The problems during the first period of state highway construction had to do chiefly with the selection of routes and designing types of paving.

Traffic and service have justified decisions of the commissioners in the selection of routes, decisions often preceded by sectional controversies.

Time has in many instances justified the type of pavement selected, at times being widened as traffic increased without loss of the original investment. The durability of these first roads against an undreamed of increase in traffic volume and the traffic load is one of the outstanding features of the history of the California highway system.

The second period of highway history was characterized largely by reconstruction activities, widening and thickening the pavement first laid, and the development of new maintenance methods. We are still in this period, with much of this work yet to do.

Another period, however, can be seen in the offing. Impending problems confronting those in charge of California's state highways have to do with:

Securing wider rights of way to provide adequate traffic lanes for present traffic and for the enormously increasing traffic that the very near future promises;

Completion of highways in the more remote sections of the state;

Removal of traffic barriers in places of present traffic congestion;

The more rapid elimination of grade crossings.

These problems have to do with the construction of our highways.

Very fortunately the most acute problem of all—that of financing new construction—

was solved when Governor Young affixed his signature to the one-cent gasoline tax, the proceeds of which are to be devoted to new construction. This measure is important, not only for the revenues that it will make available for building roads, but also because it establishes a policy of continuous financing for our highways.

The California Highway Commission is hopeful that construction, reconstruction and maintenance may all move forward in a manner that will adequately meet the traffic responsibilities of California's magnificent highway system.



RALPH BULL

upside down, and you dead, inside of a single second?

The value of scientific research in industry is well illustrated in the tremendous savings which have been made in Illinois in the construction of 2500 miles of hard surfaced roads since the Bates Experimental Road Tests in 1922. It is estimated by officials of the State Highway Department that these savings amount to approximately \$3,600 per mile, making a total saving of \$9,000,000 to the state.—*Pacific Street and Road Builder.*



# Putting the "Right" into Water Rights

*Division of Water Rights Duty Is to Encourage the Use of Water and Prevent Its Monopolization*

By HAROLD CONKLING, Chief of the Division of Water Rights.

**T**HE Division of Water Rights of the State Department of Public Works has charge of the important work of supervision over the acquisition and definition of water rights, the administration of streams, *i. e.* distribution of water, and investigation of water rights and water right resources.

A few figures will indicate the amount of business that this brings into the office, and the manner in which the waters of California are made available for development and yet at the same time are safeguarded against speculative retention without actual development.

## 5744 APPLICATIONS

Prior to November 1, 1927, the division had received a total of 5744 applications seeking to appropriate a total of some 959,439 cubic feet per second and 168,201,972 acre-feet per annum.

Approximately 43 per cent of the applications received are canceled and 57 per cent are approved.

Of those approved approximately 50 per cent are subsequently revoked and 50 per cent proceed to license and so far some 7 per cent of those licensed have been revoked.

In connection with the amounts of water applied for it may be stated approximately 10 per cent only is allowed and 90 per cent disallowed either on account of voluntary withdrawal of the application, failure to complete the application, or for lack of unappropriated water or some other sufficient reason.

Of the amount of water allowed use is never completed in connection with 58 per cent of the direct flow and 90 per cent of the storage and permit is revoked before license.

These figures indicate in a general way the weeding out process which clears the way for later development by disposing of uncompleted appropriations.

## TWOFOLD RESPONSIBILITY

The powers and duties of the division are administrative and quasi judicial in character, having as their ultimate objective the delivery of public waters of the state to those entitled to their use.

## PROCEDURE

In connection with its supervision over the acquisition of rights to appropriate, the division receives applications, works out a clear definition of the proposed projects, advertises them, hears protests and in each case either rejects the application or approves by the issuance of a permit. If a permit is issued a reasonable time is allowed for beginning and completing construction and completely applying the water to beneficial use. If the water is not so applied to beneficial use permit is revoked, and if it is so applied a license is issued confirming the right of permittee to such an amount of water as was



HAROLD CONKLING

found upon inspection by an engineer of the division to have been actually applied to beneficial use.

The Water Commission Act provides two procedures for definition of water rights. Under section 24 of the act any suit pending in a superior court involving a determination of water rights may be referred to the division for investigation as a referee. Under sections 25 to 36f, inclusive, of the act the division may itself without reference from a court undertake an adjudication of appropriate rights either upon its own initiative or upon petition signed by one or more claimants. The proceedings and functioning of the division are not essentially unlike under the two different procedures specified in the act once the work of determination is undertaken. An investigation is made including

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# Building California's Buildings

*How the State Conducts a \$4,000,000 Building Program*

By GEO. B. McDougall, Chief of the Division of Architecture.

**D**URING the fiscal years of 1927-28 and 1928-29, California will expend well over \$4,000,000 upon its building program. The expenditure of this large amount is not being carried out in a haphazard manner, but in accordance with a carefully prepared plan recommended to the legislature by Governor Young, and approved by that body.

This building program contains a total of ninety-six major projects scattered all over the state, and representing almost every type of building. The cost of individual projects ranges from \$260,000 to \$350.

The execution of the program is entrusted to the Division of Architecture of the State Department of Public Works. It may be of interest to know something of how the division operates and of the duties imposed upon it.

The activities of the Division of Architecture and the former Bureau of Architecture cover a period of approximately nineteen years.

During the first few years of its existence the work of the Bureau of Architecture consisted almost entirely of the preparation of plans and specifications for new buildings, repairs and alterations to existing buildings, and general supervision of the construction thereof. The work was therefore similar to that of the average architect of private practice, except for the fact that construction has in most cases been at a considerable distance from the central office. As the years have passed, however, the responsibilities have constantly increased, as has also the number of institutions and general building activity in the state, until the present large force is required to handle the work. The duties of the Division of Architecture at the present time may be summed up as follows:

To make plans and specifications for all

new buildings of a value in excess of \$1,000 at the various state institutions; to let contracts for and superintend their erection, or, in case satisfactory contracts can not be made, to construct the buildings by day labor; to care for all alterations and repairs to existing buildings on the same basis where the amount

involved is in excess of \$1,000; to design and install all heating, lighting, ventilating, refrigerating, water supply, mechanical and electrical plants of every nature—whether changes, extensions, or original; survey grounds, lay out walks, drives and roads; provide water supply, sewer and drainage systems, requiring the design and construction of dams, reservoirs, pipe lines, wells, pumping plants, ditches, sewage treatment and disposal plants and drains.

#### OPERATION OF THE DIVISION

Under the subject of operation, the activities of the Division of Architecture can be listed under three main subdivisions:

1. Construction by contract or subcontracts.
2. Construction by day labor.
3. Miscellaneous activities.

When working drawings for a project are started in the drafting room, a decision is made by the executive head of the division on the method of construction to be followed; that is, whether the work shall go ahead on a basis of contracts, subcontracts, or day labor.

It is the policy of the state to construct its buildings under contracts. The day labor method is resorted to only where money can be saved to the state, either on account of the nature of the work itself, because of isolated locations, or in the case of work at institutions where patients or inmate labor is available.



GEO. B. McDUGALL

(Continued on page 30.)



# Highways are California's Arteries, and Water Is Its Life Blood

By EDWARD HYATT, JR., State Engineer of California.

**T**HE position of California among the wealth producing states of the nation is directly attributable to the phenomenal growth of agriculture in this state, which has been brought about by the scientific application of water to the land and the intensive and intelligent cultivation of the soil by the California farmer.

The limit of profit by dry farming was reached in 1885, and it is since that time that irrigation has been intensively practiced in the State of California. The phenomenal growth and expansion of irrigated areas necessitated the construction of dams, diversion works, canals and other works of such magnitude that their initial cost prohibited their being undertaken by individuals. Their construction and financing has been accomplished through associated effort, which has been made possible through the California Irrigation District Act, passed in 1897 and amended in 1913, and the California Bond Certification Act, passed in 1913.

These acts provide for the approval of organization of districts and supervision of construction by the State Engineer, and the approval and certification of bonds by the California Bond Certification Commission, of which the State Engineer is a member.

## BIG PART IN WORK

The Division of Engineering and Irrigation is and has been closely associated with the phenomenal growth of California, which is among the leading wealth producing states of a nation which leads the world in agriculture. During the past generation most of all the proposals for irrigation development undertaken by collective effort have had their adequacy and general merit concurred with, if

satisfactory, or rejected, if defective, by the division.

## HUGE INVESTMENTS APPROVED

In carrying out its statutory functions millions of dollars worth of improvements are approved every year by the Division of Engineering and Irrigation. It analyzes and



Edward Hyatt, Jr., State Engineer, pictured as he was showing Legislative Committee a northern California dam site.

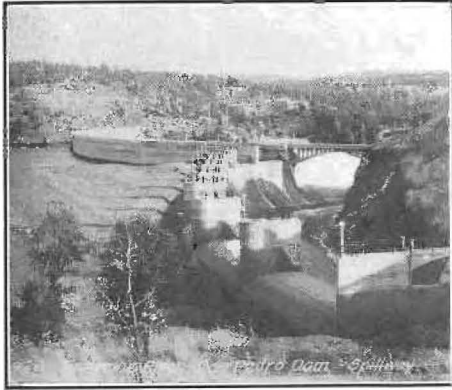
passes upon plans of irrigation, drainage, water storage, water conservation and reclamation districts. The certification of irrigation district bonds by the California Bond Certification Commission is based upon investigation made by the State Engineer. The Division of Engineering and Irrigation is charged with the approval of plans for dams other than those constructed by a municipality or public utility and with the construction of river control works and rectification of channels, of which the Sacramento River carries the highest valued tonnage of any river in the United States. It makes hydrographic surveys and cooperates with the Reclamation Board in passing upon plans of reclamation and drainage districts, with the United States Geological Survey in gaging streams and

making topographic maps, and with the United States Department of Agriculture in needed investigations.

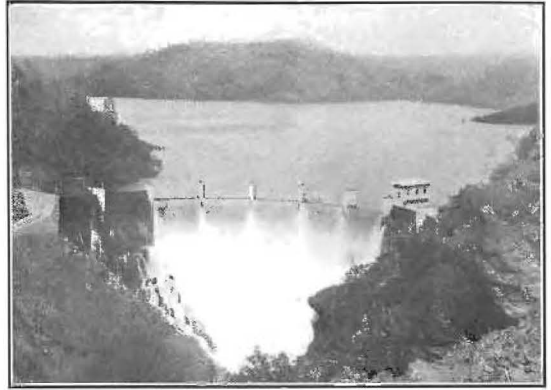
## WORK IS DIVERSIFIED

The functions of the division are widely diversified in character, some administrative, some specialized, others executive, but all constructive and contributing to the advancement and well-being of the state. The principal statutory functions may be summarized as follows:

1. To investigate and report on feasibility of proposed irrigation districts.
2. To investigate and report on proposed bond



Don Pedro Dam on the Tuolumne River.



Melones Dam on the Stanislaus River.

issues by irrigation districts before the California Bond Certification Commission for approval, of which the State Engineer is a member.

3. To supervise expenditure of funds from approved bond issues and to inspect generally the construction work of irrigation districts.

4. To collect data, make surveys and perfect plans for flood control of the Sacramento and San Joaquin rivers in conjunction with work of State Reclamation Board, to review plans for reclamation, and to advise and assist the board. The operation and maintenance of the flood control project for which the legislature appropriated \$150,000 in 1927 has been assigned to the Division of Engineering and Irrigation by the Director of Public Works.

5. To maintain and operate all weirs on the Sacramento River.

6. To investigate feasibility of water storage dis-

tricts, the fixing of their boundaries and passing upon their organization.

7. To investigate the feasibility and organization of water conservation districts. The State Engineer is chairman of the irrigation board.

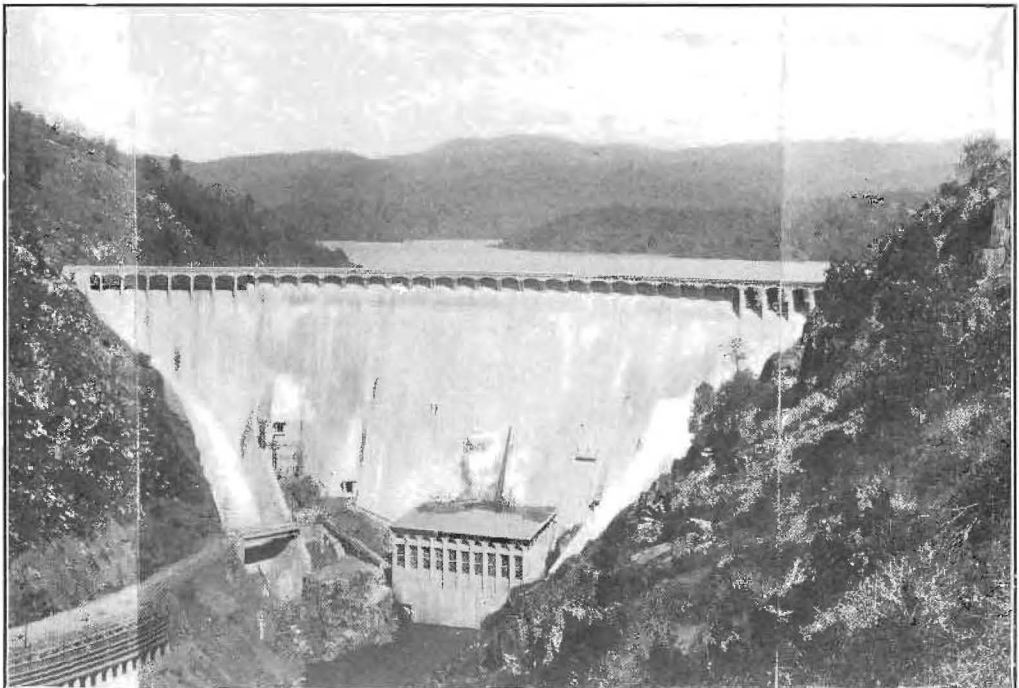
8. To pass on plans and specifications of dams, and to supervise the construction of dams, by other than municipalities or public utilities.

9. To designate the width of draw, and the length of span for bridges across navigable streams.

10. To plan and construct works for rectification of river channels and protection of property from flood damage on the rivers of the state.

11. To direct cooperative stream gaging, topographic surveying and irrigation investigations in cooperation with the federal government.

(Continued on page 34.)



Excelsior Dam on the Merced River.

# The "Oil Mix" Method

By T. E. STANTON, Assistant State Highway Engineer, California.

TREATING roads with asphaltic oil is not a development of recent years.

In California, where an abundance of asphaltic oil is available locally at a low cost, we have been oiling our roads with more or less success for over thirty years.

Many states can undoubtedly produce evidence of similar practice.

Most of the early work of this nature, however, was allowed to deteriorate through lack of proper and intelligent maintenance, with the result that oil surfacing of natural soil or gravel roads came to be looked upon by the general public as more or less of a failure and the tendency has been to replace these oil roads with expensive hard surfaced pavements as rapidly as traffic requires and funds are available.

As motor traffic has increased however and highway engineers have come to realize the great economic waste involved in permitting water-bound gravel and crushed rock roads to be loosened and blown away through the joint action of vehicles and winds, a strong movement has set in all over the country towards sealing the surface so as to make it impervious to such destructive agencies.

Instead, however, of using the haphazard methods of the past, the engineer has come to the conclusion that the problem is deserving of as much scientific and intelligent study as had been applied to the more expensive types of hard surfaced pavements, and as a natural corollary we have the rapid strides towards a full understanding of the problem which have been made in recent years.

To Oregon must go the credit in the west of being the first state to go extensively into the use of an asphaltic oil, relatively low in asphalt content (60% to 70%), locally known as "fuel oil," in surfacing the gravel and crushed rock roads of the state by what is known as the surface treatment or penetration method; and to California the credit for most

of the progress which has been made to date in the so-called "oil mix" method.

## OIL MIX

Surface oiling is only successful where the base is firmly bound and all loose material on the surface can be eliminated by brooming. The base can be placed in a properly bound condition only when the rock from which it is made has cementing qualities of a high order or there is suitable material available which has a high binding value.

In many of the arid and desert regions of California no good cementing base rock is available, nor is there any suitable local clay or other binding material. In these sections it

is impossible to secure a base sufficiently stable to enable the surface oiling method to be adopted with any success.

We were forced in such cases to either abandon the use of oil altogether or to adopt some other process than the penetration method. As a result, the oil mix method was developed.

The use of this method, while particularly adapted to sections where there is no good binder available, is being extended to cover crushed rock roads in other sections of the state, where, even though good binder may be available, it is desired to immediately oil a base in such rough condition that it must be scarified several inches in depth in order to properly smooth up or where it is desired to oil a new road surface before traffic has had time to thoroughly compact the base and surface material.

## ASSURES SMOOTHER SURFACE

Those who have become expert in this method of oiling prefer it to the oil surface method, as a smoother riding surface can usually be secured and the resultant maintenance cost under average conditions is somewhat less, owing to the fact that when the work is properly done practically no surface patching is necessary.

PROBABLY the most notable contribution of California to road building methods during the past few years has been the development of the "oil mix" method of treating roads surfaced with gravel and crushed rock.

In this paper T. E. Stanton, Assistant State Highway Engineer of California, describes in detail this method of treating roads. In the next number of California Highways and Public Works Mr. Stanton will tell of the surface or penetration method of treating these roads with oil, a method that has been used largely in California, but which has been chiefly developed in Oregon.

## Pictures Tell Story of "Oil Mix"



Step  
One—  
Heavy  
scarification



Step  
Two—  
Oiling



Step  
Three—  
Disk and  
Harrow



Step  
Four—  
Thorough  
Mixing

Where the grading of the base material shows approximately 50 per cent fines passing the 10 mesh approximately one-half gallon of oil per square yard per inch of depth is required under the mixing method or a total of one and one-half gallons for a three-inch mat, as against approximately one-half gallon total in the case of the oil penetration method. The cost of oiling is increased to this extent. On the other hand, an appreciable saving is made in the cost of screening, which is unnecessary in the oil mix method.

The mixing method produces a layer of mineral aggregate and bitumen closely akin to asphaltic concrete. The same principles of grading affect its stability. Skilled workers can produce an oiled surface which is as smooth as the surface ordinarily attained with asphaltic concrete.

### METHOD OF CONSTRUCTION

The method of construction is briefly described as follows:

If the existing road has a rough or unequal surface it is first scarified lightly and then smoothed by grading or dragging loose material into depressions.

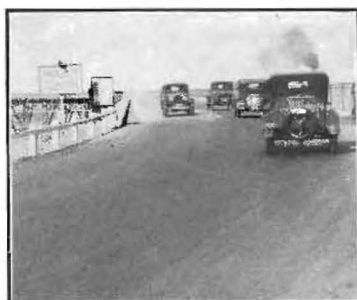
After this preliminary smoothing, the road is scarified to a uniform depth of two to three inches, according to the thickness of bituminous surface desired.

Sixty per cent to seventy per cent fuel oil is applied in two or three applications, each consisting of about one-half gallon per square yard.

The oil is mixed with the loose material after each application by means of a disc harrow, sometimes followed by a spring tooth harrow.

As soon as the oil distributor starts the disc

(Continued on page 32.)



The Finished  
Road

## 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 D. MEEK ..... Director  
 GEORGE C. MANSFIELD ..... Editor

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

Vol. 4                      NOVEMBER, 1927                      No. 11

### TELLING OF OURSELVES AND WHY WE ARE

CALIFORNIA HIGHWAYS AND PUBLIC WORKS in announcing its birth would also announce the reason of its being.

We believe that there is need in a state department spending many millions of the people's money for an authoritative source to which the people can go to learn officially of the projects, policies, and expenditures of such department. We plan to be such an official record for the California Department of Public Works.

There is also need in a department embracing a wide and varied scope of activities, some means through which the combined judgment and experience of the entire department can be brought to bear on problems that arise within its divisions.

We believe also that where large sums of public money are expended as is the case in this Department of Public Works that there should be a clearing house through which knowledge of developments of new methods, announcements of the results of experiments and matters of a like character may be made easily available to county and city officials in particular and the public in general.

That is why we are here. We plan to serve honestly, helpfully, loyally. We want to help you, and we want you to help us.

No better statement of the reason for a journal such as this than that given by Governor Young in an address before the California Association of Advertising Agencies delivered at Santa Barbara on October 22d last. Governor Young said:

"It happens that for the time I have been chosen as business manager of the largest single corporation in this state—the corporation known as California Commonwealth, owned and operated by not less than two million voting stockholders, selling its wares and services to five million customers, and conducting a business with an expenditure of more than a hundred million dollars each year. It also happens that many of the stockholders of this corporation have only a very vague idea of its

activities in general, and in particular are uninformed as to what is now being done to place these activities on a sound, business-like basis, a basis which I trust will endure not only through this present administration of their affairs, but for all administrations to come. It is equally true that many of the five million customers served by this great corporation do not even know what they are buying from it or what value they are getting for their dollars.

Accordingly, following the wise example of other business managers, I am coming to you today, requesting you to convey to those for whom this business is conducted the information which they are entitled to possess. I am doing this after nearly a year of service; and I want to indicate some of the things which have been done during that year, some of the problems which are still before us, and some of the things this corporation sells.

Governor Young's statement applies in its entirety to the Department of Public Works and CALIFORNIA HIGHWAYS AND PUBLIC WORKS.

### CALIFORNIA'S FUTURE PRESSES THE PRESENT

Ten years is a long look ahead in California.

We speak by the census book when we say that Here is the proof:

The United States census reports the population of California as follows:

1900 .....	1,485,053
1910 .....	2,377,549
1920 .....	3,426,861

Estimates made by experts for later years are as follows:

1924 .....	4,791,716
1925 .....	5,030,347
1926 .....	5,129,699

or an increase of 40 per cent in the last six years.

Money and capital have also been increasing apace. Look a moment at the total savings deposits and building and loan assets for California:

1910 .....	\$377,966,000
1920 .....	\$1,057,194,000
1926 .....	\$1,869,252,000

Sam Hellman says "statistics are the static in the tune of progress."

But the figures cited above indicate how rapidly and in the big terms that those in charge of the administration of public affairs in California must think if California's present is properly cared for and its future adequately safeguarded.



## SOME PROBLEMS OF COORDINATED WATER

The wide diversity of local conditions in California was well illustrated during the recent investigational tour of northern California counties by the joint legislative committee appointed to investigate the coordinated plan for the development of California's water resources.

Every hearing held by the Legislative Committee developed a new phase of the water problem.

Early in the meetings Bradford S. Crittenden, chairman of the committee, took occasion to carefully explain that the coordinated plan simply had to do with the disposition of stored surplus waters of the state, after the ultimate local use had been fully protected. He then asked that representatives of the communities should voice their opinion both as to the state and the local aspects of the question.

They did so. Here are seven of the local questions raised by different communities during the hearings:

1. Should the use of water for recreational purposes be considered a major use for water in California along with domestic, irrigation and navigation uses? Should not a reservation of water for recreational purposes be considered in a plan for the ultimate development of the originating areas?
2. Should the reservation of water for foothill areas be made upon the basis of the acreage to be served, or upon the basis of any estimated period of time for the development of such land?
3. Should the interests directly benefited by the proposed coordinated development bear its entire cost?
4. Should any portion of any of the proposed reservoirs be assigned for use in impounding tailings from hydraulic mines?
5. Should state coordination precede or follow the development of water projects in local units?
6. Is there an assured market for the power that would be developed as a by-product under the plan? How should such power be marketed?
7. If it should appear that the state's coordinated plan would prevent the development of a project by private capital, well in advance of its contemplated development under the state system, should the state plan be allowed to prevent such proposed private development?

## A FEW THOUGHTS ON SPEED AND SAFETY

And now we have another plan to reconcile speed on the highways with safety to travel.

This time the president of an eastern automobile association is the father of the idea.

The crux of the whole matter lies in "synchronizing."

The hand on the wheel, the foot at the accelerator, and the brain behind both are to be synchronized.

Then the driver can speed at whatever speed he may desire and the speed cop will permit, with complete safety to other autoists on the highway.

One difficulty of course is the inability of ascertaining before the crash comes whether the sixty miles an hour that the other fellow is making is the result of his being synchronized or gin-chronized.

And again, there are the petters.

The driver with one arm at the wheel and the other around his sweetie may sizzle, but he can not synchronize foot and hand with a brain behind neither.

If petters were rewarded for parking off highway, instead of penalized for so doing, the peril of the petter would probably be averted.

But for the gin-chronizer the only thing to do is to make it a jail offense either for him or his car. Drunk or sober, actually or potentially, he is and will always be a menace to himself and a peril to everyone else on the road.

And now for the second point in the new plan for making our highways safe.

"We can not educate or penalize the car," says the authority referred to above. "We must stress the human equation."

This brings up another phase of the speed problem.

Our own thought is that human equations, particularly those of tender years, who persist in tearing down the roads at a reckless rate of speed, need spanking more than stressing. And speaking both from experience as a spankee and a spanker, our further observation is that in spanking the human equation, the nearer to the human equator you spank, the more effective the results are.

Free the highways from the gin fools, and the petting fools and the irresponsible speed fools, and high speed upon the part of careful drivers may be harmonized with safety to others.

Hope lies in the fact that there is one place where this condition exists.

But the streets thereof are paved with beaten gold.

## Legislators View Northern Dam Sites

CALIFORNIA, what of your water? This was the question that the Joint Legislative Committee of the Water Resources of California carried to northern California on a trip of inspection and investigation that began on Monday, October 17th, and concluded a week later. The purpose of the trip was to acquaint members of the committee with the situation in northern California from actual inspection on the ground, and to acquaint the communities of the north with both what the coordinated plan for the development of California's water resources proposes to do and what it proposes not to do. Mr. Edward Hyatt, Jr., State Engineer, accompanied the committee on its tour, pointing out on the ground physical features of the proposed development; explaining to the communities the underlying principles of the coordinated plan, and answering questions from both members of the committee and interested citizens.

### THE ITINERARY

The committee and its party left Sacramento, Monday afternoon, October 17th. From Sacramento the party proceeded to Santa Rosa via Benicia; from Santa Rosa to Eureka; from Eureka to Redding via Weaverville and the projected Fairview Reservoir on the Trinity River; from Redding to the site of the dam for the proposed Kennett Reservoir and thence to Red Bluff; from Red Bluff to the Orland project; thence to Willows; thence to irrigation district pumping stations along the Sacramento River, and thence to Oroville. From Oroville the party went to Grass Valley via the Bullard's Bar and from Grass Valley to Marysville. The concluding day's trip took the committee from Marysville through the developed foothill areas of Placer and El Dorado counties to Placerville and thence back

to Sacramento. A total of 1045 miles were covered.

Hearings were held by the committee at Eureka, Redding, Red Bluff, Willows, Oroville, Grass Valley and Placerville. Enroute to Santa Rosa stops were made for a cursory examination of two proposed and alternative sites for the erection of salt water barriers, but as this territory is to be covered in a later trip, the inspection was only casual in its character.

The committee plans to inspect the delta area, proposed salt water barrier sites and the San Joaquin Valley in a later trip.

### OPEN DECISIONS OPENLY REACHED

In the hearings, Chairman Crittenden of the committee explained that the desire of the committee and the Department of Public Works was to ascertain all the facts concerning the plan, that whatever policy might be recommended by the committee and the department might be based upon a fair and complete knowledge of engineering data, financial facts and legal questions involved.

Mr. Hyatt in his turn explained the outstanding features of the proposed coordinated plan. Representatives of the various communities were then asked to state their views and opinions both as to the plan as far as it affected the state and as far as it affected their local interests.

### SURPLUS WATERS

In the statements, both of members of the committee and Mr. Hyatt, the fact was emphasized that the plan proposed no diversion of waters from any watershed upon which such water originated without a guaranteed reservation of sufficient water to provide for the ultimate development of such originating areas.

(Continued on page 18.)



Bradford S. Crittenden, Chairman of the Joint Legislative Committee on the Coordination of the Water Resources of California.



## TITANIC DAMS IN WATER PLANS



THE UPPER VIEW is that of the site for the Boulder Canyon Dam on the Colorado River. The report on coordination of the water resources of California advocates the construction of this dam to offset the deficiency in the natural water supply of southern California and to control floods on the lower Colorado River. A dam here 550 feet high would create a reservoir impounding 26,000,000 acre-feet of water.

The lower view is the Kennett dam site on the Sacramento River above Redding. A dam here 425 feet high would impound 2,900,000 acre-feet of water. Increased to 600 feet in height, the dam would impound 9,000,000 acre-feet of water.



## LEGISLATORS VIEW NORTHERN DAM SITES

(Continued from page 16.)

### HIGH LIGHTS IN REPORT

Here are the outstanding facts of the plan for the coordination of California's water resources:

Three-fourths of all the state's waters reach the ocean within forty-five days after the time of their precipitation as rain or snow upon the mountain areas.

Practically all the summer flow of California's streams that are accessible, is now in use. Further advancement is attendant upon the construction of reservoirs that will make available for use at the needed time, the great volume of winter and spring run-off of normal years.

Ample water originates within the state's boundaries for all future needs but it is very unequally distributed geographically. Three-fourths of all water lies within the northerly third of the state's area, while three-fourths of the need for water lies in the southerly two-thirds of the state's area.

There is some water available to California in addition to that originating within the state's boundaries in the Colorado and Klamath River systems. Of these, however, the Colorado River is the only one geographically situated to alleviate the very unequal distribution of the waters.

Cities of fairly mature growth use water about equal in amount to that required for irrigating crops on the same area. Accordingly a plan that will provide an adequate allotment of water for all the agricultural lands, together with additional amounts for urban expansion about the state's seaports, will meet the future demands for water in the maximum development of the state's resources.

At the present time, ninety-six per cent of the water consumed in California is utilized in irrigating farm lands.

The importance of municipal, industrial, navigation, hydro-electric and mining uses in the future growth of the state requires liberal provision for their needs.

The approach to exhaustion of local supplies in many parts of California presents even more serious aspects than the loss of anticipated wealth through curtailment of expansion. Large areas deriving their supply from underground sources are facing a dropping ground-water plane.

The coordinated plan provides for the storage of flood waters for conservation purposes, the transportation of surplus waters of the

Sacramento drainage basin to the deficient areas in the San Joaquin Valley, an adequate summer flow in the Sacramento River for navigation and salt water control, the resumption of hydraulic mining in the Sierra Nevada Mountains, the control of floods by reservoirs, the expansion of irrigation along the lower Colorado River in southeastern California, and the diversion of water from that river to the Pacific slope for municipal purposes.

The coordinated plan for the Sacramento Valley comprehends the solution of all these public problems, water for navigation and salt water control, the reduction of flood flows, and the restraint of mining debris, while at the same time providing for the increasing demands for irrigation water.

The new supply for the San Joaquin Valley would be derived from the water used to maintain navigation in the channel of the Sacramento River. After serving its useful purpose in the Sacramento Valley, this water would be diverted at the mouth of the river into the San Joaquin. Passing through the channels of the island region forming the delta of the Sacramento and San Joaquin rivers, it would be boosted up the main channel of the San Joaquin by a series of pumping plants, each one pumping the water over a low dam to the higher level of the pond behind it. These dams would be collapsible so that they would not obstruct the channel during the flood season. They would be so located that, if desired, locks could be constructed along side them that would make the San Joaquin River navigable for a distance of 160 miles from its mouth. This series of dams and pumping plants, extending the length of the main channel on the valley floor, would also constitute a means of conserving the scant water supply of the San Joaquin Valley.

The new supply of water obtained through the operation of these dams and pumping plants would be distributed to the lower lying lands in the San Joaquin Valley in order that the pumping lift may be a minimum. This would increase San Joaquin water now used on these lower lands, at high elevations for diversion by gravity to the lands in the southern San Joaquin Valley that need more water. In this manner, the new supply could be obtained with a maximum pumping lift of 160 feet. The exchange of waters would save 340 feet of pumping lift.

In diverting the water used for navigation in the Sacramento River to the San Joaquin, a certain portion would escape into Suisun Bay unless a physical barrier were constructed below the junction of the two rivers. Investigations of the cost of such a barrier have been

completed recently in cooperation with the United States Bureau of Reclamation. These reveal that the probable cost would vary from \$45,000,000 to \$90,000,000 according to the site selected. This exceeds considerably the cost of developing the volume of water that would escape into Suisun Bay if no barrier were constructed. At some future time when this volume of escape water is needed for irrigation in the San Joaquin Valley, a physical barrier could be constructed in order to make it available. In the meantime, the escape of this water into Suisun Bay would automatically dispel the menace of incursion of salt water into the channels of the delta region.

California, southerly from Tehachapi Pass, embraces twenty per cent of the area of the state that is favorable for human habitation, while but little over one per cent of the state's waters, exclusive of the Colorado River, are tributary thereto.

A survey of the available water, both surface and underground, shows that four-fifths of the local supplies on the Pacific slope of southern California, excluding Owens Valley, are now in use. Utilizing four-fifths of the available local water, less than half of the favorable area is occupied by cities or towns and irrigated lands.

The construction of the Boulder Canyon dam is one of the most important issues before the public at this time for the deficiency in the natural water supply of southern California and the control of floods on the lower Colorado River is a matter of serious concern.

In the study of southern California supplies, special attention has been placed upon the coordination of surface storage in reservoirs, the control of floods, and the replenishment of the underground basins from which such a large part of local water is obtained.

#### FOLLOWS LONG STUDY

The coordinated plan for the development of the water resources of California is the result of six years investigation and study upon which approximately \$450,000 has been expended.

The report was submitted to the legislature of 1927 by Paul Bailey, then Director of Public Works. Signing the report with him were Louis C. Hill, J. B. Lippincott, Wm. Mulholland, A. J. Cleary, G. A. Elliott, B. A. Echeverry, F. C. Hermann, Walter L. Huber, A. Kempkey, members of the Engineering Advisory Committee. Cooperating with the committee were F. E. Bonner, L. S. Ready, and C. B. Ridley.

The survey of the water resources of the state was made in consultation with C. E. Grunsky, Louis C. Hill, Charles D. Marx, H. D. McGlashan. Estimates of the water required for the full development of the state's resources were prepared in consultation with A. N. Bruch, B. A. Echeverry, Samuel Fortier, and A. L. Sonderegger.

The first report on these investigations rendered to the 1923 legislature was prepared with the advice of a citizens committee appointed by Governor Stephens, as follows: J. C. Forkner, chairman, Peter Cook, Jonathan S. Dodge, B. A. Echeverry, Harry Hawgood, H. A. Kluegel, Robert B. Marshall, H. D. McGlashan, O. B. Tout, U. S. Webb.

#### BULLETINS ON SUBJECT

The entire subject is summarized in Bulletin No. 12 entitled "Water Resources of California and a Coordinated Plan for Their Development." The complete report, however, in a series of bulletins, copies of which may be obtained by addressing the State Department of Public Works, Division of Engineering and Irrigation, Sacramento, California. The bulletins are:

- Bulletin No. 3—Water Resources of Tulare County and Their Utilization.
- Bulletin No. 4—Water Resources of California.
- Bulletin No. 5—Flow in California Streams.
- Bulletin No. 6—Irrigation Requirements of California Lands.
- Bulletin No. 9—Supplemental Report on Water Resources of California.
- Bulletin No. 11—Ground Water Resources of the Southern San Joaquin Valley.
- Bulletin No. 12—Summary Resources of the Water Resources of California.

Irene Thomas, pretty typist,  
Really made a hit  
With her new boss, Dave A. Mayer,  
But she had to quit  
When he noticed on each letter,  
She had signed—DAM-IT.

—Kentucky Highways.

"I've been watching that mechanic for the last fifteen minutes. There's a man that knows his business. He didn't spill a drop of oil on the mudguard. He put down the hood gently, fastened it securely and left no fingerprints on it. He wiped his hands on clean waste before opening the door, spread a clean cloth over the upholstery, meshed the gears noiselessly and then drove slowly and with caution into the street."  
"Yeah. That's his own car."—Life.

# News of California Highways

**G**ENERAL approbation appears to be accorded to the policy announced by B. B. Meek, Director of the Department of Public Works, to start at the earliest possible time a comprehensive grading and graveling program, which will make available to traffic at the earliest possible time sections of the state highway now unimproved and accordingly closed to travel.

The first stage of the construction under this program will be to grade and drain these roads as rapidly as the work can be carried on. Following this the rock surface will be oiled, for the dual purpose of holding the surface and allaying dust in summer. This will meet current traffic demands upon the roads. As the roadbed settles under traffic and by reason of weathering, and as increasing traffic makes it necessary, arrangements will be made for the installation of permanent pavement on these sections.

It is pointed out that this policy of road treatment will make for a greater stability of the subgrade, with consequent betterment of the permanent surface when the latter is laid.

Past experiments have shown that the oil can be put on the roads at a cost varying from \$1,000 to \$1,500 a mile after the rock surface has been laid. This settles the dust and, after it has been rolled and subjected to the wear and tear of traffic, soon becomes a hard packed surfacing, even though not of a permanent character.

The new plan will in no way retard permanent paving, which will be carried forward as rapidly as funds become available under the new gasoline tax and as the needs justify.

## HAD "C. H. C." LANTERN, BUT COURT FOUND HE WASN'T DIOGENES.

On October 19th, Foreman A. L. Andrus noted a truck to which was attached one of our highway lanterns, which in the fifth district are painted yellow with the "C. H. C." on them. Mr. Andrus questioned the driver and upon receiving unsatisfactory answers a warrant was sworn out for his arrest on the charge of petty larceny. The truck was operated by Rudolph Nicola of Soledad, who was brought before Judge Donaldson of Templeton and fined \$20 with alternative of 20 days in jail. This man stated that he was in the habit of picking up highway lanterns and had always returned them.

## HIGHWAY HEADLINES

Grading and Graveling Comment.  
Fined for Lantern Theft.  
Location Policies Told.  
Traffic Study of Ridge Route.  
Jumbo Does His Bit.  
New Roads and the State System.  
Asphalt Laid on Asphalt 250,000 Years Old.  
District Office Moved to Eureka.  
Activities of Prison Camps—Del Norte County Camp Moved—Lake County Camp Being Moved—Mariposa Camp—Prison Camp Population—Future Activities.  
Aeroplane Used in Highway Location.  
State Highway Progress Reports.

## Hearings on Ground Win Approval

The new policy of the Highway Commission of holding its meetings at different points throughout the state, with hearings "upon the ground" rather than in Sacramento, has also been very favorably commented upon by the press of the state. The first meeting under the new plan was held in Fresno on October 20th. Occasion was taken on this trip to hold meetings at a number of places where the people of the various counties, cities and communities had opportunity to voice their opinion as to highway plans, projects and policies, both as they affect the state and the particular communities where the meetings were held. These meetings were held at Turlock, Chowchilla, Fresno, Bakersfield, Hanford and Salinas.

November's meeting will be held at San Diego with other meetings in that section. A general study of the road situation of that section of the state will be made.

## Highway Location Methods Told

Much interest has also attached to the announcement of Mr. Meek and members of the Highway Commission that the location of roads will be made upon the findings of engineers skilled in matters of technical and economical highway location. These reports will be made available to the public and to interested communities, but unless the recommendations of the engineers can be shown to be at fault, their findings will be followed in road locations.

## Traffic Study Along Ridge Route

Thorough study of traffic conditions along the Ridge route between Los Angeles and Bakersfield will be made immediately.

## Road Policies Are Outlined

### JUMBO PUSHES CIRCUS OUT OF MUD, BUT CREATES NEW HIGHWAY PROBLEM

There are tears as well as smiles in the story of Jumbo, huge circus elephant, who died last month on the Hauser contract in Humboldt County.

The trucks hauling the circus to which Jumbo was attached, while on the way from Humboldt to Del Norte County became mired in road under process of construction. Efforts to get the trucks out of the mud by their own power were unavailing.

Jumbo was requisitioned into service. He pushed truck after truck out of the mud and from one hole to another until the circus parade was on its way again.

Then Jumbo laid down on the road in a state of complete exhaustion. All efforts to rouse and revive the huge animal were unavailing.

Finally the driver of the elephant went to his charge.

"Time to show, Jumbo," he said. Jumbo flopped his huge ears, and started to rise. "Time to show, Jumbo," said the driver again.

True to the instincts of the showman, that whatever may happen, the show must proceed, Jumbo again tried to get up. But the effort was too much. The show, however, was safe. It was on its way, out of the mud. Jumbo sank back—dead.

Then the Hauser forces buried the faithful elephant. The question now is as to whether the removal of the carcass of a dead elephant from right of way is properly a contingency that a contractor should anticipate in his bid, or should an extra work order cover the cost.

But Jumbo does not care about all that. The circus is safe. There was no failure on his part when it was "time to show."

The feasibility of the construction of a new road will be considered by the department as a means of affording relief for the traffic congestion on the present highway, if the situation can not be relieved by radical changes in the alignment of the present road.

A study of traffic and road conditions on the Saugus Tunnel road has already been ordered. This study is being made with the object in view of affording quick relief to the Saugus Tunnel bottleneck. The extent of travel at this point will be realized when it is stated that the traffic count taken by engineers

of the California Highway Commission on Sunday, July 17, 1927, showed a total traffic flow of 7680 vehicles over this road in a sixteen-hour period.

### Tells Policy Toward New Highways

"There is a legal as well as a moral obligation for the California Highway Commission to complete the roads at present in the state highway system, as embraced in proposals for bond issues and in legislative enactments, before we undertake anything else," stated Senator M. B. Harris of Fresno, member of the State Highway Commission, at a meeting held in Bakersfield, in declining to consider inclusion of Tehachapi highway in the state system, at a conference held in that city attended by members of the commission, city and county officials and more than 100 persons interested in highway building programs.

Resolutions of endorsement of the announced policy of the commission were unanimously adopted as offered by Ira Williams, chairman of the Kern County board of supervisors, favoring the completion at the earliest moment of opening all secondary highways in the state by bringing such highways to grade and properly draining the same. Also that

(Continued on page 22.)

### Asphalt Top Is Laid On Base Quarter of Million Years Old



Santa Susana Pass, near San Fernando, Los Angeles County, California. Here man-perfected asphalt is laid through a region underlain with an asphalt source estimated to be a quarter of a million years old.

## Activities of Prison Camps

(Continued from page 21.)

such highways be paved as rapidly as traffic needs demand, and funds be available.

### Division Offices Moved to Eureka

That the work of District I of the Division of Highways may be more easily and efficiently directed, it has been found necessary to move the offices of District I and Shop 1 from the building at Willits to temporary quarters in the Bank of Italy Building at the corner of Fourth and E streets in Eureka.

When the Highway Commission was organized, and Division I was formed in January, 1912, Willits was the end of the trail. There was no railroad to Eureka or Crescent City, and only steep, narrow, and tortuous wagon roads existed north of Willits. Willits was therefore the logical location for the division offices at that time.

Division I comprised the counties of Lake, Mendocino, Humboldt, and the most northwestern county of Del Norte.

As new roads were constructed in Humboldt and Del Norte counties and the railroad was extended on to Eureka, it became apparent that the bulk of the work in the division, both for construction and maintenance, was in the northern part. Often during the winter all modes of communication were cut off to the north. Accordingly it became evident that Eureka is now the logical place for the district offices, even though a well established plant must be left behind at Willits for some other use.

In contemplating the movement of district offices, an adjustment of the district boundaries was also considered advisable. Thereupon District III has been given that portion of Route 15 from Upper Lake to the westerly Lake County line and District IV has taken over all the rest of the roads which were formerly in District I south of Willits in lieu of which other territory is to be added to District I.

The equipment shops at Willits are to remain as a sub-shop of District I Equipment Department, and will care for the upkeep and repair of the state equipment in District IV as far south as Petaluma, and north in District I to Garberville.

### Activities of the Prison Camps

On October 1, 1927, the Department of Prison Road Camps was merged with the

office of the secretary of the California Highway Commission, thereby ceasing to exist as a separate unit of the Division of Highways. At that time the operation of the prison camps came directly under the supervision of E. Forrest Mitchell, secretary of the commission.

### Del Norte County Camp Moved

On October 28, 1927, after three weeks of moving operations, Camp A, which was located near Crescent City, Del Norte County, became Camp 12, located in Shasta County at Green Horn, 21.6 miles west of Redding. The new location is on the Redding-Arcata lateral, which is a primary state highway as far as the town of Weaverville. The men at this camp will for the next two years be engaged in the relocation of the highway from a point at the Green Horn mine over what is known as Buck Horn Mountain. The new location will eliminate a very difficult grade and will conform to all standard state specifications. In all there will be a total of nine miles of new road, providing work for the camp for at least two years.

The men at the camp welcome the move as weather conditions in Shasta are more favorable than those on the Del Norte coast. The work comes under the supervision of District Engineer H. S. Comly, District 11, headquarters, Redding, with the camp now known as No. 12 under the direction of Superintendent A. N. Lund.

### Lake County Camp Being Moved

On the 8th of November it is planned to move the Lake County camp, known as Camp No. 11. This camp is located in the eastern part of Lake County and is engaged in the construction of the Tahoe-Ukiah highway, known as State Highway Route No. 15. Although a secondary route, this road receives federal aid. It is the main north state cross road, leaving the Auburn-Truckee road at a point near Cisco and after traversing almost the entire width of the state, connecting with the Redwood highway at Capella, a short distance north of Ukiah, Mendocino County. The new location of the Lake County camp will be at a point near the Stubbs Ranch, which borders on Clear Lake, its work being a continuation of the present project.



## Progress Reports From the Field

George W. Lane, who has been in charge of the Lake County camp, several months ago gave notice of his resignation, which is to take effect on November 15th. His position will be filled by E. D. Willitt, who recently had charge of construction work in the Tahoe region. F. W. Haselwood, District Engineer of District III, will supervise the work of Camp No. 11.

### Camp E Located Near Mariposa

Camp E, under the supervision of District Engineer E. E. Wallace, District VI, headquarters, Fresno, is located ten miles east of Mariposa, working between El Portal and Mariposa. The camp is in charge of Superintendent W. B. Albertson and is now engaged in straightening the alignment of the all-year road into Yosemite Valley. Recently it was proposed to move Camp E to the Big Sur route, Carmel to San Simeon, in Monterey County, about January 1st, but the move has been postponed until early spring.

### Camp Population

On November 1st, the population of the several camps was as follows:

Shasta Camp, No. 12.....	120 men
Lake Camp, No. 11.....	41 men
Mariposa Camp, E.....	71 men
Total .....	232 men

### Future Activities

According to a recent announcement made by B. B. Meek, Director of Public Works, 1928 will see a rapid expansion of the camp work. Several new camps will be established and at least 400 more men will be given the advantage of the outside work.

### Aeroplane Used in Highway Location

The aeroplane has now come into use as a factor in highway location. On October 24th F. W. Haselwood, District Engineer for District III, left Sacramento in a Forest Service aeroplane to view the North Fork and the Middle Fork canyons of the Feather River from the sky. The plane was piloted by Captain Boggs. In three hours after leaving Sacramento, Mr. Haselwood was back in Sacramento. The plane flew at an approximate height of 5000 feet and at a speed of 90 miles an hour.

From Sacramento Mr. Haselwood and Captain Boggs flew direct to Oroville and from there to Bidwell Bar. The Middle Fork Canyon was then followed to Cromberg, where the plane turned, returning via Quincy, Spanish Creek and the North Fork to Oroville and Sacramento.

Mr. Haselwood states that a surprisingly accurate view of the country can be obtained in this manner, and that no difficulty was experienced in recognizing landmarks. A very excellent idea of the topography of the country was obtained.

## STATE HIGHWAY PROGRESS REPORTS

**Alameda County**—Livermore to Dublin; N. M. Ball, contractor.

Contract covers construction of a 20 feet by 6 inches Portland cement concrete pavement constructed as a second story section over the old 15 feet by 4 inches existing concrete pavement. Also the construction of road borders and heavy grading work in filling bar pits and widening the existing roadway to conform with the standards of the department.

The concrete pavement has recently been completed and is now open to traffic. Contractor Ball is now at work in completing earth shoulders and rock borders near the Livermore end and it is expected the entire work will be completed before December 1st.

The contract immediately adjacent, Dublin to Hayward, Ariss-Knapp, contractors, is well under way. The heavy cuts at Bulmer and Castro Hills are nearing completion and much other grading under way. Water-bound macadam surface is being started, and while much of the work will necessarily be put over to spring, the newly graded sections will be ready for surfacing with quarry waste base course preparatory to final surfacing.

The work on the new bridges at Alamo, Tassajaro and Los Positas creeks, within the limits of the Ball contract, is now well under way. The Alamo Creek structure is all completed except pouring of concrete rails. The Tassajaro Creek is completed with the exception of concrete rails. The contractor is now

## 1928 Road Program in Preparation

at work on both of these structures. At the Los Positas Creek all form work is now in place for the superstructure and it is anticipated that the deck will be poured during the week of November 7th to 12th. Traffic is now being carried across the Alamo Creek; however, at the Tassajaro and Los Positas creeks detours are now in use and are surfaced with rock and oil for proper handling of traffic until bridges are completed.

Additional bridge work in the Dublin Canyon section of the Ariss-Knapp contract will soon be under way.

Contractor E. B. Shields will be awarded the contract covering construction of three bridges across Palomares, Hollis and Cull creeks between Dublin and Hayward.

It is hoped that the entire work on Route 5 between Livermore and Hayward will be completed by the late spring of 1928.

Alameda County is favored with still another contract which was recently awarded to the Allied Contractors, Inc., between Warm Springs Junction, Alameda County, and Milpitas, Santa Clara County.

The contract is to grade roadway, construct an 11 feet by 7 inches by 9 inches concrete strip on the right surface of the existing pavement with asphalt concrete and 12 feet by 4 inches rock border on both sides. The work is just starting.

No other work outside of general maintenance is under way in these counties.

**Alpine County**—State forces are replacing washed out central pier under the Centerville bridge located at the junction of routes 23 and 24, approximately 9 miles south of Markleeville.

State forces are repairing abutment on the Hangman's bridge. Such repairs are necessary because of damage to abutment due to scouring under foot of pier during high water.

One-half mile of line change on Carson spur is under way by state forces to improve alignment and grades.

**Amador County**—Plans and estimate are being prepared for the reconstruction of a bridge over Dry Creek to replace the present inadequate structure. Survey for this work was made by District X and the plans, estimate and construction will be handled by the Bridge Department.

### 1928 Road Program

#### *In Preparation; Involves*

#### *\$23,500,000 Expenditure*

A program for the construction of new sections of roads, to be paid for from the proceeds of the one-cent gasoline tax, is in process of preparation. This program will cover an expenditure of approximately \$7,500,000 during the calendar year of 1928. The rapidity of construction will be governed by the fact that the one-cent gasoline tax, imposed to defray the cost of new construction, is received in half yearly periods. The levy just made by the State Board of Equalization, which will yield \$1,500,000, now goes to the State Controller for collection, and will not be available for expenditure prior to December 1st. Another payment will be made in May.

In the meantime B. B. Meek, Director of the Department of Public Works, the Highway Commission, and R. M. Morton, Chief Highway Engineer, are working out the program of projects upon which this new construction gasoline tax money will be spent. This program is being arranged to accord with the periods at which the money is received.

It is planned that the new construction program will be instituted during the early spring months of 1928.

New construction financed by the one-cent construction gas tax bill, signed by Governor Young, together with reconstruction projects set forth in the budget submitted to the legislature by the Governor, passed by that body and approved by him, will bring the total highway expenditures for 1928 up to \$23,500,000.

This will be made up as follows:

Reconstruction projects included in state budget, together with maintenance payable out of state's share of the two-cent gasoline tax and motor vehicle fees	\$13,000,000
Federal aid repayments	3,000,000
New construction under one-cent gasoline tax	7,500,000

The present underpass underneath the Amador Central Railroad tracks between Ione and Jackson will in the near future be

replaced by a more adequate structure. The new work will consist of constructing two new timber bents on concrete footings supporting four 30-foot Bethlehem steel girders, on top of which the railroad track will be built. The new structure provides for a clear width of roadway between bents of 24 feet, which, together with the added sight distance, will make this stretch of road far more safe for the traveling public.

One mile of grading to widen roadbed and improve alignment and grade is under way by state forces on Silver Lake hill.

**Colusa County**—The twelve miles of rock borders which was recently awarded to Hemstreet and Bell between Williams and Delevan is under way and progress assures early completion.

**Contra Costa County**—The contract for grading and rocking the road between El Ciervo and Valona, Tieslau Bros., contractors, has been completed and accepted.

The approaches to the newly constructed Wild Cat Creek bridge are to be graded and rocked on the new alignment. This work will be advertised soon and constructed before the winter rains set in.

Four and one-half miles of 1½-inch asphaltic macadam surfacing of the existing concrete surface of the roadway between Crockett and Martinez is completed and open to traffic. Remainder skin coat under general maintenance.

At El Cerrito, Richmond, northerly 1.4 miles, the city of El Cerrito has just completed the surfacing of San Pablo avenue, which was done with the cooperation of the Department of Public Works, Division of Highways, which contributed \$35,000 to help defray the cost of same. This section was recently turned over to the city of El Cerrito for maintenance and jurisdiction.

**El Dorado County**—The Redmond-Nelson Company has just completed the construction of a combination dry and rubble masonry retaining wall facing Emerald Bay, which eliminates portion of the narrow highway facing this beautiful body of water, one of the most picturesque views in the state.

Hemstreet and Bell have just completed their crushed gravel contract.

**Glenn County**—A mile of bituminous macadam pavement which was recently awarded to C. K. Buchanan between Four Corners and Butte City is progressing nicely.

**Inyo County**—A number of stretches of the state highway between Lone Pine and

Bishop has been oiled. Four maintenance crews fully equipped are at work on the state highways in this county. The grading contract awarded F. C. Payton between Coso Junction and Olancho, a distance of 21 miles, is now under way. A bridge widening program for this county is planned.

**Kern County** (Easterly part of Kern County north of Mojave) Two maintenance crews are at work in the easterly part of Kern County, north of Mojave. The work embraces the Kramer and Mojave road, a portion of the Bakersfield-Freeman road, and part of Route 23. The crews are equipped with tractors, motor graders and trucks. Recent rains have enabled these roads to be put into first-class condition.

**Los Angeles County**—The pouring of concrete for retaining walls, a flood protection measure, is now in progress on the Arroyo Seco road north of Pasadena in Los Angeles County.

**Marin County**—The surfacing of the existing highway from Ross to Larkspur (through Kentfield) is to be advertised soon. A 2 inches to 3½ inches asphaltic concrete surface 30 feet wide is to be constructed.

**Mono County**—Recent snow storms have compelled the disbandment of three maintenance crews. The rock crushing plant between Lone Pine and Independence has finished its season's run. The macadam work on a three mile stretch of road between Lone Pine and Independence has been completed. Four miles of road between these two points have been oiled. The widening of timber and concrete bridges from 16 to 24 feet is in progress.

**Nevada County**—Arthur Remter was recently awarded a contract for the construction of a truck and storage building and oil house at Nevada City maintenance site. He plans to commence operations on these buildings in the near future.

**Orange County**—Grading and culvert work is now well under way on the reconstruction of 5.7 miles of state highway in Orange County, between Galivan and Irvine.

**Placer County**—Hy Nelson was awarded a contract for the crushing and placing of crushed rock between Baxters and Shelter House Number 1. The recent rains have somewhat handicapped this work but it is thought the extension of open weather will permit the completion thereof before the snow drives the contractor out.

**Sacramento County**—Occasionally the Division of Highways expedites the awarding of a contract when the need is apparent, as was the case with the paving of approaches to the Ben Ali subway. Bids were opened on this work on October 31, signed by the Director of Public Works on November 2, the contractor was on the job November 3 and assures us that not later than the 7th the dirt will be flying. This means the elimination of a detour which has been in effect for some time due to the construction of the Ben Ali subway and will also allow the public to use this beautiful new structure and new safe alignment.

**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.

At Del Mar in San Diego County grading has been completed, drainage structures are in place, and paving has been commenced on the change in the highway location which eliminates the present grade crossing and will carry the highway over the new overhead crossing of the Santa Fe tracks.

**San Joaquin County**—Survey, plans and estimate are under way for the construction of new trestle approaches to the New Hope Landing bridge. We expect to start on this work in the very near future.

Plans and estimate have been prepared for reconstruction of a portion of highway between French Camp and Mossdale. The construction of this unit will eliminate the present narrow and dangerous roadbed.

A contract for the grading and surfacing of that portion from Stockton northerly to Cherokee Station awarded to Irey and Holden, is at the present time under way. Rough grading is completed and the finished grading is now in progress. The total job is about 60 per cent complete.

**San Mateo County**—The bottle neck, Colma to Cypress Lawn Cemetery, is nearly broken. The grading and drainage contract of the Kaiser Paving Company is completed and the paving with cement contract two 30-foot strips, 9 inches to 11 inches thick, with some surfacing with asphaltic concrete over existing pavement, Hanrahan Company contract, is nearly complete.

The work will be completed about December 1st.

On the Bayshore highway, bids to resurface portions of the 4½-mile stretch between Visitation Valley and South San Francisco, Road

IV-SM-68-A, have been opened. The Federal Construction Company were low bidders. Work should start within ten days and be completed before Christmas.

The surfacing of the portion of the newly graded section between South San Francisco and Broadway Station, 5.2 miles, has been advertised for bids to be opened November 14th, and work should start before December 1st.

This work, consisting of rock surfacing and some structures, should carry on during the wet weather and be complete in time for the summer travel.

The neighboring section, Broadway Station to Fifth avenue, San Mateo, 3 miles, grading, drainage and rock surfacing, will be advertised shortly and carried on to completion to allow use about the time the previous section is completed, and will open up a wide roadway from San Francisco to San Mateo.

**Sonoma County**—The approaches to the newly constructed Sonoma Creek bridge are ready for advertising. The new alignment is to be graded and a rock surface constructed. This surface will be oiled.

Also the section of the Redwood highway from Ignacio to San Rafael is to be paved 20 feet 6 inches to 9 inches second story concrete; several changes made in alignment between Novato and Ignacio, these changes to be rocked and oiled. All structures are to be reconstructed to conform to standards. This work is being prepared for advertising and will come out soon.

**Stanislaus County**—Between Turlock and Modesto 4.7 miles of sandy shoulders are being treated with the oil mixing process, this work being done by state forces. The shoulders are to be treated for a width of three feet on each side of the pavement.

Plans and estimate are being prepared incidental to the construction of a new timber approach and earth fill approach replacing the present inadequate timber approach to the bridge across Stanislaus River.

**Tuolumne County**—Between Bakers Station and the summit of Sonora Pass, approximately 9.0 miles of widening roadway and improving alignment and grade is under way by state forces.

Four and one-half miles of rock surfacing on Bucks Meadows easterly is nearing completion. The material was crushed, hauled and placed under contract let to Montfort and Kassabaum. A portion of this work extends into Mariposa County.

(Continued on page 39.)

**ONE DETOUR—**By IRA L. WOOD, in *Arizona Highways*.

I am detour;  
 Maker of cuss words,  
 Producer of pains,  
 Destroyer of autos.  
 Even the good say damn when they see me  
 And the wicked say I am hell.  
 I putreth in action the rear seat drive,  
 I maketh the Cadillac look like a flivver,  
 And a flivver like a junk pile.  
 Woe unto the motorist that forgetteth me;  
 That taketh me not into consideration;  
 That thinketh not of me when he planneth a journey!  
 For, verily, when he is at the height of his pleasure,  
 When he sayeth unto himself,  
 "Verily this is the road of roads  
 And motoring is the king of pleasure."  
 Then will I descend upon him  
 And utterly destroy his joy in life.  
 Yea, verily, I will break his springs  
 And bend his axle;  
 I will burn out his bearings,  
 And his differential I will turn into a scrap of metal;  
 I will cause his tires to be punctured  
 And his radiator to work like a sprinkler.  
 Yea, verily, I will turn his whole trip into a nightmare  
 For I am Detour, greatest of all joy killers.  
 Even the high and mighty are humbled by me  
 And the tourist liveth in fear of my wrath.

**AND ANOTHER—**

By GEORGE C. MANSFIELD.

I am a California detour;  
 A "sign of progress"  
 The advance agent of better roads,  
 Already in the building.  
 The foolish may say damn  
 When they ride over me,  
 And the wicked may say hell.  
 But the wise know that without me  
 Good roads could not be,  
 And they possess their soul in patience,  
 Some even praising me.  
 Chuck holes are my chuckles  
 As I think of the privilege  
 That has been mine  
 To be the proud parent  
 Of highways so fine  
 That all the world sings  
 Paeans of praise to these  
 My road children.  
 What if they forget  
 My part in the work;  
 Yet will I continue  
 This first work to do.  
 I clear the path  
 That the way may be made straight,  
 The pavement smooth,  
 The roadbed firm,  
 The highway good.  
 If I bump the foolish,  
 Besmatter the irritable,  
 Stall the impatient,  
 Why not?  
 It may teach them to look  
 Beneath the rough and outer surface,  
 Down into the actuality of things.  
 It may teach them to see mirrored in me  
 The reflection of  
 Labor and capital working peacefully together,  
 Building a bigger state.

For a better people.  
 I am a California detour;  
 A "sign of progress,"  
 I apologize to no one,  
 For without me  
 Good roads could not be.

**ROUGH GOING**

"How's this?" asked the lawyer of the contractor.  
 "You've named six material dealers in your will to  
 be your pallbearers. Would you not rather choose  
 some of your friends with whom you are on better  
 terms?"

"No, Judge, that's all right. Those fellows have  
 carried me so long that they might as well finish the  
 job."

"One man is knocked down by an automobile every  
 twenty minutes in Los Angeles."—*News Item*.

You would think it would wear him out.

—*Motor Chat*.

The following was the verdict by an Iowa jury in  
 a suit against a railroad company:

"If the train had run as it should have run; if  
 the bell had rung as it should have rang; if the  
 whistle had blown as it should have blew, both of  
 which it did neither—the cow would not have been  
 injured when she was killed."—*Erith Observer*.

A farmer in the south came to town a few weeks  
 ago with a load of cotton. "Do you know," he re-  
 marked as he stood near the newly improved highway,  
 "I made the trip in a little under two hours this morn-  
 ing. It used to take me two days and a couple of plugs  
 of chewing tobacco. This morning I made it with  
 one chew."—*Building Materials*.

The track supervisor received the following note  
 from one of his track foremen: "I'm sending in the  
 accident report on Casey's foot when he struck it with  
 the spike maul. Now under 'Remarks,' do you want  
 mine or do you want Casey's?"

A balky mule has four-wheel brakes.

A billy goat has bumpers.

The firefly is a bright spotlight.

Rabbits are puddle jumpers.

Camels have balloon-tired feet.

And carry spares of what they eat;

But still I think that nothing beats

The kangaroos with rumble seats.

—*Kentucky Highways*.

In a certain province liable to floods there is a  
 notice on a low-lying road which reads:

"When this sign is under water this road is im-  
 passable!"—*The Nation's Highways*.

Women, says an English paper, have invaded all  
 but thirty-seven of the occupations of the world. There  
 are as yet no women engine-drivers.

There isn't any back seat in a locomotive cab.

—*Judge*.

A man is something that can see a pretty ankle three  
 blocks away while driving a motor car in a crowded  
 city street, but will fail to notice, in the wide, open  
 countryside the approach of a locomotive the size of a  
 schoolhouse and accompanied by a flock of forty-two-  
 box cars.

## THE CALF-PATH

One day, through the primeval wood,  
 A calf walked home, as good calves should;  
 But made a trail all bent askew,  
 A crooked trail as all calves do.  
 Since then two hundred years have fled,  
 And, I infer, the calf is dead.  
 But still he left behind his trail,  
 And thereby hangs my moral tale.  
 The trail was taken up next day  
 By a lone dog that passed that way;  
 And then a wise bell-wether sheep  
 Pursued the trail o'er vale and steep,  
 And drew the flock behind him, too,  
 As good bell-wethers always do.  
 And from that day, o'er hill and glade,  
 Through those old woods a path was made;  
 And many men wound in and out,  
 And dodged, and turned, and bent about  
 And uttered words of righteous wrath  
 Because 'twas such a crooked path.  
 But still they followed—do not laugh—  
 The first migrations of that calf,  
 And through this winding wood-way stalked,  
 Because he wobbled when he walked.  
 This forest path became a lane,  
 That bent, and turned, and turned again;  
 This crooked lane became a road,  
 Where many a poor horse with his load  
 Toiled on beneath the burning sun,  
 And traveled some three miles in one.  
 And thus a century and a half  
 They trod the footsteps of that calf.  
 The years passed on in swiftness fleet,  
 The road became a village street;  
 And this, before men were aware,  
 A city's crowded thoroughfare;  
 And soon the central street was this  
 Of a renowned metropolis;  
 And men two centuries and a half  
 Trod in the footsteps of that calf.  
 Each day a hundred thousand rout  
 Followed the zigzag calf about;  
 And o'er his crooked journey went  
 The traffic of a continent.  
 A hundred thousand men were led  
 By one calf near three centuries dead.  
 They followed still his crooked way,  
 And lost one hundred years a day;  
 For thus such reverence is lent  
 To well-established precedent.  
 A moral lesson this might teach,  
 Were I ordained and called to preach;  
 For men are prone to go it blind  
 Along the calf paths of the mind,  
 And work away from sun to sun  
 To go what other men have done.  
 They follow in the beaten track,  
 And out and in, and forth and back,  
 And still their devious course pursue,  
 To keep the path that others do.  
 But how the wise old wood-gods laugh,  
 Who saw the first primeval calf!  
 Ah! many things this tale might teach,  
 But I am not ordained to preach.

—Sam Walter Foss.

## U. S. MOTOR VEHICLE REGISTRATION

Motor vehicles registered in the United States in the first six months of 1927 totaled 20,991,333, according to a statement October 25 by the Bureau of Public Roads, Department of Agriculture. California's registration was 1,584,723 and was exceeded only by New York.

The increase in registration over 1926 amounts to 1,374,578 vehicles, or 7 per cent. California's increase was 8.6 per cent.

The full text of the statement follows:

A total of 20,991,333 motor vehicles were registered in the United States in the six months of 1927. This represents an increase of 1,374,578 or 7 per cent over the registration during the same period of last year.

The states showing the largest percentage increases are Tennessee, South Carolina, North Carolina, Illinois, West Virginia, New Jersey and Massachusetts. It is worth noting that 1926 statistics showed all of these states to be above the average of 5.4 persons per motor vehicle for the entire United States.

Revenue from registrations, licenses, etc., amounted to \$272,119,534, of which \$12,452,059 has been allocated for collection and administration purposes, \$188,525,679 for state highways, \$47,937,641 for local roads, \$21,795,330 for road bonds, and \$1,408,825 for miscellaneous purposes. In recent years the motor vehicle and gasoline tax revenues have constituted quite a substantial portion of highway expenditures.

The total motor vehicle registrations and the percentage of increase or decrease compared with the same period (six months) in 1926 were as follows:

Alabama	211,385	7.0
Arizona	69,599	8.5
Arkansas	175,709	-0.9
California	1,584,723	8.6
Colorado	234,794	4.0
Connecticut	262,035	9.8
Delaware	42,784	6.1
Florida	373,482	-0.6
Georgia	260,079	9.0
Idaho	89,006	5.8
Illinois	1,866,060	12.2
Indiana	745,000	7.9
Iowa	660,888	1.9
Kansas	454,685	4.9
Kentucky	254,595	3.0
Louisiana	210,000	-3.0
Maine	141,605	10.2
Maryland	249,883	9.8
Massachusetts	697,404	11.1
Michigan	1,041,482	5.0
Minnesota	607,725	5.8
Mississippi	197,881	9.9
Missouri	609,849	4.5

## COMMUNICATED

*Los Angeles Traffic  
Greater Per Mile Than  
Is That of Chicago*

LOS ANGELES, CALIF., November 4, 1927.

MR. GEORGE C. MANSFIELD,  
Editor CALIFORNIA HIGHWAYS,  
Sacramento, Calif.

DEAR SIR:

A short article, "Cost of Road Traffic Delay," appears on page eight of the September issue of the CALIFORNIA HIGHWAYS.

The daily vehicle-miles in Cook County for 1924 are given as 990,000 for 418 miles of highway, or an average of 2390 per mile.

In Los Angeles County our traffic census shows 1,015,012 auto-miles and 105,159 motor truck miles per day for 158.55 miles of paved highways, or an average of 6400 and 633 per mile, respectively—a total of 7063, being more than three times the traffic in Cook County.

The computation of the cost of road traffic delay is a new feature and one which I can hardly recommend to represent true conditions. It is almost impossible to express loss of time, due to traffic conditions in money value.

This is entirely dependent on who is losing time and for what purposes people are traveling over the road. Pleasure travelers' time is certainly not worth three dollars an hour, nor is the time of the wife or children riding with the business man, though his time may be worth money. To compute this loss on the basis of accumulated time of four minutes per mile, gives the result far in excess of the actual value.

Loss of time in minutes can hardly be expressed in

Montana	91,701	-0.7
Nebraska	324,169	-1.7
Nevada	22,457	9.4
New Hampshire	86,618	9.7
New Jersey	639,339	11.1
New Mexico	50,556	8.6
New York	1,704,987	9.1
North Carolina*	418,271	12.6
North Dakota	145,383	0.9
Ohio	1,459,815	6.5
Oklahoma	459,429	4.2
Oregon	204,895	4.7
Pennsylvania	1,425,424	7.4
Rhode Island	103,533	7.1
South Carolina	174,378	15.5
South Dakota	152,069	-2.4
Tennessee	265,842	16.7
Texas	950,110	5.1
Utah	84,450	3.2
Vermont	69,058	9.8
Virginia	299,924	8.2
Washington	348,628	6.8
West Virginia	205,121	11.6
Wisconsin	626,452	6.0
Wyoming	46,198	4.1
District of Columbia	91,873	2.2
Total	20,991,333	7.0

\* Registration figures for North Carolina cover full year.

money. In most cases the loss does not exceed a few minutes and can not amount to that number of hours.

The most important feature has been ignored—that is, no consideration has been given as to what the loss of time would have been if these 418 miles of highways had not been improved. I can not say how much time is gained and money saved on account of traffic moving more rapidly resulting from a paved road, but many years ago I originated the theory of operative income against the cost of maintenance and depreciation, by which I assumed that there is a difference of one cent per mile in favor of the paved highway due to less wear on tires, consumption of gasoline and loss of time, and at least five cents per ton-mile for motor trucks. I find that the 418 miles of paved highways in Cook County have produced an operative income of at least \$3,613,500 for the year of 1924 (the number of motor trucks were not mentioned), which gives an average of \$8,645 per mile.

On the same basis the 158.55 miles in Los Angeles County have shown an operative income of \$3,704,700 for the past year for automobiles and \$1,919,170 for motor trucks on the basis of truck-miles only and not ton-miles, making a total average operative income of \$55,471 per mile.

Looking at the matter from this standpoint, it is my opinion that we have given the improved highway due credit, as this represents indisputably the advantage to the public at large; in other words, it shows that money has actually been saved.

Very truly yours,

JOHN C. VEENHUYZEN.

(EDITOR'S NOTE.—Mr. Veenhuyzen is superintendent of the Division of Administration and Accounts of the Road Department of the county of Los Angeles.)

## FEDERAL AID

The status of federal aid highway construction in the various states as of July 31, 1927, is contained in a report of the Bureau of Public Roads just received. The report for California follows:

Projects completed prior to July 1, 1927:

Total cost	\$35,128,269.04
Federal aid	16,967,026.82
Miles	1,806.3

Projects completed since June 30, 1927:

Total cost	\$384,361.20
Federal aid	224,871.31
Miles	15.9

Projects under construction (fiscal year 1928):

Estimated cost	\$7,088,452.73
Federal aid allotted	3,205,702.36
Miles	136.3

Projects approved for construction (fiscal year 1928):

Estimated cost	\$103,357.10
Federal aid allotted	62,114.26
Miles	4.5

Balance of federal aid fund available for new projects, \$4,096,637.25.

## TREE PLANTING AND PUBLIC UTILITIES

(Continued from page 5.)

planted with roadside trees, the annual cost involved in their care and replacement representing an expenditure of two cents of each dollar appropriated for general maintenance work.

The highway right of way is also considered the natural location for utilities as service can be furnished with a minimum of extension lines and the cost of private right of way need not be added to the established rates.

The success of the tree planting movement, however, has placed a burden on the pole line companies, as the earlier plantings have reached sufficient height to interfere with wires and cause "cross-talk" on the telephone and electric disturbances on the power wires. To avoid topping or cutting unsightly notches through the trees, it is necessary either to raise the wires on longer poles or to move the lines. The public utility companies appreciate the value of the trees and generally where trimming has been permitted, the work is satisfactory. However, occasionally through carelessness, an unsightly job is done and the public's immediate protest indicates their active interest in roadside trees.

To minimize this conflict and satisfy both, from an aesthetic and economic view, at the same time provide for the future development of our highways, it was necessary to assign some definite location within the right of way to the trees, poles and service utilities. Placing trees too close to property lines has often resulted in damage to them from the stock within the adjacent fields. Proper cultivation and protection from fire is also hampered by too close proximity to property lines, and the cost of watering increases when trees are located beyond the reach of our one man tree watering units. Placing poles along the tree line means interference with proper tree growth and, due to continuous trimming for wire clearance, handicaps growth and development of the trees.

For these reasons it was decided to place the poles at the right of way line and the trees adjacent to the curb line. The trees at the future curb line will in time present a vista of green banked foliage restful to the eye of the motorist and to a large extent hiding the unsightly poles.

The location and maintenance of pole lines within the highway right of way and their interference with trees was recently the sub-

(Continued on page 39.)

## BUILDING CALI- FORNIA'S BUILDINGS

(Continued from page 8.)

### MISCELLANEOUS WORK

This subdivision includes all the activities of various sections of the division over and above those directly related to projects for which money has actually been appropriated.

Assistance of an advisory nature is constantly being rendered the various departments and institutions, in connection with technical subjects. Sketches and estimates are prepared for considerable proposed work that is never carried to completion. Development plans for the new institutions, and for proposed changes in the older ones, are constantly being worked on. Also plot plans showing existing conditions which the division has never been able to finance in a comprehensive way, and the lack of which represents a serious handicap, are being made as rapidly as possible and are being kept up to date to the best of our ability.

It is not possible to give an accurate account of the amount of time spent by the employees of the division on this miscellaneous work. It is safe to say, however, that as a minimum estimate one-third of the time of the executive officers and the section heads is devoted to the handling of these miscellaneous details.

Subcontracts are made in many cases rather than a general contract, where it can be demonstrated that a saving to the state can be effected in handling the work in this manner. When such a procedure is followed, the Division of Architecture acts in the same capacity as a general contractor. Construction work on the Sacramento state buildings is being carried on by the subcontract method.

Three specially important points in the present method of operation are called to attention as having much to do with the increasingly satisfactory results being obtained. These three points are as follows:

1. Projects are being carefully estimated by the Division of Architecture as to cost, in advance of making appropriations.

2. The state is gradually adopting a policy of permanent building construction at all institutions; there are only occasional exceptions to this in cases where particular conditions exist.

3. The Division of Architecture itself, is financed independently of the building appropriations; this almost entirely eliminates friction between the institutions and departments served and the division, and at the same time makes for greater efficiency in the division.



## PERSONALIA

At the fall board meeting of presidents, directors, secretaries and advisory boards of the Associated General Contractors of America,



W. A. BECHTEL

which will occur during the latter part of January, 1928, at West Baden, Indiana.

R. M. Morton, State Highway Engineer, has been honored by the American Association of State Highway Officials by selection as one of the ten members of its executive committee. The committee is made up of commissioners, engineers and others affiliated with highway construction in America.

Miss Lucile Steers, personnel clerk of District III, and Thornton K. May, draftsman in the headquarters Bridge Department, were married November 8th.

Miss Elizabeth Etzel, information clerk for a number of years in the headquarters office of the Highway Commission, and Mr. Wade Rowse, prominent farmer of Gridley, will be married in Reno on November 16th. They will make their home in Quincy, where Mr. Rowse is going into business for himself.

San Francisco can invest money to no better result than improvement of streets and creation of boulevards, making available to motorists its locations of beauty, believes Harvey M. Toy, former chairman of the State Highway Commission, who recently returned from a ten months' tour of the world. In Europe Toy found that country highways are far inferior to those of California, "but," he adds, "the big cities—Paris Vienna, and Berlin in particular—are far ahead of us in boulevard construction.

PUTTING THE "RIGHT"  
INTO WATER RIGHTS

(Continued from page 7.)

such survey of water title, use of water, stream flow, etc., as may be necessary. Claims are filed, these are published, abstracted and appropriate notice given to interested parties and contests, if any, are heard. The division prepares its findings and submits them to the superior court which affirms or modifies and enters an order defining the rights of the respective parties.

## DECREES ENTERED

Decrees have already been entered under one procedure or the other defining rights on Willow Creek in Lassen County, San Pedro Creek in San Mateo County, North Fork of Cottonwood, Hat and Burney creeks in Shasta County, West Fork of Carson River in Alpine County, Oak Creek in Inyo County and Morrison Creek in Del Norte County. Proceedings looking toward a determination of rights are under way or findings have been submitted and decrees are next in order on Stanislaus River, Shasta River, Whitewater River, North Cow, Oak Run and Clover creeks in Shasta County, Owl, Soldier and Emerson creeks in Modoc County, Butte Creek in Siskiyou County and Los Alamos Creek in Santa Barbara County.

## WATER MASTERS

Section 37 of the Water Commission Act provides that the division "shall divide the state into water districts to be so constituted and adjusted as to insure the most practical and economical supervision of the distribution of water on the part of the state, and shall have authority to make such reasonable regulations to secure distribution of water in accordance with the determined rights as may be needed." There has so far been no comprehensive division of the state into water districts but the division has upon request of interested parties placed water masters upon Shasta River, North Fork of Cottonwood, Hat, Burney, North Cow, Oak Run, Clover, Butte, Owl, Soldier, Emerson and Cedar creeks—the waters of the last named creek being distributed under a decree of the superior court of Modoc County entered without reference to the division.

## INVESTIGATIONS.

The investigational work of the division is often closely allied to the adjudication and stream administration work as might be

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## THE "OIL MIX" METHOD

(Continued from page 13.)

harrow pulls in behind and begins mixing, going back and forth over the section oiled until the distributor returns with another tank load of oil. This harrowing operation can not be overdone.

The second and third oil applications are disc harrowed in the same manner as the first application.

The material is then bladed from the side to the center of the road with a road grader, the first trip with the grader lining up the edge in a straight line and throwing the material toward the center. A second trip with the grader flattens out toward the center the ridge thrown up by the first trip. The third trip windrows toward the center of the material flattened out by the second trip. Two adjacent windrows at the center are the result after the completion of the third trip on both sides of the road. The fourth trip with the grader lays one windrow on top of the other and the fifth trip splits this windrow in two, flattening out the material which is now on its way back to the edge of the road. The process is then repeated, usually with a ten-foot grader. Sometimes the mixing is done with a Best tractor pulling two graders with the blades set in opposite directions.

### FINAL MIXING

The final mixing is entrusted to an experienced man who has learned by experience the proper color which must be obtained for best results. The amount of mixing and number of trips depends somewhat on the temperature, character of material being mixed and the viscosity of the oil. The process of mixing is continued until the rock is thoroughly coated with oil and until the entire mixture has attained a uniform brown color. The material is sometimes turned over from thirty to forty times.

A properly curved mold board set at approximately 45 degree angle and operated at a relatively high speed is essential for proper mixing. The tractors used for mixing are usually governed to operate in second gear at a speed of four miles per hour. This speed is essential in order to obtain a rolling action thus turning the material completely over on the face of the mold board instead of a sliding or crowding action.

After the material is thoroughly mixed, it is bladed to a uniform cross-section by the finish grader and maintained smooth under traffic by a light grader for several days. The

last grading should shape only the top one inch.

It is essential that an experienced and expert operator be used for the finish mixing and spreading. If not handled properly, the mixed material may be spread too thin in places and unnecessarily thick in others, particularly on superelevated curves. Insufficient thickness results in early raveling of the surface which must be patched. When the surface ravel, the usual method of repair is to paint the surface of the resultant hole lightly with fuel oil and then fill the cavity with pre-mixed three-quarter-inch rock and oil tamped or rolled into place.

### SUMMARY OF OPERATIONS.

Following is a summary of the different stages followed from beginning to end of a typical oil mix job:

1. Preliminary scarifying.
2. Balance grading.
3. Final scarifying.
4. First application of oil.
5. Disc harrowing.
6. Second application of oil.
7. Disc harrowing.
8. Third application of oil.
9. Disc harrowing.
10. Preliminary or rough blade mixing.
11. Final or finish blade mixing.
12. Spreading mix.
13. Surface compacting and smoothing.
14. Seal coat (if needed).
15. Correction of construction defects and maintenance.

### AMOUNT OF OIL

The principles involved are similar to those governing asphaltic concrete excepting that the low viscosity asphaltic binder used in this process covers the particles with a thinner film than does the harder asphalt. Tests indicate that three-fourths as much light oil should be used as asphalt for like mixtures, though definite standards of quantity of oil have not been finally developed. Experienced operators can accurately judge requirements by appearance. A stain test modified from sheet asphalt practice promises to be useful. The amount of oil depends primarily upon the amount of sand and dust passing a 10-mesh screen.

Experience has demonstrated that the amount of oil to be used should be kept at a minimum.

In Oregon as low as from 0.9 per cent to 1.0 per cent of bitumen has been found holding a road. In California, the percentage

ranges from 2 per cent to 7 per cent with an average of 3 per cent to 4 per cent.

In order to secure best results, a screen analysis of the road material should be made prior to oiling.

Aggregate containing from 40 per cent to 60 per cent of 10-mesh material usually gives more satisfactory and stable results than aggregate containing less than 40 per cent passing a 10-mesh.

A hard nonporous gravel will usually require less oil and a porous volcanic rock a higher percentage.

In the final analysis the amount of oil used must be governed by the appearance and the mixing is continued until the material assumes a dark brown or chestnut color.

#### CORRECTION OF CONSTRUCTION DEFECTS AND MAINTENANCE

Construction defects are very apt to occur, especially when the work has been performed by a crew which has not had a great deal of experience. The defects consist of spots too rich or fat or which are too lean.

The spots which are too rich in oil may corrugate or rut. These places are easily rescarified and remixed. More dry material is brought up from below and mixed in until the proper color is secured.

This rescarifying and remixing of a too rich road is a job calling for much experience because of the fact that considerably less than one-half inch of additional dry material is usually sufficient to reduce the mix to the proper consistency.

If too lean a mix is secured either originally or after remixing it is customary to seal the surface with a light application of oil, approximating one-eighth gallon.

The reason why a smoother road on the average can and will be secured by the oil mix process than by the surface oiled method is primarily on account of the ability to smooth the surface of the oil mix road under traffic by means of the blade, a process which can not as a rule be used on surface oiled roads without danger of breaking the crust with resultant necessity of patching and consequent roughening of the surface, though this roughening may be slight when the patching is skillfully done.

#### COST

There is not a great deal of difference between the average cost of oiling by the penetration method and the cost by the oil mix

process, although the cost of specific projects by either method vary widely.

The average cost of oiling some 426 miles by the penetration method during the current year was \$1,103 per mile. The minimum cost was \$577 per mile on a six-mile section where only ten tons of screenings per mile were used for covering the oil. The maximum cost was \$1,582 per mile for oiling 125 miles in our District I where 0.66 gallons of oil per square yard and 252 tons of screenings per mile were used. An average of 0.585 of a gallon of oil per square yard was used on the total mileage oiled.

The average cost of oiling 185 miles by the oil mix process during the same period was \$1,183 per mile with an average use of 1.32 gallons of oil per square yard. The lowest cost was on a 2.3-mile section where \$761 per mile was spent. The most expensive work was in District VIII where the average cost was \$1,364 per mile, 1.6 gallons of oil being used per square yard. However, the work in District VIII is the best in the state and apparently fully justifies the additional expenditure to secure a first class job.

The average delivery price paid for over 7,600,000 gallons fuel oil used in California to date during 1927 has been \$1.78 per barrel, or \$0.04 per gallon. The price at the refinery was \$1.29 per barrel or 0.03 per gallon.

The 325,600 gallons of road oil used cost \$2.46 per barrel or 0.059 per gallon delivered.

#### CONCLUSION

In conclusion it may be repeated that no claim to originality is made in connection with the oiling of natural soil or crushed rock or gravel roads with light asphaltic oils.

It is claimed, however, that by following the methods of procedure outlined herein reasonable certainty can be had that roads so constructed on a good foundation will adequately serve even a large volume of traffic for a number of years at a much lower maintenance cost than the expense of maintaining and renewing a rock road with an untreated surface.

There is no doubt but that the uniform success which has attended the bulk of the oiling done in California this year is the result of systematic study and the adoption of uniform and proper methods of construction, accompanied by laboratory advice and control. Too much stress can not be laid upon the care which should be given any class of oiling work. Care and skill are necessary if satisfactory results are to be secured.

## FROM OTHER STATES

**ALABAMA** is working toward a continuously improved highway running its entire length. This route, known locally as the Bee Line Highway, passes from Athens and Albany, on the north, through Birmingham, Montgomery, and on south to the Gulf.

**ARIZONA**—Arizona's greatest highway program, calling for the expenditure of \$5,654,487.52 for the construction and improvement of state highways, is provided for in the budget of the Arizona Highway Department for the remainder of the fiscal year ending June 30, 1928, was adopted September 10th by the Arizona State Highway Commission.

The revenue provided for in the budget is to be derived from the ten-mill property tax, direct appropriation, the four-cent gas tax, motor vehicle and motor title fees, proclamation and special appropriations. Federal Aid and municipal and railroad participation. Federal Aid participation for the present fiscal year aggregates \$2,367,581.62.

**COLORADO'S** state road program for 1927 called for an estimated expenditure of \$3,904,000, a major share of which was to be derived from the three-cent gasoline tax.

**CONNECTICUT**—The program of the state highway department for the next four years calls for the reconstruction of 137 miles of road in 1927, 362 miles in 1928, 585 miles in 1929 and 334 miles in 1930, and the construction of 550 miles of new highway. The estimated cost of this program is \$69,000,000.

**LOUISIANA**—A tour of inspection of the Louisiana flooded area, from Melville north and northwest to the Arkansas line, reveals the fact that truly remarkable progress has been made in rehabilitation work. The highway forces, under skillful direction, have almost completed the tremendous task of rebuilding and repairing the damage wrought by the unprecedented flood.

**MINNESOTA**—Northern and southern Minnesota, representing respectively the iron mining center of America and one of the richest farming regions, is now connected by a hard surfaced highway 355 miles long. Improvements were completed on the last remaining gaps a few weeks ago. Route No. 1 extends from the north shore of Lake Superior at Grand Marais, Minnesota, south via Duluth and the Twin Cities to the Iowa border.

**NEW MEXICO** has developed a low-cost ground-level road for the sparsely settled table lands. This type of construction, known as Mesa Roads, costs only \$300 a mile.

**NEW YORK CITY** has 700 pieces of motor driven equipment and 1500 trucks available for snow removal. Plans are being perfected for keeping the streets more completely cleared of snow and ice this coming winter than ever before.

**OHIO**—Approximately \$40,000,000 will become available for road construction and maintenance during the next year and a half. This will be applied to a state-wide program which includes many miles of reconditioning, rebuilding, relocating, widening, and otherwise grooming Ohio's roads for an estimated 1935 traffic of 2,600,000 vehicles serving 7,000,000 people.

**PENNSYLVANIA**—Patrols are maintained on practically the entire state primary and secondary system—comprising 11,456 miles—of which 4,546 miles

is hard surfaced, 3,245 miles of gravel or similar type, and 3,665 miles earth.

**TEXAS**—Texas highway road builders are experimenting with green coloring matter in their concrete material for the purpose of getting away from the glaring white of the ordinary concrete road. One objection to the green color is that the road at night would not be so visible.

**WASHINGTON**—What is believed to be the first magnetic device especially designed to serve in highway maintenance is reported by Professor H. B. Carpenter, Director of the Engineering Experiment Station, State College, Pullman, Washington. This equipment, designed by H. J. Dana of the Experiment Station, will pick up nails and heavier pieces of iron from a height of six inches or more. When lowered to within two inches of the ground it loosens and collects nails embedded in loose gravel or partly embedded in compacted material.

## HIGHWAYS ARE CALIFORNIA'S ARTERIES, BUT WATER IS ITS LIFE BLOOD

(Continued from page 11.)

### SPECIAL INVESTIGATIONS

Along with these many permanent statutory duties which continue through succeeding years, the State Engineer is enjoined by legislative enactments to make special engineering investigations, and serve on special state commissions and boards. An idea of the nature of these special investigations and the amount of work which they involve may be had by reference to the following investigations:

1. The Water Resources of California, which is the most comprehensive of its kind ever undertaken by any state, covering as it does a complete inventory of the waters of the state and providing for a comprehensive coordinated plan for their development.

2. The survey of the Santa Ana River watershed and basin, made in cooperation with Orange, Riverside and San Bernardino counties for the control of floods and for putting to beneficial use the waters of this area.

3. The investigation of the Salt Water Barrier and Iron Canyon Survey, made in cooperation with the United States Reclamation Service.

There are people who believe that Florida will go Republican in the next presidential election. Well, ice-fields have just been found in Africa.—American Lumberman.

Before buying a horse you look in his mouth. Before buying a second-hand flivver look beside, behind and beneath the rear seat cushion. Should you find a couple dainty handkerchiefs and a pair of dice, or a lipstick and half a package of cigarettes, or several assorted buttons and a vanity case, or a cheap bracelet and an empty bottle, or perhaps a feminine garter, by all means, buy the car.

Regardless of what the dealer says, you have sufficient proof that the car has been run but little.

—College Humor.

# October Record of Bids and Awards

## HIGHWAYS

**PLACER COUNTY**—Road surfacing, crushed gravel or stone, between Baxter's and Shelter House No. 1, Dist. III, Rt. 37, Sec. D & E. Engineer's estimate \$13,750. Bids opened Oct. 3d as follows: J. R. Reeves, Sacramento, \$15,500; E. B. Bishop, Sacramento, \$15,500; Hy Nelson, Alameda, \$13,000; Hemstreet & Bell, Marysville, \$18,250; Tieslau Bros., Berkeley, \$16,000; J. F. Collins, Stockton, \$17,500. Contract awarded to Hy Nelson, \$13,000.

**ORANGE COUNTY**—Bridges, reinforced concrete girder, across Aliso Creek, and widening of existing reinforced concrete girder bridge 2 miles south of Tustin, Dist. VII, Rt. 2, Sec. B-C. Engineer's estimate \$23,154.50. The following bid was opened Oct. 10th: Richard R. Bishop, Long Beach, \$25,032.50. Bid rejected.

**SAN BERNARDINO COUNTY**—Three bridges over Warm Creek, Santa Ana River, and Mission Storm Drain; Dist. VIII, Rt. 26, Sec. A. Engineer's estimate \$81,639.40. Bids opened Oct. 10th as follows: Lynch, Cannon Engineering Co., Los Angeles, \$96,608.55; R. Johnson, Glendale, \$75,111.50; Martin Green, San Bernardino, \$79,695.60. Contract awarded to R. Johnson, Glendale, \$75,111.50.

**COLUSA COUNTY**—Two bridges over Stone Corral Creek and Funks Slough Bridge, Dist. III, Rt. 7, Sec. C. Engineer's estimate \$24,359.50. Bids opened Oct. 10th as follows: A. Young, Yreka, \$31,097.50; F. H. Neilson, Orland, \$26,157.50; M. A. Jenkins, Sacramento, \$23,933; Harry Thorsen, St. Helena, \$24,967; E. B. Skeels, Roseville, \$25,405; Holdener Construction Co., Sacramento, \$24,680.50; Noble Bros., San Jose, \$21,857.20; Villadsen Brothers, \$29,534.75. Contract awarded to Noble Brothers, San Jose, \$21,857.20.

**SAN BERNARDINO COUNTY**—Asphalt concrete paving, 9.3 miles between Cherry Avenue and San Bernardino, Dist. VIII, Rt. 9, Sec. A-B-C. Engineer's estimate \$225,984.50. Bids opened Oct. 10th as follows: Southwest Paving Co., Los Angeles, \$189,226.60; Ed. Johnson & Sons, Los Angeles, \$191,020.30; Allied Contractors, Inc., Omaha, Neb., \$193,383.20; Steele Finley, Santa Ana, \$182,544.50; A. Teichert & Son, Inc., Sacramento, \$207,730; Geo. R. Curtis Paving Co., Los Angeles, \$204,654; Hall-Johnson Co., Alhambra, \$184,977; Nighbert & Carnahan, Bakersfield, \$209,521.20; Geo. H. Oswald, Los Angeles, \$202,687; Griffith Co., Los Angeles, \$204,751.90. Contract awarded to Steele Finley, Santa Ana, \$182,544.50.

**ALAMEDA COUNTY**—Three reinforced concrete arch culverts, across Cull Creek, Palomares Creek, and Hollis Creek; Dist. IV, Rt. 5, Sec. B. Engineer's estimate \$63,185. Bids opened Oct. 24th as follows: Carl N. Swenson, San Jose, \$48,711.25; Noble Bros., San Jose, \$54,925.45; Atlas Constructor Co., Inc., Oakland, \$58,870; Ariss-Knapp Co., Inc., Oakland, \$57,050; Villadsen Bros., Inc., San Francisco, \$42,972.85; Holdener Construction Co., Sacramento, \$55,358.75; L. J. Bristow Co., Santa Monica,

\$58,409.50; H. C. Whitty, Sanger, \$48,980.50; Otto Parlier, Tulare, \$49,275; M. B. McGowan, San Francisco, \$64,327.50; Mathews Construction Co., Sacramento, \$46,777.50; McDonald and Maggiora, San Francisco, \$46,322.50; George J. Ulrich Construction Co., Modesto, \$67,966.50; E. B. Skeels, Roseville, \$42,577.50; Johnson Construction Co., San Francisco, \$54,960.65; H. E. Macauley, San Francisco, \$45,608.50; Frederickson Bros., Stockton, \$52,658.50. Contract awarded to E. B. Skeels, Roseville, \$42,577.50.

**SHASTA COUNTY**—Reinforced concrete bridge across Pollards Gulch, about 2 miles north of La Moine; Dist. II, Rt. 3, Sec. D. Engineer's estimate \$54,656. Bids opened Oct. 24th as follows: McDonald & Magiora, San Francisco, \$66,470; E. B. Skeels, Roseville, \$53,336.50; E. M. Bordwell, Napa, \$54,230; J. T. Logan, Grants Pass, Ore., \$68,360; A. Young, Yreka, \$59,527; and Holdener Construction Co., Sacramento, \$54,405. Contract awarded to E. B. Skeels, Roseville, \$53,336.50.

**HUMBOLDT COUNTY**—Reinforced concrete girder bridges across Prairie Creek, one-half mile north of Orick, and across Lost Man Creek, 3 miles north of Orick; Dist. I, Rt. 1, Sec. K. Engineer's estimate \$30,064. Bids opened Oct. 24th as follows: Fred J. Mauer & Son, Inc., Eureka, \$35,372.50; Smith Bros., Eureka, \$36,293.40; Mercer-Fraser Co., Eureka, \$34,122.50. Bids rejected, will be readvertised next spring.

**MARIPOSA COUNTY**—Laminated guard rail, about 1.25 miles between King Solomon Mine and Briceburg; Dist. VI, Rt. 18, Sec. E. Engineer's estimate \$7,475. Bids opened Oct. 24th as follows: B. C. Burnett, Turlock, \$6,825; N. L. Jones and E. R. Hibbard, Stockton, \$12,675 (irregular). Contract awarded to B. C. Burnett, Turlock, \$6,825.

**SACRAMENTO COUNTY**—Approaches at Ben Ali subway, 0.4 mile Portland cement concrete pavement; Dist. III, Rt. 3, Sec. B. Engineer's estimate \$20,078. Bids opened Oct. 31st as follows: C. W. Wood, Manteca, \$18,710; Frederickson-Watson Construction Company, Oakland, \$20,915.20. Contract awarded to C. W. Wood, Manteca, \$18,710.

**IMPERIAL COUNTY**—Repairing bridge across New River, near Seeley; Dist. VIII, Rt. 12, Sec. C. Engineer's estimate \$13,958. Bids opened Oct. 31st as follows: Norman B. Conway, Los Angeles, \$13,511; Pioneer Transfer Co., Inc., Calexico, \$15,964; Wheeler Company, Los Angeles, \$14,754; W. M. Ledbetter & Co., Los Angeles, \$12,999; L. Worel, Alhambra, \$20,450; Greene Construction Co., Los Angeles, \$16,367. Contract awarded to L. M. Ledbetter & Co., Los Angeles, \$12,999.

## ARCHITECTURE

**CALIFORNIA POLYTECHNIC SCHOOL**—General work, gymnasium and mechanical unit. Engineer's estimate \$53,990. Bids opened Oct. 4th as follows: Alfred L. Vezina, Santa Barbara, \$49,440; T. M. Maino, San Luis Obispo, \$51,690; Lamb & Bobick, Sacramento, \$52,800; Roy L. Rich-

ardson, Santa Barbara, \$53,502; W. J. Smith, San Luis Obispo, \$54,472; Carl N. Swenson, San Jose, \$54,889; Johnson Const. Co., San Francisco, \$55,859; R. S. K. McMillan, San Jose, \$59,869; Rudolph & Barr, Ventura, \$71,775. Contract awarded to Alfred L. Vezina, \$49,440.

**CALIFORNIA POLYTECHNIC SCHOOL**—Plumbing, heating and electrical work, for gymnasium and mechanical unit. Estimate \$10,961. Bids opened Oct. 4th as follows: Walter H. Smith, Long Beach, \$10,850; Luppen & Hawley, Sacramento, \$11,313; Latourrette-Fical Co., Sacramento, \$11,437. Contract awarded to Walter H. Smith, \$10,850.

**STOCKTON ARMORY**—Tile roofing work. Bids opened Oct. 6th as follows: W. L. Saxby, Oakland, \$2,818; R. E. Fraser Co., Stockton, \$2,850; Allyn Burr, Sacramento, \$2,388.80; San Joaquin Lumber Co., Stockton, \$3,024. Contract awarded Allyn Burr, \$2,388.80.

**STATE LIBRARY AND COURTS BUILDING**—Furnishings and technical equipment. Bids opened Oct. 7th as follows: Purnell Stationery Co., Sacramento, \$80,475.41; McKee & Wentworth, San Francisco, \$84,984.50; Gardner, Ehman & Kohler, Sacramento, \$3,318; H. S. Crocker Co., Sacramento, \$10,920.89; alternate bid, \$6,016.75. Award pending.

**STOCKTON STATE HOSPITAL**—General work, cottages 5, 6 and 7. Engineer's estimate \$171,970. Bids opened Oct. 18, 1927, as follows: John E. Branagh, Oakland, \$153,000; H. E. Vickroy, Stockton, \$156,000; John J. Cavanaugh, Stockton, \$157,643; Johnson Construction Company, San Francisco, \$158,490; F. R. Zinck, Stockton, \$158,777; Peter Sorensen, San Francisco, \$161,483; Tucker & Riley, Stockton, \$163,839; F. H. Betz, Sacramento, \$163,946; J. F. Shepherd, Stockton, \$165,825; Carl N. Swensen, San Jose, \$166,987; J. H. Carpenter, Stockton, \$171,500; J. A. Bryant, San Francisco, \$171,860; J. S. Hannah, San Francisco, \$174,972; C. L. Wold, San Francisco, \$178,500; F. L. Hansen, San Francisco, \$184,600; and William Martin, San Francisco, \$191,037. Contract awarded to John E. Branagh, Oakland, \$153,000.

**STOCKTON STATE HOSPITAL**—Electrical work, farm cottages 5, 6 and 7. Engineer's estimate \$5,150. Bids opened Oct. 18th as follows: Hild Elec. Mfg. Co., Stockton, \$3,585; E. H. Grogan, Stockton, \$4,166; E. L. Gnekow, Stockton, \$4,279; Latourrette-Fical Co., Sacramento, \$4,425; Luppen & Hawley, Sacramento, \$5,555; and Scott Plumbing and Elec. Co., Sacramento, \$7,637. Contract awarded to Hild Electrical Mfg. Co., Stockton, \$3,585.

**STOCKTON STATE HOSPITAL**—Plumbing and heating work, farm cottages 5, 6 and 7. Engineer's estimate \$22,594. Bids opened Oct. 18th as follows: W. H. Picard, Oakland, \$21,105; E. L. Gnekow, Stockton, \$23,561; Hately & Hately, Sacramento, \$23,588; Scott Plumbing & Elec. Co., Sacramento, \$23,615; E. H. Grogan, Stockton, \$23,941; Luppen & Hawley, Sacramento, \$24,240; Brandt Bros., Stockton, \$24,500; Latourrette-Fical Co., Sacramento, \$25,095; and R. M. Wilson, San Francisco, \$27,662. Contract awarded to W. H. Picard, Oakland, \$21,105.

**STOCKTON STATE HOSPITAL**—Plumbing, heating and electrical work for farm cottages 5, 6 and 7. Engineer's estimate \$27,744. Bids opened Oct. 18th as follows: E. L. Gnekow Co., Stockton, \$27,546; E. H. Grogan Company, Stockton, \$28,000; Latourrette-Fical Co., Sacramento, \$29,420; Luppen & Hawley, Sacramento, \$29,421; and Hyman Rosenberg, San Francisco, \$30,200. Award pending.

**EDUCATIONAL BUILDING, AGRICULTURAL PARK, SACRAMENTO**—Composition roof and repair

work. Engineer's estimate \$1,410. Bids opened Oct. 21st as follows: Capital Roofing & Supply Company, Sacramento, \$1,045; State Roofing Company, Sacramento, \$1,062; Leitch Roofing Co., Sacramento, \$1,898; and Larson Company, Sacramento, \$2,120. Contract awarded to Capital Roofing & Supply Company, Sacramento, \$1,045.

**VENTURA SCHOOL FOR GIRLS**—Laundry. Engineer's estimate \$9,018. Bids opened Oct. 25th as follows: Johnson Construction Co., San Francisco, \$8,567; Johnson & Hansen, Ventura, \$9,837; Roy L. Richardson, Santa Barbara, \$10,139; J. W. Jean Co., Pasadena, \$10,252; Alfred L. Vezina, Santa Barbara, \$10,440; G. E. Penn, Ventura, \$11,767; Louis A. Geisler, Huntington Park, \$13,200; Jack W. Baker, Ventura, \$13,836. Award to Johnson Construction Company.

**SONOMA STATE HOME**—Pasteurizer and cooling equipment. Engineer's estimate \$2,343. Bids opened Oct. 25th as follows: Creamery Package Mfg. Co., San Francisco, \$2,547; Cyclops Iron Works, San Francisco, \$2,550; York Products Corporation, \$3,111; and Frank H. Rafo, San Francisco, \$3,175. Contract awarded to Creamery Package Mfg. Co., San Francisco, \$2,547.

**SAN QUENTIN**—Miscellaneous iron and steel work. Engineer's estimate \$37,795. Bids opened Oct. 26th as follows: Palm Iron Works, Sacramento, \$34,800; Fair Mfg. Co., San Francisco, \$34,898; Folsom Street Iron Works, San Francisco, \$34,617; Golden Gate Iron Works, San Francisco, \$39,256; Pacific Rolling Mill Co., San Francisco, \$39,500; McClintic-Marshall Co., Los Angeles, \$39,695; Sims & Gray Iron Works, San Francisco, \$43,700; Schrader Iron Works, San Francisco, \$48,990; and Calif. Steel Products Co., San Francisco, \$49,845. Award pending.

**PATTON STATE HOSPITAL**—Installation of 350-h.p. boiler. Bids opened Oct. 27th as follows: R. G. Meyler, Los Angeles, \$17,300. Alternates: (1) \$1,200; (2) \$580; (3) \$100; (4) \$570; (5) \$30; (6) \$700. C. C. Moore, San Francisco, \$20,003. Alternates: (1) \$1,118; (2) \$323; (3) \$600; (4) \$862; (5) \$189; (6) \$898. Llewellyn Iron Works, Los Angeles, \$20,429. Alternates: (1) \$1,800; (2) \$700; (3) ----; (4) \$560; (5a) \$400; (5b) \$700; (6) \$600; (7) \$500. Award pending.

#### State Highway Authorizations

The following authorizations were made by vote of the California Highway Commission at a meeting held in Fresno, October 20th:

Director of Public Works authorized to prepare plans and specifications for construction of approximately 21 miles of water pipe line through the Rindge Ranch (Dist. VII LA-60-A) at an estimated cost of \$50,000 from the State Highway Construction Fund; said pipe line to be used in construction and maintenance of the state highway.

Allotment of \$10,000 authorized from the Third State Highway Fund to provide for cost of engineering and inspection in connection with construction work payable from the Third State Highway Fund, and for which engineering and construction no allotment

has hitherto been provided, and which, in the discretion of the Director of Public Works, it may be necessary for him to expend.

Routes adopted:

Del Norte County: Southerly boundary to Richardson Creek (Dist. I DN-1-A).

Sonoma County: One mile west of Sonoma Creek to Sonoma Creek (Dist. IV Son-8-A); Sonoma Creek to Schellville (Dist. IV Son-8-B).

Sacramento County: One mile south of Arno to McConnell (Dist. X Sac-4-A).

## WATER PERMITS AND APPLICATIONS

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

MODOC COUNTY—Permit 2901, Application 5385; issued to Emil Enquist and Geo. Wernmark, Davis Creek, October 5, 1927, for 400 acre-feet per annum from two unnamed ravines in sections 13 and 24, T. 47 N., R. 12 E., for irrigation of 236 acres near point of diversion. Estimated cost \$2,400.

SAN BERNARDINO COUNTY—Permit 2902, Application 5344; issued to E. W. Cook, Los Angeles, October 5, 1927, for 200 gallons per day from two unnamed springs in section 22, T. 2 N., R. 1 W., for domestic use in section 22. Estimated cost \$1,000.

NEVADA COUNTY—Permit 2903, Application 5594; issued to R. M. Ewing and A. J. Edminster, Nevada City, October 6, 1927, for 3 cubic feet per second from Middle Fork of Greenhorn Creek in section 3, T. 16 N., R. 10 E., for power and domestic purposes in section 3. 75 t.h.p. to be developed. Estimated cost \$1,000.

MADERA COUNTY—Permit 2904, Application 5655; issued to Claude E. Williams, Bass Lake, October 27, 1927, for 1.5 cubic feet per second from North Fork Willow Creek in section 9, T. 7 S., R. 22 E., M. D. M., for power purposes in NW $\frac{1}{4}$  of SE $\frac{1}{4}$  of said section 9.

EL DORADO COUNTY—Permit 2905, Application 5601; issued to Edward Ogden Strong and W. E. Bristol, Sacramento, October 27, 1927, for 0.002 cubic foot per second from unnamed spring in section 26, T. 11 N., R. 15 E., for domestic purposes. Estimated cost \$100.

SAN DIEGO COUNTY—Permit 2906, Application 5608; issued to Arthur M. and Fannie I. Neal, San Diego, October 27, 1927, for 0.025 cubic foot per second from unnamed springs in section 20, T. 13 S., R. 1 W., S. B. M., for domestic use in section 20. Estimated cost \$1,000.

NEVADA COUNTY—Permit 2907, Application 5695; issued to Miss M. Philomene Hagan, 2034 Ellis street, San Francisco, October 27, 1927, for 0.005 cubic foot per second from unnamed spring in section 16, T. 17 N., R. 13 E., for domestic purposes. Estimated cost \$250.

SAN BERNARDINO COUNTY—Permit 2908, Application 5285; issued to D. C. Hammell, 123 S.

Broadway, Los Angeles, October 29, 1927, for 0.001 cubic foot per second from underground water in section 22, T. 2 N., R. 1 W., for domestic use. Estimated cost \$400.

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

TRINITY COUNTY—Application 5707; James T. Whittlesey, room 457, City Hall, San Francisco, for 15 cubic feet per second from Price Creek tributary to Trinity River. To be diverted in section 5, T. 33 N., R. 12 W., M. D. M., for hydraulic mining purposes. Estimated cost \$500.

VENTURA COUNTY—Application 5708; F. P. Hulbert, 1616 Fifth avenue, Los Angeles, for 0.25 cubic foot per second from Little Sycamore Canyon tributary to Pacific Ocean. To be diverted in section 14, T. 1 S., R. 20 W., S. B. M., for irrigation and domestic purposes on 30 acres. Estimated cost \$1,000.

SAN BERNARDINO COUNTY—Application 5709; H. B. Martin, 303 Story Building, Los Angeles, c/o Geo. F. Moser, P. O. Box 406, Oatman, Arizona, for 1.00 cubic foot per second from unnamed spring. To be diverted in section 28, T. 8 N., R. 18 E., S. B. M., for mining purposes. Estimated cost \$500.

PLUMAS COUNTY—Application 5710; Gus Berg, Rich, Plumas County, California, for 0.025 cubic foot per second from unnamed spring tributary to East Fork North Fork Feather River. To be diverted in section 21, T. 25 N., R. 7 E., M. D. M., for mining and domestic purposes. Estimated cost \$300.

SAN BERNARDINO COUNTY—Application 5711; Paul F. Myers et al., Box 306, La Verne, for 0.01 cubic foot per second from unnamed spring tributary to Big Bear Lake. To be diverted in section 14, T. 2 N., R. 1 W., S. B. M., for domestic purposes. Estimated cost \$100.

SAN JOAQUIN COUNTY—Application 5712; Richard and Nellie C. Stevens, Route A, Box 140, Ripon, for 1.25 cubic feet per second from Lone Tree Creek tributary to San Joaquin River. To be diverted in section 24, T. 1 S., R. 7 E., M. D. M., for irrigation purposes on 100 acres. Estimated cost \$1,000.

SAN BERNARDINO COUNTY—Application 5713; Chas. A. Boynton, Victorville, for 1.00 cubic foot per second from unnamed spring. To be diverted in section 12, T. 3 N., R. 1 W., S. B. M., for agriculture, domestic and stock purposes on 80 acres. Estimated cost \$700.

TRINITY COUNTY—Application 5714; Wm. H. Gray, Salyer, Trinity County, for (1) 0.05+ cubic foot per second, (2) 0.08+ cubic foot per second, (3) 0.37+ cubic foot per second from (1) spring, (2) gulch, (3) Grays Creek. To be diverted in sections 34 and 28, T. 6 N., R. 6 E., H. M., for irrigation and domestic purposes on 40 acres.

SIERRA COUNTY—Application 5715; T. L. Park, c/o California Buttes Mining Co., Sierra City, for 5.00 cubic feet per second from (1) Big Spring, (2) Sardine Creek tributary to Yuba River. To be diverted in section 15, T. 20 N., R. 12 E., M. D. M., for power purposes. Estimated cost \$10,000.

PLUMAS COUNTY—Application 5716; La Porte Mines, Inc., c/o J. N. Turner, attorney, La Porte, for 15.00 cubic feet per second from South Fork Feather River tributary to Feather River. To be diverted in section 13, T. 22 N., R. 9 E., M. D. M., for mining purposes. Estimated cost \$2,000.

**PLUMAS COUNTY**—Application 5717; La Porte Mines, Inc., c/o J. N. Turner, attorney, La Porte, for 15.00 cubic feet per second from South Fork Feather River tributary to Feather River. To be diverted in section 13, T. 22 N., R. 9 E., M. D. M., for power purposes. Estimated cost \$2,000.

**SAN JOAQUIN COUNTY**—Application 5718; Western Pacific Railroad Company, Engineering Department, Mills Bldg., San Francisco, for 0.023 cubic foot per second from Potato Slough tributary to South Fork Mokelumne River. To be diverted in section 13, T. 3 N., R. 4 E., M. D. M., for domestic purposes.

**NEVADA COUNTY**—Application 5719; W. H. Griffith et al., c/o W. H. Griffith, Oakland, for 2.00 cubic feet per second from Rock Creek tributary to South Fork Yuba River. To be diverted in section 25, T. 17 N., R. 8 E., M. D. M., for fish culture and recreational purposes.

**SAN MATEO COUNTY**—Application 5720; Harriet N. Diamond, c/o Cyril Williams, Jr., 369 Pine street, San Francisco, for 0.006+ cubic foot per second from unnamed stream tributary to La Honda Creek. To be diverted in section 35, T. 6 S., R. 4 W., M. D. M., for domestic purposes. Estimated cost \$2,000.

**TUOLUMNE COUNTY**—Application 5721; Emil Schwoerer et al., c/o Emil Schwoerer, Vallecito, for 0.10 cubic foot per second from unnamed spring tributary to Spaulding Creek. To be diverted in section 8, T. 3 N., R. 15 E., M. D. M., for mining and domestic purposes.

**SAN BERNARDINO COUNTY**—Application 5722; Mrs. Goldie Stevens, Box 204, Reseda, for 0.001 cubic foot per second from unnamed spring tributary to Big Bear Lake drainage area. To be diverted in section 14, T. 2 N., R. 1 W., S. B. M., for domestic purposes. Estimated cost \$100.

**SAN DIEGO COUNTY**—Application 5723; Cyrus M. Ewing, Vista, San Diego County, for 0.50 cubic foot per second from well. To be diverted in section 12, T. 11 S., R. 4 W., S. B. M., for irrigation and domestic purposes. Estimated cost \$600.

**MERCED COUNTY**—Application 5724; Lucas Kilkenny, 315 Chauncey Bldg., 564 Market street, San Francisco, for 340 cubic feet per second from (1) Deadman Creek, (2) Duck Creek, (3) Owens Creek, (4) Bear Creek, tributary to San Joaquin River. To be diverted in sections 30 and 19, T. 8 S., R. 12 E., and section 12, T. 8 S., R. 11 E., M. D. M., for irrigation purposes on 2070.87 acres. Estimated cost \$100,000.

**MERCED COUNTY**—Application 5725; Lucas E. Kilkenny, 317 Chauncey Bldg., 564 Market street, San Francisco, for 50 cubic feet per second from Baldwin Slough tributary to San Joaquin River. To be diverted in section 28, T. 6 S., R. 9 E., M. D. M., for irrigation purposes on 1489.84 acres. Estimated cost \$10,000.

**TUOLUMNE COUNTY**—Application 5726; Mrs. C. J. Albert, Groveland, Tuolumne County, for 0.025 cubic foot per second from unnamed spring tributary to Big Creek. To be diverted in section 6, T. 2 S., R. 17 E., M. D. M., for irrigation and domestic purposes on 25 acres.

**LOS ANGELES COUNTY**—Application 5727; B. F. Burkhardt and Anna M. Burkhardt, Little Rock, for 750 acre-feet per annum from Middle Fork Palmett Creek tributary to Big Rock Creek. To be diverted in section 23, T. 4 N., R. 10 W., S. B. M., for irrigation and domestic purposes on 300 acres.

**SAN BERNARDINO COUNTY**—Application 5728; Dewitt Blair Realty Co., c/o Chas. L. Foulke, 455 Fourth street, San Bernardino, for 0.08 cubic foot per second from a spring tributary to Mojave River. To be diverted in section 23, T. 2 N., R. 2 W., S. B. M., for domestic purposes for 500 residences. Estimated cost \$800.

**MENDOCINO COUNTY**—Application 5729; John M. McGregor, 701 Taylor street, San Francisco, for 1.00 cubic foot per second from One Eye Creek tributary to Berger Creek. To be diverted in section 34, T. 22 N., R. 14 W., M. D. M., for irrigation and domestic purposes on 80 acres.

**LOS ANGELES COUNTY**—Application 5730; William L. Wolfskill, 227 South Union avenue, Los Angeles, for 0.25 cubic foot per second from Rogers Creek tributary to San Gabriel River. To be diverted in section 14, T. 1 N., R. 10 W., S. B. M., for agricultural and domestic purposes on 20 acres.

**SAN BERNARDINO COUNTY**—Application 5731; U. S. Forest Service, San Bernardino, for 0.036 cubic foot per second from three unnamed springs tributary to Santa Ana River. To be diverted in section 20, T. 1 N., R. 1 E., S. B. M., for domestic purposes. Estimated cost \$1,000.

**LOS ANGELES COUNTY**—Application 5732; U. S. Forest Service, c/o Forest Supervisor, 629 Federal Bldg., Los Angeles, for 0.25 cubic foot per second from Bouquet Canyon tributary to Santa Clara River. To be diverted in section 31, T. 6 N., R. 14 W., S. B. M., for domestic purposes. Estimated cost \$2,500.

**KERN COUNTY**—Application 5733; Harvey M. Cuff, Sandberg, for 1.00 cubic foot per second from spring. To be diverted in section 30, T. 10 N., R. 16 W., S. B. M., for irrigation and domestic purposes on 20 acres. Estimated cost \$4,500.

**BUTTE COUNTY**—Application 5734; Wm. Hayes, Merrimac, for 0.60 cubic foot per second from Little Ram Creek tributary to French Creek. To be diverted in section 32, T. 22 N., R. 6 E., M. D. M., for mining and domestic purposes. Estimated cost \$200.

**BUTTE COUNTY**—Application 5735; A. Moll, c/o Winchester Hotel, 44 Fourth street, San Francisco, for 0.025 cubic foot per second from Little Ram Creek tributary to French Creek. To be diverted in section 32, T. 22 N., R. 6 E., M. D. M., for irrigation and domestic purposes on two acres. Estimated cost \$200.

**EL DORADO COUNTY**—Application 5736; Dr. Leroy Francis Herrick, 542 Lakeside Blvd., Oakland, for 1.50 cubic feet per second from three unnamed springs tributary to Lake Tahoe via unnamed gulch. To be diverted in section 31, T. 14 N., R. 17 E., M. D. M., for power purposes. Seventeen theoretical horsepower to be developed. Estimated cost \$4,000.

**EL DORADO COUNTY**—Application 5737; Young Men's Christian Association, c/o J. W. Gross, Forum Bldg., Sacramento, for 1.00 cubic foot per second from Branch of Bryant Creek tributary to American River. To be diverted in section 15, T. 11 N., R. 17 E., M. D. M., for domestic and fire protection purposes. Estimated cost \$3,000.

**SAN DIEGO COUNTY**—Application 5738; Helen K. Bringer, 3940 Huron Ave., Culver City, for 0.50 cubic foot per second and 2.5 acre-feet per annum from Palm Creek tributary to Coyote Creek. To be diverted in section 22, T. 10 S., R. 5 E., S. B. M., for irrigation and domestic purposes on 40 acres. Estimated cost \$1,250.



**SAN DIEGO COUNTY**—Application 5739; Fred L. Cornish, 1493 Stearns drive, Los Angeles, for 2.00 cubic feet per second and 15 acre-feet per annum from Palm Canyon tributary to Coyote Creek. To be diverted in section 22, T. 10 S., R. 5 E., S. B. M., for irrigation and domestic purposes on 164.43 acres. Estimated cost \$5,000.

**SAN DIEGO COUNTY**—Application 5740; Leta Cornish, 1493 Stearns drive, Los Angeles, for 1.00 cubic foot per second and 5 acre-feet per annum from Palm Canyon tributary to Coyote Creek. To be diverted in section 22, T. 10 S., R. 5 E., S. B. M., for irrigation and domestic purposes on 80 acres. Estimated cost \$2,500.

**DEL NORTE COUNTY**—Application 5741; R. W. Pepin, c/o Allen & Roberts, Portland, Oregon, for 50 cubic feet per second from Jones Creek tributary to South Fork Smith River. To be diverted in section 27, T. 16 N., R. 3 E., H. M., for mining purposes. Estimated cost \$30,000.

**MONO COUNTY**—Application 5742; Frank G. English, Box 73, Laws, for 1.00 cubic foot per second from Sacramento Canyon. To be diverted in section 11, T. 5 S., R. 33 E., M. D. M., for agricultural purposes. Estimated cost \$1,200.

## TREE PLANTING AND PUBLIC UTILITIES

(Continued from page 30.)

ject of a thorough discussion before the Highway Commission and the Director of the Department of Public Works by a committee representing practically all of the public utility companies of the state. The conclusion reached substantiated the policies of the Maintenance Department.

The drawings shown represent the proposed ultimate sections for two- and four-way traffic lanes for eighty-foot width of right of way. In effect, they reserve on an eighty-foot right of way a clear zone of 56 feet between curbs for road purposes, the remaining space being available for trees, pole lines and sidewalks for pedestrians.

## STATE HIGHWAY PROGRESS REPORTS

(Continued from page 26.)

**Ventura County**—With the exception of the placing of some heavy riprap rock, all work has been completed on the reconstruction of the Coast highway from Ventura westerly to a point near the Santa Barbara County line.

**Yolo County**—State forces are doing work incidental to remedying the drainage conditions at the West Sacramento subway underneath the Sacramento Northern Railroad tracks.

## PUTTING THE "RIGHT" INTO WATER RIGHTS

(Continued from page 31.)

expected, but investigations are sometimes carried on in connection with proceedings related to supervision over the initiation of rights to appropriate. In addition to the investigations conducted in connection with each proceeding for the determination of rights the division has conducted or is conducting the following rather comprehensive investigations—the Niles Cone, the Kings River, the Kern River, the Inyokern, the San Joaquin Hydrographic, the San Joaquin Valley Underground Water, the San Joaquin-Sacramento Delta Salinity, the San Jacinto, the Lopez Creek, the Return Water, the San Dimas, the San Gabriel, the Ventura County Hydrographic and the Sacramento-San Joaquin Water Supervisor investigations.

### HISTORY OF DIVISION

The powers and duties of the Division of Water Rights, Department of Public Works of the State of California, are set forth in what is known as the Water Commission Act. This act was passed by the legislature and approved by the Governor on June 16, 1913. It was made the subject of a referendum vote and affirmed by vote of the people on November 3, 1914, going into effect on December 19, 1914. The act in its original form created a water commission of five members, whence the name Water Commission Act. The commission was, however, abolished in 1921 and its powers and duties were transferred to the Division of Water Rights of the Department of Public Works when that department was created in 1921.

### REPORTS

The history of its work is more specifically set forth in the several biennial reports of the division and the results of its investigations have been published in the biennial reports, Bulletins 1 to 5, inclusive, and numerous typed or mimeographed reports which can be made available to interested parties.

"My town is the place where my home is founded; where my business is situated; where my vote is cast; where my children are educated; where my neighbors dwell and where my life is chiefly lived. It is the home spot for me. My town has the right to my civic loyalty. It supports me, and I must support it. My town wants my citizenship, not partisanship; friendliness, not offishness; cooperation, not dissension; sympathy, not criticism; my intelligence, not indifference. My town supplies me with law and order, trade, friends, education, morals, recreation and the rights of a freeborn American. I should believe in my town and work for it."—Selected.

### HIGHWAY RESEARCH

*Public Roads*, the journal of highway research of the Bureau of Public Roads of the U. S. Department of Agriculture, in its last issue contains articles dealing with the following subjects:

Protection of Concrete Against Alkali, Static and Impact Loads Transmitted to Culverts,

Effect of Quality of Portland Cement Upon the Strength of Concrete,

Capping Square for Concrete Compressive Strength Specimens,

New Research Projects Initiated by Bureau of Public Roads.

On the first subject the "Protection of Concrete Against Alkali" general conclusions are given as follows:

1. That water-gas tar of the proper quality is readily absorbed by cement mortar and concrete, the rate of absorption varying with the manner of curing, age and density of the mix. Concrete of a 1:3:6 mix cured, respectively, 48 hours and 7 days under moist conditions in the forms followed by 7 days' exposure to dry air, was found to be the most absorptive, while a 1:1½:3 mix, cured 7 days in forms and 83 days in air, was the least absorptive.

2. That the absorption of coal tar by concrete is similar to that of water-gas tar except that the quantity absorbed increases with the time of exposure after treatment with water-gas tar.

3. That a treatment consisting of 4 coats of water-gas tar applied at the rate of about one-fourth gallon per square yard of surface, followed by one coat of coal tar appears to afford adequate protection against alkali attack, provided the concrete is of good quality, has been properly fabricated and not leaner than a 1:2:4 mix.

#### The Highway Engineer's Creed

I believe that transportation is the keystone of the structure of civilization which is built of school, and church, and court, and market place upon the twin foundations of the home and productive industry.

I believe that highway transportation is a necessary and integral part of this connecting stone in civilization's arch and is coequal with other forms of transportation in sustaining the body of the structure.

I believe that my mission, as a highway engineer, is to assist in shaping and improving the highways of my country, in harmony with those who provide the vehicle which are the necessary complement, to the end that, jointed with other means of transportation, they may meet the need of our people for easy, quick, and untrammelled transportation.—*Arizona Highways*.

### Capitol Copper

California's oldest copper, boasting fifty-four years of active service, is doing daily duty up on the dome of the California State Capitol.

State Architect George B. McDougall made this announcement. When he says "copper" he doesn't mean police officer. He means that the sheet copper covering the entire dome of the California State Capitol building has been there since 1873. Its excellent condition has aroused comment among experts on copper and inquiries regarding the dome were received from the Copper and Brass Research Association of New York.

#### Statement From Bidders Required.

Before the Bureau of Public Roads will issue plans, specifications and proposal forms to any contractor desiring to bid on any project under its jurisdiction, it will be necessary for the contractor to file a financial and experience statement with C. H. Sweetser, district engineer, 807 Sheldon Building, San Francisco. This policy was started on October 21, 1927, and will be followed hereafter.

### GRADE CROSSINGS REMOVAL PROCEEDING IS FASTER IN THE EAST THAN IN WEST

The trunk line railroads through the east have a considerably higher standard of roadway, track and maintenance than do the railroads in California. On the other hand, the passenger equipment through the east is not of as good a quality, in general, as the passenger equipment operated on California lines. Apparently, due to density of traffic, eastern roads have spent enormously greater sums than have the western lines for providing facilities for faster operation, including particularly the feature of grade separations with other railroads or highways. This is the report made to the California Railroad Commission by Chief Engineer A. G. Mott of the commission, summarizing the results of a tour of investigation of the principal states, with particular reference to transportation.

Next to Lindbergh's feat, the greatest sensation will be the fiftieth wedding anniversary of a movie couple.—*Indianapolis Star*.

In another ten years, says General Patrick, it will be perfectly safe to travel by air. Long before that, however, if traffic continues as at present, it won't be safe to travel anywhere else.—*San Diego Union*.

**ROSTER**  
**DEPARTMENT OF PUBLIC WORKS**  
**STATE OF CALIFORNIA**

C. C. YOUNG, *Governor*

B. B. MEEK, *Director, Department of Public Works*

CORNING DE SAULES, *Deputy Director, Department of Public Works*

GEORGE C. MANSFIELD, *Editor, California Highways and Public Works*

**DIVISION**  
of  
**HIGHWAYS**

**CALIFORNIA HIGHWAY COMMISSION**  
RALPH W. BULL, Chairman, Eureka  
J. P. BAUMGARTNER, Commissioner, Santa Ana  
M. B. HARRIS, Commissioner, Fresno  
JOSEPH M. SCHENCK, Commissioner, Los Angeles  
FRED S. MOODY, Commissioner, San Francisco

R. M. MORTON, State Highway Engineer, Sacramento

HARRY A. ENCELL, Attorney, San Francisco  
E. FORREST MITCHELL,  
Secretary and Disbursing Officer

**HEADQUARTERS STAFF, SACRAMENTO**

T. E. STANTON, Assistant State Highway Engineer  
L. V. CAMPBELL, Office Engineer  
FRED J. GRUMM, Engineer of Surveys and Plans  
C. S. POPE, Construction Engineer  
T. H. DENNIS, Acting Maintenance Engineer  
CHAS. E. ANDREW, Bridge Engineer  
R. H. STALNAKER, Equipment Engineer  
C. L. McKESSON, Materials and Research Engineer

WILLIAM SCHLEIP, Principal Accountant

**DISTRICT ENGINEERS**

T. A. BEDFORD, District I, Willits  
H. S. COMLY, District II, Redding  
F. W. HASELWOOD, District III, Sacramento  
J. H. SKEGGS, District IV, San Francisco  
L. H. GIBSON, District V, San Luis Obispo  
E. E. WALLACE (Acting), District VI, Fresno  
S. V. CORTELYOU, District VII, Los Angeles  
E. Q. SULLIVAN, District VIII, San Bernardino  
F. G. SOMNER, District IX, Bishop  
R. E. PIERCE (Acting), District X, Sacramento

General Headquarters, Third Floor, Strub Bldg.,  
Eleventh and P Streets, Sacramento, California.

**DIVISION**  
of  
**PORTS**

Port of Eureka—F. B. Barnum, Supervisor  
Port of San Jose—Not yet appointed  
Port of San Diego—Not yet appointed

**DIVISION**  
of  
**ARCHITECTURE**

GEO. B. McDOUGALL, Chief, Division of Architecture  
P. T. POAGE, Assistant Architect  
W. K. DANIELS, Deputy Chief of Division

**HEADQUARTERS**

ALFRED EICHLER, Architectural Designer  
H. S. HAZEN, Architectural Designer  
W. E. MANHART, Architectural Designer  
RODERICK MILES, Architectural Designer  
HARRY W. DeHAVEN, Chief Architectural Draftsman  
C. H. KROMER, Structural Engineer  
CARLTON PIERSON, Specification Writer  
F. M. STEWART, Principal Clerk  
C. E. BERG, Engineer Estimates and Costs  
J. W. DUTTON, General Superintendent Construction  
W. H. ROCKINGHAM, Mechanical Engineer  
W. M. CALLAHAN, Electrical Engineer  
A. J. BEAKEY, Civil Engineer  
Headquarters, 615 Forum Bldg., Sacramento, California

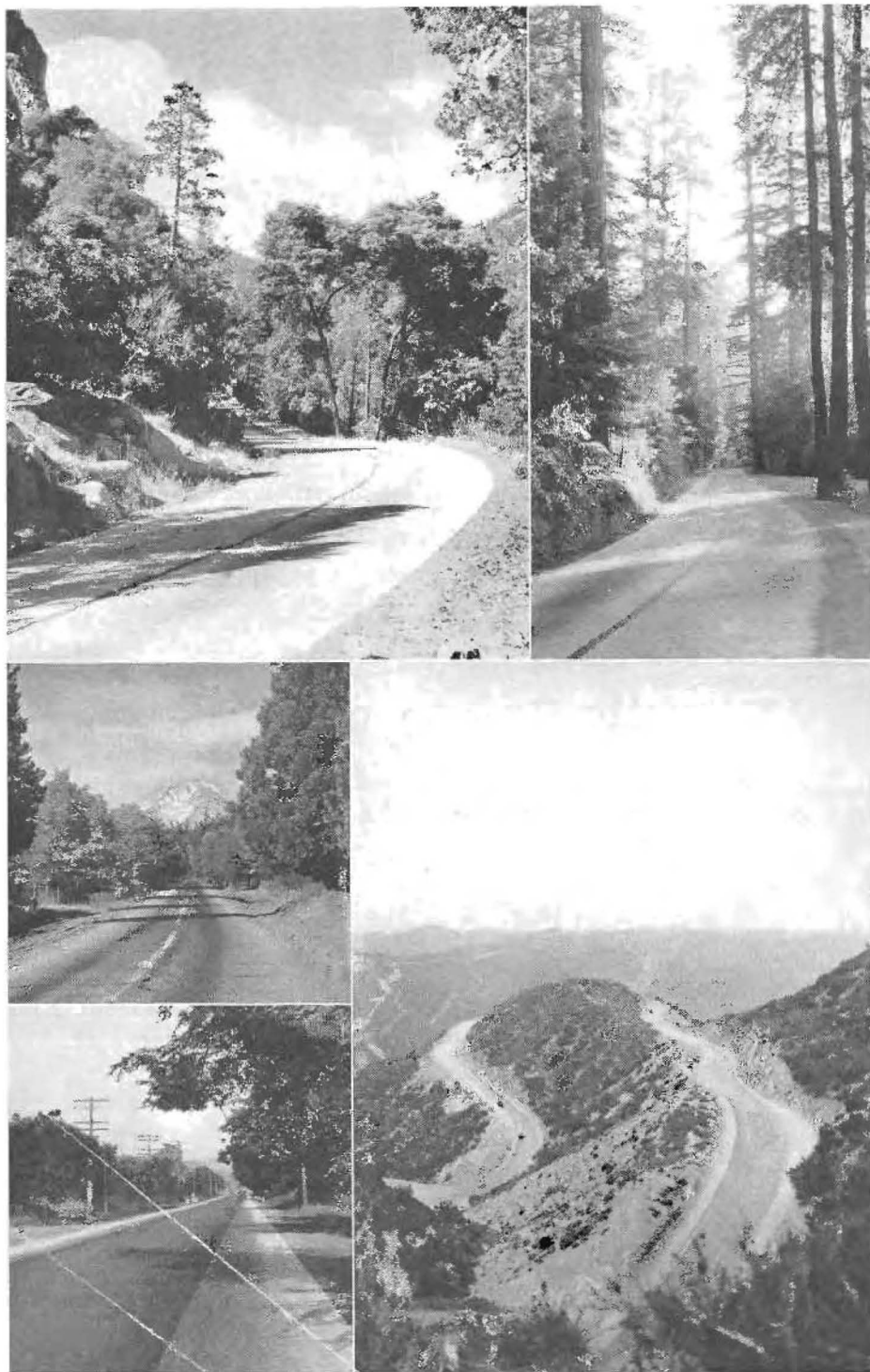
**DIVISION**  
of  
**ENGINEERING AND IRRIGATION**

EDWARD HYATT, JR., State Engineer and Chief,  
Division of Engineering and Irrigation  
J. J. HALEY, JR., Deputy Chief of Division  
A. D. EDMONSTON, Water Resources Investigation  
R. L. JONES, Bureau of Reclamation  
W. A. POST, Santa Ana River Investigations  
W. A. PERKINS, Investigation of Dams  
S. T. HARDING, Irrigation and Special Investigations  
Headquarters, 627 Forum Bldg., Sacramento, California

**DIVISION**  
of  
**WATER RIGHTS**

HAROLD CONKLING, Chief of Division  
EVERETT N. BRYAN, Deputy Chief of Division  
KATHERINE A. KEENEY, Chief Clerk  
SPENCER BURROUGHS, Attorney  
CHARLES KAUPKE, Kings River Water Master  
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# Seeing California from its State Highways



*Upper left, State highway, Yosemite road near El Portal; Upper right, State highway through the redwoods in Santa Cruz County; Middle left, A view of Mt. Shasta from the Pacific highway; Lower left, Coast road near Santa Barbara; Lower right, State highway on the Ridge route.*