

Public Works

California Highway Commission

CALIFORNIA  
1924

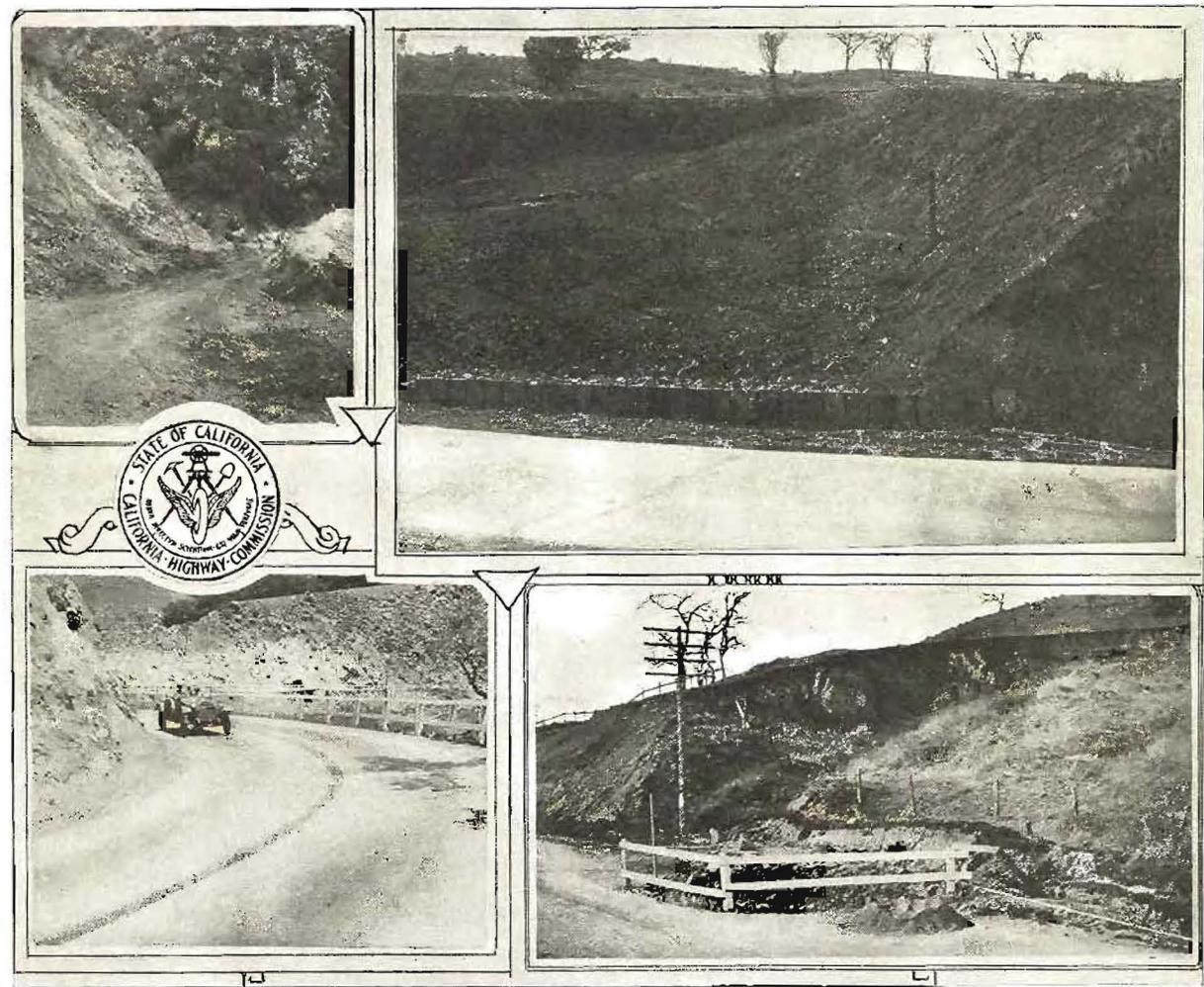
# CALIFORNIA HIGHWAYS

OFFICIAL PUBLICATION OF THE CALIFORNIA HIGHWAY COMMISSION

Vol. 1

MARCH, 1924

No. 3



PROBLEMS OF THE MAINTENANCE DEPARTMENT—At the right, are two views of the famous Novato Slide, in Marin County, the upper showing protection work done by maintenance crews of Division IV. Upper left, is a view of a recent slide on the new St. Helena summit road, in Napa County. Marking of the highway on dangerous curves is shown in the lower left.

*In this issue: Work of the Maintenance Department.*

CALIFORNIA STATE PRINTING OFFICE  
FRANK J. SMITH, Superintendent  
SACRAMENTO, 1924

# California Highway Department

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## Maintenance of the State Highway System

By A. J. WAGNER, Maintenance Engineer.

**P**ROPER maintenance of the state highway system is one of the most important tasks confronting the California Highway Department. Including roads constructed by the counties and taken over by the state, approximately \$100,000,000 has been expended on the state highway system. Protection of such an investment is not a negligible consideration.

### MAINTENANCE FUNDS.

From the first, it was realized the question of financing maintenance was a serious problem. The first motor vehicle act for the raising of maintenance funds was passed by the legislature in 1913. It has been amended at each subsequent session.

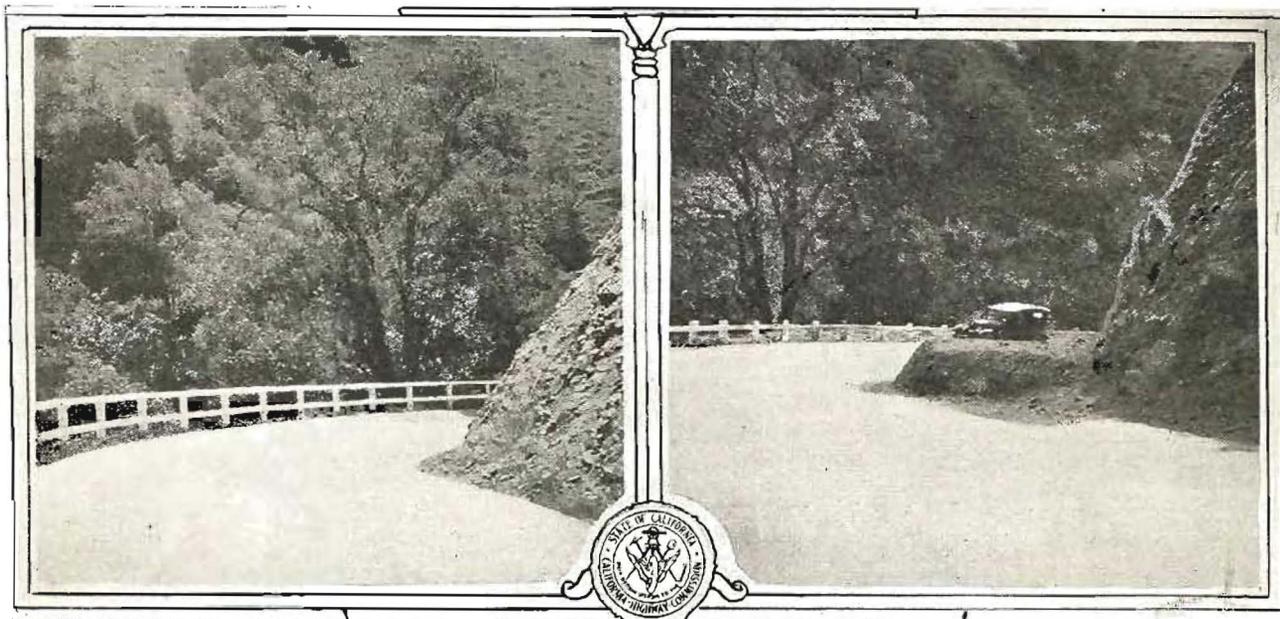
In 1923, the motor vehicle fuel fund or gasoline tax law was enacted to provide funds for reconstruction in addition to maintenance.

Expenditures for maintenance and improvement of the highway system from 1914 to 1923 are shown in the following tabulation:

Year	Expenditures
1914	\$83,935 85
1915	454,894 40
1916	1,189,812 10
1917	772,483 15
1918	915,500 10
1919	1,406,104 61
1920	1,621,071 76
1921	2,688,445 71
1922	3,874,537 43
1923	3,590,751 82

BEFORE

AFTER



"Daylighting" Dead Man's Curve at the Tejon Pass on the Ridge Route to Los Angeles, Division VI.

**CALIFORNIA HIGHWAYS.**

**1924 MAINTENANCE BUDGET.**

Division	Miles	(1) General maintenance	(2) Rental of equipment (General maintenance only)	(3) Purchase and repair of small tools	(4) Tree maintenance	(5) Major slide removal
I.....	401.9	\$160,760 00	\$70,000 00	\$2,000 00	\$75 00	\$50,000 00
II.....	509.0	184,375 00	68,000 00	1,500 00	2,600 00	50,000 00
III.....	629.1	188,222 50	75,000 00	1,500 00	12,300 00	5,000 00
IV.....	394.1	197,025 00	75,000 00	2,000 00	3,600 00	20,000 00
V.....	367.3	188,756 25	45,000 00	1,000 00	500 00	20,000 00
VI.....	518.7	155,613 75	60,000 00	2,000 00	12,000 00	5,000 00
VII.....	425.8	200,189 50	70,000 00	2,000 00	2,600 00	10,000 00
VIII.....	503.2	201,280 00	48,000 00	2,000 00	-----	7,000 00
IX.....	180.9	46,401 30	10,000 00	500 00	-----	-----
X.....	619.7	226,909 00	75,000 00	1,500 00	7,800 00	-----
<b>Totals.....</b>	<b>4,549.7</b>	<b>\$1,699,492 80</b>	<b>\$596,000 00</b>	<b>\$16,000 00</b>	<b>\$41,475 00</b>	<b>\$167,000 00</b>

Division	(6) Specific maintenance and betterments	(7) Purchase of new equipment	(8) Maintenance stations	(10) Permits	Totals
I.....	\$72,000 00	\$35,000 00	\$10,000 00	\$200 00	\$400,035 00
II.....	100,000 00	20,000 00	14,000 00	500 00	440,975 00
III.....	100,000 00	25,000 00	7,500 00	3,000 00	417,522 50
IV.....	100,000 00	30,000 00	10,000 00	6,000 00	443,025 00
V.....	100,000 00	10,000 00	8,000 00	600 00	323,856 25
VI.....	75,000 00	12,000 00	8,000 00	1,200 00	330,813 75
VII.....	24,000 00	20,000 00	14,000 00	3,600 00	346,389 80
VIII.....	83,000 00	25,000 00	15,000 00	650 00	381,910 00
IX.....	28,000 00	10,000 00	2,400 00	100 00	25,401 30
X.....	100,000 00	25,000 00	6,500 00	3,000 00	445,709 00
<b>Totals.....</b>	<b>\$780,000 00</b>	<b>\$212,000 00</b>	<b>\$95,400 00</b>	<b>\$18,850 00</b>	<b>\$3,626,217 60</b>
Plus overhead.....	-----	-----	-----	-----	<b>290,544 00</b>
<b>Total.....</b>	-----	-----	-----	-----	<b>\$3,916,761 60</b>

At the beginning of 1924, there were 4549.7 miles of state highways under maintenance, an increase of 623.6 miles since January 1, 1923. During the year, about 300 miles of county roads on the state system were taken over for maintenance in addition to roads completed by the construction department.

To reduce costs and increase efficiency is the ambition of the men in charge of maintenance. To this end, advantage is taken of improved types of machinery and scientific methods.

**SMALLER ROCK USED.**

An outstanding achievement has been the improvement of gravel roads. Specifications have been changed to limit the size of rock for surfacing to a maximum of one inch instead of the larger sizes used heretofore. This change, plus continual dragging, eliminates ruts and greatly improves the surface of the road.

Drags, operated by small tractors of the Fordson type, are being placed in service throughout the unpaved portions of the system in increasing numbers and with good results.

**DUST TREATMENT.**

Dust on graded and graveled roads is another serious problem confronting the maintenance department. Where water is available and traffic not too great, sprinkling is resorted to. On some of the heavily traveled sections, calcium chloride has been used as a dust preventative. This

compound absorbs moisture from the air which acts as a binder for the road surface. Although somewhat expensive, calcium chloride (costing as much as \$800 per mile applied on the road) has been found satisfactory in several locations and will be used extensively during the Spring and Summer.

In cooperation with the equipment department, tests are being made of various types of machinery used in maintenance work. Small tractors of the Fordson type have been adopted, superseding the more expensive truck for pulling drags and similar work. These light tractors are economical to operate and make fast time in some localities, dragging as much as fifteen miles of road a day.

Where roadbed shaping is required, the one man combined tractor and grader is being used.

**OIL MACADAM ROADS.**

Some 303 miles of oil macadam roads, largely built by the counties and taken over by the commission, present a serious problem. These roads often are expensive to maintain where traffic is heavy and the foundation poor, but, by the use of heavy scarifiers, or road planers, good results have been obtained.

As fast as funds permit, narrow and dangerous grades are being widened and ample ditches constructed to handle drainage. Sharp curves are being eliminated or widened and superelevated to increase safety.

(Continued on page 6.)

## TRAFFIC CENSUS PLANNED

UNDER instructions issued by State Highway Engineer R. M. Morton, the maintenance departments of the various divisions will be charged with the duty of taking a traffic census on the state highway system, beginning next month or as soon as the necessary organization is perfected. The work will be under the general supervision of the headquarters maintenance engineer.

Traffic is becoming a more and more important factor in the determination of the width and thickness of pavements and the character of highways, generally.

The census will enable the state highway engineer to study both the volume and type of traffic using the state highways and also will provide a comparison with counts made in 1920 and 1922.

A twenty-four hour count will be made on all important roads, eighteen hours on others, and probably none will be for less than twelve hours. The plan is to take the census monthly for an indefinite period.

## ADVISORY COMMITTEE ORGANIZED

THE advisory committee authorized by the last legislature to make a study of the state highway system met with Governor Richardson, in Sacramento, March 6th for organization purposes. Senator A. H. Breed, of Alameda, was chosen chairman. W. F. Mixon, secretary of the state highway commission, will act as secretary for the committee.

Plans for an inspection of the highway system and the gathering of necessary data were discussed. Members of the committee and its secretary are serving the state without compensation.

## PEOPLE WANT BETTER ROADS

DURING our travels over the State, into almost every county, one thing has impressed us above all others, and that is the widespread desire for more and better roads. While there may be some division of opinion as to the best methods of paying for them in the future, everywhere, in California, the people want roads.

There can be no denying such a universal demand and the citizenship of California will find a way to provide the funds and complete the job which was begun with the passage of the first bond issue in 1909.

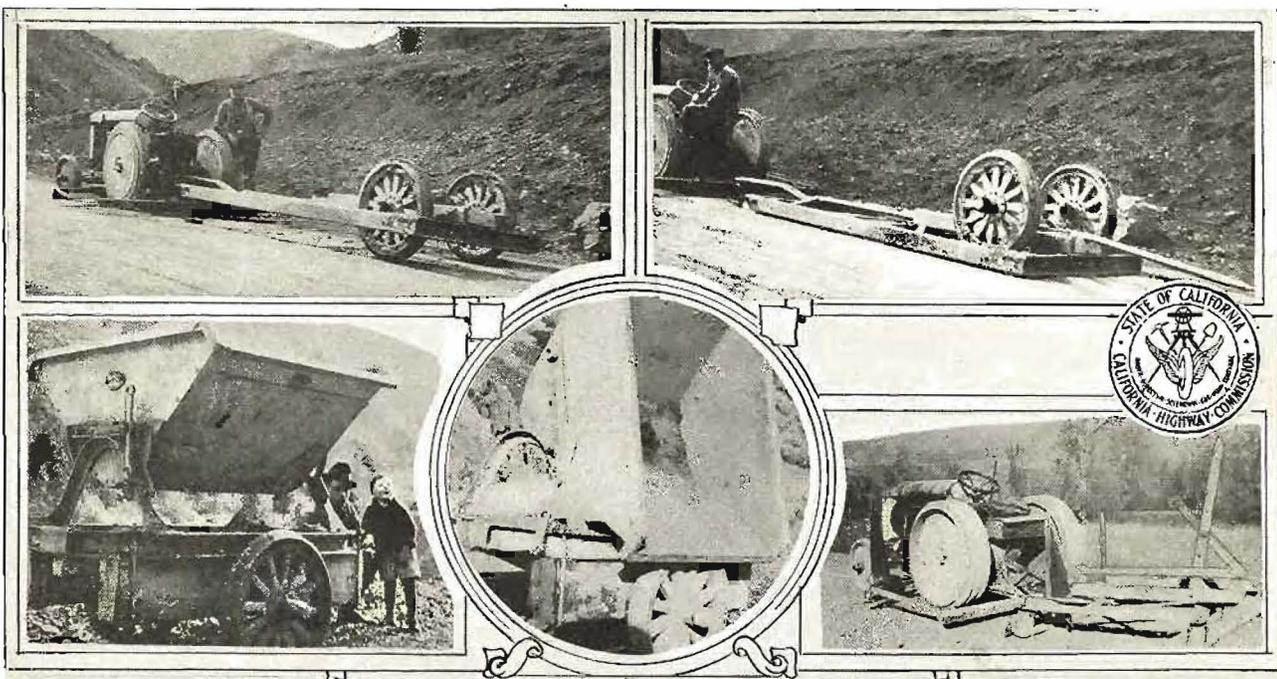
It would be impossible to measure or estimate the value of improved highways to California, but in the minds of the people there is a consciousness that roads have become vital to the progress and prosperity of the State. And in this age of motor transportation the roads must be built.

It is the purpose of the present Highway Commission to see that they are built well and as rapidly as the means at our command will permit. In that endeavor, we invite the support and cooperation of all the people of the State.

—From an address by Chairman Harvey M. Toy.

"When the American people need or even wish for anything they get it. They not only wish for highways, they need them, and they will get them. But they must pay the price—and the principal user of the road, the motorist, can not escape scot-free from the paying."

—From a paper by A. R. Hirst,  
Wisconsin State Highway Engineer.



Upper views—Homemade drag in Division II, constructed of an old Nash frame and Ford wheels. It may be moved at high speed from one job to another and quickly dropped in place for instant use. Lower left—Koppel dump car mounted on Ford wheels for moving small slides on mountain roads to places where material is needed for shoulders and embankments. Three of these carts can be drawn by one Fordson. Lower right—A Fordson and drag in use on the Redwood Highway, in Mendocino County, Division I.

PORTABLE ASPHALT PLANTS IN DIVISION V



MAINTENANCE DEPARTMENT

(Continued from page 4.)

On straight sections of the highway, unsightly guard rails are being removed following extension of culverts to the shoulder line. Where danger exists on sharp turns and heavy fills, a new type of heavy guard rail is being erected with sufficient strength to prevent vehicles leaving the road.

Considerable graveling and oiling of shoulders is contemplated during the year.

Arrangements have been made with the automobile clubs to install warning signals of the electric flasher type at dangerous railroad crossings.

TREE MAINTENANCE.

It has been demonstrated that shade is an effective agent in road maintenance. Systematic planting of trees on the state highways of California was made possible through the establishment of a state nursery in 1920. Here thousands of trees are propagated annually for this purpose. Some 270 miles of plantings have been made during the past four years and the care of these trees is a duty of the maintenance department.

In cooperation with the State Board of Forestry, the state highway commission employs an expert arboriculturist to superintend the planting and care of trees along the highways.

**PERMANENT MAINTENANCE STATIONS.**

It is now the policy of the commission and the state highway engineer to establish permanent maintenance yards at central locations to provide storage for state owned equipment and materials. These stations include warehouse and garage space, and, in some localities, a dwelling for the foreman. The state now owns forty-five of these permanent maintenance stations, about one-half the number required.

A program for acquirement of the additional stations necessary has been outlined, covering a period of years.

During the coming Spring and Summer, the maintenance department has been charged with the duty of taking a simplified traffic census which will cover the entire state.

A serious aspect of the maintenance problem becomes apparent when it is known that the average increase in traffic at 103 stations on the state highways, from the 1920 census to the 1922 census, was 47 per cent, and that the average traffic in 1922 at these stations was found to be over 2000 vehicles per day.

**ISSUANCE OF PERMITS.**

The many miles of state highway built through rapidly developing communities must, of necessity, be crossed and recrossed with telephone and telegraph lines, opened up for the placing of pipe lines carrying water, gas, sewerage, etc. Under an act of the legislature these encroachments can not be made unless authorized by permits issued by the California Highway Commission. Investigation of applications for permits is another duty of the maintenance department.

Precautionary measures are necessary to protect the traveling public and to insure repair of the highway in as good condition as before it was disturbed. If necessary, a bond is required.

Permits authorizing work of major importance are referred to headquarters for final approval. Others are handled by the division engineers. Reference of important matters to headquarters is required, that the commission and state highway engineer may be assured similar work throughout the state is being handled in a uniform way, and nothing done in conflict with any of their established policies.

The motor vehicle act also provides that any traffic not regularly permitted under that act must apply to the California Highway Commission for a permit to use the highways. The increasing use of tractors and oversize trailers and the moving of heavy road building equipment greatly multiplies the number of applications for permits which must be investigated by the maintenance engineers.

As time goes on and additional highways are built, maintenance will become an increasingly important activity of the California Highway Department.

**"BUMP METER" TRIED OUT  
ON CALIFORNIA PAVEMENTS**

THE Via-Log, humorously known as the "Bump Meter," is an innovation recently introduced into the service of the maintenance and construction departments of the California Highway Commission. It is used to mechanically record the condition of pavement surfaces.

The instrument is attached to an automobile. Two pencils make a record on a moving paper chart. The pencils are connected with the front axle near the front wheels by

steel wires, and when either front wheel strikes a depression or a hump in the pavement the pencils are actuated accordingly. This causes them to draw an irregular or straight line upon the moving paper, according to the roughness or smoothness of the pavement.

In addition, the instrument has an integrating device, which adds up, on a dial, an accumulative record of the inches of irregularities in any stretch of pavement passed over.

The paper chart is propelled through the instrument at a speed proportionate to that of the car by means of a flexible speedometer shaft, geared to one of the front wheels.

The Via-Log can be used for periodical records of pavements, and when taken in connection with traffic records will show relation between the resistance of various types of pavement and the deterioration due to traffic and age. It also shows the efficiency obtained in different types of repairs under the varying conditions encountered by the maintenance department.

The New York State Highway Commission gives, as one of its most rigid specifications on pavement uniformity, a Via-Log test, showing a maximum of a designated number of inches of irregularities per mile. Its psychological effect on both contractor and inspector results in greater care and attention in obtaining a uniform riding surface.

"If an army depends upon the feet of its soldiers, the nation of the future will depend on its roads."

—Mary Roberts Rinehart.



Close up view of the Via-Log installed ready for use



## With the Maintenance Crews



A LETTER from Division V says the bulletin has failed to give proper credit for widening work being done by that division. And right here we want the state to know that wonderful improvements are under way on the Coast route, in Santa Barbara County. Cuts are being widened and the drainage improved with a power shovel and truck outfit. We would like to have some photographs of this important betterment which is increasing the safety of the road and providing for future widening of the pavement.

Division V is believed to hold the banner for maintenance. Its average cost per mile is declared the lowest in the state. Division Engineer L. H. Gibson reports that new maintenance stations have been established at San Simcon and Shandon, bringing the total in the division up to ten. Assistant Division Engineer Andrew Swickard is in charge of maintenance work.

A portable patching outfit has been developed in Division V with much success. It consists of a George patching machine with auxiliary heating equipment permanently mounted on a trailer. Asphalt may be melted and fed to the patching machine while the outfit is in operation. Tamping and smoothing tools also may be heated during cool weather.

Division V also has been successful in developing a special apparatus for marking a center line on the pavement of grades. It consists of a triangular shaped squeegee with a brush in the center mounted on a wheelbarrow frame. A portable patching outfit is used to pump the asphalt to the brush.

Maintenance men in Division V also have been endeavoring to work out a plan for a hot blast to clean out and dry cracks that are to be filled and patched. A hose attached to the exhaust of a motor truck was used but the plan was not fully successful. It is planned to repeat the experiment, making a direct connection, eliminating the muffler. The division would like to know what other divisions have accomplished along this line.

### Calcium Chloride Experiments.

Division IV is going to fight dust on the Skyline Boulevard with calcium chloride. The application will be about two pounds per square yard, to be applied in three applications during the season in quantities of one pound, one-half pound, and one-half pound. The applications will be made over the graveled portions of the roadway. The cost of the chloride will be less than sprinkling and other experiments in the division indicate that its use will provide a much smoother road surface and make possible an appreciable saving in the amount of road dressing required.

A maintenance foreman in Division IV has worked out a contrivance which paints a white line in the center of the pavement to help guide traffic on curves and other dangerous places. A frame made of strap iron carries a paint reservoir to which is attached a pet-cock and a flexible length of hose. The hose is attached to the leading one of two brushes. The machine is run by hand along a previously made chalk line. A truck forms a moving barricade and also carries a supply of small barricades which are used to protect the line while it is drying. It is estimated that an efficient crew can paint a mile a day with this outfit.

In a paper read before the recent conference of division engineers, T. A. Bedford, Division I, came out strongly in favor of crushed rock as against gravel for road surfacing. He also favored softer rock as against the harder types desirable for paving purposes. In Bedford's opinion the best wearing surface is produced with broken rock one-half inch down to particles too coarse to rise as dust. He is for more experiments rather than always following precedent.

### Crushers Going in Division II.

Division II has four rock crushing plants going in the Sacramento River canyon surfacing the road to handle traffic during the coming tourist season. Two to three inches of fine rock is being placed and "spare the drag and spoil the road" has been adopted as a slogan by maintenance foremen. Extensive dragging with Fordson tractors is under way. Six machines of this

type are now in use, equipped with Wehr road planers. In the valley sections a special mower attachment will be used to handle the weed situation.

Road graders in Division II have been equipped with roller bearings and solid rubber tires. It is believed this will increase the life of the equipment as well as its efficiency. The division also contemplates the use of additional quantities of calcium chloride during the coming summer.

Permanent maintenance stations are planned for Canby, Susanville, Red Bluff, and Montgomery Creek.

### Plans in Division III.

Division III announces its maintenance crews are going to try out the following innovations during the next few months:

Calcium chloride on earth and waterbound macadam road to reduce dust; a Honck kerosene torch for burning off dry weeds and grass along the roads (loaned by the state forester); a machine for breaking out concrete where patching is to be done; trail of 1000 feet of the Page Hi-way elastic guard rail on dangerous curves; water gauges for securing high water elevations in Dry Creek, near Wheatland; and a paper mulch for protection of young trees recently planted along the highway.

Division III now has two assistant engineers working on maintenance—George W. Wade and John C. North—and fifteen maintenance foremen.

In an effort to get away from ruts at the edge of rigid pavements, Division III is experimenting with a dovetailed or scalloped edge. It is believed this broken edge will help traffic get back on the pavement and tend to prevent accidents.

### Bad Grade Widened.

Widening of the Mountain Springs grade, between San Diego and the Imperial Valley, under direction of Superintendent Mike Sullivan, is progressing rapidly. Steam shovels are employed and much heavy rock is being moved. Motorists using this road have commented favorably upon the results. This is one of the most important maintenance jobs under way in Division VII.

The maintenance department is proud of the new station at Saugus, Los Angeles County. In addition to the foreman's cottage, it has a combination garage and bunk house for employees.

Arrangements have been completed to wire and light the Newhall Tunnel. A dangerous curve at the intersection of the state highway and Central avenue, La Habra, has been widened and conditions bettered.

### In Division VI.

Widening of sharp curves on the main line through the San Joaquin Valley, between Turlock and Bakersfield, is one of the big jobs under way by the maintenance department in Division VI. Jogs around railroad reservations are being increased from radius curves of 250 feet to those of 850 and 1000 feet.

### Desert Road Building in Division VIII.

The "Division of Desert Highways" is proud of what has been accomplished on the Barstow-to-Needles highway since it was taken over by the commission for maintenance some months ago.

The 200 miles of road between Victorville and Needles has been divided into five sections with a foreman and four to eight men in charge of each section. These crews are each equipped with two Fordson tractors, a seven-foot grader, and three sixteen-foot drags, varying in weight from 400 to 1200 pounds.

Besides these permanently located maintenance crews, there is one large outfit working on betterments over the entire 200 miles.

### MODOC PLEASD

MODOC COUNTY is pleased with the work which has been done in that county during the past year. This was the declaration of State Senator F. J. Powers of Eagleville who addressed the commission, briefly, at a recent meeting in San Francisco.

Senator Powers said he appeared to express the thanks of the people of Modoc County for what had been accomplished within the county during 1923, and to assure the commission of the support of the people of his district.

## CALIFORNIA HIGHWAYS.

It consists of a superintendent and sixteen men with heavy equipment. A gravel loader and dump trucks are in contemplation.

Division Engineer E. Q. Sullivan declares the road is being built by three agencies: road drags, traffic, and strong winds. The drags keep the surface loose and the ruts hidden, traffic churns up the surface materials, and the winds blow away the dust leaving the coarser gravel and materials from which the ultimate roadbed will be made.

In many places, regarded as hopeless, the color of the surfacing is gradually changing.

It is necessary that the road be built of materials that are not dependent upon rain to produce a bond. The roadbed is not being crowned but is flat or slightly concave so that the gravel will be retained in the center where traffic is heaviest.

### Oil Macadam Maintenance in San Joaquin.

Division X reports that forty-seven miles of oil macadam highway in San Joaquin County were repaired last summer. A Killifer heavy disk scarifier with forty-eight adjustable disks was used for the first time. A grader followed the scarifier and the two were pulled by a truck, the grader serving to remove material cut off by the disks.

Fillings of low places and necessary patching was done by maintenance crews. Pea gravel was found satisfactory for patching in warm weather, but in cold weather the addition of coarse sand made a better seal.

Headquarters for the maintenance foreman are in Stockton and there are four patrol crews of two men each equipped with Dodge express body trucks, portable asphalt kettles, and necessary small tools. These crews are assigned to definite sections of the highway for which they are responsible. A floating crew is maintained for shoulder and roadside grading and other heavy work.

## MORE CONTRACTS AWARDED

SINCE the last issue of the bulletin, three contracts for additional work on the state highway system have been awarded by the California Highway Commission as follows:

Two reinforced concrete bridges on the Pacheco Pass road, in Santa Clara County, across Cedar Creek and North Fork of

Pacheco Creek, awarded to John Simpson and Company of Los Angeles; estimated cost \$43,501.12.

Grading and surfacing of 11.86 miles from 2¼ miles east of the Sand Hills to the Colorado River, in Imperial County, awarded to Kisselburg, Schmidt, and Hitchcock of Phoenix, Arizona; estimated cost \$171,888.37.

Grading and surfacing of 6.42 miles of the Skyline Boulevard between Half Moon Bay road and Kings Mountain road, in San Mateo County, awarded to J. P. Holland of San Francisco; estimated cost \$189,729.90.

All three contracts will be financed from state highway bond funds.

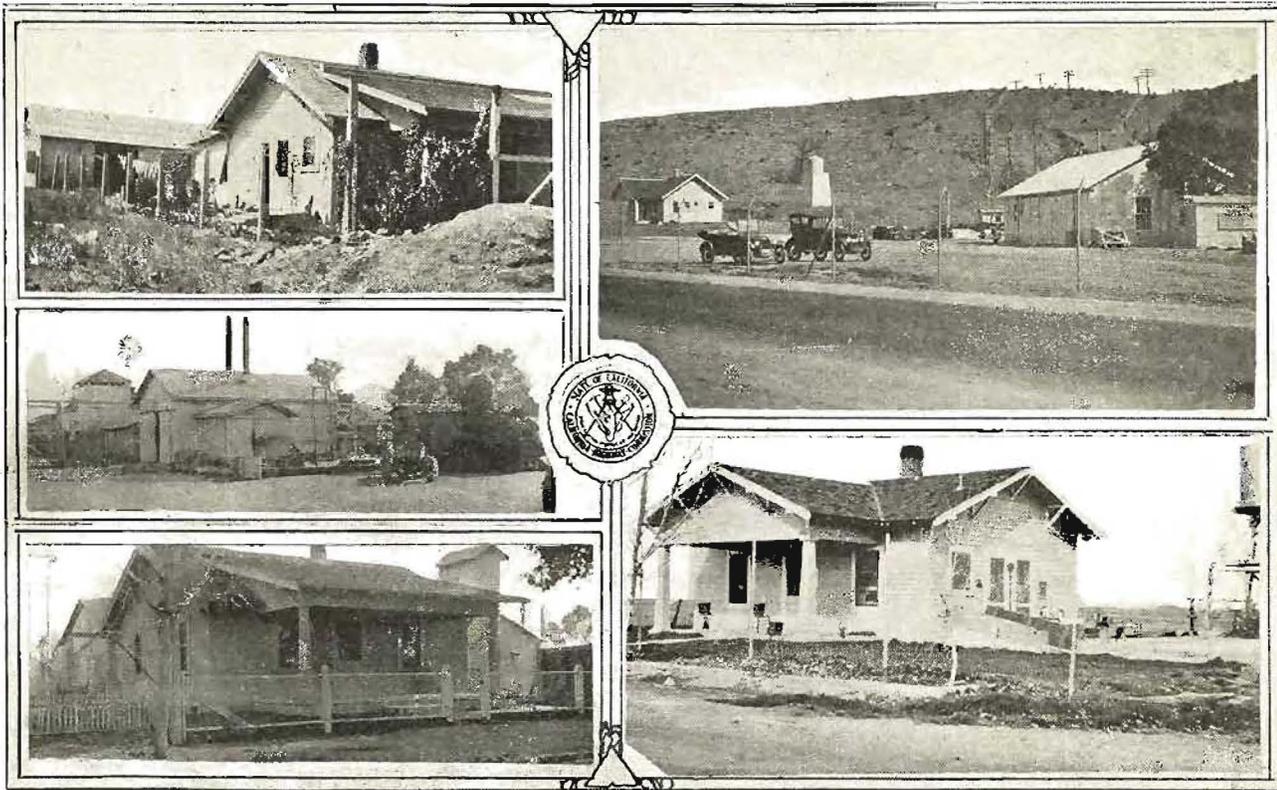
### Maintenance.

Out on the road in the sunshine,  
Out in that health-giving air,  
Out where there's macadam and concrete,  
And out where they need some repair;  
Sixteen years I have spent in this road work  
In this State and part of the West,  
But of all the games on the program,  
I like the maintenance the best.

You repair all the breaks in the roadbed,  
You cut the brush and the weeds on the side,  
You clear out the ditches and culverts  
And in this you will soon take a pride;  
Your guards and your guides you keep painted,  
Your danger flag is out on the fly,  
And you will have to look sharp and be nimble  
If you dodge all the Fords that go by.

There's millions been spent in this road work,  
But in maintenance have been mighty slow,  
But they will have to get busy and hustle  
Or some of their roads will soon go;  
So of all the jobs of the highway  
I think there is none to compare  
With the hustle and pride of the upkeep,  
And you are out there in nature's fresh air.

—W. G. WHITLOW, Grand Rapids.



PERMANENT MAINTENANCE STATIONS: Upper right—Saugus maintenance station, Los Angeles County, Division VII; left center—Fresno maintenance station. The three cottages are the homes of maintenance foremen in the San Joaquin Valley, maintained by the highway commission.

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HARVEY M. TOY, Chairman;  
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 ROBERT M. MORTON, State Highway Engineer.  
 W. F. MIXON, Secretary.

We are pleased to permit publication of any of the matter contained herein and this privilege is extended newspapers and periodicals without restrictions.

FRANK B. DURKEE Editor  
 P. O. Box 1103, Sacramento, California.

Vol. 1. MARCH, 1924 No. 3

## JUST AMONG OURSELVES



### HIGHWAY NEWS NOTES

#### Headquarters News.

C. L. McKESSON, formerly with the Portland office of the United States Bureau of Public Roads, is now testing and research engineer for the construction department. He will have general charge of the laboratory and the testing of materials used in the construction of the highways.

George N. Cook, formerly with the maintenance accounting department, is now secretary to State Highway Engineer R. M. Morton.

Mrs. Beulah Farley has succeeded Mrs. Billie Frasier as secretary to Assistant State Highway Engineer T. E. Stanton.

Mrs. Martha Anderson is the new personnel clerk, succeeding Mrs. Farley.

#### Newspaper Man Visits Division I.

Division I, during the month, was visited by Sheldon Davis, special writer for the Stockton Record, who contributed excellent articles to his paper on the Redwood highway and convict camp work in this section.

#### L. H. Taylor Leaves Siskiyou.

L. H. Taylor, for many years in the employ of the California Highway Commission, has requested a leave of absence for six months, as assistant division engineer in Division II. Taylor has had general charge of construction and maintenance in Siskiyou County, north of Dunsmuir, and particularly the construction work on the Klamath River. For a number of years, he was in charge of one of the commission's convict road camps. He has entered the employ of Davidson and Rose, Hollywood engineers, formerly with Division II. Men in Siskiyou camps presented Taylor with a handsome watch upon his departure.

#### Waterman Transferred.

H. A. Waterman, with Division III for several years, has been transferred to headquarters as office assistant to C. S. Pope, construction engineer. Other Division III notes follow:

W. A. Smith, former resident engineer, has succeeded Mr. Waterman as division office engineer.

A. A. Lernhart has been transferred to the bridge department at headquarters. R. W. McCrea and Noel Pearce, draftsmen, have been transferred to Division X.

J. C. North, resident engineer and also superintendent of maintenance on the Placerville road and around Lake Tahoe, is now with division office as assistant maintenance engineer.

#### Division IV Man to Wed.

Wedding bells will be ringing soon in Division IV. The betrothal of Assistant Resident Engineer William Howard Smith and Mary Eleanor Davies has been announced. Miss Davies graduates from the University of California in May and the wedding has been set for June.

Resident Engineer H. Carter has been transferred to headquarters at Sacramento.

#### Division V.

J. H. Clay, for five years maintenance foreman with headquarters in Santa Barbara, has been transferred to San Juan Bautista.

W. P. Rothert, former maintenance foreman with the state and recently in business for himself, has been appointed maintenance foreman to succeed J. H. Clay at Santa Barbara.

E. M. Hall, instrumentman working out of the San Luis Obispo office, has resigned to return to his home in Portland, Oregon.

George Major, former resident engineer in Division V, and recently locating engineer with Division III, is now engaged in silver mining near Idaho City, Idaho.

#### Sad Accidents in Division VI.

It is with extreme regret we report two sad accidents in Division VI in recent weeks. David B. Taylor, bridge foreman at Briceburg, was killed February 12th by the explosion of a gasoline lamp, and on February 13th, T. R. Cotter, Mariposa maintenance foreman, lost his life when his truck overturned on a grade.

Earl Withycombe, former resident engineer at Chowchilla, has been promoted to assistant construction engineer at division headquarters.

W. J. Bradley, equipment clerk, is the proud father of a daughter, born February 27th.

Harry Nelson, former resident engineer at Coalinga, is now at Democrat Springs, locating a unit of the Kern River-Walker Pass road.

#### Division VII.

L. M. Ranson has been transferred from Division VIII to Division VII, where he will assist the division engineer in the supervision of construction work.

L. D. Packard has been transferred to Division VIII, where he succeeds L. M. Ranson as resident engineer on the new Whitewater Bridge, in Riverside County.

H. C. Foster, formerly resident engineer with Division VII, is now with the Industrial Testing Laboratory in Los Angeles.

#### Division VIII Man Praised.

Officials of the United States Forest Service have written the headquarters of Division VIII commending L. H. Lucas, foreman on the Crest Route, for his cooperation during the recent fire in Waterman Canyon.

#### Division IX.

F. G. Somner, division engineer, was in Crescent City, Del Norte County, recently in connection with matters formerly under his jurisdiction as division engineer in Division I.

Musa Patterson of Bishop has been appointed stenographer in the division office.

Lawrence D. Kelsey, assistant division engineer in Division IX, has been transferred to Division VI at Fresno and reports an improvement in health in the lower altitude.

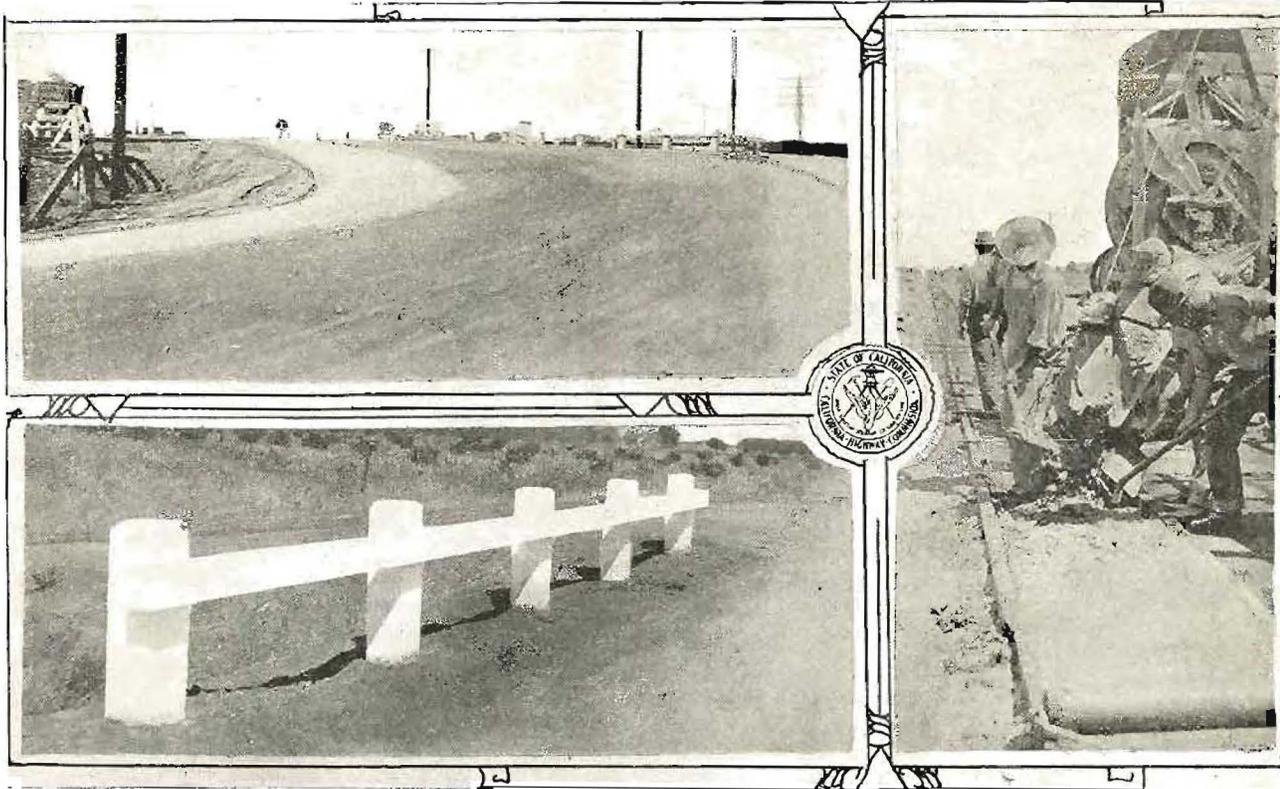
#### Division X.

William K. Wright, formerly with the Oregon state highway department, has reported for duty with Division X as assistant division engineer.

Arthur Wallace, formerly with Division III, has completed his assignment on the Tracy road and is now assistant resident engineer on the Upper Stockton Road paving.

Staff members of Division III, transferred to Division X, include the following:

R. E. Pierce, assistant engineer; L. E. McDougal, office engineer; C. M. Butts, resident engineer; C. L. Caine, Arthur Wallace, G. A. Ullom, assistant resident engineers; R. E. Raley, draftsman; Mrs. Emma Fifield, clerk.



DIVISION VI ACTIVITIES—Upper left, a widened curve; below, new type heavy guard rail now in use; at the right, pouring concrete shoulders.



## SMILEWAYS



**T**HIS being leap year, Ben Milliken wishes to announce for the benefit of the young women about headquarters that he does not recruit his assistants from among the convicts in his camps. Any rumors to the contrary are hereby positively denied.

Division IV sends in the following as an actual occurrence in camp:

First chainman: "You say we have to get up at 2 a.m. to shoot Polaris?"

Second chainman: "That is what the chief said."

Third chainman (absolutely serious): "Is Polaris good to eat?"

### THE FRIGHTFUL SUBSTITUTE.

"Are you sure we have taken the best road?"

"Somebody has. Dreadful thing they left in its place, isn't it?"

—Sydney Bulletin.

Here's one from Division VI:

A chief of party and rodman were working in the Mariposa County toward the Yosemite. It was winter time and the party had to remain out overnight. The second night they spotted a poison oaker's shanty.

They went in for something to eat. Old Joe Travucco bid them eat and furnished a rough jerked steak dinner. When they had finished the chief said:

"Joe, that jerky venison hit the spot, but aren't you afraid the forest ranger will get you with this out-of-season deer?"

"Jerky, h—," replied Joe: "Me honest man; burro him die, me jerky him."

Mary—"Dad, what is a detour?"

Dad—"Johnny's ears. He goes around them when he washes."

Eleven

### DIDN'T WORRY HIM.

The following has reached headquarters from one of the prison camps:

A convict was arrested one Sunday, after the season had closed, with trout in his possession, having been fishing.

"The Judge'll give you six months for this," said the game warden, as he started off with his unidentified prisoner.

"I should worry," came the reply, "I'm doing life now."

Of all sad words of tongue or pen, the saddest are:  
"That damned old tire is flat again."

When visiting one of the prison camps one day, Ben Milliken was asked by a negro convict if he knew the definition of "disgrace."

"No, what's your version," replied Milliken.

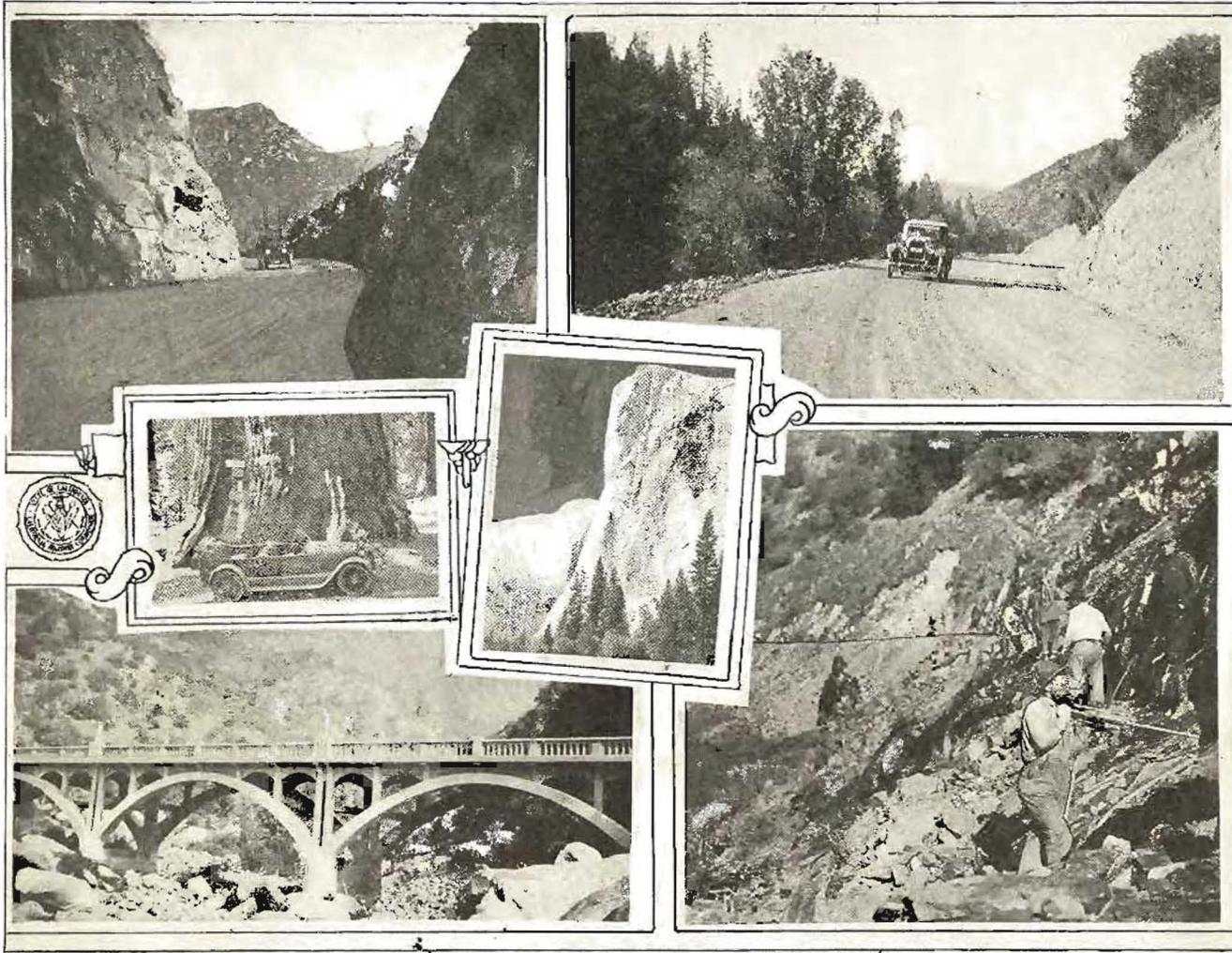
"Disgrace," said the darkey, "Is when youse forgets to pull down the blind."

"The little things are the ones that tell," said the girl, as she pulled her little brother from under the sofa.

J. B. Woodson may still claim first honors as the "Beau Brummell" among the division engineers, but he will have to go some when he goes up against Ben Milliken for the grand sweepstakes of the entire organization.

"The only difference between a rut and a grave is that the rut is longer," says the Ohio River Sand Company, Pittsburgh.

OPENING UP THE NATIONAL PARKS



Upper left, new state highway into Three Rivers, the Sequoia Park lateral, Tulare County; right, on the Yosemite lateral beyond Mariposa, a recently completed grading contract, showing the width of grade; lower left, the Kaweah River bridge on the Sequoia road, Division VI; and right, convicts at work in the Merced River canyon on the new water grade road into the Yosemite. Insets, destinations on these highways.

Good Roads Are Worth Their Cost

(From North Carolina Highway Bulletin.)

The highway is not simply a road. It is not simply a surface. It is the assurance of the civilizing influence of better communication between sections.

It is a silent, but persistent factor for the reduction of living costs.

It is an humble, but powerful foe of ignorance for the reason that it makes easily accessible our splendid system of public schools to the people in rural districts.

It is the safeguard of our food supply. It is a guarantee to the public against the prostrating influence of industrial upheaval and interruption to distribution therefrom.

It is the popular open-air theater of enjoyment of the family.

It is the text book of nature to our people.

It is the connecting link between the home and the factory.

It is the call to open air; the great physician who makes no charges for his services.

The people who are opposed to good roads oppose them for the same reason that some people oppose our great public school system: they are not informed.

An ex-President as a Road Builder

John Tyler at his retirement from the Presidency of the United States, had fallen so low in the scale of popularity that his neighbors elected him road overseer in his home precinct. The law at that time empowered the overseer to call out the farmers to work the roads whenever he saw fit. To the surprise of all, Tyler accepted the job, and worked the roads with such frequency and energy that he developed the best roads in the country.

Two years ago a great American statesman said, in speaking to the young men of Lincoln, that the safest, sanest, strongest, and soundest principle for a politician to advocate was this, "A hard road to every farmer's door in America." So it is that he who buildeth a good road is greater than he that taketh a city.

*Motor Stage Lines Carry  
Millions Over State Roads,  
Commission Report Shows*

One of the results of the building of a system of state highways in California is the remarkable development of the automobile stage as a means of transportation. According to a recent report of the State Railroad Commission, 21,221,928 passengers were transported by common carriers using motor transportation during 1922. A large portion of this traffic is over state highways.

The revenues of these carriers from purely motor operations totaled \$15,549,349.94 and their operating expenses were \$14,322,725.34.

Reports filed with the Commission showed 1616 passenger cars, 959 freight cars and 335 other pieces of equipment in use. Including leased vehicles and equipment not reported by small lines, the Commission estimates 3300 cars, trucks, and trailers devoted to common carrier purposes in California.

Caring for this growing form of traffic is one of the many problems confronting the California Highway Commission and its engineers.

*Why He Called It  
"Portland" Cement*

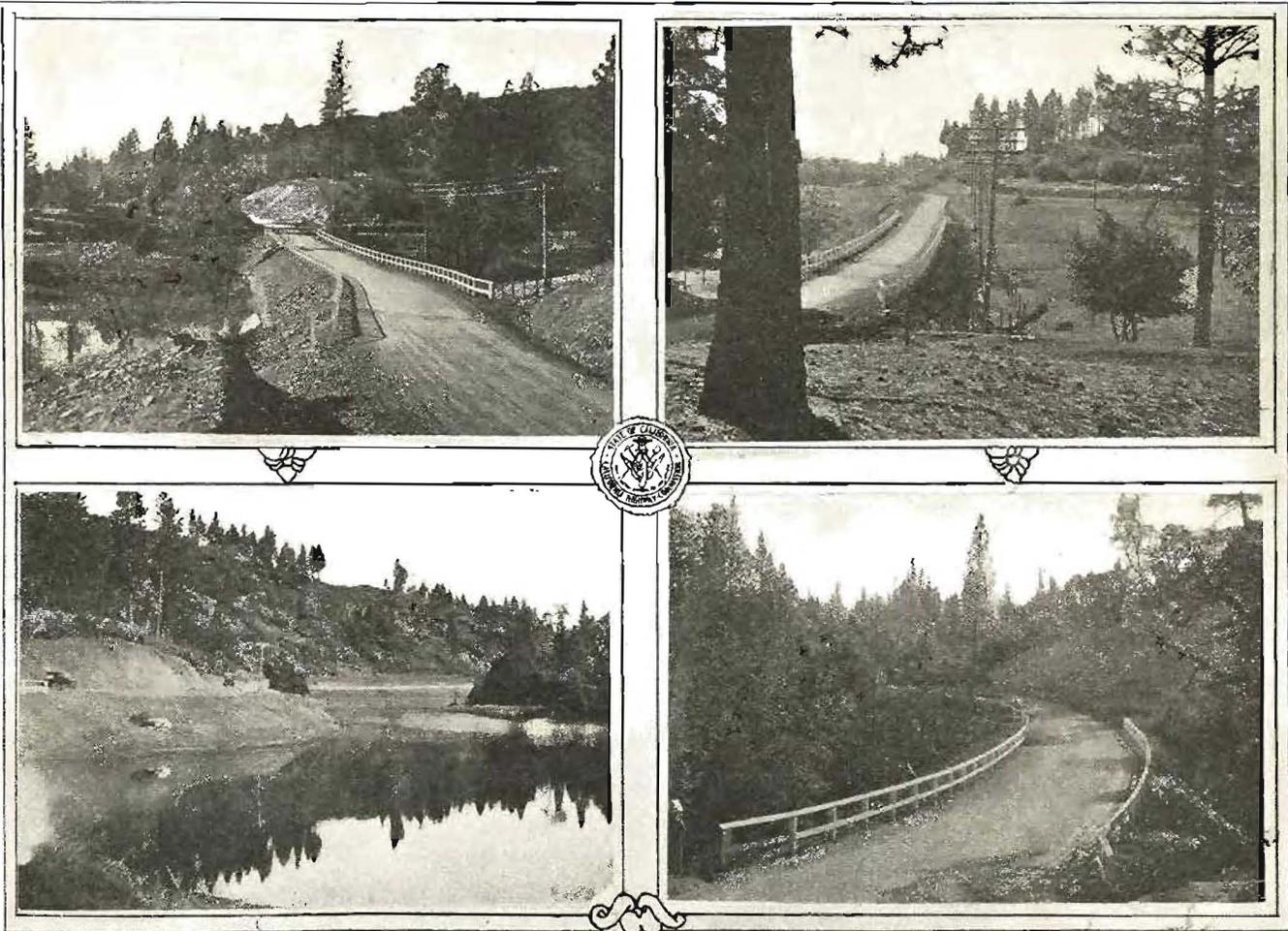
In 1824, an English mason wanted to produce a better cement than any then in use. To do this he burned finely ground clay and limestone together at a high heat. The hard balls (called clinker) that resulted were ground to a fine powder.

When a mixture of this dull gray powder with water had hardened, it was the color of a popular building stone quarried on the Isle of Portland, off the coast of England. So this mason, Joseph Aspdin, called his discovery "portland" cement.

That was less than one hundred years ago.

Portland cement was not made in the United States until fifty years ago. The average annual production for the ten years following was only 36,000 sacks. Last year the country used over 470,000,000 sacks of portland cement. Capacity to manufacture was nearly 600,000,000 sacks.

(From an advertisement in the *Concrete Highway Magazine*.)



Construction on the Victory highway: Scenes on the recently completed unit of the state highway between Auburn and Colfax, in Division III. The views show the improved alignment, width, and high standards of the new construction.

REPORTS FROM THE DIVISIONS

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.

SLIDES on the new St. Helena Summit road in Napa County temporarily closed the road in places following recent rains. The old toll road has been used in places for detours while the new grade is being cleared.



JOHN H. SKEGGS

A new Tel-Smith crusher has been installed on this road to furnish surfacing material which will be necessary to repair the road after fills have settled and slides are cleared away. It also will provide surfacing material to keep the road in condition during the coming season.

The Pacheco Pass road, recently opened to travel, already is accommodating a heavy traffic between the San Joaquin Valley and the Coast. It is apparent considerable work will be necessary to keep the surface in condition to accommodate this traffic.

SURFACING STOCK PILED.

While the contractor was on the job, an agreement was reached whereby he is hauling and stock piling 10,000 cubic yards of gravel for use in surfacing work during the coming summer.

The Redwood Park road is closed at present for heavy maintenance repairs in anticipation of a heavy summer traffic. A small concrete dam has been built at Bull Springs to provide water for sprinkling.

The Livermore-Dublin road is receiving heavy basic repairs under maintenance forces.

DIVISION II.

HEADQUARTERS, DUNSMUIR.

H. S. COMLY, ACTING DIVISION ENGINEER.

Counties of Siskiyou, Modoc, Trinity, Shasta, Lassen, Tehama, and northern Plumas.

THE big construction program for the rebuilding of a considerable part of the state highway between Redding and the Oregon line is now under way. Between Redding and Bayha, the Kaiser

Former Division V Man to Get \$15,000,000 Fortune

HERE'S one "highwayman" who landed in the millionaire class. We hope there is no come back to the following sent in by Division V: "J. E. Cox, mechanic at the Santa Ynez Screening Plant, and later in the division shops at San Luis Obispo, on January 17th, sold his patent rights for a carbon absorber of use in the manufacture of lubricating oils for \$15,000,000. An eastern syndicate, presumably the Standard Oil Company, was the purchaser.

HOW'S THIS?

"He receives \$2,000,000 cash and  $4\frac{3}{4}$  per cent interest on the remainder. Incidentally, the interest amounts to about \$1,700 per day.

"It is reported Cox, whose father used to drive an ice cream wagon about the streets of San Luis Obispo, fell heir to the formula in whole or in part from his foster father. He later had the formula patented and offered it for sale.

"He was first offered \$3,000,000, but the bid was steadily raised until \$15,000,000 was offered and the sale made at that figure."

Paving Company has extensive grading operations under way.

This company has constructed a large high line outfit to secure sand and rock from a bar in the Sacramento River near Redding for use in its crushing plant located on the bluff opposite the city. This plant will furnish sand and rock for the paving operations which will be under way soon.

From Bayha to Halfway Creek, the Nevada Contracting Company has a steam shovel and a number of men at work on grading operations. This road is now closed to traffic from 7 p.m. to 11 a.m., daily, because of the heavy blasting which is done during the nighttime.

Every effort is being made to keep detours in good condition for traffic. The Kennett road is open between Halfway Creek and Redding for those who do not mind a rather dangerous mountain road.

Contracts north of Dunsmuir are progressing satisfactorily and this work will be largely completed before the season of heavy summer traffic.

DIVISION IX.

HEADQUARTERS, BISHOP.

F. G. SOMNER, DIVISION ENGINEER.

Counties of Inyo, Mono, and eastern Kern County, north of Mojave.

THE commission has approved an allotment of \$42,835 for Division IX for surfacing and regrading work between Independence and Davison Creek, a distance of  $10\frac{1}{2}$  miles. The work will consist of re-shaping the roadbed, building of trenches, and surfacing with volcanic cinders. Little work has been done on this unit since it was first graded by the state in 1920.



F. G. SOMNER

The unprecedented dry season, while making travel possible at all seasons, north of Bishop, has greatly increased the problem of highway maintenance in this section of the state.

CRUSHER PLANNED.

Installation of bunkers is in progress in Mono County and a power plant is provided for. Rock of a limestone formation will be crushed for surfacing material to be used in the Sherwin Hill district.

During the winter months attention has been given to the removal of "tufa" boulders from the roadbed and a marked improvement in the width, surface, and general appearance of the highway is noticeable.

DIVISION VII.

HEADQUARTERS, LOS ANGELES.

S. V. CORTELYOU,

ACTING DIVISION ENGINEER.

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

CONSTRUCTION work has been resumed on the Coast highway through the Malibu Ranch, near Solstice Canyon, Los Angeles County. A court order giving possession in the right of way suit has been obtained and twenty men and an equal number of stock are at work.

Work is now under way on the following contracts in this division recently awarded by the commission:

Jahn and Bressi, widening and repaving from the San Diego city limits

to Oceanside; a steam shovel is now at work and culverts are being lengthened. Numerous radical line changes will straighten the highway.

George Oswald, widening and thickening the pavement on the Los Angeles-Ventura boulevard, between Shoup Avenue and the westerly boundary of the county.

W. F. Beal, grading of the Coast boulevard between Huntington Beach and Corona Del Mar and paving of 3.5 miles.

A second grading camp has been established by the Hauser Construction Company in Sycamore Canyon on the Coast boulevard, Ventura County, and the work speeded up.

Good progress is reported by Williams and Singletary, who are widening the roadbed between Quail Lake and the northern boundary of Los Angeles County.

**DIVISION VI.**

HEADQUARTERS, FRESNO

J. B. WOODSON, DIVISION ENGINEER.

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

**R**ECENT action of the California Highway Commission makes possible an important extension of the Coalinga lateral if the counties of Fresno and Monterey are able to go ahead with construction of units of this road. The commission has agreed to take over the entire route for maintenance if the counties build uncompleted sections, and plans are now under way to raise the necessary funds.

The last unit of the Pacheco Pass road, terminating at Calfa on the main line through the San Joaquin Valley, is rapidly nearing completion. Contractor R. T. Shea is building an eighteen-foot asphalt macadam pavement on this route.

Survey parties are rushing the location of an extension of the Kern River Canyon road between Bakersfield and Democrat Springs. The contract for the first seven miles is rapidly nearing completion. W. S. Mead is the contractor.

**DIVISION X.**

HEADQUARTERS SACRAMENTO

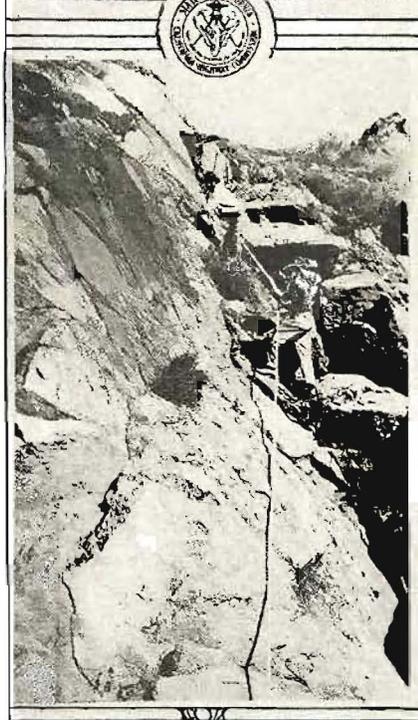
J. C. McLEOD,

ACTING DIVISION ENGINEER

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

**A**BOUT three-quarters of a mile of concrete pavement has been poured at Galt under the contract with the Kaiser Paving Company. A nine-sack mixer is being used with a central pro-

Running the lines: Along the Ventura Coast and in Kern River Canyon.



portioning plant operated by a caterpillar crane to unload cars and fill aggregate bunkers.

The three-mile section from Sacramento to the Florin road is being scarified and the subgrade prepared for paving. This is to be laid in two strips twelve feet in width, and pouring of concrete will begin the latter part of the month.

The 8.1 miles of macadam shoulders from Tracy to Banta have been completed.

**MAINTENANCE ACTIVITIES.**

Widening between the top of the Shawmut Grade and Priest's Hotel on the Big Oak Flat road is nearly complete. Portions of the grade are being resurfaced with gravel and cementing slate rock.

Resurfacing with gravel on the unpaved unit between Keystone and Jamestown is progressing satisfactorily.

Emergency repairs to the east approach to the Mossdale bridge over the San Joaquin River have been made.

Authority has been given for replacing the deck on the Woods Creek bridge on the Big Oak Flat road near the Shawmut Mine.

Seven hundred dollars has been allotted for widening and daylighting on the road between Valley Springs and San Andreas.

A Fordson tractor equipped with blade and drag has made a fine showing on the Michigan Bar-Drytown gravel road.

**HIGHWAY BECOMES ROOF WHEN IT RAINS DOWN IN IMPERIAL.**

**E**VERY year it rains in the Imperial, but only in spots. On the road from Holtville east toward Yuma there is one stretch where there was once a nine year drought. Two years ago it rained here and again a few weeks ago.

The country where it rained is truly a desert. There are long expanses of flat sand and for six miles great sand dunes. A few days after the rain a most beautiful change came over the whole surface of the flat, sandy waste. Though it only rained a few hours, the country sprang to life with a carpet of delicate flowers.

**Flowers Follow Downpour.**

Besides the lawn-like carpet of flowers, certain varieties of old, wrinkled cacti threw out over their entire surface a green covering of leaves about the same color and appearance as fragile lettuce. At the ends of each cactus stalk a great scarlet flower appeared.

But all the little desert creatures dislike rain. We have an asphaltic concrete road here and countless little white mice, gophers and other desert rodents decided to move under cover. Their mounds of earth appeared for miles along the edge of the pavement. The maintenance foreman sent in a hurry call for poison.

(From Division VIII.)

STATE OF CALIFORNIA  
 CALIFORNIA HIGHWAY COMMISSION  
 MAP SHOWING  
 STATE HIGHWAY SYSTEM

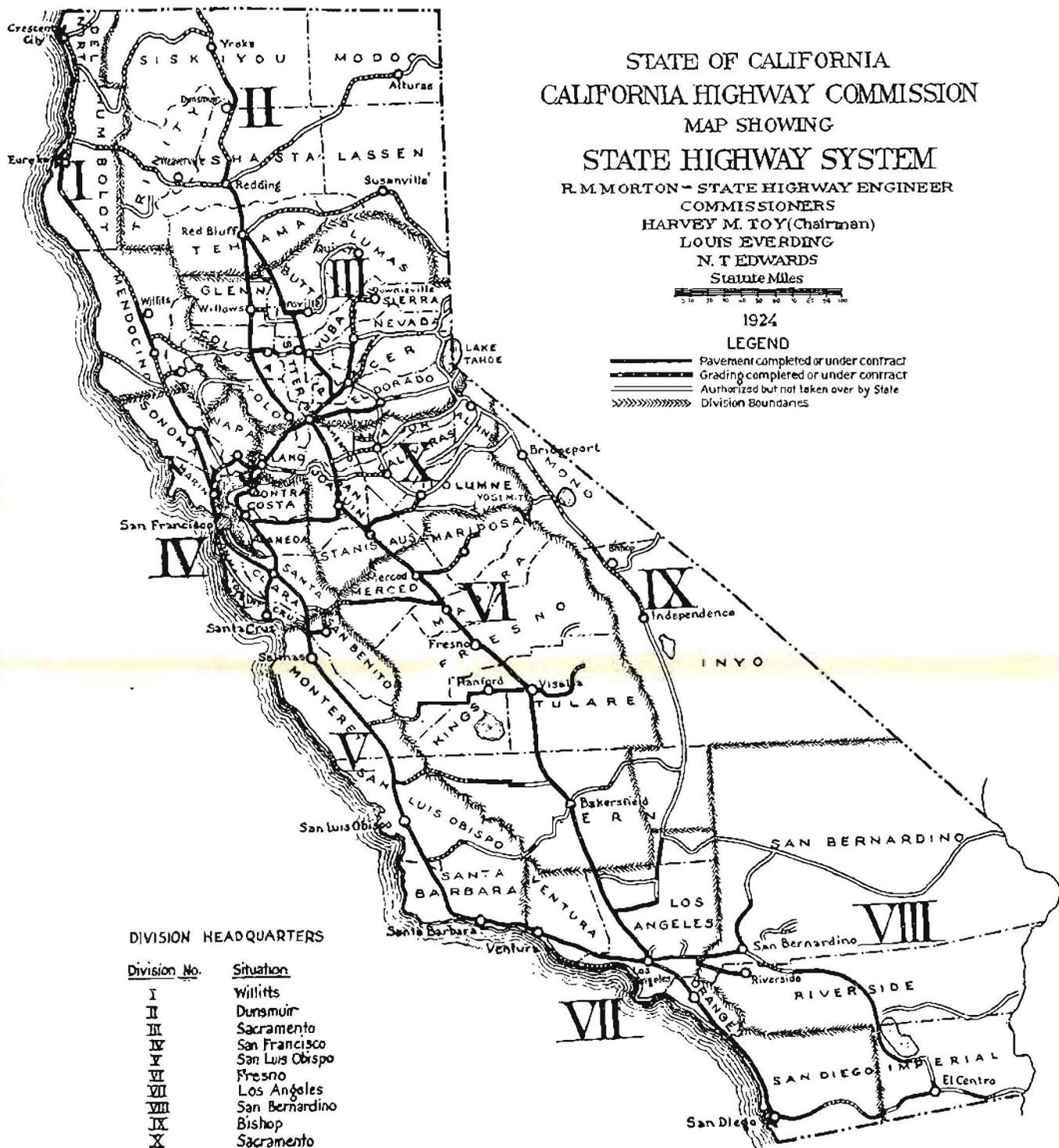
R. M. MORTON - STATE HIGHWAY ENGINEER  
 COMMISSIONERS  
 HARVEY M. TOY (Chairman)  
 LOUIS EVERDING  
 N. T. EDWARDS  
 State Miles



1924

LEGEND

- Pavement completed or under contract
- Grading completed or under contract
- Authorized but not taken over by State
- Division Boundaries



DIVISION HEADQUARTERS

Division No.	Situation
I	Willits
II	Dunsmuir
III	Sacramento
IV	San Francisco
V	San Luis Obispo
VI	Fresno
VII	Los Angeles
VIII	San Bernardino
IX	Bishop
X	Sacramento

Map showing progress of paving and other improvements on the California state highway system, and also boundary lines of newly-created divisions.