

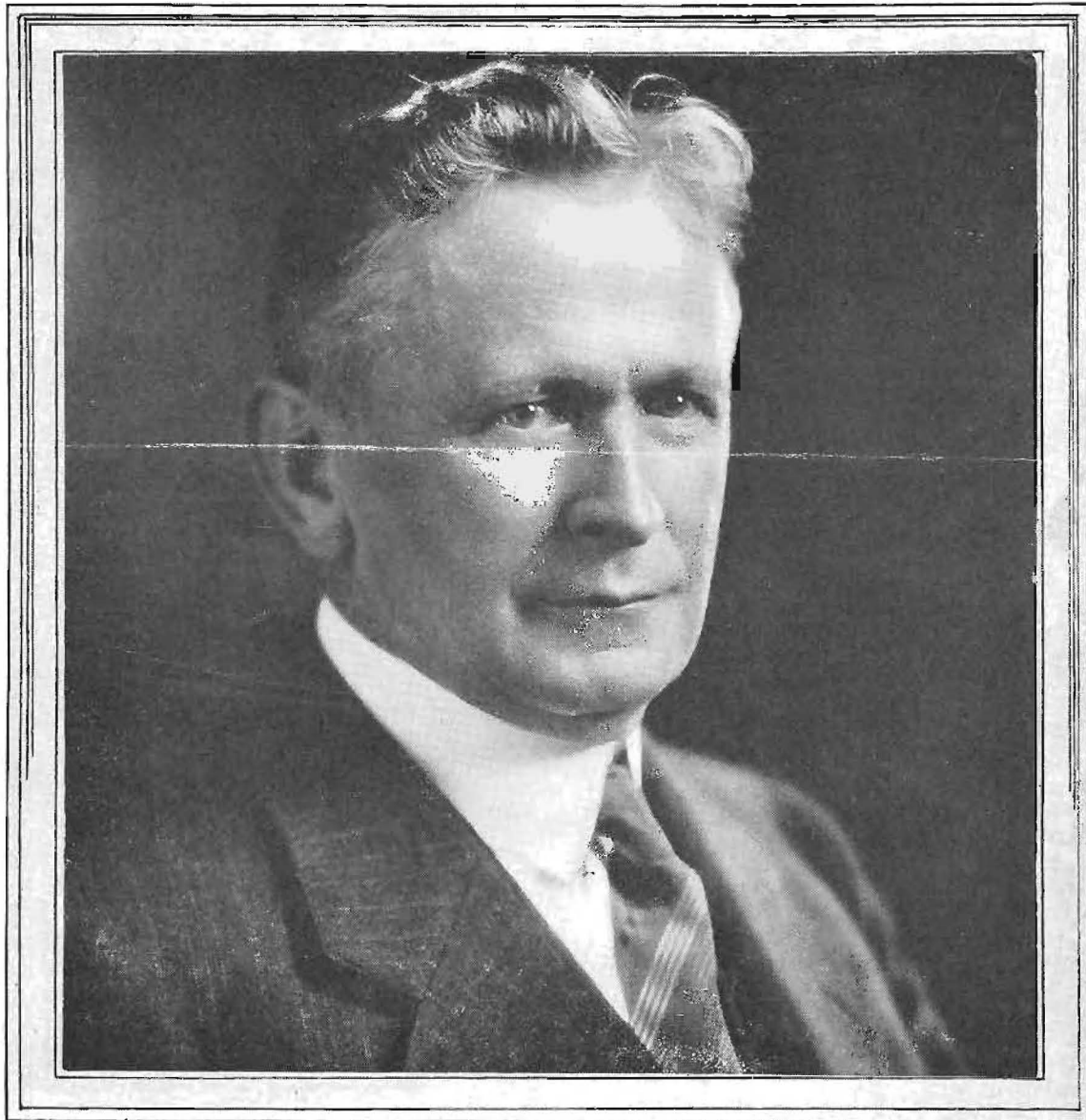
CALIFORNIA
HIGHWAYS

A BULLETIN ISSUED BY THE CALIFORNIA HIGHWAY COMMISSION FOR THE
INFORMATION OF ITS EMPLOYEES AND THE PUBLIC

Vol. 4

JANUARY, 1927

No. 1



C. C. Young, inaugurated twenty-sixth Governor of California, January 4, 1927.

In this issue: EXCERPTS FROM GOVERNOR YOUNG'S MESSAGE—SECRETARY JARDINE
SETS GOAL FOR FEDERAL AID—BUILDING THE HIGHWAY THROUGH
FAMOUS RANCHO MALIBU.

CALIFORNIA HIGHWAYS

This Bulletin is published by the California Highway Commission for the information of its employees and the public. Editors of newspapers and others interested are welcome to use, without restriction, any of the matter herein contained. Cuts will be gladly loaned upon request.

FRANK B. DURKEE Editor

P. O. Box 1103, Sacramento, California.

Vol. 4. JANUARY, 1927. No. 1

CALIFORNIA HIGHWAY DEPARTMENT

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WHEN a road building engineer thinks that he knows it all, he is on the toboggan. In all branches of our work lie opportunities to improve results or to reduce cost.

This idea is sharply exemplified in the inside history which preceded the construction of the excellent oil-surfaced gravel roads in Division I. When Division Engineer T. A. Bedford advanced the idea of using a portion of his annual allotment of general maintenance funds to defray the cost of a light application of heavy oil, he met with little encouragement on the part of some of our supervisory engineers, who thought they knew something about what could be done with oil.

In spite of this, goaded by desperation caused by seeing the valuable gravel turned into dust clouds and carried away by the wind, Engineer Bedford insisted, experimented, failed, persisted and triumphed in his endeavor to produce an asphalt seal top at low expense, on a rough gravel base full of clay and boulders.

Bedford's maintenance allotments seemed less adequate each year. The traffic increased and with it the complaints of travelers about the dust. The gravel surface disappeared at an alarming rate. Bedford is an engineer who keeps his eyes and ears open and takes advantage of the breaks. His oiling ideas were not necessarily original. Lessons learned in early road building experience in Los Angeles County were not forgotten. He observed enough the year before, viewing experiments in a neighboring state, to set him thinking.

(Continued on page 5.)

TABLE OF CONTENTS.

Governor Young's Inaugural Message Outlines Highway Policies	page 3
Secretary Jardine Urges Completion of Interstate Routes.....	page 4
Governor Appoints Two Highway Commissioners.....	page 5
Highway Construction Through Famous Rancho Malibu. Reported by C. P. Montgomery, Resident Engineer, Division VII.....	pages 6 and 7
Distinctive Doney Creek Bridge Now Open to Traffic.....	page 8
Forest Funds Building Truckee-Tahoe Highway.....	page 9
Civil Service Announces Examinations for Engineers.....	page 9
Division VIII Meets Emergency Caused by Floods.....	page 10
Agreement Approved for Serra Grade Separations.....	page 13

EVERY employee of the highway commission has a direct interest in the improvement of the highway organization's methods and results, both engineering and clerical, office and field. To that end, the State Highway Engineer invites constructive criticism or suggestions from every employee.

Ideas as to the more economical and efficient handling of your job, or suggestions for elimination of waste will be welcomed. Criticism is also desired from persons outside the organization, who are in a position to give facts.

Send only signed communications addressed as follows: California Highways, P. O. Box 1103, Sacramento, Cal.

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

Governor Young's Inaugural Message Gives Important Place to Highway Policies

AN OUTLINE OF THE POLICIES of the new administration with reference to the state highway situation was enunciated by Governor C. C. Young in his inaugural address, on January 4th, before the joint session of the Legislature. In an unequivocal, forward looking statement, the Governor declared his belief that the problem now of most general interest to the people of California is the completion of the state highway system. To meet the state-wide demand for a resumption of work upon the highways, he suggested to the Legislature the necessity of adopting some plan which will provide the funds necessary for new construction. He expressed also the hope for an extension of the prison road camps as a part of his program with relation to the prisons.

Parts of the message of Governor Young having to do with highways and prison road camps, are as follows:

I PASS now to certain problems of the state's material welfare, which must be solved, and speedily solved, if the growth and development of California is to continue unretarded. I believe that the problem of most general interest at the present time is the completion of our state highway system.

I shall waste no words in emphasizing the importance of this problem, or the economic value of providing, at the earliest possible moment, a completed system of state highways. I believe that the speedy completion of our highway system is an end desired by every citizen. The only question is the best method of securing the necessary revenues.

In the first place, it is clearly impossible to secure our necessary highway revenues from the state's general fund. To do this would inevitably lead to the necessity of imposing a state ad valorem tax upon our citizens, already suffering under too great a burden of local taxes.

Secondly, I do not believe that at present we should attempt to divert to the construction of new roads the money now being used to save our existing roads through the reconstruction process of widening and thickening.

Finally, I am convinced that we should not depend upon the issuance of bonds for this purpose, partly because of the extra expense involved, and partly because we can not afford to delay our highway work by waiting two years for a bond election.

Accordingly, if we are to satisfy the almost universal demand that we at once resume work upon our state highway system, we are thrown back upon the necessity of adopting some plan which will produce the necessary revenues. It is true that such a plan was defeated at the recent election, but when we consider the narrow margin of the defeat, and analyze the reasons for it, I am sure that it is not to be taken as a verdict of the people against the general proposition, nor as precluding the legislature from now undertaking to find some solution of it which will be assured of general approval and acceptance.

I believe, that with proper regard for the interests involved, the legislature should determine upon a policy through which this vitally important problem may be solved. Toward this policy I offer the following suggestions:

First, let the northern and southern sections of the state determine upon a list of roads, such, for instance, as all interstate roads and other roads included in the first bond issue, to be set aside as a charge against the state as a whole.

Second, let the revenues for remaining roads, both for con-

struction and reconstruction, be allocated fairly and equally between the two sections of the state.

Finally, fix upon a gasoline tax, or some equivalent method for the financing of new roads; and thus, by giving this proposition a fair trial, permit the coming administration to show what can be done in highway construction, to the satisfaction and for the benefit of the entire state. It is unnecessary to point out that the problem must not be complicated by any attempt to add to the present state highway mileage at this time.

I BELIEVE that in our penal institutions every effort should be made to study the individual prisoner, and to restore him, whenever possible, to useful citizenship. I do not believe, however, that the criminal should be sentimentally pampered as the innocent victim of untoward circumstances. I believe that the prison should provide plenty of work, wholesome food, medical attention, and an opportunity for self-development through education, but there should be no reason for criminals to regard it as a desirable place of residence.

Furthermore, I believe in a careful segregation of prisoners, so that the first offender may escape contamination by the hardened criminal. I believe in a wise and conservative use of the parole system, to be applied to such prisoners as the parole board feels morally certain of redeeming thereby. However, I also believe that parole is rarely justified in the case of a repeater, or habitual criminal.

I emphatically believe in the prison road camp, and hope to see its work extended as rapidly as possible, in order that discharged prisoners may leave with strong bodies, and such small sums of money as they have honestly earned, thus giving them a fairer chance to break away from crime and criminal associations.

Finally, I believe that we should lose no time in relieving the intolerably crowded condition in our own state prisons, where two, and sometimes three, prisoners are confined in the same cell. I also believe that San Quentin is no place for our women prisoners, and I would favor the appointment of a commission, consisting partly of women, to plan for the establishment of a separate penal institution for woman offenders.

Secretary Jardine Urges Completion of Interstate Routes

SECRETARY OF AGRICULTURE WM. M. JARDINE, in his recent comprehensive address at Pinehurst, North Carolina, before the annual meeting of the American Association of State Highway Officials, placed before the road builders of America a definite goal—completion of the initial improvement of the primary system of transcontinental highways by 1930. This definite object, he asserted, is possible of accomplishment and by it both the federal and state governments will have kept faith with those who provide funds for highway building.

To establish the 80,000 miles of important interstate routes in the public mind as an entity, the secretary urged as essential the consummation of plans for their uniform signing and numbering as already recommended by the joint board of state and federal engineers.

What Federal Aid Has Done.

The remarkable improvement in roads during the last ten years and the increase in highway transportation, the secretary pointed out, has been the greatest in the history of the country. Coincidentally this same decade covers the period of federal aid road legislation and its administration under the Department of Agriculture. In 1916 there were less than 2,500,000 motor vehicles in the country, of which only 73,000 were registered as motor trucks. Today the registration is in excess of 20,000,000 and commercial vehicles alone are in excess of the total registration of ten years ago.

The decade also has witnessed the organization of efficient highway departments in all of the states; research and experimentation have made important contributions to engineering science and have resulted in increased service from highways at a lower cost; equipment has been made more efficient and numerous new devices have added to the speed of construction.

Stage Construction Approved.

Stage construction of highways, which is the policy being followed in California, was heartily approved by the secretary in the following words:

"The problem of the present is to serve as adequately as possible the present needs, keeping in mind at the same time the greater needs of the future, and making suitable provision for their accommodation when the time arrives. This is the policy of stage construction, a sound policy because it recognizes the utter impossibility of building once for all a system of highways which may be regarded as a finished product, but rather substitutes for that conception the principle of progressive improvement.

"The construction of earth roads on the lines and grades and with the drainage provisions that will be required by the pavement of the future is a recognized application of the state-construction principle. But it has much wider applications than that. The acquisition of rights of way of *ample width* for the future so that, when the need arises, it will be possible without heavy expense or the injury of private property to effect the necessary improvements, is another highly important application. The same foresighted policy suggests the location of the improved highways in relation to railroads at crossings in such manner as to provide satisfactorily for separation of grades, and it applies also to provisions for the construction of future by-pass highways around cities, and for the diversion of traffic from routes of growing congestion.

"To anticipate thus the needs of the future implies a knowledge of the probable traffic importance of the various roads which can only be obtained by a careful and detailed study of the present distribution and the factors inherent in the economic and physical characteristics of the state.

"The highway department that has in its possession such information as these surveys supply can really plan for the future. It has substituted facts for opinions; it knows the present and probable future importance of its roads; it knows the density and also the weight of the traffic to which each road is now subjected and to which it is likely to be subjected

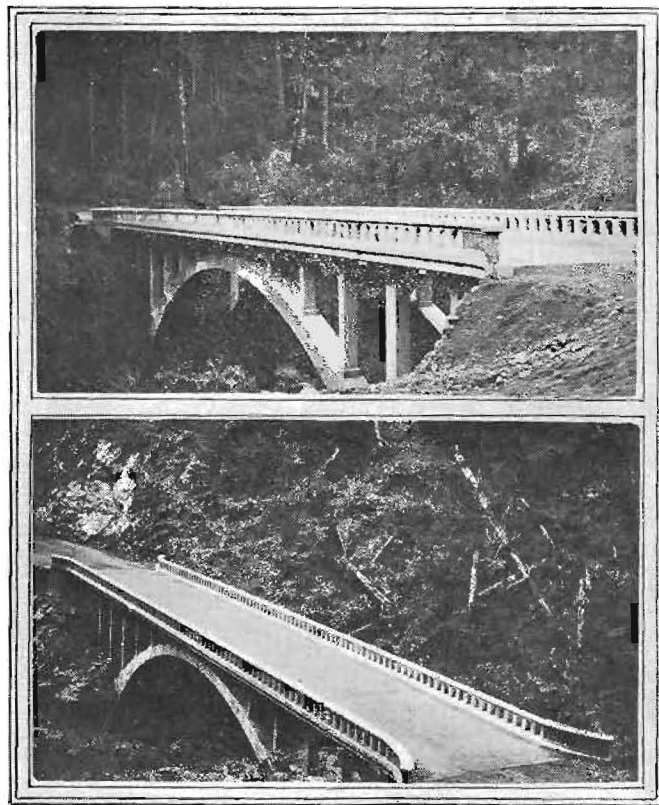
in the near future. It can, therefore, devise a reasonable program of construction extending into the future, it can budget its funds intelligently; it can determine the order in which the various highways should be improved and give a satisfactory answer to those who favor priority for other roads; and it has in its possession an adequate basis for the necessary decision as to the character of improvement required for each road.

"This is sound and businesslike administration of highway improvements. It is the reverse of the casual and haphazard procedure which too often has subjected the business of highway improvement to political manipulation, and produced discontinuous, unbalanced, and uneconomical development instead of well articulated systems of improved highways."

Importance of Maintenance.

Discussing the important subject of maintenance, the secretary said:

"Looking to the future also there must be a still greater improvement in the maintenance of all roads and especially of the federal-aid roads, an obligation which the federal law places upon the state highway departments. While unquestionably there has been great improvement in this respect during the last decade, the failure to make proper provisions for the repair of roads upon which large sums of public money have been invested is the sheerest of economic folly. Unless



BRIDGES IN SMITH RIVER CANYON—Views of typical reinforced concrete structures built by United States Bureau of Public Roads on the Redwood highway, Del Norte County, as part of a forest highway project.

there is positive assurance that means will be available for the constant and continuous care of the roads after they are improved, I am convinced that it would be better not to improve them at all.

"While the states in accepting the federal appropriations accepted also the obligation of keeping the roads in proper repair, the deeper obligation is that of rendering the best possible service to the public and of protecting public investment."

Primary System Nearing Completion.

Secretary Jardine sees a great system of national highways taking form as a result of federal and state cooperation. Coming to the closing paragraphs of his address, he held up before the assembled highway officials the vision of those who, in 1916, worked for the passage of the first federal-aid law. Discussing the completion of the primary system of federal-aid routes, he said:

"With each year's progress now it becomes easier to see the working out of one of the primary conceptions of the federal-aid road legislation as expressed in the requirement to expedite the completion of an adequate system of highways interstate in character. It was foreseen that the fulfillment of this purpose would come through a linking up of sections of main highways as they are developed state by state, and up to this time the programs within the states have in general been in harmony with the expected progress in the direction of through routes. In some cases the department has taken definite positions with reference to specific projects to provide missing links, usually in the way of bridges at state boundaries, but now with the major routes of the country so clearly defined by the action of the states through this association, the unimproved sections of these routes have been brought in strong relief.

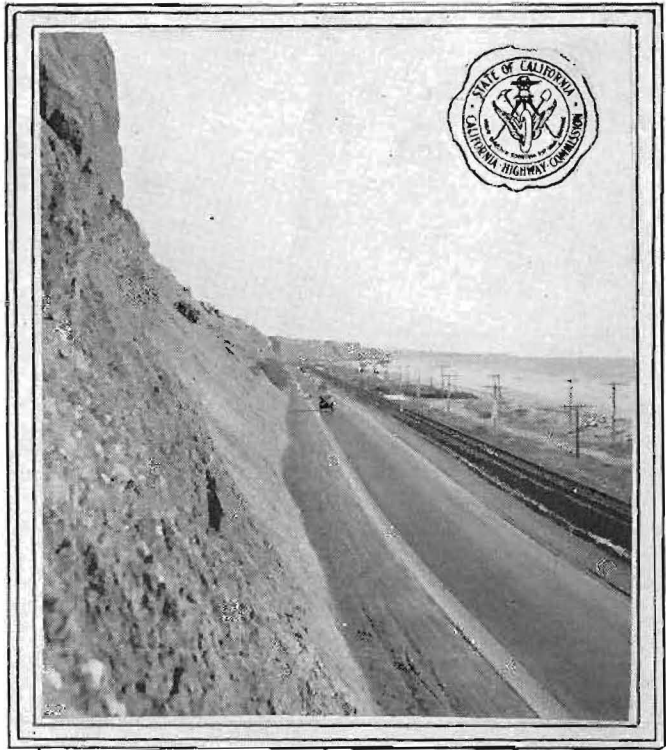
"There may be critics who hold that the ten-year period covered by this legislation should have produced more transcontinental routes fully improved.

"There are two answers: The actual operations of the federal highways legislation did not get under way until well into the year 1919, and the tremendous development of motor vehicular traffic, particularly around every center of population, large and small, local rather than transstate in character, has necessitated first, attention to the immediate service demanded. It is my feeling that the progress in the completion of transcontinental roads is gratifying, but I do not lose sight of the fact that the lack of transstate routes in the agricultural states of the Mississippi Valley is not in keeping with the development, east and west. In specific states this condition is brought about more largely by dependence upon county financing (which the secretary did not approve) than upon any lack of need of such roads or lack of response on the part of the state highway departments.

"Now that there has been plainly pointed out and defined the through routes which are of major national importance, there should be an energetic effort made to improve the missing links, not because they are transcontinental routes but rather because in general these unimproved sections are on the most important state routes, and the failure to improve these imposes a handicap upon the people of each state in the satisfactory use of their own road systems. But the national use must not be lost sight of, nor the requirement of the national legislation that these interstate routes shall be expedited.

"The department has not attempted to dictate the routes which should be regarded as major state routes. Neither for that matter have the state highway departments. Through the careful work of the Joint Board of Interstate Highways, and the executive committee of the association, each state highway department has expressed in a definite way the routes which are of the greatest importance within the state. In other words, this system of interstate routes has been built from the local viewpoint upward and not from the transcontinental viewpoint downward.

"But having now settled upon these routes, which is the last analysis the public itself has defined by their use, it becomes our duty, the federal and state highway departments working in cooperation, to expedite their completion. There are approximately 80,000 miles of highway included in these routes. To complete them to a state of improvement satisfactory for present use is a matter of closing gaps. I am convinced that this, the initial improvement, can be completed by 1930 without difficulty, and as a definite objective I can think of no expenditure of effort which would bring with it a greater return of



ALONG THE OCEAN—State Highway on the Orange County coast, widened to twenty feet and thickened.

public satisfaction or any more intelligent method of keeping faith with both the federal and state governments which have entrusted to us the administration of these large funds.

"From the federal point of view the early improvement of these routes is of large importance, and I ask your full support in an effort to complete the unimproved links at the earliest possible time and to bear with this department in a reasonable but insistent demand that the federal funds so far as possible be dedicated to this purpose with the full consent and belief on the part of the highway departments that the end is desirable and worthy."

GOVERNOR YOUNG APPOINTS TWO HIGHWAY COMMISSIONERS

SHORTLY after his inauguration on January 4th, Governor C. C. Young announced the appointment of Ralph W. Bull of Eureka as chairman of the California Highway Commission to succeed Havery M. Toy of San Francisco, resigned. J. P. Baumgartner of Santa Ana was appointed commissioner to succeed Nelson T. Edwards, resigned. As this issue of the *Bulletin* goes to press, the third member of the commission to succeed Commissioner Louis Everding, whose resignation was accepted on January 17th, had not been named.

The *Bulletin*, in a subsequent issue, plans a more formal introduction of the new commissioners to the personnel of the department and to its other readers throughout the state.

Five

STRAIGHT FROM THE CHIEF

(Continued from page 2.)

The results in Mendocino County on Route I are little short of marvelous, considering the condition of the road before the oil was applied. Excellent results have been obtained at very low cost. An extensive program, largely based upon his success, is planned for 1927-28 in other divisions, in protecting rock-surfaced roads with oil.

The proper development of highway construction and maintenance, to obtain better and more pleasing work at less cost, requires the highest order of intelligence, and an attitude of open-mindedness on the part of engineers. The man who thinks conditions are stabilized, and that he knows it all, is only sliding backwards.

Highway Construction Through Famous Rancho Malibu

Reported by C. P. MONTGOMERY, Resident Engineer, Division VII.

IN contrast to the years of litigation attendant upon efforts to secure an adequate right of way, the California Highway Commission, in a comparatively short period, has completed all of the grading and a part of the paving of state highway route 60 through the famous Rancho Malibu Sequit y Topango, from Santa Monica, in Los Angeles County, northward to the Ventura County line.

Several issues of the *Bulletin* could be devoted to a complete story of the battles, legal and otherwise, which have resulted from the efforts of Los Angeles County and the state to open to public travel a highway along this section of the southern California coast, to provide another needed outlet for traffic northward from Los Angeles. Litigation with reference to the Malibu rights of way has reached the Supreme Court of the United States, while various phases of the controversy have been before the courts of Los Angeles and Ventura counties for years.

The road was added to the state highway system by bond issue of 1919 as a part of the Oxnard-San Juan Capistrano coast highway. Its completion will provide a travelable highway in sight of the ocean from San Diego to Santa Barbara, a road which will bring added fame to California's system of highways.

The first construction work on the Malibu section of Route 60 consisted of 7.4 miles of 20-foot cement concrete pavement, 6 inches thick, reinforced, placed in 1921. Following this, some grading work was done by state forces in 1923 and 1924, pending a further effort to obtain rights of way.

Grading Contract in 1925.

The next contract, for grading 16.13 miles through the Malibu, from Arroyo Sequit to Las Flores Canyon, was awarded early in 1925 to S. Wright Jewett of Los Angeles, and was completed on October 23, 1926, by subcontractors of the Southern Surety Company, assignee.

This section follows for the most part the shore line with practically no grades of any consequence. Where it was found necessary to leave the beach, the highway leads across a high mesa, overlooking on one side the ocean, while from the other may be had a splendid view of the Santa Monica mountains.

It was found desirable after construction started to make a number of changes in the original plans, particularly with reference to grade lines and drainage structures. Besides 460,667 yards of roadway excavation, the contract involved considerable station overhaul, placing of 125 pipe culverts and headwalls; construction of ten box culverts with openings ranging from 3' by 5' to 10' by 10'; a large arch culvert 135 feet long; and a 20-foot reinforced concrete bridge.

Temporary crossings were provided at eight large waterways where bridges are to be built by Los Angeles County. Three of these structures, those across Malibu Creek, Solstice Canyon, and Corral Canyon, are now under construction.

Johnson Paving Contract.

Upon completion of the grading between Latigo Creek and Las Flores Canyon, a second contract was awarded to Ed Johnson and Sons of Los Angeles for the construction of a cement concrete pavement between these points, a distance of 6.7 miles. This contract, which was recently accepted by the commission, was carried on in the face of difficulties and there are several features of interest to engineers.

TRANSPORTATION. The inaccessibility of the Malibu region, by road or rail, presented difficulty in the handling of material. Therefore the proportioning plant for the entire job of necessity was located near the Santa Monica city limits on the

Pacific Electric line and materials were hauled in batches from that point. The minimum haul was nearly seven miles and the maximum was over thirteen miles.

Materials were shipped to the job in gondolas, where they were unloaded by crane equipped with a clamshell bucket into bins or stock piles. Coarse aggregate was delivered separately in 2½-inch and 1½-inch sizes. The plant was equipped with three bins, one for sand and two for rock. The latter were combined in proportions as determined by frequent grading tests. All aggregates were proportioned by weight.

Blending of Aggregates Difficult.

The small space available for stock piles, allowed room for the storage of only two cars of each size of aggregate and made it necessary to load most of the aggregates directly into the bunkers from the cars. This lack of adequate stock piles upon which to blend the aggregates, made necessary a very careful check of the grading and frequent adjustments of the paving mix.

Difficulties of the situation were overcome largely through the energy and skill of Assistant Resident Engineer R. H. Rowe, who was in charge of the proportioning plant.

BATCHING. Aggregate was hauled to the mixer in five-ton batch trucks. The cement was loaded on the trucks as it passed the warehouse after leaving the bunkers, five sacks being placed over each compartment. As a protection against moisture in the aggregate, and to prevent loss from wind or leakage during the long haul, the sacks of cement were not emptied until the load reached the mixer.

SUBGRADE AND EMBANKMENTS. From Las Flores Canyon to Winter Canyon the grade was made either of beach sand or a very sandy material. However, from Winter Canyon to Latigo Creek, the center line of the roadway followed closely the roadbed of the abandoned Hueneme, Malibu and Southern railroad. In widening the old embankment to provide a roadbed of 40 feet, heavy fills were made in places along the shoulders.

Embankment Puddled for Full Width.

To provide against a future settlement of the subgrade or of the shoulders, the full width of the embankment was compacted by puddling. Earth dykes of lengths determined by the grade, and 12 inches deep, were constructed covering the full width of all fills having a depth of 18 inches or more. To secure a rapid and uniform penetration holes, four feet apart, were jetted in the dykes by means of a ¾-inch pipe to which was attached a 2-inch hose.

Flooding was continued until tests with a soil auger showed the moisture to have penetrated the full depth of the fill.

While there was a decided compression during the puddling operations, the roadway stood through the heavy spring rains and later was subjected to the traffic of a fleet of 5-ton batch trucks, with no apparent settlement at any point. It is not believed that further serious settlement will take place.

A careful investigation of soil conditions showed satisfactory subgrade material on the section to be paved, except between Solstice and Winter canyons. Here the tests indicated a shrinkage of 5 to 12 per cent. To overcome this, the subgrade between these two points was cut low and a cushion of several inches of sand provided. This sand was hauled from the nearby beach in Ford dump trucks.

PAVEMENT DESIGN. The design for the Johnson contract, in so far as it concerned the pavement section, exemplifies the latest California practice. This design provides for a Portland cement concrete pavement 20 feet wide and 7 inches thick, increasing in a distance of 2 feet to a thickness of 9 inches at the center and edges.

Such a pavement was laid over 6.3 miles of the distance. On the other 0.4 of a mile, because of heavy fills, there was placed a water-bound macadam, 5 inches thick, surfaced with 1½ inches of type "B" bituminous macadam. Rock borders, 5 inches thick and 2 feet wide, were placed along either edge of the pavement for the entire length of the contract.

Longitudinal Joints.

The method followed on the Johnson contract in the construction of the longitudinal center joint is an experiment, so far as this state is concerned. The joint was made by using a 14-gauge chan-

nel type metal plate, 9 inches high. Keeping a center joint made by this means to a true line proved difficult, however, and the length of the iron pins driven through the channel in the joint had to be increased from 15 to 19 inches. A metal channel of 3/16-inch steel held in place by a gauge from the side forms was kept over the center joint, until the first passage of the mechanical tamper over the fresh concrete. The channel was then moved ahead to hold the center joint in line, while the mix was being spread around it.

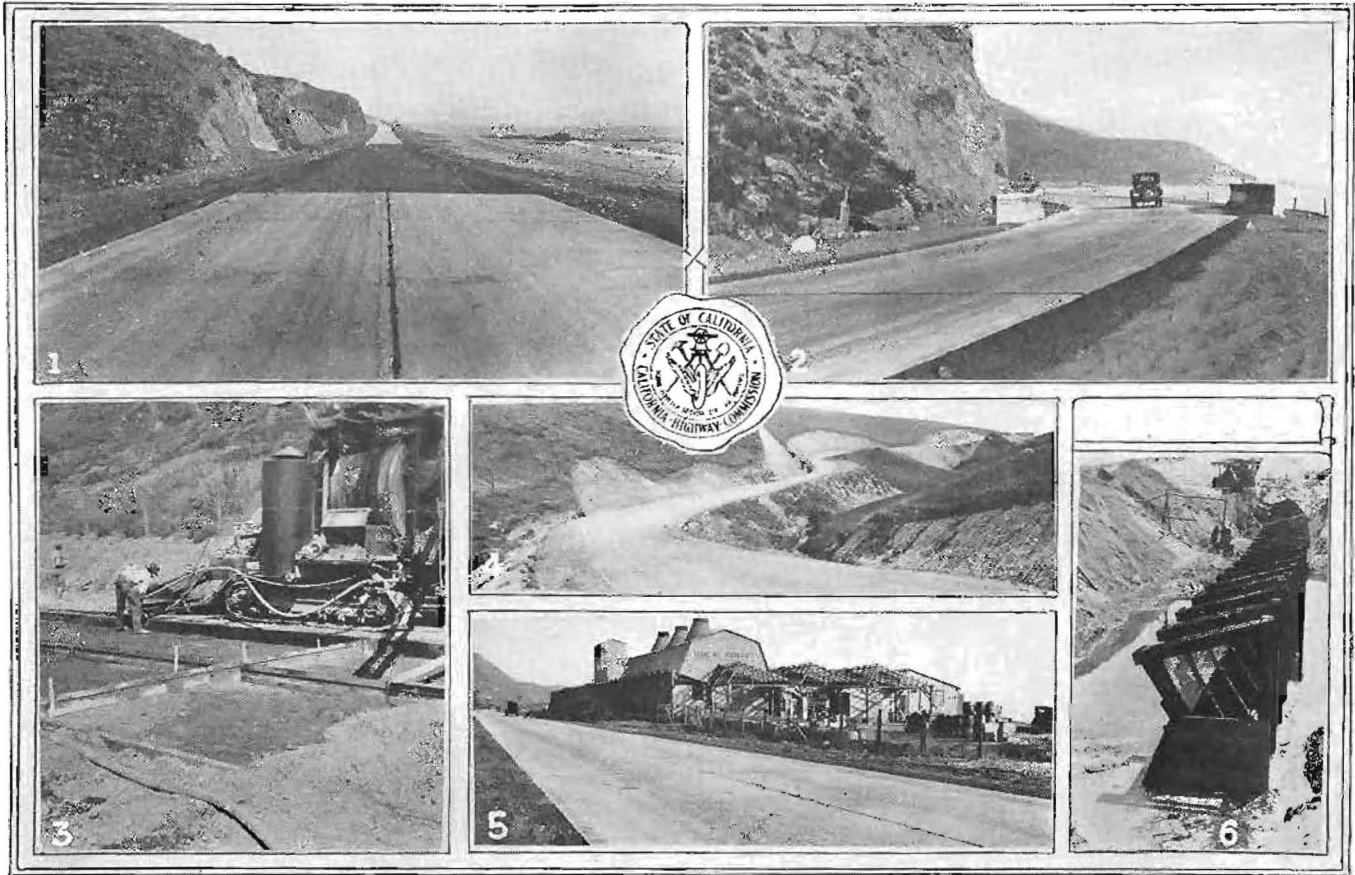
The first practice was to support the center joint from beneath with a small block of wood under each end, care being taken, by means of a gauge extending over the top of the side forms, to keep the top of the joint uniformly 1/2 inch below the surface of the pavement. It was found, however, that, by supporting the metal plate at two intermediate points, spaced equally through the 15-foot length, the alignment of the joint was greatly improved. (Note: This type of longitudinal joint is not standard California practice.)

EMBANKMENT PROTECTION. High seas during spring storms carried away considerable embankment at Rattlesnake Point, and between Malibu wharf and Malibu Creek there was an encroachment upon the grade for a distance of 600 feet. In places the embankment was washed away as far back as the center line.

Some 8000 tons of rock were used for riprap protection at these points. A supply was secured from a large face of hard rock discovered about a quarter of a mile from Rattlesnake Point. Rock was blasted down and loaded on trucks with a power shovel for moving to points where needed.

New Type Bulkhead Designed.

Test pits sunk along the exposed sections showed a layer of closely packed boulders beneath the beach sand, which made driving of piling for an ordinary bulkhead impossible. To meet the situation a box-like structure, 8 feet wide at the base and 7 feet wide at the top, with a V-shaped front wall facing the ocean,



CONSTRUCTION VIEWS ALONG THE MALIBU, LOS ANGELES COUNTY—(1) Low tide, south of Corral Canyon, new concrete pavement with oil macadam exception over fill; (2) new pavement and bridge at Carbon Point; (3) construction view showing method adopted for holding center and expansion joints in place; (4) newly graded section looking north from Walnut Canyon; (5) pottery industry established since building of the highway; (6) forms in place for building of bulkhead on beach near Malibu Creek to provide protection for roadway. (Photos by Division VII.)

Transverse Joints.

Transverse joints were provided every 100 feet with the exception of the first mile, in which, for experimental purposes, joints were placed at intervals of 30 feet. The 30-foot intervals have joints 1/2 inch wide, while the 100-foot intervals have a 3/4-inch joint, supported by 3/4-inch by 5-foot dowels. (Note: Present practice specifies 24-inch dowels.)

Concrete after being deposited on the subgrade was struck off and tamped with a Lakewood machine, finishing over all joints. The transverse joints were cut through and edged after the finishing operation was completed, thus insuring a smooth riding surface. The center joint was allowed to form its own crack above the steel plate, but the transverse joints were edged with a 3-inch double edger. A 6-inch edger was used along the side forms.

CURING. For curing, burlap strips were used until the pavement was sufficiently hardened to withstand pressure of an earth cover. Water for curing as well as for the mixer had to be piped from a Los Angeles city supply at a point three miles north of Santa Monica.

Seven

was designed. This structure, built of creosoted timbers bolted together, as shown in the illustration, was filled with boulders and sand. (Further details may be secured from the division office.)

Negotiations are now pending for the acquisition, by the commission, of the quarry site near Rattlesnake Point from which rock may be secured for future protection work along this section of the highway.

STRENGTH TESTS. The compressive strength tests of concrete samples from this project, made by the commission's testing laboratory at Sacramento, maintain the high record of recent California pavement. The average breaking point of 59 test cylinders broken at twenty-eight days was 5027 pounds per square inch. The standard California requirement of six sacks of cement per cubic yard of concrete was used.

Remarkable Smoothness Record.

VIALOG RECORD. For smoothness, the Malibu paving project holds the record for California, according to a letter received by Division VII from the office of C. S. Pope, con-

(Continued on page 12.)

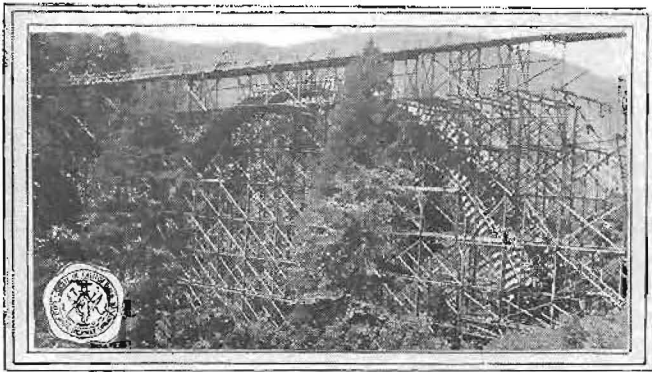
DISTINCTIVE DONEY CREEK BRIDGE NOW OPEN TO TRAFFIC

THE second of three large arch bridges which are an important feature of the reconstruction of the Pacific highway through the Sacramento Canyon—the bridge across Doney Creek—has been completed and opened to traffic. The structure, which is located in the vicinity of La Moine, Shasta County, not only shortens the distance to be traveled in the canyon, but contributes as well to the safety of the highway by making possible abandonment of a number of dangerous curves and grades.

The third of the three structures—the Harlan D. Miller bridge across the canyon of Dog Creek—is now in course of construction and should be finished by the middle of next summer.

Department Describes Structure.

The bridge department of the California Highway Commission, which designed and is supervising the construction



Construction view, Doney Creek bridge, Sacramento Canyon.

of all three bridges, has furnished the Bulletin with the following description of the structure at Doney Creek:

Doney Creek Bridge is the second largest of the three to be built in the Sacramento Canyon. It has a span of 175 feet and a theoretical rise of 70 feet. The distance above the bottom of the canyon, however, is 120 feet. The arch is an open spandrel, two-ribbed design with spandrel columns spaced on 14-foot centers. There are four approach spans on the south end and five on the north, of 33 feet each, making the overall length of the bridge 499 feet. Its clear roadway width is 24 feet.

The main arch spans on a tangent between two curves of 500 feet and 1500 feet, respectively, which afford the traveler a view of the structure while approaching it. The entire bridge is built on a 540-foot vertical curve which conforms to the road grade.

Site Ideal for High Arch.

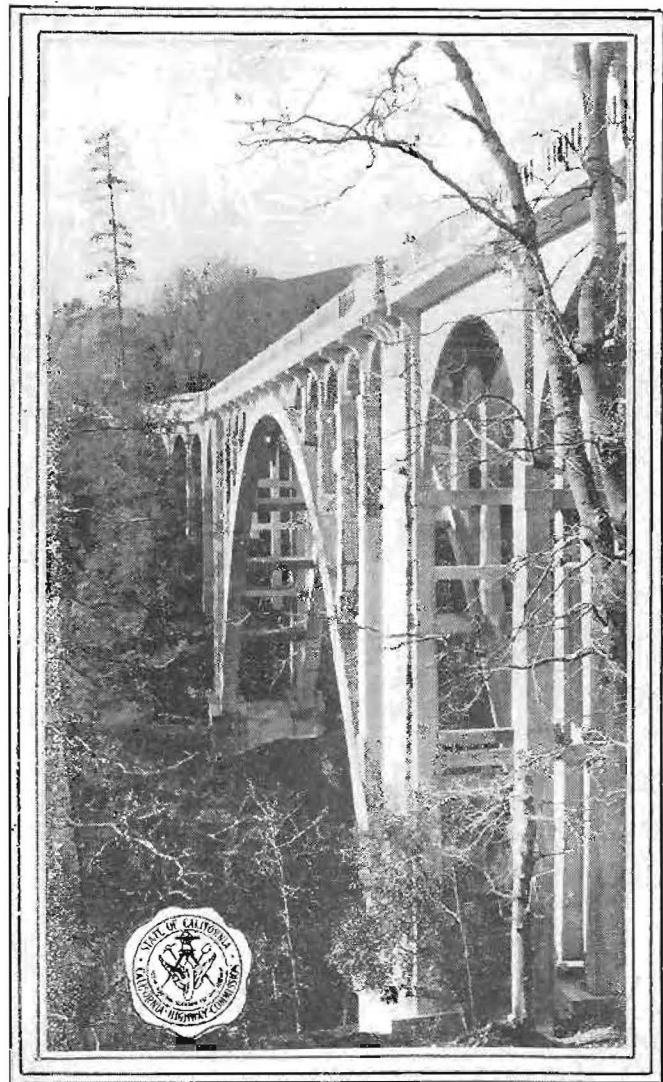
Because of its steepness and outcrops of rock, the canyon in which the bridge is located an ideal site for an high arch. Closeness of the rock to the surface permitted the use of a foundation pressure of eight tons per square foot and accordingly small abutments and footings. On account of the large rise, a comparatively small rib section was required. The arch ribs have a depth of three feet, and six feet, at the crown and spring, respectively, and a width of four feet.

The standard highway loading of two fifteen-ton trucks, or the equivalent uniform live load, was used in the

design. Unit stresses are 750 pounds per square inch for the slabs, stringers and floor beams, and 800 pounds per square inch for the arch ribs, which includes dead load, live load, impact, temperature and arch shortening stresses. To provide for the considerable variation in temperature in this section of the state, the ribs were designed for a 30 degree F. rise and a 50 degree F. fall in temperature.

The design of the Doney Creek structure harmonizes with its surroundings, and its position overlooking the Southern Pacific railroad, along the river at the bottom of the canyon, provides the traveler with views of mountain and stream that will add to the pleasure of a trip over this section of the state highway.

Bordwell and Zimmerman of Napa were the contractors. The bridge department was represented by W. H. Johnson as resident engineer. The contract was awarded on March 17, 1926, and was ready for acceptance early in the present month. The cost of the structure will be approximately \$83,000.



Completed structure, Doney Creek arch on Pacific highway, Shasta County.

FOREST FUNDS BUILDING TRUCKEE-TAHOE HIGHWAY

THE history of the Truckee-Tahoe City road goes back through the years to the days of immigrant trains, ox teams, and the mad scramble for California gold. Its beginning, like that of many of the pioneer trails, antedates county records, but it appears that for a time it was a toll road. It was in 1915 that it was included in the state highway system as a part of the Donner Lake to McKinney's state road, authorized by a special act of the legislature.

In 1917 the road came under the jurisdiction of the California Highway Commission. Its crooked alignment and narrow width, however, made it impossible to maintain it as an acceptable roadway for the greatly increased traffic of recent years to and from Lake Tahoe.

Improvement of the section from Truckee to Tahoe City as a Forest highway project was suggested to the Forest Service and the Bureau of Public Roads by State Highway Engineer R. M. Morton. It was put forth as an ideal project for expenditure of Forest funds, and, following its adoption, surveys were started during 1924. It is located in Division III.

Work has been under way during the construction season of 1926, the contract for thirteen miles of grading having been awarded by the bureau to Isbell Brothers of Fresno. A major portion of the rough grading already has been completed and the end of 1927 should see completion of the project. Several bridges, a grade separation, and considerable surfacing, however, are yet to be placed under contract, but plans are being made ready for bids.

Young Brothers have completed the base course of surfacing on four miles near Tahoe City.

High Standards on New Work.

The Bureau already has expended approximately \$200,000 of Forest funds on this project; the total expenditure may reach \$350,000 when the work is completed.

The new Truckee-Tahoe City highway will be about a mile shorter than the present route. It is being built on high standards of alignment and grade, eliminating the sharp turns and steep pitches of the present road. A connection with the Sacramento-Reno trunk highway will be made at Donner Creek about a mile west of Truckee, where an underpass will be constructed

under the main line tracks of the Southern Pacific. All grade crossings of the Lake Tahoe branch of the Southern Pacific, in the Truckee Canyon, except one, will be eliminated by relocation of the existing road. The remaining crossing will be removed by a reinforced concrete bridge that will span both the Truckee River and the railroad.

An order directing construction of the underpass at Donner Creek already has been issued by the State Railroad Commission upon application by the Highway Commission.

The State is assisting with the project by handling the application for the subway and in the securing of deeds for right of way. Condemnation has been necessary in only one or two



FOREST HIGHWAY—View on new Forest highway under construction by the Bureau of Public Roads between Truckee and Lake Tahoe, in the Tahoe National Forest, Division III. The route is a part of the State highway system.

instances and a court order of possession for these parcels already has been obtained. This work has been done by Division III cooperating with the legal department.

By the end of another summer, motorists will have a splendid, safe, high-speed highway from Truckee to Lake Tahoe. It will add to the comfort and pleasure of this drive through a section of the beautiful Tahoe National Forest, while at the same time lessening the time necessary for the trip.

CIVIL SERVICE ANNOUNCES EXAMINATIONS FOR ENGINEERS

THE Department of Civil Service has fixed February 15th as the final date on which to receive the applications of those who wish to take examinations for engineering positions in the state service. The examinations to be given include the following classifications:

- Junior Construction Engineer, Bridges, Grade 3.
- Assistant Construction Engineer, Bridges, Grade 4.
- Junior Designing Engineers, Bridges, Grade 3.
- Assistant Designing Engineer, Bridges, Grade 4.
- Associate Bridge Engineer, Grade 5.
- Associate Highway Engineer, Grade 5.

Examinations for Assistant Bridge Engineer, Grade 5, and Assistant Highway Engineer, Grade 5, will be entirely oral and will be given by a board of examiners composed of experienced engineers and executives appointed by the Civil Service Commissioner. The other examinations will be partially written and partially oral. The required minimum rating for all examinations is 70 per cent.

Application blanks may be secured at room 116 State Building, San Francisco; Room 1007 Hall of Records, Los Angeles; or

Room 331 Forum Building, Sacramento; or by writing to the headquarters of the commission at the last named address.

The date on which the examinations will be held will be announced later. The closing date for all applications, however, is February 15th.

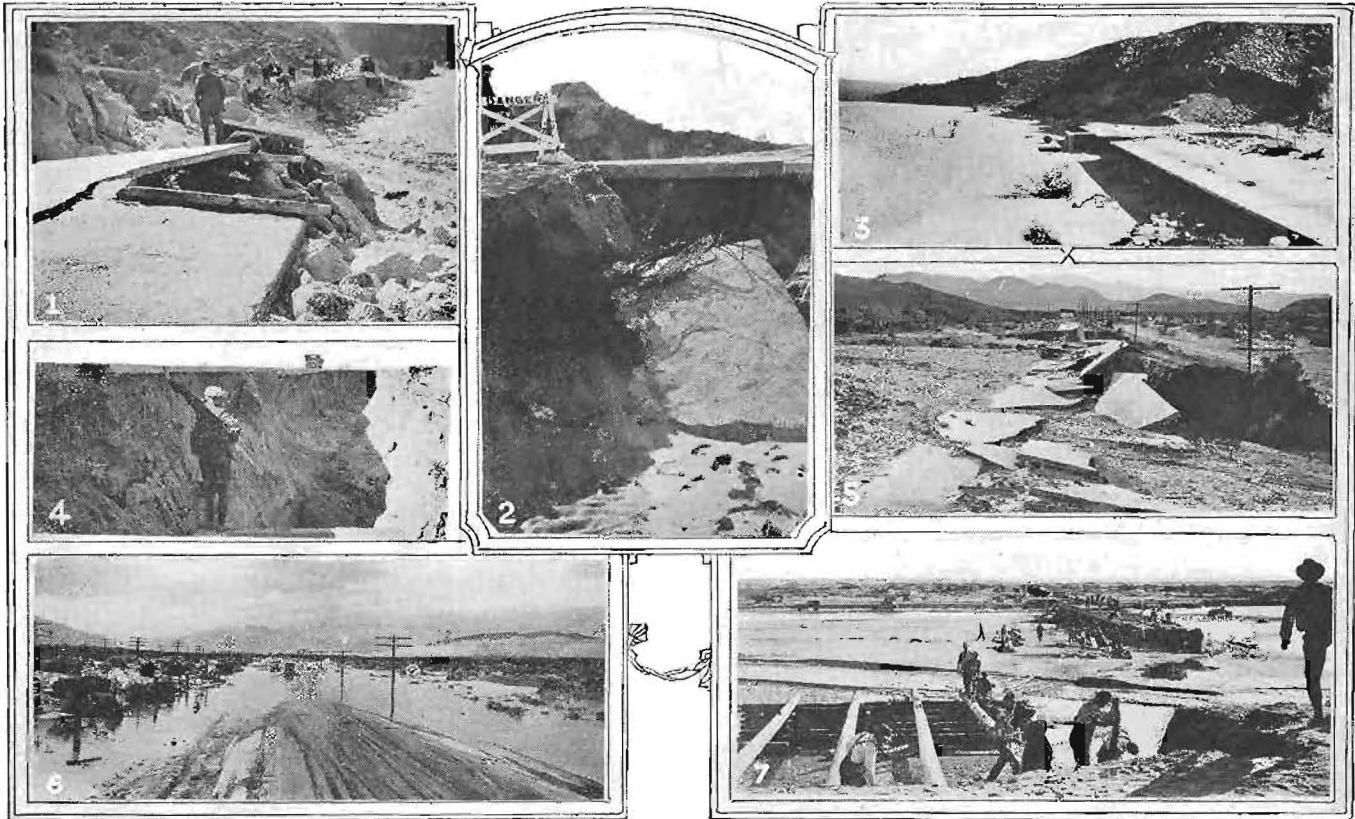
Mechanics Examinations.

The Civil Service Commissioner also announces that applications are now being received for examinations to be held at various times throughout 1927 for positions in the general metals, mechanical and automotive trades, including the following:

- Mechanics' Helper, Grade 1 (all classes).
- Mechanic, General, Grade 2 (skilled or journeyman).
- Mechanic, Automotive, Grade 2 (skilled or journeyman).
- Foreman Mechanic, Automobile, Grade 3.
- Truck Driver, Heavy, Grade 2 (skilled or journeyman).
- Tractor Operator, Grade 2 (skilled or journeyman).

For details as to these examinations information may be secured by writing to the State Department of Civil Service at 331 Forum Building, Sacramento, or by application at its San Francisco or Los Angeles offices.

DIVISION VIII MEETS EMERGENCY CAUSED BY FLOODS



AFTER THE STORM IN DIVISION VIII—(1) Crew building temporary road at washout in Meyers Creek Canyon, western Imperial County; (2) terrific force of cloudburst undermined pavement to great depth at many places; here a block of concrete has fallen into the gully cut below; (3) Meyers Canyon where a section of two miles of pavement was entirely destroyed; undermined pavement at right; (4) the unprecedented flood clogged culverts and washed away shoulders and embankments; no culverts were adequate to carry the flood waters; (5) destruction of concrete pavement at approach to San Diego and Arizona railroad underpass on the Borderland highway; a section of the railroad also was washed away, (6) flood across highway in Riverside County, between Indio and Edom; (7) hastily gathered crew begins construction of temporary bridge across San Felipe Wash, part of original bridge not swept away is being dismantled to provide timbers for temporary structure; the flood completely covered the highway bridge, cutting away the banks at either approach.

DIVISION VIII had an opportunity to demonstrate the efficiency of its maintenance forces, when early in December unprecedented floods caused serious damage to state highways in Imperial and Riverside counties. On the northern and western entrances to Imperial Valley. Reports indicate the emergency was splendidly met, and that, considering the circumstances, there was a minimum interruption of traffic.

Torrents of water which carried away bridges and entire sections of pavement were caused by great cloud bursts in the Laguna Mountains. These cloud bursts followed several days of rain, which already had thoroughly saturated stream beds of the desert washes.

To the northward of El Centro, there was some damage as far as Edom, Riverside County. To the westward, the damage extended to the Mountain Springs grade, where numerous slides delayed paving operations. At the foot of Meyers Canyon, at the westerly line of Imperial County, two miles of cement concrete pavement and grade were destroyed by the terrific force of the flood in Meyers Creek.

Bridge Carried Away.

The most serious interruption of traffic began on December 9th at San Felipe Wash, on Route 26, in northern Imperial County. San Felipe River, swelled to a raging torrent, destroyed nine of the twenty spans of the highway bridge crossing the wash. Even

the pile bents of the destroyed spans were washed away. On nearby sections, at many points, water poured over the pavement for hours, doing extensive damage by causing deep erosion of shoulders and embankments and undermining of the pavement slab. At other places deposits of mud and sand covered the pavement to a depth of several feet.

The San Felipe bridge went out on the night of December 9th. By mobilizing all available maintenance foremen and crews, Division Engineer E. Q. Sullivan succeeded in building a crossing for light traffic which was in use on December 12th. A procession of vehicles, three miles long, was waiting to move northward when traffic was resumed. As soon as the pavement could be cleared for the movement of lumber, a heavier crossing for truck traffic was provided. To make this possible maintenance forces worked night and day to clear the pavement of debris washed down from the mountains. Stranded motorists were employed to augment state maintenance crews.

An emergency contract for the rebuilding of the San Felipe bridge was awarded by the commission at its meeting in Sacramento on January 3d.

Relocation Studies Under Way

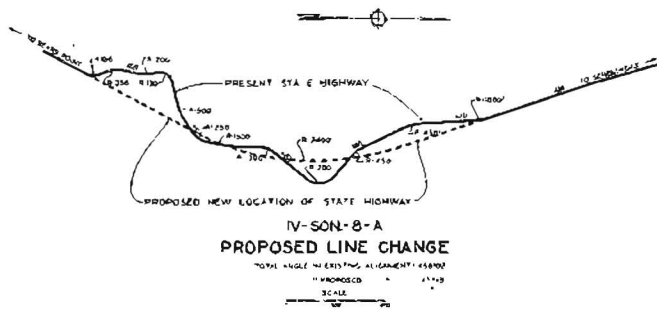
The most serious damage to pavement was wrought by the flood in Meyers Canyon, just east of the San Diego County border, on Route 12. An oil cake detour road has been built through the

LINE CHANGE ON BLACK POINT CUT-OFF TO REMOVE CURVES

DIVISION IV has completed plans and has secured necessary right of way for an important line change on the Black Point cut-off near Fairville, Sonoma County. One curve with a 2400-foot radius, with long tangents at either end, will be substituted for twelve curves on the present line, several of which are blind and two of which have a radius of only 130 feet. The commission, at its meeting on January 24th, authorized a call for bids.

The outstanding features of the proposed change over the present alignment are shown by the following comparison:

Total length of present line.....	4882.98 feet
Total length of proposed line.....	4378.70 feet
Total reduction in length.....	504.28 feet
Total curvature of present line.....	466° 02 feet
Total curvature of proposed line.....	47° 13 feet
Total reduction in curvature.....	418° 49 feet



Grades of the new line are equally as good, if not better, than those on the existing highway. The road on either side of the proposed change has good alignment, and with the completion of the proposed improvement the alignment of the entire section may be considered above the average, the Division reports.

DIVISION VIII MEETS EMERGENCY

(Continued from page 10.)

wash around the 2-mile washout, and studies are now being made to determine the best location for the rebuilding of this section. The division has a survey party in the field and the situation has been gone over personally by the Engineer of Surveys and Plans. It is probable that a new location will be adopted for a part of the distance.

Maintenance Engineer T. H. Dennis reports emergency maintenance allotments for Division VIII, because of the floods of December, will total approximately \$27,000. A preliminary estimate of the amount necessary for reconstruction of destroyed sections of highway is placed at \$100,000 by Fred J. Grumm, Engineer of Surveys and Plans.

As indicative of the way in which the emergency was handled by the division, the following is quoted from a letter received from W. R. Conway, proprietor of the Hotel Barbara Worth at El Centro.

"I wish to acknowledge my appreciation of the assistance rendered me last week by your road men during the tie-up when I was delayed out on the desert, and to thank your organization for the consideration and help extended. They did all possible and I certainly appreciated as never before the credit due your commission for the work they are doing."

"I bought a radio set to try to keep my children indoors."

"Was it a success?"

"Not altogether. They now stop indoors until the announcer calls 'Good night, everybody.'"—*Pele Pele, Paris.*

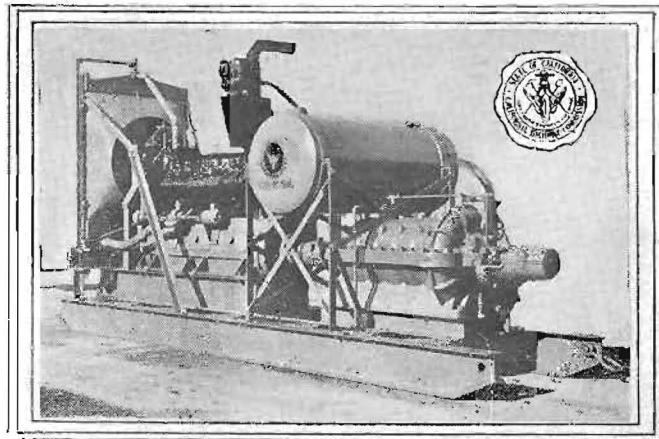
Eleven

SHOP ASSEMBLES PRESSURE PUMP FOR HYDRAULICKING SLIDES ON THE REDWOOD HIGHWAY

THE Headquarters Shop has just completed the assembling of a high-pressure multi-stage centrifugal pump for use in hydraulicking slides on the Redwood highway in Division I. This outfit has a capacity of 400 gallons per minute against a total head of 462 feet. During a recent test at the Headquarters Shop, a 1¼-inch stream was thrown nearly 300 feet.

The outfit is made up of a six-cylinder 130-h.p. Sterling marine engine received from the United States government some years ago, a 4-inch six-stage Dean-Hill multi-stage centrifugal pump, and a radiator removed from an old Holt 15-ton tractor which was received from the government several years ago and wrecked for parts. The pump and engine are mounted on skids so as to be easily portable.

The shop also has assembled a single-stage centrifugal pump outfit as a feeder for the multi-stage pump. This outfit was made up of one of the Cadillac engines received from the



High pressure pump for hydraulicking slides on the Redwood highway; assembled at Headquarters Shop, Sacramento.

government some years ago, a tractor radiator, and a 4-inch Byron-Jackson centrifugal pump having a capacity of 450 gallons per minute against a total head of 100 feet.

Division Develops Plan.

The feeder pump is necessary because the state highway at many places is at a considerable elevation above the nearest available water supply. Too much of the pressure would be consumed if the multi-stage pump were placed at the lower elevation. Also the larger pump is so much heavier and more cumbersome than the single-stage pump, that it is easier to get the latter down to the water.

Removal of slides by hydraulicking, it has been found by experience, is the most efficient and economical means to employ in many localities along the Redwood highway. This plan of slide removal has been developed to a considerable extent during recent winters by Division I.

CIVILIZATION AND ROADS.

You hear people say that civilization rests on the home, the school, the courthouse, or the church, but how about roads?

Isn't the ability to move about, to exchange goods and ideas, the real secret of human progress?

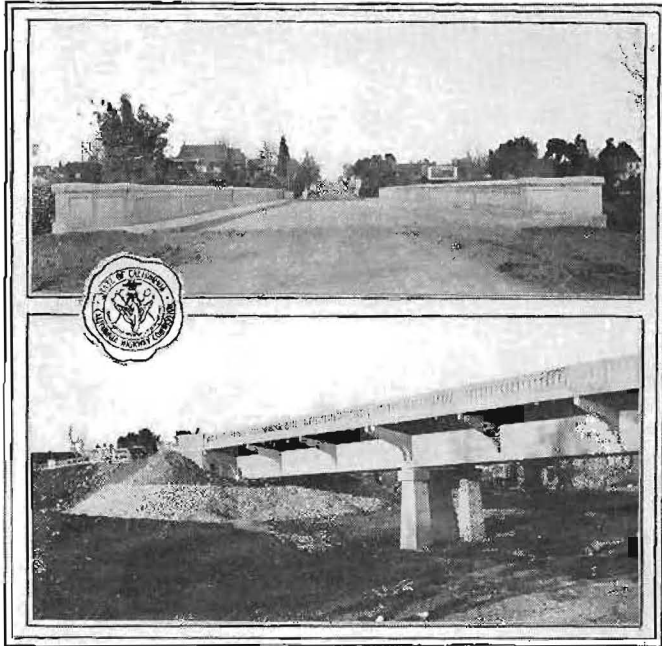
A genius can be born in the desert, just as a clock can strike in the forest, but what good does it do?

The courthouse stands at the center of the town, the school and church by some main highway, and no man builds his home far from a road if he can help it.—*Georgia Highways.*

NEW REEDS CREEK BRIDGE HAS STATE'S LONGEST GIRDER SPANS

THE new Reeds Creek bridge, which provides a handsome Pacific highway entrance to Red Bluff from the south, is distinguished in that it has the longest concrete girder spans ever built by the California Highway Commission. In designing this structure, the Bridge Department provided for three two-girder spans, each 70 feet in length, making the total length of the bridge 210 feet. The long spans necessitated deep girders extending 8 feet 6 inches below the surface of the roadway. Large panels in the girders, together with cantilevers for sidewalks, give a pleasing elevation.

The bridge has a clear roadway width of 24 feet and, in addition, a five-foot sidewalk has been provided on either side.



Reeds Creek bridge, Tehama County; note deep girder design and sidewalks on either side of roadway.

The Bridge Department was represented by M. J. Dwyer as resident engineer. The contractor, the Holdener Construction Company of Sacramento, began operations during the latter part of the summer. Work was completed early in January and the bridge is now open to traffic.

The cost, which was approximately \$31,000, was divided between the state, Tehama County, and the city of Red Bluff.

MALIBU PAVING PROJECT

(Continued from page 7.)

struction engineer. The vialog test showed only 4.1 inches of roughness per mile.

This remarkable record of smoothness and high strength well repay the engineer for his efforts to meet the trying situations encountered on this job. In this connection the writer wishes to give full credit to his assistants: Assistant Resident Engineers, J. M. Lackey, J. P. McAndrew, R. P. Lapp, and R. H. Rowe. When additional funds become available, it is hoped future pavements on this important highway will be equally as good or better.

ORIGINAL.

She: "Now what are you stopping for?"

He (as car comes to halt): "I've lost my bearings."

She: "Well, at least you are original. Most fellows run out of gas!"

TRAFFIC PROBLEM SOLUTION NOT A DETRIMENT TO DIXON

(From the Livermore Herald.)

THE crossing problem at Dixon, regarding which we have heard considerable since the tragedy of some weeks ago, is to be solved by the State Highway Commission through the establishment of a new route which parallels the railroad tracks and eliminates the two grade crossings. This new route will not pass through the business section of Dixon, and the town is inclined to feel that it will suffer through loss of business when the traffic is diverted away from its principal street.

Dixon should consider itself fortunate in the plan devised by the commission as whatever loss there may be will be offset many times over by the removal of through traffic from its streets. The situation is almost exactly the same as in Livermore, except that here the highway was never routed through town and from the start gave us the go-by, two grade crossings being thus eliminated and a more direct route secured, as will be the case at Dixon. We have lost some business, undoubtedly. But even so our streets have more traffic than they can carry comfortably and the situation is daily growing more unsatisfactory. Furthermore, a new business section of the type catering to auto traffic has grown up at the junction of the highway and the streets leading into town, which takes care of business main street stores lose. Dixon may expect a similar result.

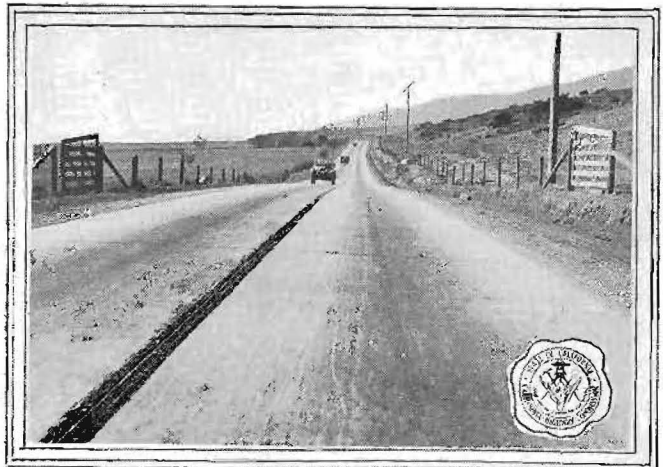
The highway system of the future will find great trunk roads connecting the big cities by as direct routes as possible and missing most of the smaller towns, such as is planned for the highway down the west side of the San Joaquin Valley. Livermore and Dixon and other similarly situated communities will still find that they have all the auto traffic they can take care of with the tremendous growth in the use of the automobile which is increasing every day and with the saturation point expected but seemingly never reached.

BRIDGE DEPARTMENT COMPLETES STRUCTURE FOR CITY OF WILLITS

The Bridge Department of the California Highway Commission, acting for the city of Willits, Mendocino County, has just completed the construction of a reinforced concrete bridge across Broadtus Creek. The structure, which is located on the Redwood highway within the city limits, was financed by the municipality.

The bridge consists of three twenty-eight-foot spans. It has two eight-foot sidewalks and a clear roadway width of forty feet. Plans were prepared and construction supervised by the Bridge Department at the request of the municipality. W. S. Kingsbury, Jr., was resident engineer.

Proctor and Cleghorn were the builders and the cost was approximately \$11,000.



ON COAST ROUTE—Section of new "second-story" cement concrete pavement on Coast highway near Oceanside, San Diego County. Jahn and Bressi, contractors.

AGREEMENT APPROVED FOR SERRA GRADE SEPARATIONS

THE State Railroad Commission has approved the agreement entered into by the California Highway Commission and The Atchison, Topeka and Santa Fe Railway Company for the construction of two subways at Serra, Orange County, at the junction of the Oxnard-San Juan Capistrano coast highway with the Los Angeles-San Diego trunk route. It is expected that bids for the grading will be asked in the near future. The Commission, on January 3d, signed an agreement with the railroad company for building of the underpasses. Steel has been ordered and actual construction is expected to start by February 15th.

The project involves a notable change in the line and grade of both the State highway and the railroad, which is shifting its tracks to make possible a safe junction of the two State highways. The present 200-foot curve in the Los Angeles highway will be increased to one of 550-foot radius, superelevated. This will be made possible by cutting down the bluff at this point, the excavated material being used by the railroad company to raise the grade of its tracks.

The shifting of the location of the railroad and a raise of nine feet in the grade will greatly facilitate construction of the two subways. These will be built of steel and concrete and will each have a clear roadway width of 40 feet. The curve leading through the south subway, in the direction of San Diego, will have a

radius of 750 feet, and the one leading northward toward San Juan Capistrano will have a radius of 900 feet, as shown in the illustration.

Necessary for Traffic Safety.

Two subways at this point were determined upon because of the heavy traffic over the Coast highways, which must be properly cared for at this junction to obviate dangerous congestion.

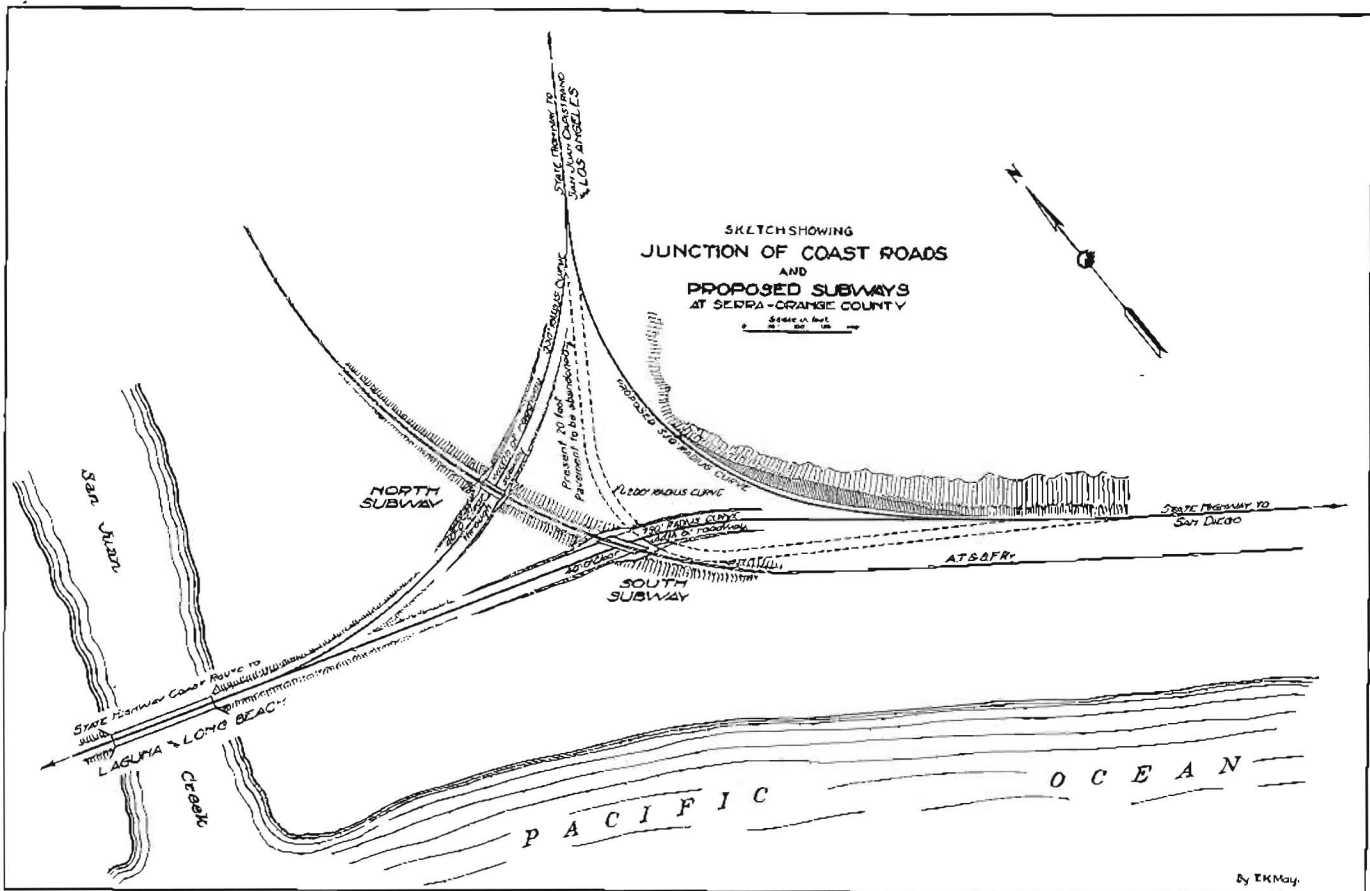
The agreement between the Commission and the railroad company, as approved by the State Railroad Commission, is as follows:

(a) The Highway Commission shall bear 60 per cent and the railway company 40 per cent of the cost of the North bridge.

(b) The Highway Commission shall bear 75 per cent and the railway company 25 per cent of the cost of the South bridge, including foundation, excavation, concrete abutments, steel span, docking for span, and all necessary labor incidental thereto.

(c) Each party shall pay 50 per cent of the cost of all track work and the necessary grading for the change of the line of railroad and all other work incidental thereto.

Material cooperation was extended by Orange County, the road department of which secured considerable necessary right of way at Serra.



He was just a plain, ordinary surveyor with a transit—a small telescope mounted on three legs, through which he peered to see if the cornerstone was eight inches inside the line or \$4,000 outside. A bilious individual with a heavy breath stood and watched him as he lined up the Mission district and made little marks in his

pad. Finally the tanked one approached, and after fumbling in his pockets brought out a not too clean nickel. "Here, feller," he said. "Le's see 'em." "See what?" asked the surveyor. "The eclipses . . . that's wha'cher lookin' at, ain't it?"

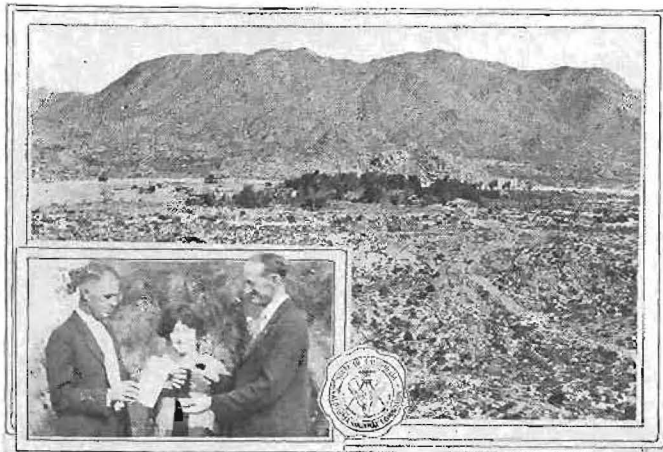
WHAT THE DIVISIONS ARE DOING

DIVISION VII MAKES GOOD WITH GOLD DOLLAR FOR RIGHT OF WAY

IN EASTERN San Diego County, on the highway between San Diego and El Centro, is the desert oasis of Mountain Springs. It is the only water supply in miles and in all probability was a famous place among the Indians long before the days of the padres. In Mexican war times it was the headquarters for troops of General Fremont and General Kearny, who were engaged in opening up a military road through the mountains to provide a more direct route from Fort Yuma to San Diego.

The seven-mile grade from Myers Creek to the summit passes through the springs and takes its name from them. The grade forms a part of the State highway and has been under improvement by Division VII for several years. First it was widened and straightened, and now paving is in progress.

Line changes required some additional right of way through Mountain Springs, and the division entered into an agreement with



DOWN NEAR THE BORDER—View of Mountain Springs, San Diego County, where paving operations are under way on Borderland route. Inset, L. M. Ranson of Division VII handing J. E. McDonald a gold dollar in exchange for deed to right of way through Springs property.

J. C. McDonald, the owner, to make the purchase for one dollar, "gold coin of the United States." When the time came for delivery of the deed, McDonald insisted on receiving his dollar in gold. Following its usual procedure, Division VII made good.

The search for a good dollar was taken up by Assistant Division Engineer L. M. Ranson. Visits to a number of Los Angeles jewels and pawn shops were without avail; then a friend in a bank sent him to a coin collector, from whom, for \$3.50, Ranson purchased a United States gold dollar of 1853 coinage. With due ceremony the dollar was delivered to McDonald, and the state took the deed to the needed right of way.

After it was all over Ranson learned that the resort owner formerly was a publicity man in Chicago, which explained everything. The 1853 dollar is now on display at Mountain Springs along with a collection of guns, canteens, uniform buttons and other souvenirs which have been found in the vicinity, and which are evidences of the use of the place by Fremont's soldiers, the first road builders of the early days of American sovereignty.

As the only residents in many miles, Mr. and Mrs. McDonald are cooperating in a most friendly way with the engineers of Division VII in their efforts to improve the Borderland highway.

SNOW REMOVAL ACTIVITIES

THE regular maintenance crews, who are trained for the work, are available night and day to remove snow in Division II, reports H. S. Comly, division engineer. The division at the present time is engaged in snow removal work at five places on the Redding-Alturas lateral; between Montgomery Creek and Burney; over Burney Mountain; over Big Valley Mountain, between Pitts-ville and Bieber; on Adin Summit, between Adin and Canby; and also over Cedarville Summit, east of Alturas.

Light equipment and graders, which start operations as soon as snow begins falling, are used unless the snowfall becomes exceptionally heavy, when the lighter equipment is supplimented by heavier tractor plows of the push type.

Such equipment is also in readiness at all times for action on the Pacific highway in the vicinity of Mount Shasta City, Division II, where removal is sometimes necessary.

Southern California Also.

Division VIII, with headquarters in San Bernardino, is the only other division carrying on a snow removal campaign of any magnitude. Strenuous efforts have been made by Division VIII to keep the state highway leading to Arrowhead and Big Bear lakes, in the San Bernardino mountains, open for motor traffic. Heavy equipment has been necessary for this work.

DIVISION VII.

HEADQUARTERS, LOS ANGELES.

S. V. CORTELYOU, DIVISION ENGINEER.

Counties of Los Angeles, Ventura, Orange, San Diego, and eastern Kern, south of Mojave.

ASSISTANT Superintendent of Maintenance A. W. Schmück, in charge of the camp at Point Mugu, is operating two gas shovels and a fleet of dump trucks for placing of riprap rock and removal of slides along the 6.5 mile stretch of coast highway, in Ventura County, between the point and the westerly boundary of the Rindge Ranch. Riprap rock for protection of the highway embankment from ocean waves is being quarried at various places along the highway.

Concrete pipe culverts along this section recently were provided with half-round corrugated metal pipe extensions, designed to carry the drainage clear of the embankment. Headwalls have been omitted on this section to permit easy lengthening, by adding sections of concrete pipe, should wasting of slide material and subsequent widening of embankments make it necessary.

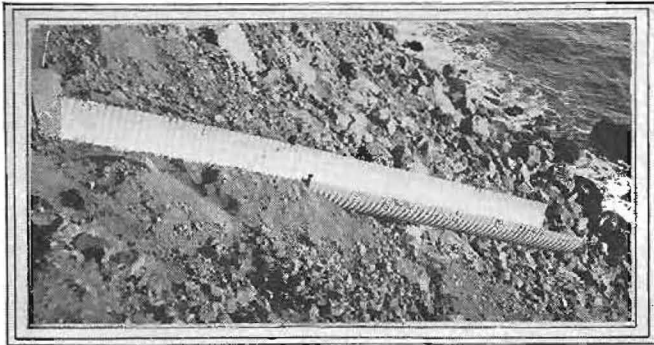
The half-round corrugated metal pipe extensions are of commercial size, having a diameter which corresponds as nearly as possible to the outside diameter of the concrete pipe. They are slipped under the end of the culvert and are held in place with an half-inch iron ring clamp, painted with asphalt. The extensions are supported with one or more stake saddles, depending upon their length. Cement mortar is used at the connection to prevent water from getting back under the concrete pipe.

Progress on Tustin Contract.

Good progress is being made on the paving contract of the Griffith Company from the easterly city limits of Santa Ana to Tustin, Orange County. Public utilities, poles and pipe

lines have been moved and trees taken out to clear the way for widening of the pavement. Curb and gutter construction is well under way and preparations are being made to place the 56-foot concrete pavement.

A rainfall of 14 inches in 36 hours, recorded at Boulder Park at the top of Mountain Springs grade, in San Diego County, caused considerable damage on the Jahn and Bressi



Culvert extension on Coast highway, Division VII, to prevent erosion of embankment.

contract. Several large and many small slides occurred and the roadbed was washed in many places.

Over a mile and a half of concrete pavement, 20 feet wide, has been placed on the Oxnard-Hueneme road cut-off, in Ventura County. Grading of the roadway and installation of culverts has been completed.

DIVISION X.

HEADQUARTERS, SACRAMENTO.

R. E. PIERCE, ACTING DIVISION ENGINEER.

Counties of Amador, Calaveras, Alpine, Tuolumne, Stanislaus, San Joaquin, Solano, and southern Sacramento and Yolo counties.

WORK of widening the Sonora-Salida lateral from Salida easterly to the McHenry road, a distance of five miles, is proceeding as rapidly as weather conditions will permit. The work is being done by the Valley Paving and Construction Company, as an extension of the contract for widening the state highway from Modesto north to Stanislaus River. The existing paving is a 12-foot concrete slab, 4 inches thick, built about eleven years ago. It is being widened to 20 feet by placing on either side shoulders of asphaltic concrete, 4 inches thick, the entire width to be covered with a top wearing surface of asphaltic concrete.

Two concrete culverts also are being lengthened in connection with the widening work.

HIGHWAY NEWS NOTES

F. E. QUAIL, for many years County Surveyor of San Joaquin County, is now an assistant engineer with the Headquarters maintenance department under T. H. Dennis. He has been placed in charge of field inspection.

Rodney Messner, formerly resident engineer on the state of Division IV, is now County Surveyor of Marin County, an office to which he was elected on November 2d. He based his campaign on his record of service with the California Highway Commission.

R. A. Allen, superintendent of equipment, Shop 8, San Bernardino, has been transferred to Redding to take charge of Shop 2. He succeeds I. H. Sanford, resigned.

Fifteen

SHOVEL OPERATOR RISKS LIFE

A POWER shovel operating on the coast highway near Point Mugu, Ventura County, Division VII, was buried recently by a slide, but not until Shovel Operator Dewey Alderson had made a strenuous effort to move the equipment to a place of safety.

The shovel was being operated on slide removal work by the maintenance crew of Superintendent A. W. Schmuck, when a slide was observed starting down the mountain side. Instead of jumping from the cab, Alderson put the machine into reverse and held the governor open, but the great mass of earth and rock was upon the shovel before it could be moved far. Alderson's foot was wedged fast when the side of the cab was caved in, but he was not seriously injured.

The attempt to back the shovel away prevented it from being completely covered with earth and rock. Five minutes later, the second shovel on the job was on its way to dig its companion out. The two shovel operators, taking turns at the control, worked all night to clear away the debris, and in twenty-four hours the damaged machine was released and was being partially dismantled for repairs, which were completed within three days.

The report of Superintendent Schmuck commended Shovel Operator Alderson for his effort to protect the equipment.



Shovel buried by slide while in operation near Point Mugu, Ventura County. Inset, Shovel Operator Dewey Alderson who risked life in effort to save equipment.

AMENDED VERSION.

Show me a paved road home,
I'm tired and I want to go to bed.
I just drove to town 'bout an hour ago,
In mud clear to my head.

Everywhere I roam,
Through sand and mud and loam,
You'll always hear me singing this song,
Build me a paved road home.

—Nation's Highways.

Willis D. Cook has assumed his former position as superintendent of Shop 8, succeeding Mr. Allen.

E. S. Anderson, superintendent at Shop 6, Fresno, has resigned and has been succeeded by John M. O'Malley.

R. E. Pierce, acting division engineer, Division X, returned to the office on January 3d, after a vacation spent with relatives in San Diego and Los Angeles. Mr. Pierce was much impressed with the splendid work accomplished during the past year on the Ridge Route and on the highway between Los Angeles and San Diego.

STATE HIGHWAY FUND CONTRACTS (Bond Funds, Including Federal Aid)

Cont. No.	Di- vision	County	Route	Sec.	Location	Miles	Type	Contractor	Estimated cost	Date contract awarded	Contract time, days
COMPLETED AND ACCEPTED SINCE DEC. 15, 1926.											
479	VII	Orange.....	60	A, B	Newport Beach to Laguna Beach.....	9.78	4 mi. P.C.C. Pave. and 5.78 mi. Asp. Mac. Pave.	Kavanagh and Twohy.....	\$222,535 60	Aug. 14, 1925	
497	I	Del Norte.....	1	C	Across Smith Riv. 1 mi. west of Adams Sta.		Concrete Arch Bridge.....	Smith Brothers Co.....	44,183 38	May 7, 1926	
502	VIII	Imperial.....	26	H	New River, Tamarack and Trifolium Canals.....		3 Timber Bridges.....	Norman B. Conway.....	15,973 31	June 8, 1926	
504	VI	Fresno.....			City of Fresno.....		Division Office Building.....	Shorb and Neads.....	18,893 25	June 28, 1926	
505	VI	Fresno.....			City of Fresno.....		Plumbing and Heating for Div. Office Bldg.	Barrett Hicks Co.....	8,513 38	June 28, 1926	
488	VII	Orange.....	60	C	Laguna Beach to San Juan Creek.....	7.42	Grading and Rock Surfacing.....	Chas. G. Willis and Son.....	239,362 00	Sept. 21, 1925	
508	II	Tehama.....	8	B	Across Reeds Creek at Red Bluff.....		Concrete Girder Bridge.....	Holdener Construction Co.....	36,732 25	July 14, 1926	
AWARDED SINCE DECEMBER 15, 1926.											
519	VII	Orange.....	60	B, C	Through Laguna Beach.....	1.54	Grading and P.C.C. Pavement.....	United Concrete Pipe and Const. Co.	\$70,012 13	Jan. 3, 1927	125
PENDING AWARD—None.											
Total State Highway Fund Contracts Awarded and Pending Award.....											
						1.54			\$70,012 13		

Note.—Primary construction covered by the above contract does not include funds obligated on cooperative forest highway projects, prison camp road activities or day labor jobs not being done under contract.

STATE HIGHWAY MAINTENANCE FUND CONTRACTS (Including Gasoline Tax Fund)

Cont. No.	Di- vision	County	Route	Sec.	Location	Miles	Type	Contractor	Estimated cost	Date contract awarded	Contract time, days
COMPLETED AND ACCEPTED SINCE DEC. 15, 1926.											
M-146	II	Tehama.....	8	D	Sacramento River Bridge.....		Repair and Paint Bridge.....	D. E. Burgess.....	\$6,890 00	Sept. 14, 1926	
M-127	III	El Dorado.....	11	F	Between 2 miles east of Sportsman's and Riverton.....	8.56	Grading and Rock Surfacing.....	Irey and Holden.....	59,933 59	May 15, 1926	
M-132	V	Santa Barbara.....	2	K	Across San Jose Creek.....		Conc. Girder Br. and Pave. Approaches	Mstock and Peasey.....	11,623 27	June 28, 1926	
M-124	IX	Inyo.....			At Bishop.....		Maintenance Buildings.....	Grant T. Johnson.....	16,522 88	July 30, 1926	
M-136	IV	Marin.....	1	B	Across Corte Madera Creek at Ross.....		Widening Existing Bridge.....	McDonald and Maggiora.....	11,070 00	Aug. 16, 1926	
M-158	IV	Marin-Sonoma.....	8	A	At the Petaluma Creek Bridge.....		Pile Fenders and Dolphins.....	Healy-Tibbitts Construction Co.....	11,857 50	Oct. 22, 1926	
AWARDED SINCE DECEMBER 15, 1926—None.											
PENDING AWARD—None.											

Note.—The above obligations charged against the State Highway Maintenance Funds do not include funds from these sources obligated for general maintenance and for specific betterments being done under day labor authorization.

Sixteen

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