

CALIFORNIA  
DOCUMENT

# CALIFORNIA HIGHWAYS

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

Vol. 4

JULY, 1927

No. 7



RESULTS OF COOPERATION.—Beautiful view of newly finished state highway near Whittier, the result of cooperation between Los Angeles County, a local road improvement district, and the California Highway Commission.

*In this issue:* WHAT REORGANIZATION MEANS TO THE HIGHWAY DEPARTMENT.

# 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.

J. P. HALL Editor  
P. O. Box 1103, Sacramento, California.

Vol. 4 JULY, 1927. No. 7

## CALIFORNIA HIGHWAY DEPARTMENT

C. C. YOUNG, Governor.

B. B. MEEK, Director of Public Works.

### CALIFORNIA HIGHWAY COMMISSION

RALPH W. BULL, Chairman, Eureka  
J. P. BAUMCARTNER, Commissioner, Santa Ana  
M. B. HARRIS, Commissioner, Fresno

R. M. MORTON, State Highway Engineer, Sacramento

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

### HEADQUARTERS STAFF, SACRAMENTO

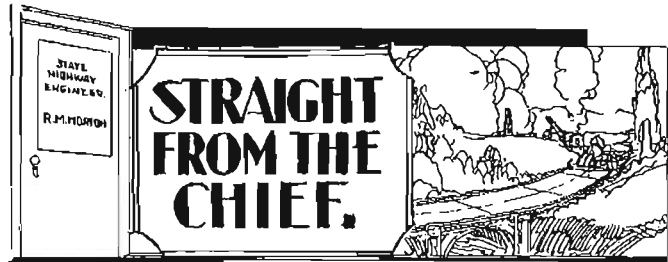
T. E. STANTON, Assistant State Highway Engineer  
L. V. CAMPBELL, Office Engineer  
FRED J. GRUMM, Engineer of Surveys and Plans  
CHAS. E. ANDREW, Bridge Engineer  
C. S. POPE, Construction Engineer  
R. H. STALNAKER, Equipment Engineer  
T. H. DENNIS, Acting Maintenance Engineer  
C. L. MCKESSON, Materials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

WILLIAM SCHLEIP, Principal Accountant  
BEN H. MILLIKEN, Superintendent of Prison Road Camps

### DIVISION ENGINEERS

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

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



LAST FALL there was accumulated information from the divisions as to the estimated cost of various special projects, which data finally took shape in the Governor's budget passed by the legislature in the spring of this year. The state highway expenditures for maintenance and reconstruction in the biennium from July 1, 1927, to June 30, 1929, will be conducted on a budget basis.

This budget anticipates the revenue and lays out a complete scheme for its expenditure, divided into such detail that little elasticity can be permitted in the initiating of projects not included. The cost of projects can not be materially increased over the preliminary estimates submitted by the divisions last fall without the direct approval of the Highway Commission and Board of Control to budget modifications, which it is presumed will be based only on emergency conditions.

In many cases the cost estimates as printed for use by the legislature are somewhat higher than those submitted by the divisions. In such cases the divisions should use their original estimates in getting out detail plans. Savings accumulated will be rebudgeted at a later date.

Experience gained under the budget procedure during the present biennium will be profitable in preparing succeeding budgets. It can not be expected that all details will work out perfectly, for no precedent existed for the preparation of the present budget. The divisions, however, should form the habit of accurately analyzing future requirements as to cost and order of importance. This will simplify preparation of future budgets.

Full cooperation of all those in authority is needed to make the budget work smoothly and successfully.

### ARGENTINA LOOKS TO CALIFORNIA.

Acknowledging receipt of a copy of the Fifth Biennial Report of the California Highway Commission, Carlos G. Gerstroni, County Engineer for Tres Arroyos, Argentina, South America, writes that in his opinion his country should "follow the wonderful California trends towards highway construction."

### TABLE OF CONTENTS.

What Reorganization Means to the Highway Department .....	page 3
B. B. Meek, Director of Public Works .....	page 4
Gratifying Results Obtained With Oiling State Roads .....	page 5
Mountain Springs Grade Has New Construction Features .....	page 6
Redwood Highway Job Progressing Under Difficulties .....	page 8
Experiment in Methods of Spreading Asphaltic Concrete .....	page 9
A Billion Dollars Spent to Improve Highways .....	page 11
The Bridge Department .....	page 12
What the Divisions Are Doing .....	pages 13, 14 and 15

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.



## What Reorganization Means to the Highway Department

ON JULY 29th Governor Young's Reorganization Act, which was Assembly Bill No. 1119, introduced by Mr. Feigenbaum, became law, changing the powers of the California Highway Commission, and reorganizing the activity as a part of the newly created Department of Public Works, to be known as the Division of Highways. The new law directs the Director of Public Works to organize the department, with the approval of the Governor, in such manner as shall be deemed necessary to properly segregate and conduct its work.

The Chief of the Division of Highways shall be designated the State Highway Engineer.

The Director of Public Works is given the power, with the approval of the Governor, to create other divisions and subdivisions of the department, and may change or abolish same from time to time, with the Governor's approval.

Heretofore the entire Highway Department has been designated as the "California Highway Commission." The name "California Highway Commission" will now mean only the commission, to consist of five members. They are appointed by and hold office at the pleasure of the Governor. Heretofore they have received a salary of \$3,600 per year, but under the new law are to receive only traveling expenses

incurred in the discharge of their duties. The Governor is vested with the power of naming a chairman of the commission, and with the filling of all vacancies on same.

Under the new law the commission is granted the power to change or abandon any highway route or portion thereof; to relinquish portions of existing state highways, and shall have under its jurisdiction the institution of condemnation suits. Except as may be otherwise provided by law the commission shall have power to conduct preliminary surveys to determine the advisability of the inclusion of new routes in the state system, to select new routes for state highways, to allocate moneys for construction or repair of portions of the state highway and to determine in each case the maximum sum of money that shall be made available therefor. In case of surveys for routes not in the state system the commission is limited to expending not more than one-half of the total cost of the survey.

Except as otherwise provided in the Reorganization Act the new Department of Public Works shall assume all the powers, duties and responsibilities heretofore vested in the California Highway Commission and all its employees and officers. All positions in the former highway organization except as otherwise provided in the new law are abolished, but all the laws pertaining to same continue in force.

### PUNCTURE VINE CONTROL ON THE STATE HIGHWAYS

Reported by W. E. GLENDENNING, State Highway Arboriculturist.

THE DIVISION OF HIGHWAYS is getting very satisfactory results in its efforts to control and check the growth of puncture vine on the state highways. This work is now being done under the supervision of W. E. Glendenning, State Highway Arboriculturist.

For several months past he has centered his attention in the central and southern parts of the state, especially in Divisions VI and VIII, where the vine is most prevalent; and now states that for the first time in the history of the fight for eradication, the San Joaquin Valley highway right of way is entirely cleaned of the pest. Outstanding results have been obtained in Imperial Valley, this year's growth running but 10 per cent of that of last year.

The spraying solution used to kill the vine is composed of equal parts of water and stove distillate, every 100 gallons being thickened with 3 gallons of crank-case oil. While being applied it is continually stirred by an agitator within the tank. The water assists the penetration process. Removing the vine by hoeing says Mr. Glendenning, is not effective and only scatters the seed for the following year's growth.

The State Agricultural Department is now experimenting with the seed taken from the vines treated last year to determine if the solution used by the Highway Department has destroyed germination.

### COMMISSIONERS INSPECT HIGH- WAY LATERALS No. 28 AND No. 29

FOLLOWING THE meeting of the Highway Commissioners at Sacramento on July 7th an inspection trip was made of the Red Bluff-Susanville and Redding-Alturas laterals of the State Highway System.

Improvements desired by the communities served and those contemplated by the Engineering Department were considered and the entire length of both routes inspected. The Commission's party attended gatherings at Drakesbad, near Mount Lassen, at Susanville, also a meeting of the Sacramento Regional Citizens Council, Inc., at Susanville, at Adin, Alturas, Lakeview, Oregon and Cedarville. The county road connection with the Oregon line leading to Lakeview was also inspected. The abundant hospitality exhibited everywhere was highly appreciated by the party.

### CHILE FOLLOWING CALIFORNIA STATE HIGH- WAY CONSTRUCTION.

"California Highways" is in receipt of a letter from the Automobile Association of Valparaiso asking to receive two copies monthly, stating that their organization is very much interested in California highway construction as conditions in the central Chile zone are practically the same as in California.

**B. B. MEEK, DIRECTOR  
OF PUBLIC WORKS**

**INVESTIGATION IN UP-HILL  
AND DOWN-HILL TRAFFIC**

By EARL WITHYCOMBE, Assistant Construction Engineer.

ON JULY 29th, the effective date of Assembly Bill No. 1119, one of the reorganization measures, the State Highway organization became a division of the Department of Public Works. Other divisions include the Division of Engineering and Irrigation, Division of Architecture, Division of Water Rights, and Division of Ports. Mr. B. B. Meek of Oroville assumes charge of the new department as Director.

Mr. Meek has been for many years closely identified with the olive growing and packing interests of California. His holdings in Butte County are extensive, and although still a young man, he has established an enviable reputation as a successful business man. In his early days he was identified as an engineer with the construction of the Western Pacific Railroad. This experience stands him in good stead in the management of a department, the work of which is largely engineering and construction.

Mr. Meek has seen state service as a member of the state legislature during the session of 1915, and also as a member of the State Board of Prison Directors for practically ten years.

Governor Young's desire to have for the Director of Public Works, a successful business man, mature in judgment, of proven executive ability, and yet one who would bring to the work the vigor of youth, is fully exemplified in his selection of Mr. Meek, and his consent to serve the state is gratifying to all. The Governor and the department are to be congratulated upon this excellent appointment.

**COOPERATION IN HIGHWAY BUILDING.**

Highway construction in California offers a wide field for cooperation. Daily the California Highway Commission is confronted with situations in which counties, cities, road improvement and joint highway districts, corporations and individuals, can greatly aid their respective communities to secure adequate and permanent highway improvement by proper cooperation with the state.

Our front page illustration for this issue is an excellent example of cooperative result obtained by Los Angeles County, a local road improvement district and the Highway Commission. The practice of cooperative highway building has brought many improvements to the south, which could not have been otherwise obtained.

Besides in actual construction there are many other ways in which state highway development can be aided and hastened by proper cooperation. Those communities willing to cooperate place themselves in most advantageous positions for securing more immediate highway development.

**COMMENT**

In order to be on time at a recent meeting of the Highway Commissioners in Lake County one of her largest land-owners used an airplane from Oakland. His necessity for highways might be questioned.

Kern County finds investment in state highway bonds advantageous for her surplus funds. She has recently added to her already large holdings of this security.

When the public thinks in terms of "cheap prices," rather than safety, durability, permanency and less future cost, in construction—it is as great a mistake as to choose a doctor, or lawyer, on the same basis. Are you inviting disaster or requiring qualification?—Tri-State Constructor.

OUR INVESTIGATIONS of speed of traffic around curves on grades of six per cent indicate that little or no difference is found in automobile traffic traveling either up or down grade or on either inside or outside of curves. Truck traffic travels considerably faster on the inside of curves both up and down grade, but most noticeably on the down grade sections.

Our observations were taken at San Juan grade, Division V SB-2A, Conejo grade, Division VII Ven-2B and Chalk Hill grade, Division VII LA-2B. Average automobile traffic moved up grade at the rate of 21.4 miles per hour on the outside of curves and 23.6 miles on the inside. Down grade the average was 22.2 miles on the inside and 23.0 miles on the outside of curves. Average truck traffic moved up grade at the rate of 9.3 miles on the inside and 8.0 miles on the outside of curves. Down grade they averaged 16.2 miles on the inside and 11.4 miles on the outside of curves.

As nearly as possible similar conditions were selected in each case. Radius of curves ranged from 120 to 275 feet. Central angle ranging from 60 to 160 degrees per cent of grade was uniformly 6 per cent. Super-elevation was from 3/4" to 1 1/4" per foot of width. Pavement in two cases was 20-foot width of bare concrete and in one case 15-foot width of bare concrete with a 3-foot bituminous macadam shoulder on the inside of curve.

**TIRE WEAR.**

Following extended tests made by the Washington State College, Kansas State Agricultural College and others to determine the amounts of tire wear on the different types of highway it was found that a mile of pavement which carries 1000 cars per day, wears out \$1,000 worth of tires in a year, while a mile of gravel road with the same traffic wears out \$3,800 worth. The saving on tire wear alone would pay the interest on the cost of paving, where traffic exceeds 1000 cars per day.

**A COMPLETED CONTRACT.**

"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."

**AN OLD HABIT.**

The story now is that the Scotch gawfer learned to keep his eye on the ball originally when some one told him that there were two or three strange persons playing around the course.—Detroit News.

**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 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 vehicles which are their necessary complement, to the end that, joined with other means of transportation, they may meet the need of our people for easy, quick and untrammelled transportation.—Public Roads.

## Gratifying Results Obtained in Oiling State Roads



AFTER THE OILING TREATMENT.—*Left*, showing highways just after the oil process has been completed, but before opening to traffic; *Right*, shows the same highway compacted by several weeks of traffic.

ONE OF the outstanding developments in California highway maintenance this year is the successful treatment of gravel and rock-surfaced highways with oil which will result in tremendous savings in maintenance, solve the acute dust problem, conserve materials, and provide a smooth, well-compacted wearing surface free from corrugations.

California has a large mileage of secondary type roads, improved during recent years. With the rapid increase in traffic a real problem in maintenance and dust control on these roads has faced the state highway organization. In some instances the loss of material has been as high as an inch annually, representing a loss of from \$500 to \$1,000 per mile. The dust problem has also become an acute one, having resulted in several instances in severe accidents, because of inability of the drivers to see through the clouds of dust.

A number of experiments have been made to solve this dust problem and conserve the road materials, but none has shown promise of success of the present system of oiling. Up to a recent date there was a total of 374 miles of highway oiled since April 1st at a cost of \$510,000. On several sections extra amounts of road materials were used adding at least two inches to the thickness of the road and providing a smooth surface that will last until funds for paving are available.

The comments concerning road results obtained and the manner in which the traffic was handled over roads being oiled reflect considerable credit upon the department. Early in the spring the Maintenance Department formulated a set of rules for its employees, as well as notices requesting cooperation from the traveling public. All employees handling oiling jobs were impressed with the importance of reducing the inconveniences to autoists and judging from reports from various sources success attained their efforts. Two automobile associations of the state have stated that they have this season received very few complaints and that the department is to be congratulated upon working out a plan that has reduced motoring inconveniences to the minimum.

### How The Smooth Finish Is Obtained.

Getting that smooth finish on an oiled highway has become a real science with California highway workers and with the "mixing" method it takes three days of constant working to secure the best results. Immediately after the mix has been "laid down" a 7-foot grader drawn by a small tractor begins working the road behind the traffic for the purpose of keeping the surface smooth during compaction. When traffic first moves over the finished roadway a light car will sink into the surface as much as in inch. Within three hours the same makes no impression and in three days a 22,000-pound load will leave only faint marks which are quickly ironed out by following traffic. The blade is kept steadily working until no further material can be moved, this stage usually being reached about the third day. For this work it is desirable that a rubber-tired tractor be used to avoid cutting up the surface.

Vialog tests on Division VIII oiled highway demonstrated it to be smoother than any type of road in the California highway system and this includes cement concrete, asphaltic concrete and bituminous macadam, and after nine months' service no wear is apparent.

### Costs Reduced.

Using the same force of men at the oiling this season that "learned the game" last year has enabled a number of the divisions to not only attain a more satisfactory finished roadway but to do the work at a lesser cost. In Division VIII oiled highways cost \$1,600 per mile last year but this year better results were obtained for \$1,025.

### CIRCUMSTANTIAL.

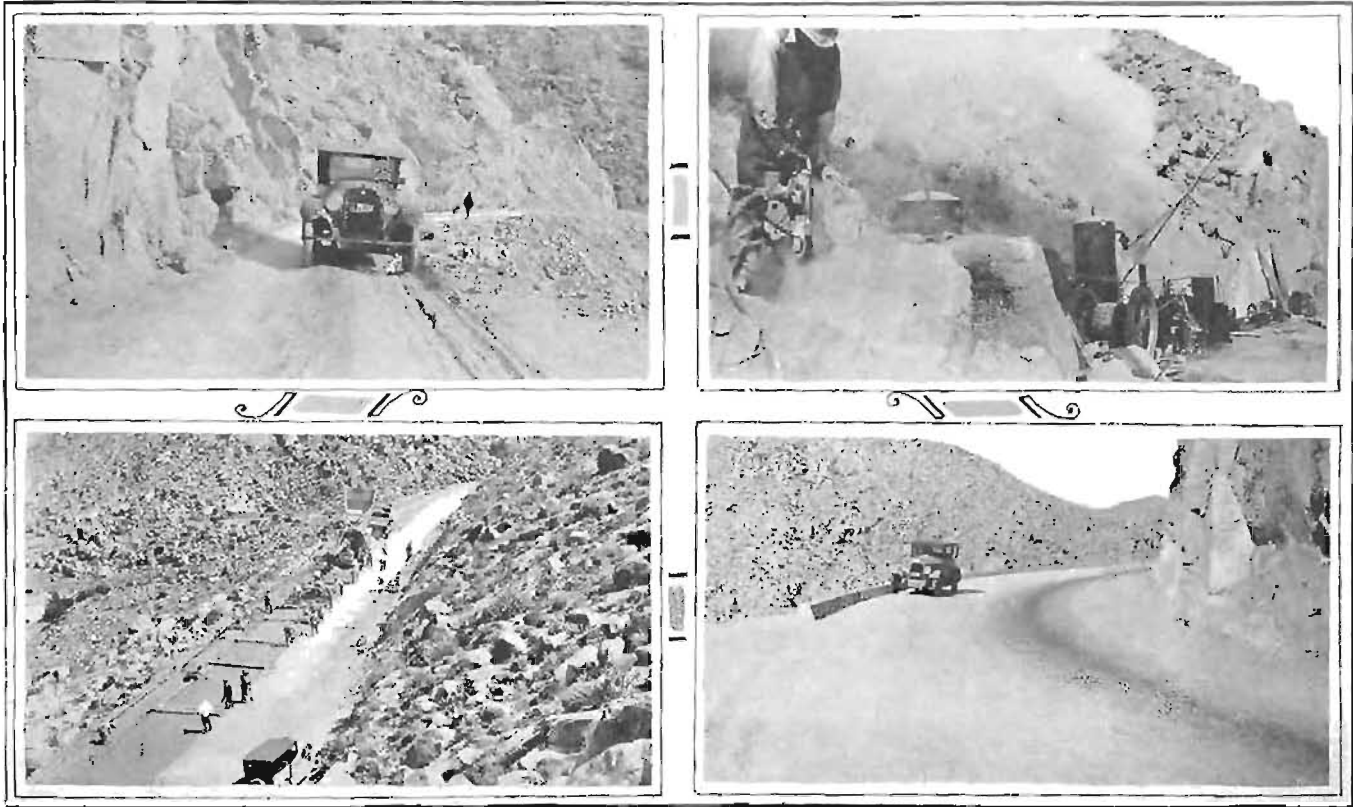
"Why are you divorcing your husband?"

"Well, the other night he was reading the paper and I slipped up and kissed him on his bald spot—"

"Yes?"

"And he said, 'Quit playing, honey, and get out those letters I dictated yesterday.'"—Life.

## Mountain Springs Grade Has New Construction Features



MOUNTAIN SPRINGS GRADE.—(1) A few years ago, a narrow roadway with many sharp curves. (2) Drilling the rock for blasting ahead of the gas shovel. (3) Laying the concrete pavement in half width. (4) The complete pavement showing curb on the outside of curve. (5) New pavement winds its way down a canyon on the side of a mountain of huge boulders.

Reported by S. V. CORTEVOU, Division Engineer, Division VII.

**T**HE MOUNTAIN Springs Grade paving project, completed in June, 1927, is built to the highest standards of the California Highway Commission. Constructed through solid rock in a difficult location, it is ranked by the engineers as one of the outstanding jobs of the year. The new highway extends from the Myers Creek bridge in Imperial County to the top of Mountain Springs grade in San Diego County, a distance of 6.8 miles. It is near Jacumba, a resort at the top of the grade, about 60 miles from El Centro.

The Jahn & Bressi Construction Company, Inc., were the contractors, and began work in February, 1927. The paving is of Portland cement concrete, 20 feet wide, laid in two 10-foot strips, each 6 inches thick at the center and 9 inches at the edges. Considerable drilling and blasting was done ahead of the subgrade shaping, to widen the roadway and improve the alignment. Making subgrade in the rock was very expensive, and the total cost of the job was \$416,255. W. D. Eaton was resident engineer.

Originally the road was a narrow grade, constructed by the two counties by public subscription. After being taken into the State Highway System the easterly 5 miles was

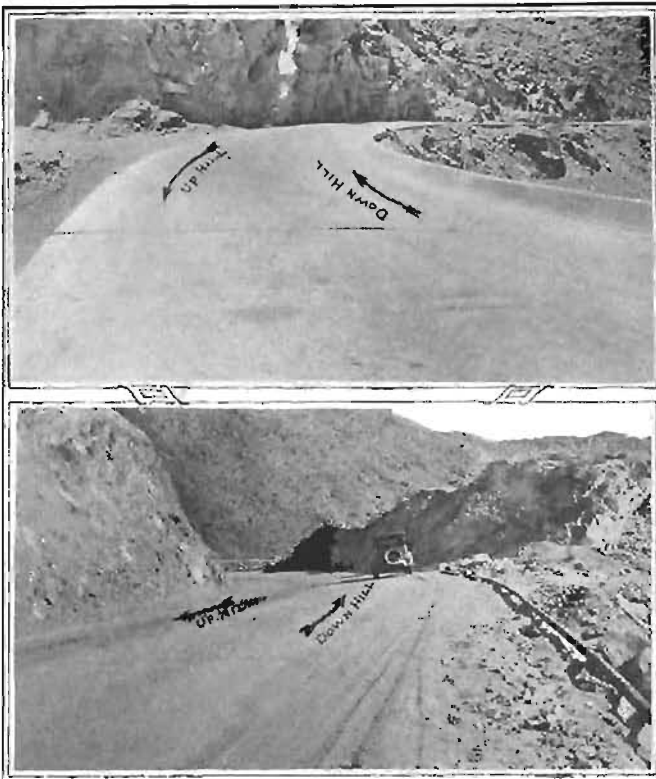
widened in 1920 under a day labor authorization. The westerly 1.8 miles was widened in 1926.

### Construction Features.

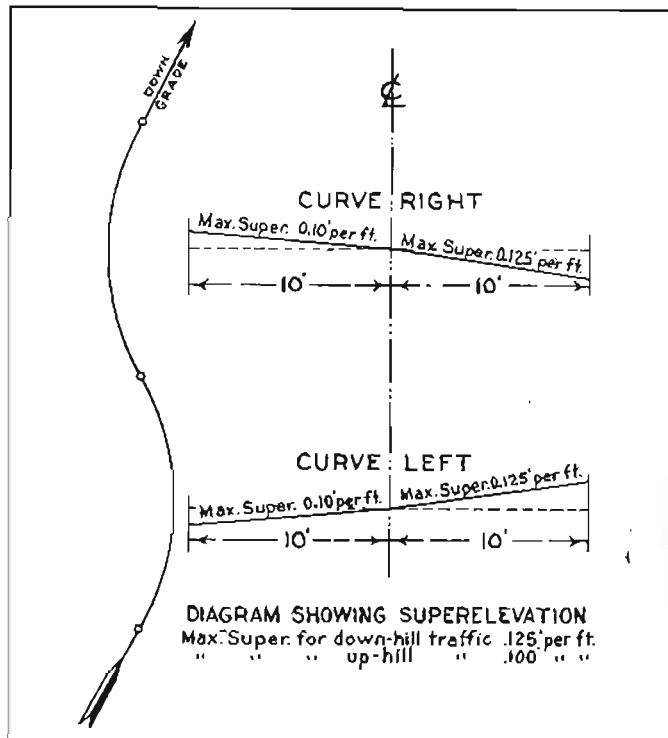
Owing to maximum grades of 7.12 per cent. and curves with radii as sharp as 140 feet, the matter of super-elevation was given considerable study. Much of the traffic over this road is heavy trucking from Imperial Valley to San Diego, with slow up-hill and fast down-hill speed, and to care for this condition a compromise super-elevation was adopted. Each one-half of the pavement was designed with different super-elevations suitable for the unusual difference of speed. Had the maximum super-elevation been used of 2½ feet in the full 20-foot width, there would have been danger of the heavy trucks with high loads over-turning or sliding to the low side of the pavement.

Results obtained in the riding qualities of the finished pavement justify the type of construction adopted. In spite of the steep grades and sharp curves motorists can drive with safety in either traffic lane.

Another feature worked out successfully in this job is a combination curb and guard rail. By thickening the curb and constructing it a few inches higher than the customary standard it served both purposes.



Two views of the completed Mountain Springs grade paving which shows change in the angle of super-elevation at the center of the roadway.



MOUNTAIN SPRINGS SUPER-ELEVATION.—Plans for Mountain Springs grade paving showing variation in super-elevation at center of paving.

**NO INCENTIVE.**

Employer—Sam, I hear you and George almost had a fight.

Sam—Yessah, boss, we-all would 'a' had a terrible fracas, only dey wasn't nobody dere to hold us apart.

Seven

**OVER 200,000 YDS. OF EARTH  
MOVED IN CARQUINEZ APPROACH**

WHILE THE erection of the main cantilever spans of the Carquinez bridge was an outstanding engineering feat, the building of the south approach to this crossing by the California Highway Commission was no less spectacular.

Excavation of 207,000 cubic yards was necessary in building the 1.8 miles. The largest cut made was 500 feet long, and 106 feet deep, with a yardage of 83,000.

Under the requirements of the contract, dirt was spread in one-foot layers and then rolled to allow immediate use without disastrous settlement or sliding.

**HIGHWAY TRAVEL IN COLONIAL DAYS.**

In these days of rapid transportation by airplane, railroad, and automobiles, it is hard to realize that only a little over 100 years ago the difficulty of traveling only a short distance was very great. A very few of the wealthier people owned coaches, but a coach could never make over three miles an hour, and often only two.

It was actually urged as a serious objection to the adoption of the Constitution, that many of the people would be more than 300 miles from the seat of government. Of course, the members of Congress were obliged to attend, but HOW to get there was often a serious question. The few who could come by stage or coach often arrived weary and spattered with mud, as it was a common thing for them to be obliged to get out and help pry the wheels out of the mud. The most of them came riding horseback. Andrew Jackson came in this way over mountains, through dense woods, fording rivers and creeks, 800 miles from Tennessee.

The country roads were often nothing more than trails or bridle paths. It was easy to make a wrong turn and wander for hours in the thick woods.—Georgia Highways.

**Such is Fame.**

Several years ago, Firestone, Ford, Edison and Burroughs were touring through West Virginia. A light on their car went bad and they stopped at a little cross-roads store in the Buckingham section. Henry Ford went into the store to make the purchase.

"What kind of automobile globes do you have?"

"Edison," replied the merchant.

"I'll take one," said Ford, "and you may be interested to know that Mr. Edison is out in my car."

"So?" said the merchant.

When the light was put in it was found that a new tire was needed, so Ford went back to the store and asked what kind of tires the merchant had.

"Firestone," was the reply.

"By the way, you may be interested to know that Mr. Firestone is out in my car, and that I am Mr. Ford—Henry Ford."

"So?" said the merchant, and let drive a long squirt of tobacco against the wall.

While the merchant was putting on the tire, Burroughs, who had white whiskers, leaned out of the car and said, "Good morning, sir."

The merchant looked up at him with a grin of sarcasm, and said, "If you try to tell me that you are Santa Claus, I'll be damned if I don't crown you with this wrench."

**He'd Have the Judge Pay the Fine.**

The Accused—I was not going thirty miles an hour—not twenty, not ten; in fact, when the officer came up I was almost at a standstill!

The Magistrate—Oh, well, I must stop this or you'll be backing into something. Ten dollars!—Tatler.

**Fair Warning.**

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

"When this notice is under water this road is impassable!"—The Nation's Highways.

## Redwood Highway Job Progressing Under Difficulties

ONE OF the largest California state highway projects now in progress is the construction of 14.9 miles of the Redwood highway in Humboldt County, from Orick to the northerly boundary.

The clearing of the right of way was made a separate contract and was awarded to the Englehart Paving Company of Eureka for \$54,600. This part of the work, necessitated the removal of over 20,000,000 feet of timber and a great deal of undergrowth and trunks of fallen trees and was started two months prior to the grading.



View of heavy excavation being done on Redwood highway contract, north of Orick, Humboldt County.

The contract for the construction which will be rock surfaced, was awarded in two sections: A, 8.2 miles, to W. H. Hauser of Oakland for \$198,071.55 and B, 6.7 miles, to Englehart Paving Company for \$241,737.99. The contract was divided in order to assure the completion of the entire job in one season, or 175 working days. Hauser broke all records in getting his equipment on the job and work started. He loaded his equipment at Oakland, May 22, 1927, shipped over the Northwestern Pacific Railroad 320 miles to Trinidad, then transported 24 miles over mountain road to Orick. One shovel was moved on a trailer hauled by truck and tractor, the other under its own power. He started work on June 1st.

Englehart has begun grading work on Section B. The total allotment set up for the work, including clearing will be \$572,749.94. This is a Federal Aid job.

### Closing the Gaps

By THOS. H. MACDONALD,  
Chief of the U. S. Bureau of Public Roads.

Approximately 26,000 miles is the estimate of the roads to be constructed this year under the supervision of the state highway departments. Probably more than 21,000 miles will be on the Federal-aid highway system, and somewhat less than half of this improvement will be carried on with Federal aid. The year's addition to the Federal-aid system will bring the mileage of that system initially improved up to practically 150,000 miles, leaving only 35,000 miles of the roads thus far designated to be constructed in order to complete the initial improvement of the system.

More rapidly than most of us realize the main highway system of the United States is being brought to a condition of continuous improvement. We are still a long way from the condition that will ultimately be required but we are moving toward it at a surprisingly rapid rate. Roads we are now improving with gravel and other low-type surfaces will eventually have to be further improved. Narrow present surfaces will need widening; bridges which suffice for the present will need replacement; grade crossings tolerated in the initial improvement must be later eliminated; and the whole system as originally constructed must be combed over to root out of it the danger places, the congestion breeders, and the failures of one sort or another inevitable in a construction work of such magnitude. These are refining processes and they will continue indefinitely; but the fact remains that we are now rapidly approaching the time when we shall have a continuous net-work of main state and interstate arteries improved throughout to some degree at least, and all of it under maintenance by the state highway departments.—The Highway Magazine.

#### POSTPONEMENT PAYS.

Sparks—"If you know who stole your car, why don't you go get it back?"

Larks—"I'm waiting for him to paint it."—Life.

#### DELAY RUNS INTO MONEY

Whatever slows transportation in these modern days costs everybody money. This is a fact not understood with sufficient clearness by the roadmakers.

Some striking estimates have been made by the Albert Russell Erskine Bureau for Traffic Research conducted in Harvard University. Traffic congestion costs New York City upwards of \$200,000,000 a year. If Chicago could cut its traffic congestion delays by 10 per cent, the saving would be not less than \$27,000,000 a year.

The loss is more than the cost of gasoline burned in running motors that do not move their cars. The adoption of motor transport enormously has increased the item of "cartage" which is charged against almost every article used by the people. Transport is the blood circulation of business and congestion and delay are temporary commercial paralysis.

The worst obstructions in the great trunk line channels of motor transportation are village main streets. It is absurd to spend millions of dollars to secure facilities for rapid transportation and still permit these great roads to become impassable at faster than horse-and-wagon speed at intervals of five or six miles. The future plan of surveying for main trunk highways will avoid the ancient, narrow, obstructed village high streets and the frequent cross roads that now have to be guarded with intermittent lights that bring all traffic to standstill at intervals of a few seconds. The world is moving too fast for such delays.—Detroit News.

#### Feminine Safety.

Motorcycle Policeman: "You were going 45 miles an hour. I'll have to pinch you."

Sweet Young Motorist: "Oh, if you must, sir, do it where it won't show."

#### So Sudden.

Johnny, ten years old, applied for a job as grocery boy for the summer. The grocer wanted a serious-minded youth, so he put Johnny to a little test.

"Well, my boy, what would you do with a million dollars?" he asked.

"Oh, gee, I don't know—I wasn't expecting so much at the start."—Goblin.



## HIGHWAYS AND THE MISSISSIPPI FLOOD

"It is impossible at this time to prophesy," says "Good Roads" in June issue, "how much damage has been done to the roads in Arkansas, Illinois, Louisiana, Mississippi, Missouri and Tennessee, as result of the Mississippi River flood, but it is safe to say that the loss will be large and when the waters subside extensive repairs will be necessary. Some roads will undoubtedly have to be entirely rebuilt and the opportunity for improved design through relocation and elimination of curves and turns will be large. Also evidence will be forthcoming as to the behavior of various types of material under such conditions and we shall undoubtedly hear much from many trade associations along these lines in the months to come.

The South has suffered a mighty disaster, but it will come through, and in the rebuilding of its economic and material structure new and improved highways, replacing those destroyed and lost by the floods, will play a large part in the reconstruction work. It is to be hoped that engineers of the flooded states will plan for the future and not for the immediate present. By so doing they will make possible a bigger and better South.

Over 1200 miles of improved highways have been rendered useless, not to mention thousands of miles of secondary roads that are unavailable for highway transportation, the result of the Mississippi flood."

When Noah sailed the ocean blue,  
He had his troubles same as you;  
For days and days he drove the ark,  
Before he found a place to park.

—Florida Highways.

### "CALIFORNIA HIGHWAYS."

An engineering authority of one of the leading road material organizations of the United States writes the following of "California Highways": "Of the many highway commission publications which we receive, I believe that this one contains more real meat in each issue than any other. We look forward to receiving this each month with a great deal of interest."

### AUSTRALIAN EXPERT HERE.

E. F. Stevens, a road expert of Australia, recently paid different departments of the Division of Highways a visit, investigating highway building, stating that he was anxious to get the advice of a state that has passed the experimental stage of highway building.

### COMMISSION COMPLIMENTED ON SAN BERNARDINO JOB.

The San Bernardino Chamber of Commerce has written the Highway Commission expressing appreciation of the "Splendid way in which the Waterman Canyon highway and switch-backs to the top of the mountains are being cared for and maintained." This road accommodates thousands of autoists each week-end.

Nine

## EXPERIMENT IN METHOD OF SPREADING ASPHALTIC CONCRETE



Upper, Rake used in mixing asphalt; Lower, Smoother surface obtained with strike-off templet.

(By the Construction Department.)

Experiments are now being carried on by the Construction Department, with the cooperation of various contractors, to devise means of spreading asphaltic concrete mechanically to eliminate the uncertainty and expense of hand work. The device giving most promise consists of a tooth scarifier followed by a strike-off templet. Results obtained on Contract M-161, Merced-4-A, justify further experiments and it is now planned to combine the rake and templet with a tamper.

Further experiments along this line will be watched with interest by the department and interested highway builders.

### A SAD TALE.

The traffic cop he did not heed  
But raced ahead, pell-mell,  
So the doctor told the sexton  
And the sexton tolled the bell.

### Highway Mathematics.

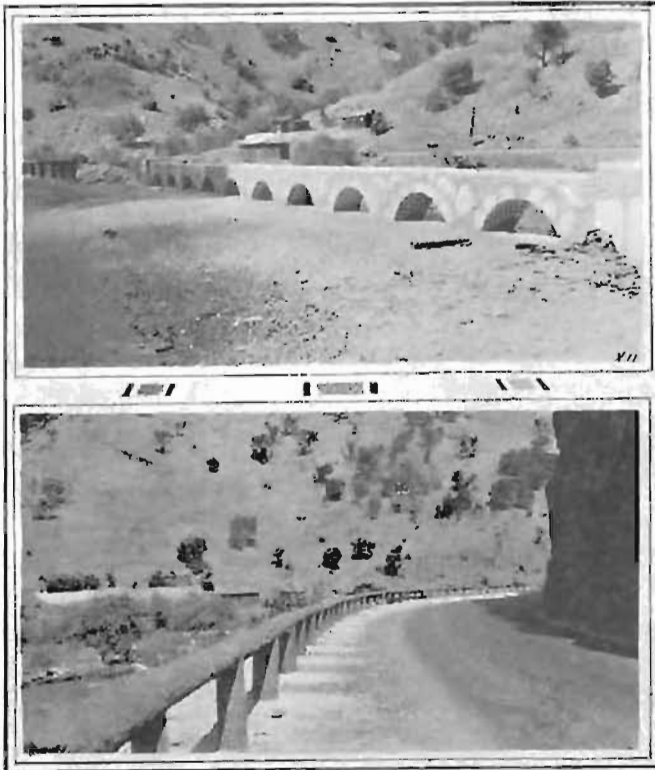
Professor: "Define the word 'detour' as used on highways."  
Student: "A detour is the roughest distance between two points."

### Choice of Fuel.

"What, according to your view, is the burning question of the day?"

"Shall I eat or buy gasoline?"—Florida Times-Union.

**TWO TYPES OF GUARD RAIL  
USED ON YOSEMITE HIGHWAY**



GUARD RAIL—Upper, Stone parapet on Yosemite highway; Lower, Guard rail of natural logs on Yosemite highway.

(Reported by Division VI.)

**T**WO TYPES of guards are being used on the Yosemite highway. Stone parapets and retaining walls were built during the construction of the road, and some natural log rails have been built during the past month, both by convict labor. Both parapets and rails blend well with the rugged country through which the road passes.

The natural log rail, besides adding beauty to the highway, is of economical and substantial construction. Trees cleared from the right of way in many districts are successfully utilized for this purpose.

**COST OF POOR ROADS**

An automotive engineer found that in one year the average automobile consumption of gasoline in North Carolina was reduced, by improved roads, from 521 to 454 gallons. That made a saving of \$16.76 per car.

Fuel, however, is only one of the various factors involved. The poor road wears out the whole car faster than the good road. The expense thus caused is far higher than most owners suspect.

An automobile dealer in Illinois, who carefully checked up the expense of operating on paved roads and dirt roads, found that the motorists saved, on an average, 2.4 cents a mile on the hard-surfaced highways. Another investigator put the saving a little higher. The average may be 2.5 cents a mile. Motor trucks may save as much as 5 cents a mile on good paved roads as against unimproved roads.

This is many times as much as any motorist or trucker pays in the form of road taxes on gasoline or otherwise.

**HIGHWAY ACCIDENTS**

A survey made recently shows that 100,000 persons have been killed and 3,000,000 injured in highway accidents during the last five years—one casualty every forty-two seconds—and that 30,000 of those killed have been children.

Highway and city engineers are endeavoring to make accidents difficult by widening roads and streets, eliminating grade crossings, removing blind and dangerous curves, but they need public support.—Concrete Highways and Public Improvements.

**GAS TAX IS SCIENTIFIC TOLL**

The gasoline tax is by far the most scientific impost upon motor vehicles. It meters highway service and the benefits received from the use of highways. It approximates toll-gate results without the infirmities of toll-gate procedure. The consumption of gasoline varies with the weight, speed and mileage of the motor vehicle. No other factor in the car's domestic economy reflects so closely the benefits received from highway use.—Nation's Highways.

**A. S. C. E. Will Meet in Columbus.**

The American Society of Civil Engineers will hold its fall convention in Columbus, beginning Wednesday, October 12th, to Saturday, October 15th, inclusive. This convention will bring together many well-known civil engineers of the United States and foreign countries.

The American Society of Civil Engineers is the oldest national engineering organization, having been founded in 1852.

The chief topics for discussion at this meeting will be sanitary engineering and the Mississippi flood protection problem. An effort is being made to schedule a meeting of the highway section of the society in connection with this convention.

**Oregon Dam To Set New Record.**

Problems surrounding the projected construction of three new irrigation dams, one of which will be the highest dam in the world, will be studied by a board of consulting engineers, appointed by the Secretary of the Interior, the Department of the Interior stated on August 1st.

The board will report to the department upon "various matters in connection with the design and construction" of the dam. The three construction projects are the Owyhee dam in Oregon, which will have a total height of 360 feet, 11 feet higher than Arrowrock, the world's highest existing dam; the Deadwood dam in Idaho and the Gibson dam in Montana.

**According to the Freshman Intelligence Test.**

- An oxygen is an eight-sided figure.
- Nero means absolutely nothing.
- Homer is a type of pigeon.
- Ulysses S. Grant was a tract of land upon which several battles of the Civil War were fought.
- A quorum is a place to keep fish.
- A vegetarian is a horse doctor.
- Radium is a new kind of silk.
- Henry Clay is a mud treatment for the face.
- Mussolini is a patent medicine.
- Flora and Fauna are a couple of chorus girls.—Western Reserve Red Cat.

**Concrete Roads.**

No type of pavement surface has shown the tremendous increase that concrete has. Practically unknown except to a very small part of the population in 1909, it is now so much a part of every community that "hard roads" and "concrete" have become synonymous.

## A Billion Dollars Spent to Improve Highways

Announcement by the United States Bureau of Public Roads that more than 4000 miles of roads included in the Federal-aid highway system have been completed since the beginning of the current fiscal year serves to focus attention on the progress which has been made on the program thus far.

Construction during the fiscal year ending June 30, 1927, was begun on 14,580 miles of roads embodied in this state and federal cooperative building scheme. When this addition has been completed, approximately 70,000 miles of this nation-wide network will have been laid down with the aid of federal funds.

It is appropriate to take account of stock regarding the Federal-aid highway system at the present time, since this year marks the tenth anniversary of the start of this plan for stimulating road building in the United States with an especial view to providing better highways in those states whose resources and income were inadequate to performing the task alone.

The Federal-aid system was launched in 1917 and since its initiation has involved the expenditure of more than one billion dollars. The total outlay to July 1, 1926, was \$966,692,834.36. Of this sum the Federal Government contributed \$426,178,703.58. The mileage which this amount made possible totaled 52,526. The first largest units built during this period were 4920 miles in Texas, 3181 miles in Minnesota, 2193 miles in North Dakota, 2181 miles in South Dakota and 2114 miles in Iowa. Between 1000 and 2000 miles were built in 21 other states.

Projects now under construction call for an estimated expenditure of \$365,729,746.36, or approximately one-third the whole sum expended from 1917 to July 1st last. Of this huge total, the Federal Government is scheduled to contribute \$151,489,782.13. Nebraska is down for the largest mileage of any state which is to benefit from the projects now under way, the total for this state being 1359 miles. North Dakota is second with 807 miles, Kansas third with 800 miles and New York, which acquired 1197 miles prior to July 1, 1926, is fourth with a total mileage of 665 miles.

Figures indicating mileages completed with the assistance of federal moneys do not, however, tell the whole story of the progress of the Federal aid system. The entire length of this highway scheme is 182,134 miles, but the fact that about 70,000 miles have been built or are under construction does not mean that less than half the entire system is still on paper.

It is far more than projected and Thomas H. MacDonald, Chief of the Bureau of Public Roads, is authority for the statement that the mileage within the system at present initially improved or in process of improvement is not far from three-quarters of the total. This does not mean that this portion is entirely improved. But it does indicate that the greater part of the foundation work for his great scheme of nation-wide highways has been accomplished.

With comparatively slight exceptions, the roads included in the Federal-aid system are embodied in the state highway systems. Thus it is that a goodly portion of their improvement has been completed without Federal Government

participation. In fact, state reports show that the ratio of mileage completed by state highway departments in 1925 was more than double the Federal-aid mileage completed during the fiscal year ended June 30, 1926.

The system will insure the improvement of the main arterial highway of the nation, as may easily be realized when it is borne in mind that the Federal-aid system includes less than 200,000 miles of the total 3,100,000 miles of roads existing throughout the United States.

### LOS ANGELES SPENDING \$25,000,000 ANNUALLY ON STREET IMPROVEMENTS

An expenditure of approximately \$25,000,000 per year is being made by the city of Los Angeles for the improvement of its streets, is the recent statement of C. J. Shultz, who is in charge of the street designing division of the office of the city engineer. He adds that the statistics for last year show that Los Angeles expended upon street improvements two and one-half times as much as the cities of Chicago, New York and Philadelphia combined.

### Dizzy Doings On the Desk.

The pencil has made quite a number of pointed remarks about the sponge being soaked all day and the waste basket being full. The scissors are cutting up and the paper weight is trying to hold them down while the paste is sticking around to see the stamps get a good licking. The ink's well, but appears to be blue, while bill is stuck on the file, and the calendar is looking fresh after having a month off. The blotter is lying around taking it all in.—Exchange.

### Right to Restrict Truck Loads Upheld.

The right of a state to limit truck loads upon the highways was upheld in a recent decision of the United States Supreme Court, in a case brought against the Oregon Highway Commission by certain trucking companies, attacking the validity of an order reducing load limits on the Columbia highway from 22,000 to 16,500 pounds.

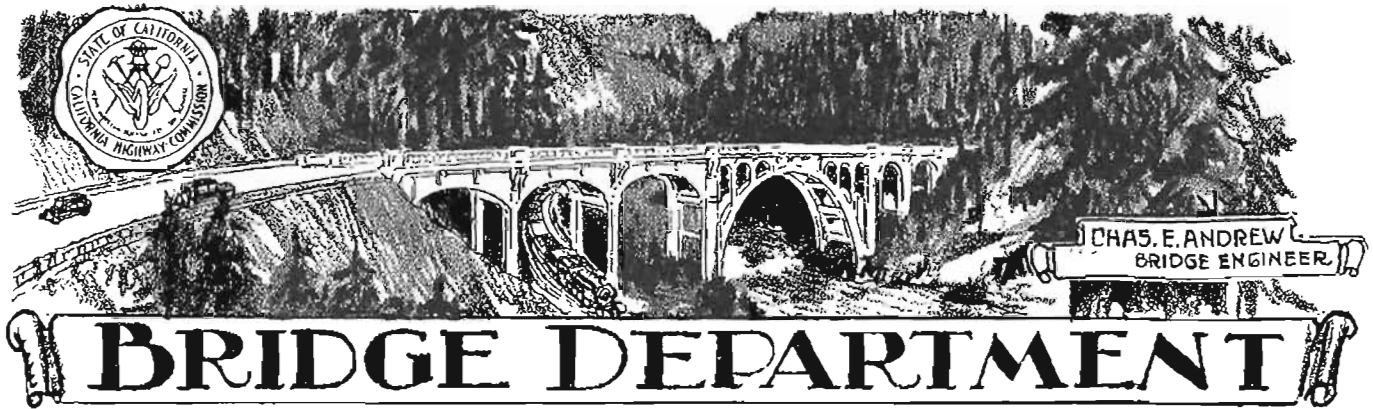
### NOTES.

Wynn Meredith, a former resident engineer for the California Highway at Eureka, has joined the engineering staff of the Englehart Paving Company. He has gone to Merced County where his company is constructing 20 miles of road-bed for a railroad.

Ray A. Klein has been reappointed chief engineer for the Oregon Highway Commission.

### Highway Construction Over Radio.

In the radio program announced for August, by Texas A. & M. College, College Station, the theme for Monday, August 29, is listed as "Asphalt and Tar Highway Construction," given by S. R. Wright.



## BRIDGE SURVEY

By C. E. ANDREW, Bridge Engineer.

ON MAY 11th, the Highway Commission directed the State Highway Engineer to investigate and report on all bridges on the State Highway System, regarding their load-bearing capacity and general physical condition, etc., and to post with adequate warning signs those bridges found to be in a weakened condition.

There now exist on the State Highway System over 600 bridges of various types and design. Many of them are in a dangerous condition structurally. Others are depreciating so rapidly that they will soon be dangerous, while still others will be safe for ordinarily heavy loads for many years if they are not overstressed.

Most of the bridges were built by counties prior to the organization of the State Highway Commission. When built many of them were considered high-class structures, measured in terms of the then existing traffic. Depreciation is so general that it is wise to take stock of their present condition.

The state has millions of dollars invested in its bridges, but the Highway Division has only casual knowledge of their condition. Very few states in the Union have ever attempted to keep what might be termed a bridge inventory. There has been a tendency to consider a bridge as everlasting. The Bridge Department considers the proper prosecution of the bridge survey as one of its most important immediate functions.

The completed survey will serve many purposes. It will establish the load capacity of all bridges. A load capacity will be established for continuous traffic which may be hauled without permit, and for intermittent loading which may be permitted occasionally under special permit.

The study will include determination of traffic-carrying capacity, width of roadway and condition and alignment of approaches. Bridges will be classified as to their adequacy and safety under existing traffic, and under the increase which may occur during their useful life.

The report will be valuable to the designing and maintenance departments, in that it will furnish data on many different types of materials, and forms of construction, particularly bridge floors, paint, types of expansion joints, etc. It should be a guide in determining the entire future bridge construction program, in that it will determine those

bridges which require immediate replacement, those which may be adequate for a few years and those which may safely carry the traffic for a number of years.

It will disclose those structures which are immediately dangerous but which may be repaired with a nominal amount of expense and made adequate for the immediate future. Many bridges are now posted with low-limiting load signs which with a comparatively small amount of money may be strong enough to justify increasing the load limit.

There are no doubt many bridges now existing which should have repairs not apparent upon superficial examination, but which will be discovered by expert examination. By such examination the proverbial "stitch in time" may save expense in the future.

Such an examination to be of real value must be made as thoroughly and rapidly as possible, and when once made must be kept up to date by men who are thoroughly familiar with bridge construction and design.

The Bridge Department has assigned two of its experienced assistant bridge engineers to the task—one to the southern and one to the northern part of the state.

In making such a survey California will have made a step in advance and one which is in line with the policy of the large railroads and other big business corporations, which seek to preserve as far as possible their enormous investments in equipment and property.

It is planned to examine first those structures which are known to be dangerous and which are now posted for low-limiting loads, so that the load limit signs now existing may be either revised or eliminated.

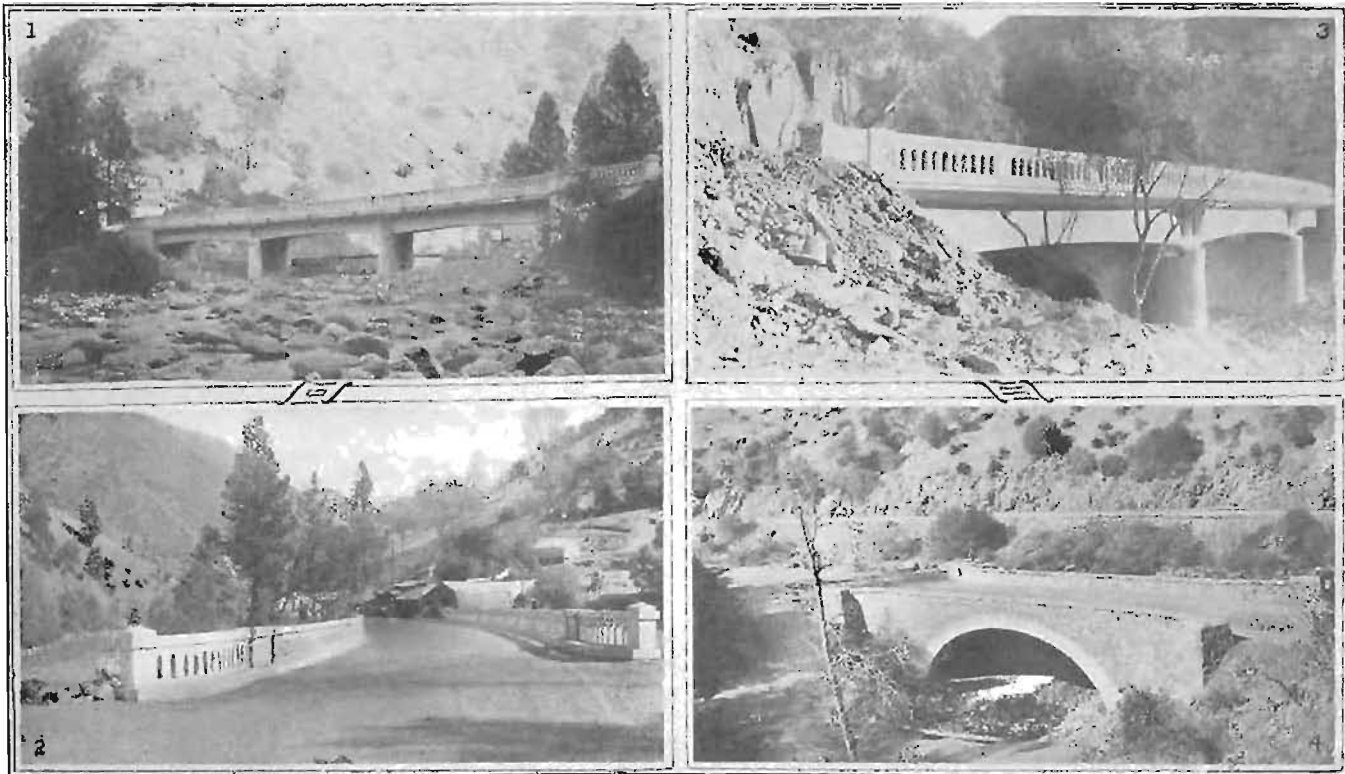
## BRIDGE DEPARTMENT NEWS

Frederickson and Watson of Oakland were awarded the contract for the construction of the Mossdale subway in San Joaquin County. T. E. Ferneau will be resident engineer in charge.

Mercer-Fraser Company of Eureka were low bidders on the Redwood Creek bridge near Orick in Humboldt County. Albert Lernhart will be in charge of this project.

J. C. Wilson has been assigned as resident engineer for the construction of Rattlesnake Creek bridge in Modoc County. F. A. Maurer & Sons of Eureka were the successful bidders on this project.

Frederick Panhorst, by virtue of his high standing in recent Civil Service Examinations, Grade V Associate Bridge Engineer, has been appointed in the Bridge Department.



ALL-YEAR HIGHWAY BRIDGES.—Route 18, Merced to Yosemite Valley, popularly known as the All-Year highway, has a number of recently completed bridges of modern design. (1) Bridge across the South Fork of Merced River, built by convict labor. (2) A roadway view of the same bridge. (3) Bear Creek bridge at Briceburg. (4) Concrete arch with stone facing across Sweetwater Creel.

ment. Mr. Panhorst was formerly connected with the bridge department of the Washington State Highway Department and had direct charge of the construction of several large bridge structures for that state, the most important of which is the million-dollar bridge structure recently completed at Everett, Washington. He has had a wide experience in both construction and design of highway and railroad bridges. The Bridge Department is fortunate in acquiring his services.

### LOWLY OYSTER SHELL AN ECONOMIC SELF-CEMENTING ROAD MATERIAL

Some of the shell roads of the southern United States are famous the country over. Their compact nature, the almost perfect cementation of the material, the smoothness of the surface and the low cost of maintenance of such roads interest those who have witnessed highways elsewhere in the throes of dissolution, never apparently being able to hold their own, good weather or bad. An increasing number of southern municipalities are turning to the lowly clam and oyster shell as the most suitable material for use on their highways and their city streets after having had rather costly experiences with the usual clay-sand-gravel combination.

In spite of the fact that shells as a means to a suitable material for the making of roads is readily available, work along these lines is still in its infancy. Doubt on the part of taxpayers that the shell road will stand up is common. It is for this reason that most cities that utilize shells as a road material try out a section of road with shells and a like section with gravel. In almost every instance where both have been tried out the shell road has won the approval of the people; the gravel sections of such streets needing constant attention as to blading and replenishing. The shell road needs no blading; the material, once compacted, does not fly out of place as does the loose gravel. Rain instead of affecting the shall road rather hastens cementation of the material, and added rains only make it that much more substantial.—Christian Science Monitor.

Thirteen

### WHAT THE DIVISIONS ARE DOING

(Continued on page 15).

#### DIVISION VIII.

HEADQUARTERS, SAN BERNARDINO.

E. Q. SULLIVAN, DIVISION ENGINEER.

Counties of San Bernardino, Riverside, and Imperial.

#### New Imperial Highway Completed.

Completion of Contract 520 between Brawley and Westmorland opens a new road diagonally across some of the richest land in the Imperial Valley, and shortens the distance to Los Angeles about two miles. There have been many appreciative comments in the local newspapers on the new road. H. L. Cooper, resident engineer, was in charge of the contract.

#### Lived in Tent Two Years Awaiting Cottage.

A maintenance foreman's cottage has been completed at Newberry. The Newberry site has been owned by the Highway Commission for several years, and is one of the most beautiful on the desert, being a true oasis where there is plenty of water.

Maintenance Foreman, G. Harp and Mrs. Harp, at Newberry, are rejoicing in their new home. They have lived in tents since May, 1925. Mrs. Harp gave a house-warming party that was greatly enjoyed by residents of the surrounding region.

#### Oiling Complaints Nil.

Oiling of the gravel road has been completed between Victorville and Daggett, a distance of 45 miles. The road has a fine appearance and the work has been greatly appreciated by the public. Considering the fact that it is difficult to do any great amount of this work without at least some traffic being splashed with oil, the division forces in charge of this work take pride in reporting that not a single complaint was received during the progress of the work.

WHAT THE DIVISIONS ARE DOING

**DIVISION III.**

HEADQUARTERS, SACRAMENTO.

F. W. HASELWOOD, DIVISION ENGINEER.

Counties of Butte, Colusa, El Dorado, Glenn, Nevada, Placer, southern Plumas, Sierra, Sutter, Yuba, and northern Sacramento and Yolo.

**New Type of Construction for Placer Bridge.**

Unusual interest is attached to the new type of construction to be used on a reinforced concrete culvert and retaining wings and wall to be built on Blackwood Creek, five miles south of Tahoe City, Pla-38-A. The concrete is to be faced with cobweb rubble masonry which will be a new feature in state bridge construction. The bids for the job were opened in the division office on August 1st, Holdner Construction Company of Sacramento being the low bidder with a bid of \$5,630. The engineer's estimate was \$6,225.

**Draftsman Wins Southern Bride.**

John Edgar Stewart, draftsman in Division III office, and Miss Lillian May Wallace of Long Beach were married on July 25th at the home of the bride's parents. The newlyweds will be at home in Sacramento after August 10th.

**DIVISION IV.**

HEADQUARTERS, SAN FRANCISCO.

JOHN H. SKEGGS, DIVISION ENGINEER.

Counties of San Francisco, Marin, Sonoma, Napa, Contra Costa, Alameda, Santa Clara, Santa Cruz, and San Mateo.

**Marin County.**

The Pacific States Construction Company has completed its contract M-144 for widening and reconstruction of a portion of the Redwood highway in Marin County through Ross and Larkspur.

The work consisted chiefly of grading and placing water-bound macadam shoulders and leveling course, and surfacing the road with asphalt concrete type "A" surface. The completed roadway presents a marked improvement over the former traveled way. Sharp turns were eliminated and short vertical curves lengthened, resulting in a very much improved alignment, and safer grades. Very little additional right of way was necessary. One desirable construction feature was the elimination of excess crown in the old roadway.

The work has brought many compliments from the local communities.

**Contra Costa County.**

The Tieslau Brothers' contract for reconstruction in Contra Costa County from Tormey to Valona is rapidly nearing completion. The main effort on this contract centered in completing grading work and placing broken stone surface prior to the dedication services of the Carquinez Straits bridge, on May 21st. The contractors are now placing the concrete grillage and gunitite surface on the cut slope between the highway and the Great Western Power Company's Valona substation.

**San Mateo "Bottle Neck" Job Progressing.**

The Kaiser Paving Company is completing its work of grading and widening on Peninsula in San Mateo County, between Colma and Cypress Lawn Cemetery. The work involved moving of many buildings, as well as reconstructing storm drains and heavy grading.

The moving of the Market Street Railway Company's tracks to the center of the new right of way is under way. It is hoped that this work, and all of the grading, will be completed within the present month, so as to permit the construction of pavement. The contract for the paving has been awarded to Hanrahan Company of San Francisco, and should require not more than 75 days to complete.

This section of state highway has been notoriously known as the Bottleneck, the old pavement being only 24 feet wide. The entire Peninsula highway traffic in and out of San Francisco traverses this road, and on peak days approximately 23,000 vehicles have been counted in a 16-hour period. The new improvement is being constructed wide enough to take care of this traffic.

**Alameda County.**

Contractor N. M. Ball of Porterville has made a very energetic start on the reconstruction on Route 5 in Alameda County between Dublin and Livermore. Contractor Ball has commenced placing concrete in one-half width, working from the Dublin end. Approximately two miles of one-half width were completed early in July.

Widening the roadway requires considerable grading. Borrow pits and deep side ditches will be filled, and all borrow material is to be secured from outside the right of way. The contract involves a small line change near Livermore which requires the construction of a new bridge across Las Positas Creek. The widening of the Alamo Creek bridge near Dublin and reconstruction of the Tassajero Creek bridge at Santa Rita are also included in the project. The three bridge contracts have been awarded to George J. Ulrich of Modesto. It is planned to have all work completed early in the fall. All through traffic is now detoured between Dublin and Livermore over the county road via Pleasanton, much of which is paved.

**Maintenance.**

The division maintenance forces have been busy in carrying out an oiling schedule on stone-surfaced roads in various locations. The Pacheco Pass from Gilroy to Merced County has been oiled and is in excellent condition. The oiling has alleviated the dust which has prevailed on this road during previous summers.

All of the Skyline boulevard from San Francisco to La Honda summit is now oiled. The oil surface should prove to be a safer road by the elimination of loose stone.

The oiling forces have also completed the oiling of the broken stone surface roadway in Sonoma County and the approach to the Carquinez bridge in Contra Costa County.

**DIVISION V.**

HEADQUARTERS, SAN FRANCISCO.

L. H. GIBSON, DIVISION ENGINEER.

Counties of San Benito, Monterey, San Luis Obispo, and Santa Barbara.

**San Juan to Hollister Reconstructed.**

The reconstruction of the highway from San Juan to Hollister, a distance of 7 miles has just been completed by the Granite Construction Company. This work includes the construction of concrete shoulders and bituminous macadam second story. When bids were called for on this work, alternative bids were secured on constructing the second story work of asphaltic concrete and of bituminous macadam, and the contract was awarded on the basis of the bituminous macadam work. This work constitutes a fine improvement on a lateral route which has a traffic of from 1000 to more than 2000 vehicles per day.

**Elwood Overhead Completed.**

The grading of a line change at the approaches to the Elwood Overhead Crossing about 12 miles north of Santa Barbara on the Coast Highway, Route 2, has recently been completed by E. Schelling Contractor, and the broken stone surface placed under this contract has been oiled by the state using the mixing method.

**30-Foot Concrete Pavement.**

The reconstruction of the state highway between Summerland and Carpinteria in the southern part of Santa Barbara

County, is rapidly approaching completion. This is a very heavily traveled highway and the reconstruction includes the building of a 40-foot graded roadbed and a 30-foot concrete pavement. It is expected that the pouring of the concrete pavement will be completed before the middle of August.

**Quarry Waste Used For Highway Building.**

Approximately 8 miles of the Cholame Lateral has recently been oiled, extending from the end of the concrete pavement approximately 12 miles east of Paso Robles through the town of Shandon. On the first 6 miles of this road Logan quarry waste was placed by the Granite Construction Company, and oiled by the state forces using the Oregon surface method of oiling. On the remaining 2 miles oiling was performed by the mixing method, utilizing the existing roadway surfacing.

**Traffic Increasing on Big Sur.**

While much of the highway on the Monterey Coast between Carmel and Big Sur receives comparatively little travel, the portion of road from Carmel south to the Highlands Inn, is subject to a maximum travel of more than 1600 vehicles per day, according to recent counts. In order to help maintain the road under this traffic an oil sand mulch one inch thick is being placed over the surface by the maintenance forces.

**Cuyama Lateral Work.**

When the construction of the Cuyama Lateral between Santa Maria and Bakersfield was completed by the Cuyama Joint Highway District within the past year, considerable portions of the road were left unsurfaced. Nevertheless recent traffic counts indicate a through travel continuously in excess of 200 vehicles per day, where but few vehicles formerly used this route. The splendid work that the state maintenance forces have done in improving the surface condition of this road, undoubtedly has considerable to do with the increased travel on the road. At some points in the Upper Cuyama Valley, many washouts occurred during the storms of last winter. Temporary repairs were made at that time and the maintenance forces are now engaged in making permanent repairs including the construction of a 42-foot bridge at the site of the worst washout.

**Newly Acquired Bridges Painted.**

A contract has been let to D. E. Burgess for the painting of four steel bridges on the Cholame Lateral which last year were taken over from San Luis Obispo County for maintenance by the state. The painting of the bridges is rapidly approaching completion.

**Coast Highway Improved at Gaviota.**

A Division Contract 95FFC1 has recently been awarded to Hodson & Carter of Santa Barbara for grading a line change in Gaviota Canyon at the approaches to the Gaviota Creek bridge which was recently constructed by Oberg Brothers under Contract 516. It eliminates two of the worst curves in the vicinity and constitutes a distinct improvement to the alignment of the Coast Highway through Gaviota Canyon.

**Personal.**

E. B. Brown, Resident Engineer in Division V, has been appointed City Engineer of Santa Barbara and assumed his new duties on August 1st. He has been with the California Highway Commission since its organization in February, 1912, and has been on construction work almost continuously since the latter part of 1913. His construction experience thus covers almost the entire period of construction activity of the California Highway Commission.

Ted Sullivan, Assistant Resident Engineer at Santa Barbara, has resigned to resume his studies at the University of California.

C. M. Butts recently with the Bridge Department has taken charge of the construction work in the vicinity of Santa Barbara formerly directed by Mr. E. B. Brown, now City Engineer of Santa Barbara.

J. H. Orr, for some time past draftsman with Division V, and formerly draftsman with Division II, has resigned his position with Division V to attend his ranch property in Oregon, after which he intends to undertake structural engineering work at Los Angeles.

J. T. Hays, for several years past Chief Clerk of Division V, has taken a leave of absence on account of his mother's health and is at present in San Diego.

**DIVISION VI.**

HEADQUARTERS, FRESNO.

E. E. WALLACE, ACTING DIVISION ENGINEER.

Counties of Fresno, Madera, Merced, Mariposa, Kings, Tulare, and Kern, north of the Tehachapi.

**Kern Trees Making Steady Growth.**

Trees along Route 4 south of Bakersfield are making a steady, healthy growth in spite of adverse conditions. An avenue of four-year-old Locust trees makes a pleasant fringe of green for 30 miles across the desert.

**Thick Oiled Surface for Yosemite Highway.**

Division VI has completed 34 miles of oiling by the mixing method on the Yosemite all-year highway. A surface two to three inches thick has been secured and the riding qualities of the road compare very favorably with the best pavement. The remaining 21 miles of earth and gravel road has been covered with a light oil for dust prevention.

Five miles of decomposed granite roadway connecting with the General's highway in Sequoia National Park have also been oiled for dust prevention and shoulders and roadbeds through sandy sections along the main Valley highway have received oil treatment.

**DIVISION VII.**

HEADQUARTERS, LOS ANGELES.

S. V. CORTELYOU, DIVISION ENGINEER.

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

**Paving Jobs in Progress.**

Along the Coast highway between Naples and Anaheim Bay bridge, Match Brothers, Elsinore, contractors, have under way the paving of 1.5 miles with 20-foot cement concrete. The new pavement will fill gaps left unpaved several years ago to allow for settlement of the embankment.

Jahn and Bressi, Oceanside, contractors, are making excellent progress with new stretch of highway through Del Mar in San Diego County. They will also construct the approaches to the recently completed concrete overhead crossing of the Santa Fe tracks, at Del Mar.

Contractor George Herz and Company, San Bernardino, is placing concrete pavement on the contract for the reconstructing of that portion of San Diego to El Centro highway between La Mesa and El Cajon.

**Highway Unit Opening Celebrated.**

On the Oxnard-Capistrano highway, through Laguna Beach, all paving has been completed and open to traffic. A street dance was held to celebrate the opening of the new concrete pavement. United Concrete Pipe and Construction Company of Los Angeles was the contractor.

**Another Dangerous Crossing Eliminated.**

At Carlsbad in San Diego County, the new overhead crossing of the Santa Fe tracks, has been completed and open to traffic thus eliminating another dangerous grade crossing. This job was handled by Coon Brothers of Riverside. The approaches were built by Chas. E. Crowley of Los Angeles.

**Engineer Takes Bride.**

R. L. Thomas, Associate Engineer in Division VII, was recently married at San Bernardino to Miss Mabel M. Mussen of Long Beach. The couple are now visiting in northern California.

**Popular Headquarters Girl Becomes Bride.**

Miss E. Alta Ruff of Headquarters Accounting Department became a June bride when, on the 26th of June last at Westminster Church, she and Edwin H. Sandstad, a North Sacramento business man, were wedded.

## 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
515	III	Imperial.....	12	H-A	COMPLETED AND ACCEPTED SINCE JUNE 23, 1927. Top of Mt. Springs grade and Meyers Creek Bridge.....	6.8	Portland Cement Concrete Pavement.....	Jahn and Brosi Const. Co., Inc.....	\$416,255 00	Aug. 16, 1926	-----
527 528	II I	Modoc..... Humboldt.....	28 1	B K	AWARDED SINCE JUNE 23, 1927. Across RattleSnake Creek..... Across Redwood Creek, one-quarter mile north of Orick.....		R.C. Girder Bridge..... R.C. Girder Bridge.....	Fred J. Maver and Son, Inc..... Mercer Fraser Co.....	\$10,511 44 103,566 38	July 7, 1927 July 28, 1927	100 300
Total State Highway Fund Contracts Awarded.....									\$114,077 82		

NOTE.—Primary construction covered by the above contracts 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
M-141 M-164 M-159 M-164 M-165	VI V VII II II	Merced..... Santa Barbara..... San Diego..... Siskiyou..... Siskiyou.....	4 2 2 3 3	A G B A-B A	COMPLETED AND ACCEPTED SINCE JUNE 23, 1927. Between Merced and the southerly boundary..... At the Ellwood Overhead Crossing..... At the Carlsbad Overhead Crossing..... Between Dunsmuir and Staasta River..... Near Weed, line change.....	14.33 0.30 0.26 0.22	Asphalt Concrete Surface..... Surfacing, Crushed Gravel or Stone..... Rock Surfacing..... Clearing and Grubbing Right of Way..... Surfacing, Crushed Gravel or Stone.....	Allied Contractors, Inc., of Denver..... E. Schelling..... Charles E. Crowley..... J. P. Brennan..... J. P. Brennan.....	\$185,909 84 20,466 00 14,235 75 5,077 69 9,083 25	Aug. 28, 1926 Nov. 29, 1926 Feb. 7, 1927 Mar. 9, 1927 Mar. 28, 1927	----- ----- ----- ----- -----
911EC3 911EC4 911EC5 911EC6 910EC1 96FC1 96FC2 95FFC1	IV IV X III X VI VI h V	Alameda..... Contra Costa..... San Joaquin..... Sacramento..... San Joaquin..... Kern..... Kern..... Santa Barbara.....	5 14 5 3 4 4 4 2	B A B B C E F E	AWARDED SINCE JUNE 23, 1927. Arroyo Las Positas, Tassajero and Alamo Creek..... Wildcat Creek, one-quarter mile north of Richmond..... At Mossdale Undergrade Crossing..... Across Arcade Creek, east of Ben Ali..... Between Stockton and Cherokee Station..... Lerdo to 1 mile north of Famosa..... One mile north of Famosa to 1 mile south of Delano..... Caviota Creek.....	2.8 9.1 9.4	R.C. Girder Bridges..... 1 R.C. Girder Span, 2 Slab Spans..... 2 Concrete Abutments with Wing Walls..... 3 R.C. Girder Bridges..... Crushed Gravel or Stone Surfacing..... Asphalt Concrete Pavement..... Asphalt Concrete Pavement..... Line Change at New Bridge.....	George J. Ulrich..... Atlas Construction Co..... Fredrickson and Watson Co..... Peter F. Bender..... Irey and Holden..... Force, Carrigan and McLeod..... Valley Paving and Const. Co..... Ira Hodson.....	\$27,534 15 16,292 48 22,120 63 37,791 56 44,004 81 224,052 39 202,966 88 10,930 50	July 7, 1927 July 7, 1927 July 7, 1927 July 28, 1927 July 28, 1927 July 28, 1927 July 28, 1927 July 28, 1927	125 125 125 150 125 150 150 75
Total State Highway Maintenance Fund Contracts Awarded.....									\$585,763 49		

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.

CALIFORNIA STATE PRINTING OFFICE  
SACRAMENTO, 1927

Sixteen