

CALIFORNIA HIGHWAYS

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

Vol. 3

JULY, 1926

No. 7



PACIFIC HIGHWAY ARCH—Bridge across Charley Creek in northern Shasta County. This structure, 120 feet from creek bed to bridge floor, shortens distance nearly a half mile and greatly improves alignment. Plans for two other similar structures have been completed by Bridge Department. (See article on page eleven.)

In this issue: NEW YOSEMITE HIGHWAY DEDICATED—PRACTICABILITY OF MAINTENANCE ON DESERT ROADS DEMONSTRATED.

CALIFORNIA HIGHWAYS

HARVEY M. TOY, Chairman;

N. T. EDWARDS and LOUIS EVERDING, Commissioners.

ROBERT M. MORTON, State Highway Engineer.

W. F. MIXON, Secretary.

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

Vol. 3 JULY, 1926. No. 7

CALIFORNIA HIGHWAY DEPARTMENT

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WITHOUT minimizing the importance of the work of the various other departments, the Maintenance Department is the one on which we depend to keep us out of trouble. Whether it be for the repair of natural disintegration, remedying inadequate construction, or meeting an extraordinary emergency caused by floods or washouts, the maintenance man must be always on the job—in fact, he must be a little ahead of the job.

Unlimited opportunity exists for the exercise of ingenuity by the maintenance employees. Road building standards are in a gradual state of change. Amount of traffic and weight of loads are not stabilized. The analysis of conditions that cause heavy maintenance expense and suggesting the remedy therefor is strictly within the province of the maintenance man.

The maintenance man must not only repair deterioration, but he should keep constantly in mind the safety features of the highways. The public rightfully expects uniform, safe maintenance of State highways. The life of the motorist who is accustomed to a safe standard of maintenance in one section of the State is far more dependent than we sometimes realize on that same safe standard being found on all State highways.

Must Be Ever Vigilant.

It should be the personal creed of every employee of the Maintenance Department that nothing of an unsafe nature is left overnight as an obstruction on a highway. High rates of speed and an assumption of safety are induced by good maintenance.

(Continued on page 6.)

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.

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Federal Aid Victory Insures National Progress

PASSAGE by congress of the federal aid appropriation, which was recently approved by the President, means the continuation, unhampered, of the American road building program. Few things will make a greater contribution in the immediate future to the progress, prosperity, and solidarity of the nation. With this encouragement from the federal government the states will carry on construction of that great system of national highways first definitely established under the Highway Act of 1921.

Continuation of this wise policy of state and federal cooperation in highway building, although overwhelmingly supported in congress and generally favored by the people, was not accomplished without a nation-wide campaign by its supporters. The appropriation of \$75,000,000 for each of the fiscal years 1928 and 1929 was strenuously opposed in the senate by a small group of eastern men who threatened a filibuster and who, apparently, from a national point of view, have no conception of the importance of highways.

Their rich constituencies are able, they assert, to build their own highways and for those beyond the borders of their states they have no concern. The need and desirability of continuous trunk highways, binding together all sections of the country, bringing the citizenship closer together, and providing, also, for the national defense, means nothing to them.

The West, whose great natural resources contribute annually to the wealth of the East, has ever been alert to the necessity of highway construction as a means of development. Alarmed by the growing hostility of certain eastern interests, the western states, in the face of the cry of sectionalism, began the campaign that rallied the friends of federal aid from every state in the union. Never before in the history of this legislation, reported

Congressman Dowell, did an appropriation have such unanimous support as was accorded the 1926 federal aid bill.

The State of California will receive from this appropriation approximately \$2,500,000 a year, a small share of what the state undoubtedly will expend for highway during the same period. California eventually could complete her highway system without additional federal aid, but she recognizes that progress in other western states, where great areas are still in federal ownership, would stop almost altogether without the helping hand of the national government; the continuity of the whole highway building program of the country, of far greater importance than actual cash contributions from Washington, would be destroyed.

The California Highway Commission is proud to have had a part in bringing about favorable action by the congress. In the dark hours when some went so far as to predict an overthrow of the federal aid policy by the recently adjourned congress, Chairman Harvey M. Toy, by personal appeal to civic organizations, governors, highway officials, congressmen, and senators, urged united action by the western commonwealths. The warning from the west found willing workers beyond the Rockies, who convinced congress that the great majority of the people of all classes throughout the country desired continuation of federal aid for roads. Eventually there came to its support the American Association of State Highway Officials, American Automobile Association, American Bankers Association, American Farm Bureau Federation, American Federation of Labor, National Grange, American Road Builders Association, National Automobile Chamber of Commerce, and the Chamber of Commerce of the United States.

It is to be hoped that the wisdom of federal aid or the attitude of the people will not again be questioned until an improved highway connects every community in every state of the union.

New Highway Opens Yosemite To All-year Motor Travel

ADREAM come true—incomparable Yosemite, the supreme of Nature's handiwork in California, easily accessible by automobile at all seasons of the year. This thought will be uppermost in the minds of the state's motorists on July 31st, when Governor Friend Wm. Richardson formally opens to travel the Merced canyon highway from Briceburg to El Portal. He will dedicate not only a highway destined to be traveled by countless thousands, but also a memorial to the California plan for "building men and roads." The highway is a monument to the engineers who conceived it and to the prisoners from San Quentin and Folsom prisons, who contributed the greater part of the labor that created it. It is one of the outstanding convict-built roads of the country.

Second Bond Issue Road.

Ever since the automobile came into general use, the people of California have desired a better highway than existing roads over the rim as a means of reaching Yosemite Valley. The legislature proposed to meet this demand by providing, in the second bond issue of 1915, for an extension of the Merced-Mariposa county seat lateral from Mariposa to El Portal by way of Merced Canyon.

When the present highway commission took office in 1923 it found some work authorized on this project, which would complete the road as far as Briceburg on the Merced River, 16.5 miles from El Portal. The commission viewed a Yosemite entrance as the major recreational highway of California, an attitude concurred in by the Governor, and despite heavy grading necessary throughout most of the canyon, immediate construction was deemed justified.

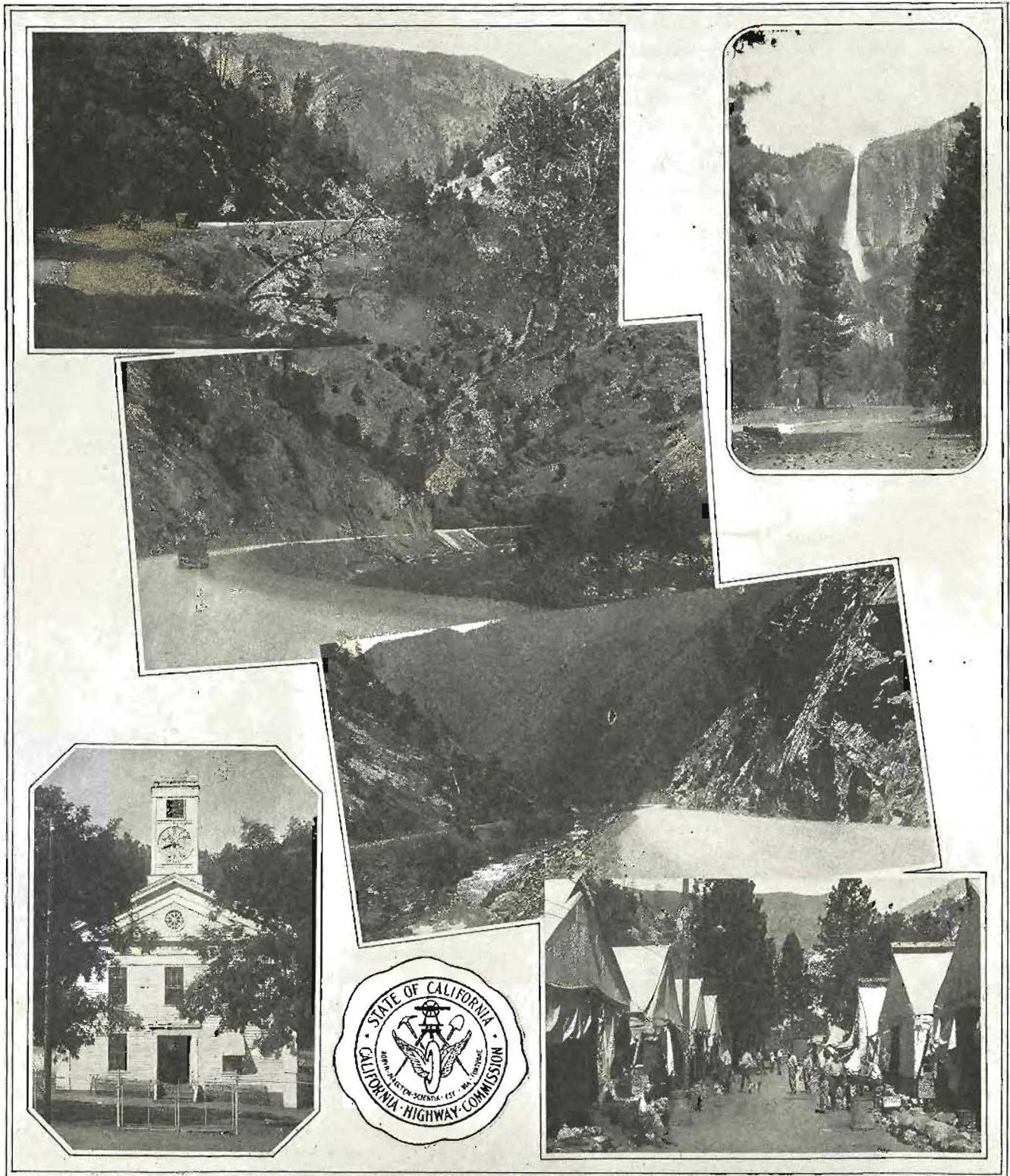
Trial of New Pay Law.

The project also was believed ideal for a thorough trial of the new convict pay law which had been passed by the 1923 session of the legislature; accordingly the first camp of San Quentin prisoners was established at Briceburg in November of 1923.

Later, in December of 1925, a second camp of Folsom prisoners was put to work at the El Portal end; grading operations were continued from both directions until the two crews met, when the camps were consolidated at the South Fork. A crew will be continued at the latter point until considerable surfacing has been completed.

W. B. Albertson has been superintendent of the San Quentin camp throughout the operations and since the consolidation of the Folsom camp with his, he has had charge of both crews.

PRISONERS COMPLETE ENTRANCE TO NATIONAL PARK



IN MERCED CANYON—Views in Merced River canyon on new Briceburg-El Portal section of the Yosemite lateral which opens Yosemite Valley to motor travel at all seasons of the year. *Upper right*, Yosemite Falls, world's highest water fall, an objective of the new road; *Lower, left*, old court house at Mariposa, landmark on the highway into the park; *Lower right*, scene at South Fork prison camp after work for the day is over.

GOVERNOR DEDICATES MERCED CANYON ROAD

(Continued from page 3.)

During the period of construction the average number of prisoners employed was over 200, together with an average of some twenty or more free men. Eight hundred prisoners have been sent to the project, of which number approximately 500 have been discharged or paroled during the progress of the work. After charges authorized by the law are deducted, net earnings of prisoners employed on the Yosemite highway to date total approximately \$59,000, of which \$20,000 has been allotted to dependents. The average net earnings per man per day has been about 31 cents. At present about 170 prisoners are on the job.

Before construction began a thorough study was made of the Merced canyon by engineers of Division VI and representatives of headquarters. A previous survey had been run on a location high up the slopes of the canyon away from the river. This line was abandoned for one near the water, more desirable from

Macadam Pavement Planned for Next Year.

Additional funds to the amount of about \$112,000 are being held in trust in San Francisco to finance paving. The money was raised in 1919 by automobile clubs and civic organizations by the sale of automobile permits to enter Yosemite Park, under an agreement with the Secretary of the Interior that the money would be held until the State completed the grading. It is proposed to use this fund next spring to defray the cost of placing an oil macadam surfacing on the Merced canyon section. Prisoners to be retained at South Fork will be engaged during the winter in the production of the necessary crushed rock.

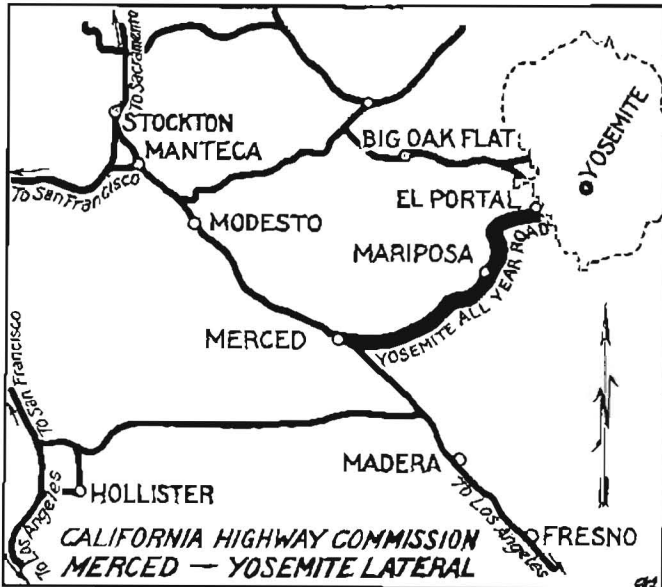
The highest point on the Merced-El Portal lateral is at Bear Creek summit which the highway crosses at an elevation of 2974 feet as compared with an elevation of more than 6,000 feet on other entrance roads to the Valley. The elevation at El Portal is 1924 feet.

It is a happy coincidence that the dawn of all-season motor transportation for Yosemite Valley comes almost to the day of the seventy-fifth anniversary of the discovery of the Valley by the Mariposa Battalion. Dedication of the highway will be the opening event of Yosemite's two-day Diamond Jubilee celebration. National and State leaders will participate in the ceremonies and the speaking program will take place at the Clark Ranch near Mariposa on the morning of July 31st.

Chairman Harvey M. Toy of the California Highway Commission will be introduced as chairman of the day by Richard Shaffer of Merced. Governor Friend W. Richardson will make the principal address. Others invited to participate are:

Julian H. Alco, State Prison Director; Nelson T. Edwards of Orange, Highway Commissioner; Dr. L. I. Hewes, Chief of Western Division, United States Bureau of Public Roads; Henry W. Keller, President, Automobile Club of Southern California; Stephen T. Mather, Director National Park Service, Washington, D. C.; R. M. Morton, State Highway Engineer; H. B. Show, District Forester, United States Forest Service; H. J. Brunner, Chairman Good Roads Committee, California State Automobile Association.

At the conclusion of the dedicatory exercises, the assembled officials will lead a motor caravan over the new highway from the Clark Ranch to Yosemite Valley. En route, two brief stops will be made at Briceburg and El Portal, where it is proposed to dedicate bronze plaques to the convicts from San Quentin and Folsom prisons, whose toil has made Yosemite Valley an all-year motorland, available to the nation.



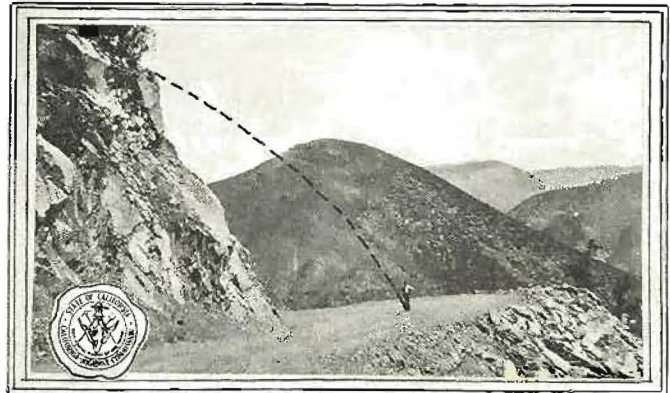
the point of view of the motorist and less expensive because of reduced yardage to be moved.

High Standards Prevail.

A roadway of high standards has been literally blasted from the rocky walls of the canyon. The roadbed has a minimum width of twenty-six feet and in many places is much wider. In the entire section of 16.5 miles, from Briceburg to El Portal, there are only three curves with a radius of less than 500 feet. The prevailing grade varies from 1 to 2 per cent; the steepest pitch on the whole section is a few feet of 4.58 per cent grade beyond Sweetwater Creek. There are, of course, steeper grades on the sections between the San Joaquin Valley and Mariposa, built a number of years ago, and between Mariposa and Briceburg, but all are within 7 per cent and may be made in high gear by almost any make of car. The different sections demonstrate the increasing standards of State highway construction.

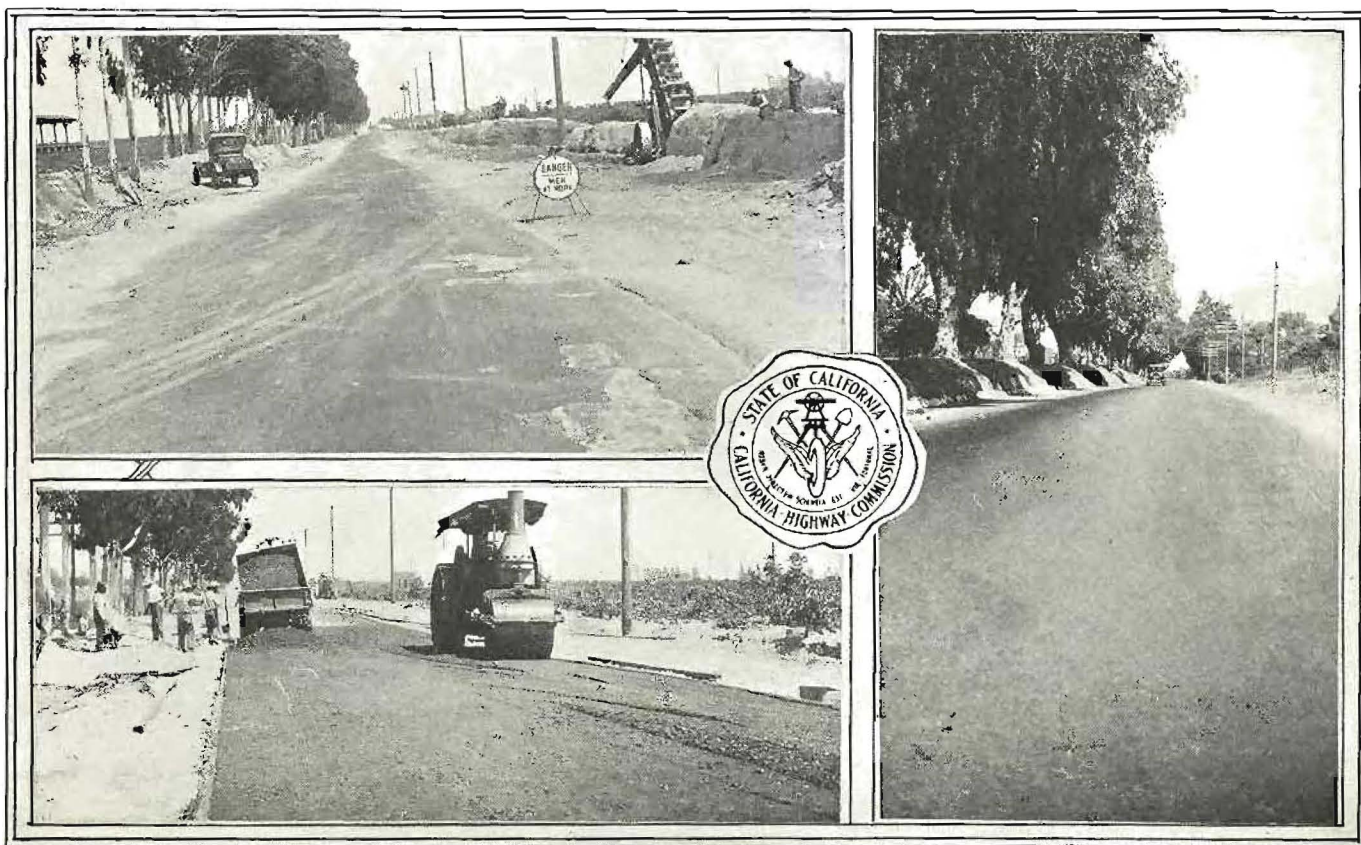
Approximately 1,000,000 cubic yards of earth and rock have been moved on the Briceburg job. In addition a crushed rock surfacing, four inches thick and twenty feet wide, has been applied. Five bridges have been necessary across Bear Creek, Slate Gulch, Sweetwater Creek, South Fork and Merced River. The grading, the surfacing, and the bridges represent an expenditure of approximately \$1,200,000.

Five



Widening on Yosemite lateral in vicinity of King Solomon Mine, Mariposa County. Material between dotted line and bank was removed to widen curve and improve safety of highway. Work done by maintenance forces of Division VI.

RECONSTRUCTED PAVEMENT CONNECTS ONTARIO AND RIVERSIDE



ONTARIO TO RIVERSIDE—Reconstruction of state highway between Ontario and Riverside, Riverside County, has been completed by Division VIII. *Upper*, condition of old fifteen-foot base prior to placing of new surfacing; *Below*, work under way; *Right*, new twenty-foot asphaltic concrete pavement with graded shoulders.

“STRAIGHT FROM THE CHIEF”

(Continued from page 2.)

The possibility of saving time is a financial asset to the road user, and is a part of his return for the tax money which he pays for State highways. An unexpectedly encountered obstruction, whether it be a fallen branch from an overhanging tree, an excavated pavement, or a section of rough going, threatens the life and property of the motorist, especially in night driving.

The standing of the Maintenance Department with the public as an efficient organization is affected by the quality of the maintenance performed on the highways. Its position as an efficient branch of the State Highway organization is best effected by the evolution of better methods and reduction of costs.

Any amateur can take some one else's money and accomplish a desired result. The real accomplishment is to set a high-class result at small cost. This is the problem the maintenance engineers and foremen on the California State highways are wrestling with, and we want the balance of the organization and the public to give them full credit for their many accomplishments.

MAINTENANCE WORK PLEASES

MAINTENANCE work on all unconstructed state highways, which became general throughout the state on January 1st of this year in accordance with an act of the 1925 legislature, already has resulted in the improvement of many miles of county road. It is the purpose of the commission to improve traffic

conditions until such time as final location and construction can be undertaken.

Among the roads taken over by the commission on a designated state highway route was the county road from Middletown to Lower Lake, Lake County.

C. C. Donovan, well known citizen of Santa Rosa, writing to Chairman Harvey M. Toy, has this to say of what has been accomplished on this road by Division I:

Allow me to congratulate and thank you for the work now going on in improving the Middletown-Lower Lake road.

The straightening out of the dangerous curves on that road will, I think, prevent many accidents with the coming traffic on the completion of the Carquinez Bridge next March.

Every tourist going into Lake County over that road will be grateful to you for the work now being carried out.

DELIVERING CONCRETE MIX AT TWENTY MILES PER HOUR

TO EXPEDITE the work and cheapen the cost, Gutleben Brothers, contractors for the State on the Rio Hondo Bridge on Whittier boulevard, Los Angeles County, have constructed a novel motorized outfit for delivering concrete mix.

A second-hand Ford automobile with the wheels and body removed was fitted with flanged wheels for operation on an industrial railroad. A riveted sheet steel hopper takes the place of the body for carrying the concrete. The mixer dumps directly into the hopper and the driver steps on the throttle and the load is quickly delivered to its destination on the bridge.

A lever near the driver's seat makes it possible to release the mix on either side of the hopper as desired. The speed at which a load of fresh concrete may be delivered makes the apparatus very effective, in the opinion of the contractors.

WORK OF DIVISION VIII DEMONSTRATES PRACTICABILITY OF ECONOMICAL MAINTENANCE OF DESERT ROADS

THE FOUR major interstate connections of southern California—El Centro to Yuma, Mecca-Blythe highway, National Old Trails, Barstow to Topoc, and the Silver Lake cut-off—reach the state's eastern border after traversing many miles of desert country. A fifth, the trunk highway east of the Sierra, extending from Mojave to Owens Valley and beyond, also crosses many miles of sandy wastes. Increasing transcontinental travel demanded improvement of these desert trails, but little was attempted by the State until after the present commission took office in 1923.

In justice to users of the interstate connections, it was decided that at least maintenance should be undertaken. The first step in this program was to relieve Division VII of the burden of the desert roads and to set up a new division with headquarters in San Bernardino. To this new organization, designated Division VIII, was transferred all state highway work in San Bernardino, Riverside and Imperial counties, and a study of desert road conditions at once undertaken.

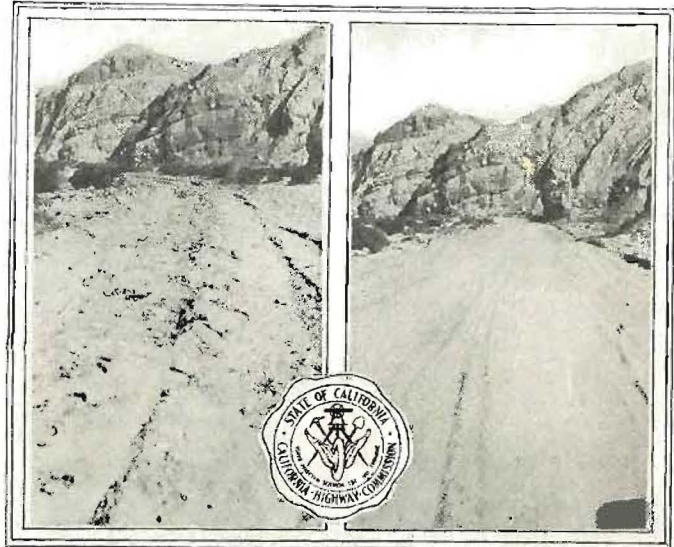
Maintenance Program Authorized.

A program of maintenance was authorized to improve as quickly as possible traffic conditions throughout the length of the desert roads. In many instances it was evident maintenance could with advantage be undertaken over the surveyed location of the highway, and wherever this was possible the winding desert trails were abandoned for the more direct and shorter routes.

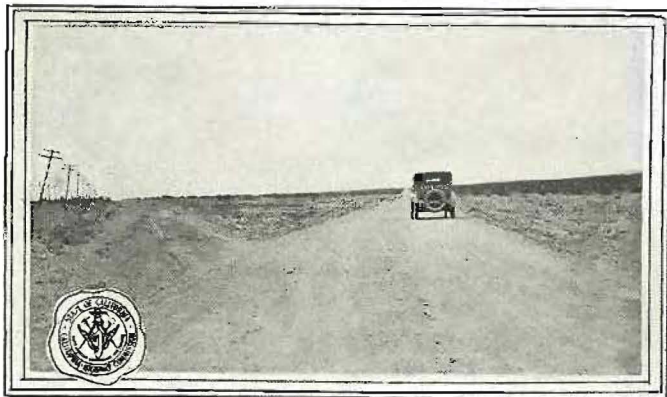
Tractors, trucks, scrapers, and drags comprise the bulk of the equipment in use. With the exception of the Silver Lake cut-off, which was added to the highway system in 1925 by legislative act, work on the desert roads was fairly well under way in 1924 and up to the present time excellent progress has been made. It was found the bugaboo of the desert, that had prevented construction because of a lack of large amounts of money for permanent improvements, was largely a myth. Remarkable changes were

The work has been facilitated by the loyalty of the maintenance foreman and crews sent to work in these distant and uninhabited sections, where heat and lack of water are only some of the difficulties to be encountered. It has been necessary to so do the work that the dragging would produce a surface without rain or artificial sprinkling to pack the road. To determine the best means to this end has required much patient study and experimentation.

Many users of the highway familiar with past road conditions on the desert have not hesitated to commend in highest terms



MECCA-BLYTHE HIGHWAY—Before and after state maintenance in Box Canyon east of Mecca, Division VIII.



DESERT LINE CHANGE—Old road wanders to left, new road cuts distance by direct line across the wastes. Maintenance work by Division VIII near Ludlow.

wrought in a comparatively short time with an expenditure of a few hundreds of dollars per mile.

Maintenance Becomes Construction.

Running time for a motor trip across the desert was greatly reduced and in some instances cut almost in half, while the discomforts as far as rough roads were concerned were largely removed. Constant dragging with placing of some rock surfacing on the most sandy section was the plan followed by the Division. Where the work is being done on final locations, this form of maintenance in a few years will provide a completely graded and surfaced highway at a minimum of expenditure.

what has been accomplished. Recently there was added to these words of approval of the course followed by the commission, the testimony of Phil Townsend Hanna, the well known editor of *Western Highways Builder*. After a trip over some of the Division VIII desert roads, he writes as follows:

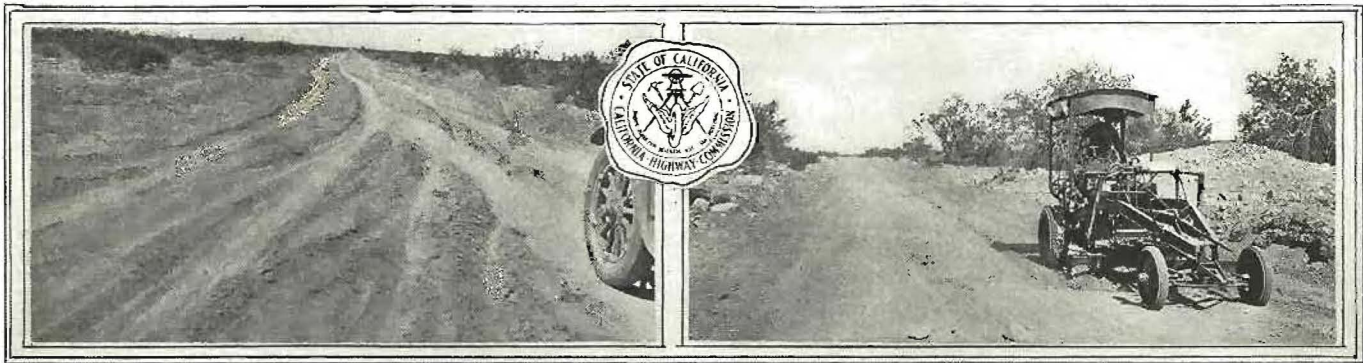
Keeping everlastingly at it, some sage once remarked, brings success. Keeping everlastingly at maintenance, to paraphrase this aphorism, is the secret of the satisfactory road. No road, regardless of type, will long endure without continuous maintenance. Maintenance, of course, varies in intensity in inverse ratio to the quality of the road. Hard-surfaced roads require less than gravel-surfaced highways and gravel-surfaced less than natural earth roads. But no type escapes the necessity for constant repair and conditioning.

Customarily, maintenance follows construction, but occasionally it precedes construction and, even less frequently, it becomes a construction operation. Such is the case of what is known colloquially in southern California as the Silver Lake, or Arrowhead Trail cut-off. This road is an important link in the Arrowhead Trail, stretching from Daggett, in the center of San Bernardino County, to the California-Nevada State line, south of Jean, Nevada. * * * The road was added to the state highway system by a legislative act of 1925 and maintenance operations started in November of the same year.

E. Q. Sullivan, division engineer of the California Highway Commission at San Bernardino, under whose jurisdiction the maintenance work is performed, found many discouraging obstacles when work was started. For its length of practically 108 miles, the cut-off was virtually uninhabited. It crossed the northern end of the Colorado desert, the heat from which complicated the labor problem and necessitated the installation of complete motor-driven equipment.

San Bernardino County had expended more than \$35,000 to make a passable road of the cut-off when the State took over the work, but it was little more than two rutted wheel

INTERSTATE CONNECTIONS BENEFIT UNDER NEW POLICY



DESERT MAINTENANCE—Before and after scenes on a section of desert road in Division VIII.

tracks across the desert, the mesas and the mountains. Soil conditions varied along the route from fine sand to rough volcanic rock and malapai. The topography of the country, however, is rolling and the problem of gradients was reduced to a minimum, despite the fact that the road varies from 900 to 4700 feet in elevation. The chief difficulty confronting the maintenance crews was the elimination of unnecessarily sharp curvature and the development of ways and means of improving the surface.

Equipment Employed.

When maintenance started, 15 men were employed, operating one Best 60 tractor in combination with a 12-foot Adams leaning wheel grader; three Spearwell Big 8 one-man maintainers, McCormick-Deering powered; two 2-ton Holt tractor-Fresno combinations and sufficient trucks and small equipment. Camp was established at Baker, on the Tonopah and Tidewater Railroad, approximately halfway across the project, and operations were started in both directions from the camp. Heavy grading was accomplished with the Best-Adams outfit and the Holt-driven Fresnos, and light grading with the Spearwell maintainers, the latter averaging upward of 20 miles of work each day.

Experiments Demonstrate Best Methods.

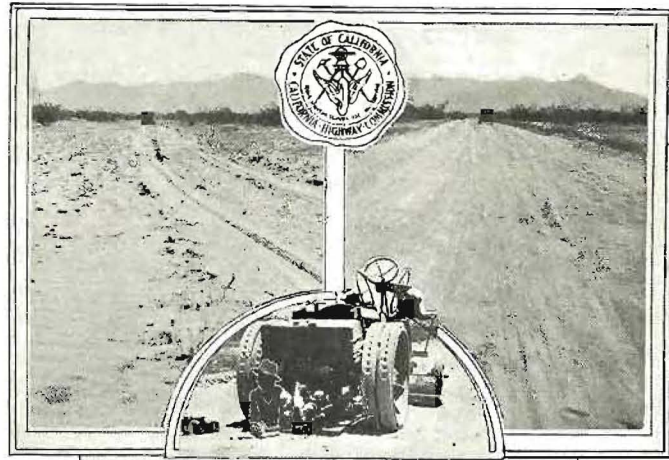
The light sandy stretches provided cause for experimentation. For several weeks maintenance forces found it necessary from time to time to snag cars that had become stalled in the sand. Experimentation revealed a rather simple but interesting solution for this problem. The entire roadway was ploughed to a depth of a few inches and then dragged with a light drag. This had the effect of hardening the entire roadway and provided adequate traction.

Traffic over the cut-off has averaged approximately 150 cars a day but as this is written, the summer touring season is opening and vehicles employing the road are rapidly multiplying. The maintenance crew, therefore, is being augmented considerably. It is six months since maintenance on the cut-off started and today it is veritably a boulevard. Motorists travel from Barstow, California, to Las Vegas, Nevada, a total distance of 160 miles, in six hours with ease and many have gone over the road in 5 hours. When the Committee of Nine, authorized by the Legislature, made an inspection trip over the road a year and a half ago, they required an entire day to negotiate the same distance and were forced to carry provisions, adequate supplies of water, gasoline and oil, for there were no filling stations or sources of supply over the entire road. Now filling stations and provisions may be obtained every few miles and the trip is a mere jaunt. All of which is directly traceable to the efficient maintenance that has been done.

Economy Features Work.

As remarkable as any phase of the work, has been the economy with which it has been conducted. When the State took over the route for maintenance, the highway commission made an annual appropriation of \$100,000, of which \$50,000 was

to be spent on maintenance and \$50,000 for improvement. On May 1, some six months after work started, a total of but \$17,400 had been spent on the road. Of this sum, 90 per cent was employed on the 70 miles immediately west of the Nevada State line, thus putting this section in first-class shape at an average mile cost of about \$233. The remaining section of the road has been worked over once or twice and will be subjected to intensive maintenance for the next few months, but even so, it is believed that the cost of maintenance and improvement will fall far below the estimate.



ON THE DESERT—Work of Division VIII on National Old Trails. Views show condition before and after road was taken over by state. Insert, tractor operator crawls under machine to eat lunch, the only shade for miles around.

DESERT HIGHWAY WORK PRAISED

State Highway Commissioner N. T. Edwards is in receipt of a communication from H. A. Lake, prominent Garden Grove man, complimenting the commission on the excellent condition of the desert highway in San Bernardino County.

Lake states that his party made the tour from Garden Grove to Kingsman, Arizona, a total distance of 356 miles in ten hours.

This road leaves San Bernardino via the Cajon Pass and then proceeds through Victorville, Barstow and Needles.

Lake writes: "The highway is extra fine."—Orange News.

Some men are successful chiefly because they didn't have the advantages others had.—Columbia Record.

First try your hand at something, and if you fail try both hands. Then, if unsuccessful, try using your head.—Pure Oil News.

OILING MAY SOLVE DUST PROBLEM ON UNPAVED HIGHWAYS

OILING of a considerable mileage of earth and rock surfaced highways has been under way by maintenance forces throughout the state during the present Summer. The object of oiling the state highways is dust prevention, while in some sections it is taking on the added characteristics of an oil macadam surfacing. In all instances a fuel oil is being used.

Oiling is being done on highways in Imperial Valley and other sections of Division VIII, on the Redwood and Pacific highways, in Divisions I and II, and also on unpaved highways of Divisions III, IV, V, VI, IX, and X. Reports from various parts of the state indicate success but it will be some time before a final estimate of results of the Summer's work can be made.

On most of the mountain roads applications have been light and have been made as a dust palliative only. More permanent work is being done on sections of the Pacific Highway, in Shasta and Siskiyou counties, and also on the Redwood Highway in Mendocino and Humboldt counties. On the latter routes, which already have been surfaced with crushed rock, larger applications of oil are being made for the purpose of forming a bonded surface.

Applications Vary With Conditions.

The amount of oil applied varies with the purpose in view and the condition of the road. Where the rock surface has been packed firmly, it is swept clean of dust and an oil of 60 to 65 per cent asphalt is applied under pressure in two applications of 0.25 of a gallon each per square yard. The oil thus applied is allowed to penetrate downward into the road and is not absorbed on the surface by application of additional rock. When necessary it is heated before application. The purpose of permitting the oil to seep into the road is the formation of an asphaltic bond.

Where the use of the oil is as a dust palliative only, the highway is not swept, the oil being applied directly on the road surface at the rate of one-tenth to one-seventh of a gallon per square yard. An oil of 40 to 45 per cent asphalt is applied under pressure without heating and the quantity used is varied according to the amount of dust. Oil thus applied gives body to the dust the same as water sprinkling but it is much more durable.

There is every reason to believe that the new plan will prove cheaper than applications of calcium chloride or sprinkling with water and much more satisfactory. It is evident, too, that the plan is meeting with hearty approval upon the part of the public. Except in a few instances where traffic has followed immediately after the application of the oil, there has been no inconvenience to motorists.

Conditions Commended.

Among comments received from users of the highways is the following letter from Frank A. Kent, of Stockton, Secretary of the American River Summer Home Association. Writing to Division Engineer F. W. Haselwood, he says:

I have just returned from a trip over the Placerville road to Lake Tahoe, coming down through the heavy travel the last week end.

While up the Canyon, I had the opportunity of interviewing quite a number of those using the road, and they were loud in their praise of the work of the Highway Commission in oiling the road. It is a wonderful piece of work, and has certainly added immensely to the comfort of the trip. We have been informed that it is contemplated giving the road a second treatment of oil sometime during July.

As we are called upon frequently to register complaints, it is indeed a pleasure to be able to write something more pleasant. I am sure that those who are responsible for securing this oil are entitled to the thanks of every person traveling the road.

We are hoping that this good work will continue, and if there is any place along the way where we can be of service to you, do not hesitate to call upon us.

Lake Supervisor Comments.

The following has been received by Chairman Harvey M. Toy from Supervisor T. A. Read of Middletown, Lake County.

"I wish to thank you and the other members of the Highway Commission for the splendid work you had done in oiling the street in Middletown.

"I know I express the appreciation of the entire community as well as the traveling public for this work. Before it was done the dust was almost unbearable."

Protects Adjacent Orchards.

Prevention of dust is of value not only to users of the highways but to adjacent property owners as well. Particularly is this true where the roads are adjacent to fruit orchards and vegetable gardens. A letter to Division III from James Mills, Jr., manager of the large Mills Orchard properties at Hamilton City, Glenn County, expresses this point of view. The letter reads as follows:

"The splendid work done in the oiling of the Chico-Orland highway through our property has been of great benefit to us in holding down the dust and thus keeping our orchards in good shape, and we wish to take this opportunity of thanking you for your very prompt attention to the matter."

Sufficient funds to carry on this type of maintenance were not available prior to 1923 when the two-cent gasoline tax law was signed by Governor Friend Wm. Richardson.

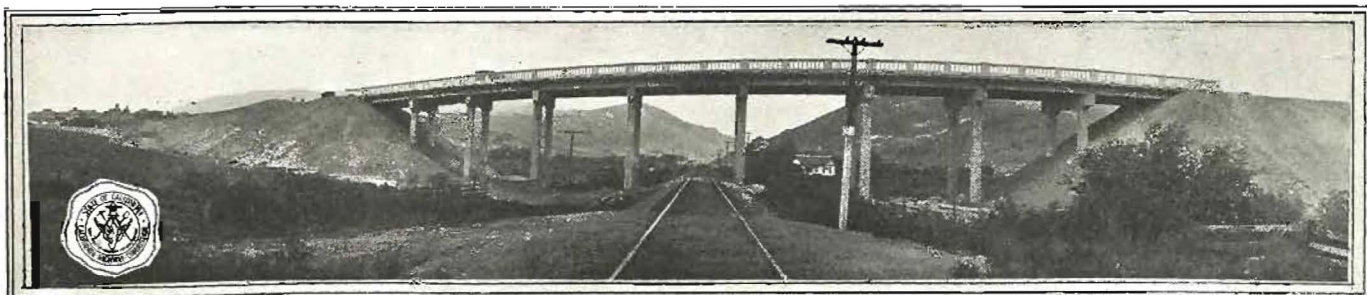
Effective Method.

"Black boy, what yo' all runnin' fo'?"

"T'se gwine to stop a fight."

"Who all's fightin'?"

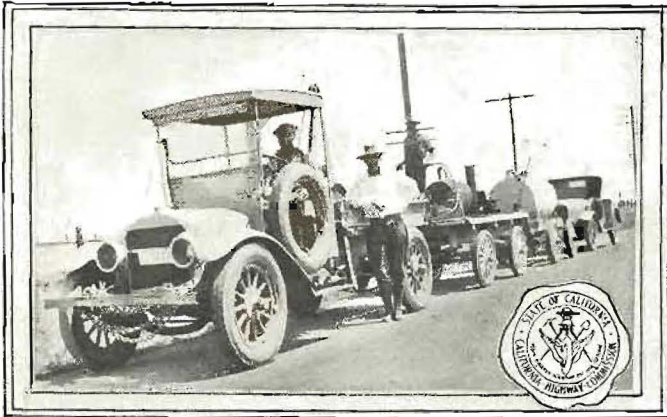
"Jes me an' anothah niggah."



PISMO OVERHEAD—Grade separation over Southern Pacific Railroad on Coast highway at Pismo Beach, San Luis Obispo County, showing new highway location which eliminates dangerous curves. New highway now open to traffic.

COMMISSION HELPS FARMERS FIGHT SPREAD OF PUNCTURE VINE

IN ALL parts of the state maintenance forces of the California Highway Commission are aiding farmers in an effort to control weed pests along the right of way. In recent months these efforts have been centered upon an attempt to stop the spread of puncture vine. Several methods have been tried but spraying with oil rather than cultivation seems to be the most effective.



Puncture vine spraying outfit, Division III, Glenn County. Maintenance of state highways includes assistance to agriculture by eradication of weed pests on the highway right of way.

The following letter comments upon the work of a Maintenance Superintendent of Division X:

F. B. McKEVITT COMPANY
Growers and Shippers

Vacaville, California,

July 8, 1926

California Highway Commission,
Sacramento, California.

Gentlemen:

I wish to take this opportunity of commending your Mr. Caine for the very efficient measures he used in treating the puncture vine which he found on the highway two miles southwest of Vacaville. He has been very active in looking for the puncture vine and is doing a very common sense job in cleaning it out.

* * * * *

We want to thank your department for the interest that you are taking. Would like to suggest that a record be kept of the location of any cases of puncture vine so that this ground can be more readily inspected in the early summer of



RIDGE ROUTE LINE CHANGE—Callahan line change as it looks today. New line eliminating curves has been paved with oiled macadam. Photo by Division VII.

1927 and the oiling done before the formation of the burrs, should any of the plants come back.

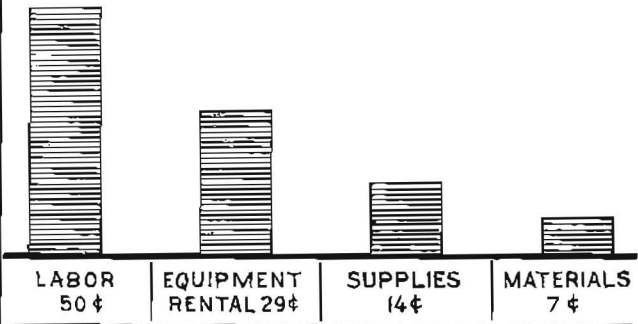
Thanking you for your efforts, I remain,

Yours truly,

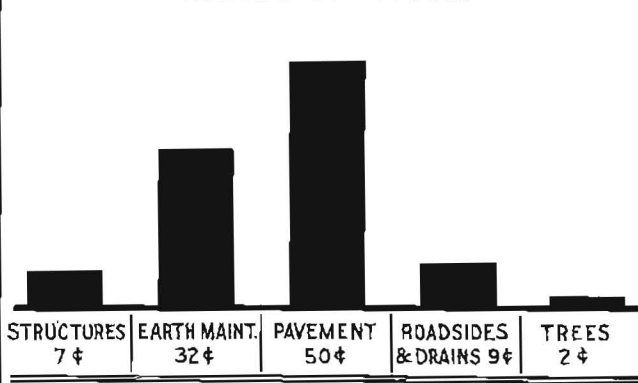
F. B. McKEVITT, Jr.

CALIFORNIA HIGHWAY COMMISSION 1925 MAINTENANCE DOLLAR

CLASS OF EXPENDITURES



CLASS OF WORK



A GRAPH which will give the public an idea of how the Commission expends maintenance funds on the State highway has been prepared by the Maintenance Department, covering the work of this character done throughout the State for the year 1925. An original graph showing expenditures for Division III was submitted by that division and was revised to cover maintenance for the State as a whole.

Details of Classifications.

The department gives the following explanation of the character of expenditures included within each of the classifications:

STRUCTURES—includes all work incident to the upkeep and restoration of walls, culverts, bridges, guard rails, fences and signs, also the minor additions thereto.

EARTH MAINTENANCE—includes the regrading and shaping of shoulders and roadsides of paved roads and the regrading and shaping of any portion of the width of unpaved roads, also the removal of slides.

PAVEMENT—includes all work connected with the upkeep and restoration of pavements, and of the surface for the width of the traveled way on unpaved roads. The application of dust preventives is included in this item.

ROADSIDES AND DRAINS—relates particularly to the clearing and cleaning of roadsides and water ways, the removal and destruction of noxious weeds, the trimming of trees and brush to give greater vision, etc.

TREES—relates particularly to the trees which have been planted upon the State highways for the purposes of shade and ornamentation. It includes planting, watering, cultivating, trimming and all other work incident to the care and preservation of such trees.

HIGH ARCH BRIDGES PART OF PACIFIC HIGHWAY RELOCATION

RELOCATION of the State highway through the Sacramento canyon in northern Shasta County includes the building of four major bridges, three of which will be of the arch type. One of these, the Charley Creek arch, has been completed; a second, at Doney Creek, is under way, while a third at Dog Creek is about ready for contract. All three arches span deep canyons where considerable saving in distance is being made with decided improvement in alignment and grade. Reinforced concrete is the material being used.

The new structure at Charley Creek, now open to traffic, saves a half mile of six per cent grade and eliminates seven sharp and dangerous curves. Four approach spans at either end and two eight-foot pilasters lead up to the central feature, a 147-foot spandrel arch, at present the highest on the State highway system. The distance from the creek bed to the roadway of the bridge is 120 feet. The total length is 394.5 feet.

Resident Engineer Describes Construction.

The depth of the canyon and the steepness of its slopes make the Charley Creek location ideal for a structure of the arch type, says Resident Engineer W. H. Johnson, of the Bridge Department, who tells of construction details, as follows:

Charley Creek is a small stream and the flow of water did not interfere with the erection or maintenance of the arch centering. The contractors were successful in designing and constructing a light falsework which was carried up in 20-foot bents, at 14-foot centers, 4" x 6" caps and posts being used. At the bottom of each bent 2" x 6" scabs were nailed on each side to take up some of the thrust and

hold the posts in place. Cables attached to each side at the top of the false work held it rigid while pouring of concrete was taking place.

In order that no unequal strain would be thrown on any part of the structure, care was taken to pour the fresh concrete to the same elevation at both sides and ends of the arch. The false work was built to provide for an estimated settlement of two inches, and when the centering was struck the arch crown was on exactly the plan elevation.

For finishing the structure, a mixture of one part of fine sand, two parts of cement, and an amount of calcium chloride equal to five per cent of the cement was mixed with water and used as a paint on the exterior. After this application had set, which took from a few hours to several days according to weather conditions, the brush coat was dampened and rubbed with a carborundum stone until it lathered and filled the air pockets. It was then brushed out with a wet brush to a smooth surface.

The contractors also took great care to keep the lines true and the forms well tied. There was no bulging of forms. The concrete also tested well. Deck concrete, Class "A" (six sacks of cement per cubic yard), averaged 3586 pounds per square inch; abutment concrete, Class "B" (five sacks of cement per cubic yard), averaged 2530 pounds per square inch, while that in arches and columns, Class "F" (seven sacks of cement per cubic yard), averaged 4650 pounds per square inch.

Workmanship throughout was of high order and the result insures a lasting and beautiful structure. The neat finish of the long columns, the arched fascia beams, and the great, high arch will make the Charley Creek bridge one of the attractive features of the reconstruction of the Pacific Highway.

Harlan D. Miller, bridge engineer, had general direction for the State. Bordwell and Zimmerman of Napa were the contractors.

RESULTS ON NORTHERN ROADS SHOW WISDOM OF STATE MAINTENANCE

(From the Redding Courier Free Press.)

THE ROAD from Redding to Fall River Mills, a portion of the Redding-Alturas lateral, and the road from Redding to Weaverville were never in better shape than they are right now. The State Highway Commission took over these roads so far as maintenance is concerned on January 1st, last.

The roads are now so well surfaced that they are but little inferior to the paved portions of the state highway.

The condition of these laterals is striking evidence of the wisdom of placing road construction and maintenance in the hands of engineers who know how. In years past, when all the country roads were in the hands of the county officials, those placed in charge of overseeing roads were good citizens, of course, and well meaning citizens, too, but they knew little of the engineering of road construction and maintenance. Thousands of dollars were thrown away, as everybody knows, but now that the work is in the hands of the State Highway Commission and its engineers, road building and road repairs have been made to endure and the work has been done in a know-how way.

H. S. Comly, Division Engineer of the second division of the state highway, has an able body of road builders at his command, as judged by the work that has been done in and around Redding, and it is also true that the fine condition of the Weaverville and Alturas laterals is largely due to his management.

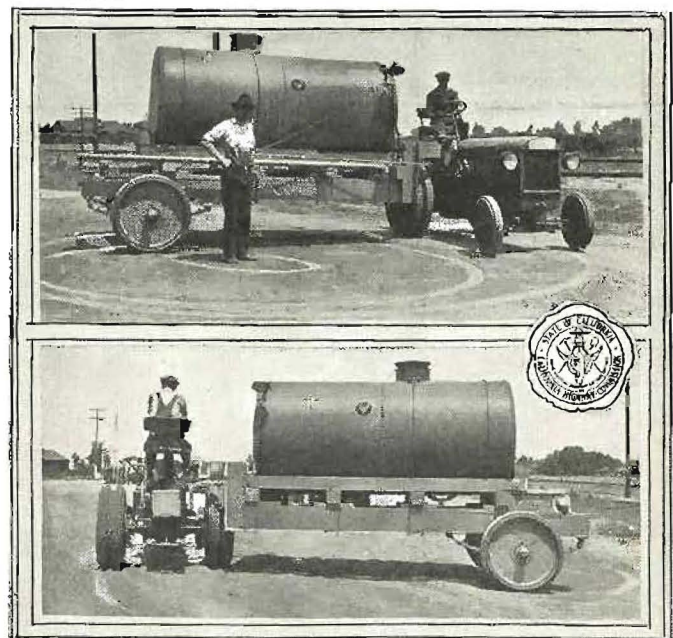
NEW TREE WATERING OUTFIT OF DIVISION VI CUTS COSTS

RENTAL of equipment used for watering roadside trees has been reduced 50 per cent, Division VI reports, by the use of a tank trailer hauled by a McCormick-Deering tractor. The new equipment is now in use on the 17-mile section south of Bakersfield, where trees planted under desert conditions require much water during Summer months.

The new equipment replaces two Packard trucks which accounts for the big saving in rentals. The tank-trailer also has the fur-

ther advantage of a short turning radius as shown in the illustration. It can be turned around in a space of 17 feet.

The outfit is equipped with lights and the sides also are illuminated at night when turning for the prevention of accidents. During the season when watering is not necessary, the tank may be removed from the trailer permitting its use for other purposes.



Division VI tree watering outfit which has cut cost of this work. Water tank can be removed and trailer used for other purposes during winter.

WHAT THE DIVISIONS ARE DOING

STATE MAINTENANCE ON REDWOOD ROUTE BENEFITS TRAFFIC

BY AUGUST 1st maintenance crews of Division I expect to have finished the improvement of nearly thirty miles of unconstructed highway on Route I in northern Humboldt and southern Del Norte counties. The work, which has been under way for over two months, consists of widening the existing county road at curves and the construction of additional turnouts.

The old road, inadequate for the rapidly increasing traffic of the redwood country, has been extensively improved under the new policy of State maintenance, which was authorized by the last legislature. On the section mentioned more than 100 blind curves, formerly too narrow for machines to pass, have been widened to 20 and 30 feet. Additional turnouts to the number of more than 100 have been built so that for a considerable portion of the distance a two-way road has been provided.

Small Shovels Prove Effective.

Two Insley power shovels, of the type operated by a Fordson motor, have been used on this job. These narrow shovels offer

results, the cash expenditure has been very modest, while traffic conditions have been materially improved pending the day when construction of a high standard highway can be completed.

J. J. Stockard of Division I has had general charge under the direction of Division Engineer T. A. Bedford. Lee Lane and Walter Tracy were the maintenance foremen on the job.

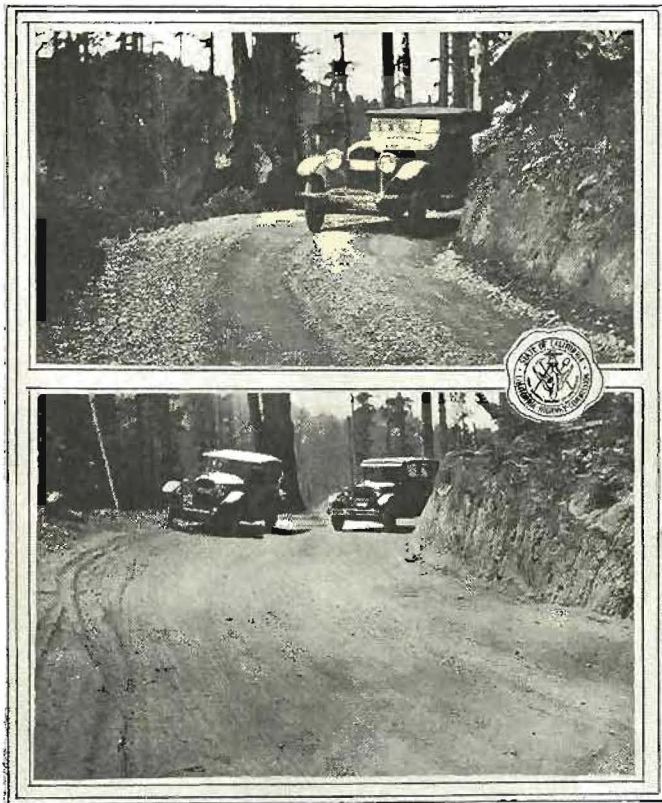
DIVISION V.

HEADQUARTERS, SAN LUIS OBISPO.
L. H. GIBSON, DIVISION ENGINEER.

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

STEEL traffic plates have recently been installed in Division V on the San Benito River Bridge between San Juan Bautista and Hollister. Two traffic lanes, as installed, consist of four lines of 20" x 2/16" A. W. steel traffic plates, 707 feet long, fixed by lag screws and bolts to the 4" x 12" planks. The plank floor between the treads is surfaced with a thin protecting coat of oil macadam.

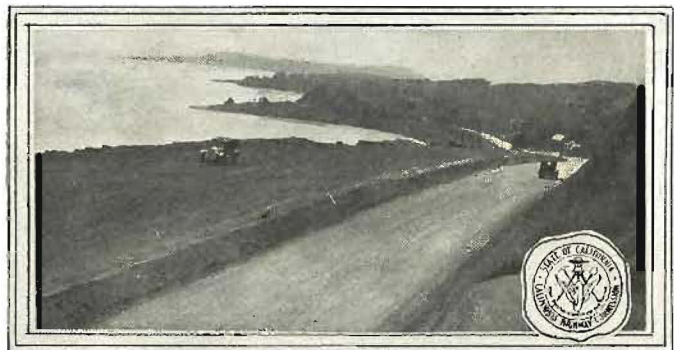
It is somewhat too early to determine just how well traffic will follow the treads. Roy S. Peck, foreman in charge, declares



MAINTENANCE ON REDWOOD ROUTE—Curve widening with maintenance funds on existing county road in Del Norte County. Views show condition before and after improvement by Division I.

less obstruction to traffic than most other equipment; and when attended by a number of three-wheel tractors, they are capable of moving 250 to 400 cubic yards of material per day, where hauling can be combined with overcasting.

Residents of the north coast counties, who are familiar with the past condition of this road, are duly appreciative of what has been done by the state maintenance crews. Measured by the



ORTEGA HILL—New state highway over Ortega Hill south of Santa Barbara, Division V. View shows traveled roadway and wide parking space for lookout over Santa Barbara channel.

that on the day the bridge was opened, women drivers insisted on driving between the plates, men on the plates as intended, while heavy loads and busses took the two center traffic treads.

By the time this is in print, it is expected that Pismo line change will have been completed and opened to traffic. The new sections at Ortega Hill and through Carpinteria have been finished and opened to travel.

DIVISION VI.

HEADQUARTERS, FRESNO.
E. E. WALLACE, ACTING DIVISION ENGINEER.

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

DIVISION VI is planning for the opening of the Briceburg-El Portal highway on July 31st. This section paralleling the beautiful Merced River will open Yosemite Valley to comfortable automobile travel at all seasons of the year. The division has completed the oiling of twenty-five miles of the highway between Mariposa and El Portal in anticipation of heavy travel after the opening date. The oiling is being done as a dust preventive.

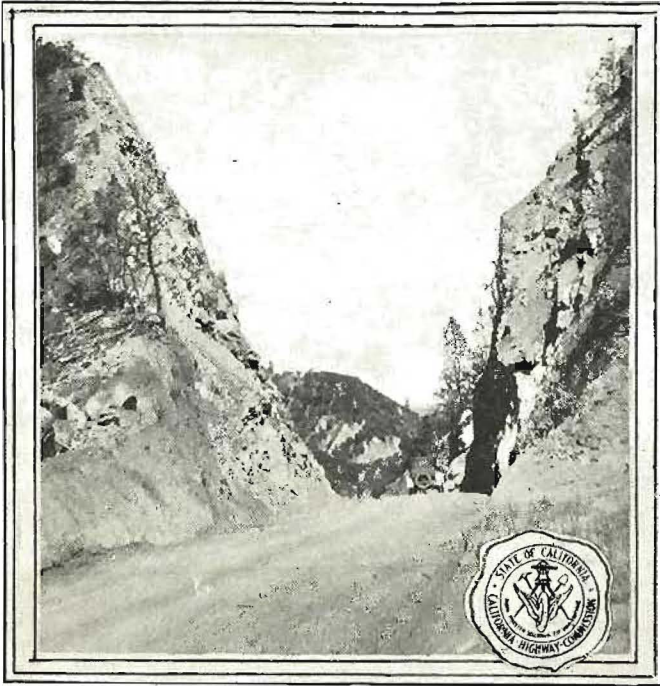
Resurfacing work also has been completed on 2.5 miles of the Merced-Yosemite lateral east of Planada, Merced County. Unevenness of the present 15-foot concrete base has been greatly improved by placing a 2-inch thickness of oil macadam. The work has been done in accordance with the so-called "Riverside County specifications."

County Completes Highway Section.

Fresno County has completed and turned over to the State for maintenance a section of the Sierra-to-the-sea highway west of Coalinga. The last three miles of this road is through a rugged country and required an expenditure of \$150,000 for grading.

The most dangerous point on the Merced-El Portal highway has been eliminated by maintenance forces. At the King Solomon Mine two rock retaining walls were built and grading done at a cost of \$1,300 of reconstruction funds.

Maintenance forces are at work widening the roadway and improving alignment on the Grapevine grade at the north end of the Ridge Route. An appropriation of \$10,000 has been made by the commission for this work.



ON COALINGA LATERAL—Cut 95 feet deep at summit west of Coalinga. Heavy grading for several miles at this location has been done by Fresno County and the road turned over to the state for maintenance.

DIVISION VII.

HEADQUARTERS, LOS ANGELES.

S. V. CORTELYOU, DIVISION ENGINEER.

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

THE 6.3 MILES of cement concrete pavement on the Coast Highway through the Malibu Ranch, between Las Flores and Latigo Creeks, has been completed by Ed Johnson and Sons, contractors. Westerly from Latigo Creek as far as Zuma Creek grading has been completed, and from Zuma Creek to the completed Hauser contract finish grading is in progress.

On the new Coast highway in Orange County, the new concrete pavement between Newport Beach and Corona Del Mar has been completed and opened to traffic. Between Corona Del Mar and Laguna Beach, placing of the rock base for an asphalt macadam pavement has been completed and the placing of the bituminous surface is in progress.

Between Laguna Beach and Serra, grading is practically completed and the placing of the 24-foot crushed gravel surface is now in progress.

Ventura Pavement Completed.

Widening and thickening of the highway with cement concrete from Camarillo to Ventura, Ventura County, has been completed, and construction of rock shoulders is now in progress between Camarillo and Springville.

Grading work has been completed on the Chalk Hill line change in Los Angeles County. The new section of the highway will be paved with a 24-foot oil macadam until the new fills have had time to settle.

BLAST VICTIMS PAID TRIBUTE

THIRTY-FIVE employees of the Commission comprising the maintenance crew of Superintendent A. W. Schmuck of Division VII have joined in asking the *Bulletin* to publish a tribute to two of their deceased associates, who were killed on June 10th last in a premature explosion on the Coast Highway south of Oxnard, Ventura County.

Thomas Gilbride, powder man and Jose Dominguez, his helper, were engaged in placing a charge for a blast in connection with slide removal operations when the explosion occurred. The bodies were never found and it is believed they were hurled into the ocean.

Gilbride was a native of Pennsylvania, 58 years of age. He learned powder work in the mining regions of his native state and had been engaged at this occupation for forty-four years. He had been an employee of the California Highway Commission for fifteen years, having first been employed as powder man on the construction of the Ridge Route. He has done the powder work on many jobs throughout Division VII.

His friends say of him: "Tommy was a cheerful, optimistic Irishman with a good word for everyone. The Division has lost an efficient workman who always did his level best."

Jose Dominguez, 26 years of age, was a willing worker who had been with Division VII for five years. He had been assigned to Gilbride as helper at the latter's request.

No relatives of Gilbride have been located, but Dominguez is survived by a widowed mother and brother.

DIVISION X.

HEADQUARTERS, SACRAMENTO.

R. E. PIERCE, ACTING DIVISION ENGINEER.

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

THE VALLEY Paving and Construction Company has completed the placing of cement concrete shoulders on the Modesto-Stanislaus River reconstruction project, in northern Stanislaus County, and laying of the asphalt concrete surfacing will be under way shortly. Grading and graveling of two line changes to eliminate curves at Salida has been completed. The new grade has been surfaced with crushed rock.

Fuel oil has been tried as a dust preventive on detours alongside the Stanislaus project with considerable success.

Maintenance Activities.

Concrete foundations have been placed under the combination truss span bridge over the North Fork of Calaveras River between Mokelumne Hill and San Andreas. This is one of the county bridges taken over when the State assumed maintenance of the Mother Lode highway.

Repairs recently authorized for numerous bridges in San Joaquin County are now under way.

Division X has completed the oiling of over forty miles foot-hill roads. The results generally are considered satisfactory, the oiling having practically eliminated dust.

Heavy traffic over the mountain highways of the Division was reported over the Fourth of July week end.

TOURING.

First Tourist: "I motored up this way to see the scenery, but 'egads, one can't see anything for the billboards."

Second Tourist: "Yes—the billboards bother me, too—but not as much as the board bills."

DIVISION II MAINTENANCE FORCES BUILD LOADER

MAINTENANCE forces of Division II have constructed a modification of an "A" frame loading device which has proved economical and efficient on small jobs for quickly loading trucks from the roadbed, borrow pits or stock piles. The essential parts consist of a frame fitted to the truck bed to which a single block is fastened, a piece of 3/8-inch cable, a 48-inch fresno scraper with runners removed, and a Fordson or McCormick-Deering tractor.

Necessity for a back line is eliminated by use of the grizzly bars shown in the illustration which make it possible for the scraper to be pulled back by hand.

The device makes use of equipment at hand and cuts down the amount of labor needed on small jobs. From this point of view it is a desirable acquisition of the maintenance forces.

For Light Widening.

It is particularly designed for light widening work and the cleaning of thorough cuts where the loose material to be moved can be readily windrowed by a one-man grader. The windrow is made with the tractor while the truck is dumping and the loading is done directly from the windrow by the scraper.

In operation, the empty fresno is pulled back so as to just clear the lower end of the apron. The truck is then moved forward a few feet drawing with it the apron which is attached

California Highway Commission has contracted with a Phoenix concern for the building of a stretch of asphaltic concrete highway across "the American Sahara" in Imperial County, near Yuma. This road leads through the mysterious, colorful and ever-changing sand dune country. The loose plank road across it has been a bane to motorists, thousands of whom have hesitated at the trip to this scenic wonder.

Incidentally, this new road will complete one more main paved entrance connecting the rest of the west with California's famed chain of highways. One more job to be done, a mean stretch of unpaved road just south of the Oregon line, and California will present an open road to every frontier for the thousands of visitors eager to motor through the picturesque Golden State.



Maintenance section marker on Route 4. Similar markers are being placed throughout the state.

STANDARD MARKERS FOR MAINTENANCE SECTIONS ARE ERECTED

STANDARD markers for maintenance sections are being erected throughout the state by maintenance forces. The signs are 3 feet by 5 feet mounted on two 5-inch by 6-inch redwood posts.

The signs are being placed at boundary lines between sections. Below arrows pointing in either direction are the names of the foremen and places where they have their headquarters. The top of the sign carries the information that the road is a state highway, the number of the route, etc., as shown in the illustration.

By means of these signs, the public may know who is responsible for the condition of the highway and the place where a representative of the department may be found.

PASSING THE BUCK

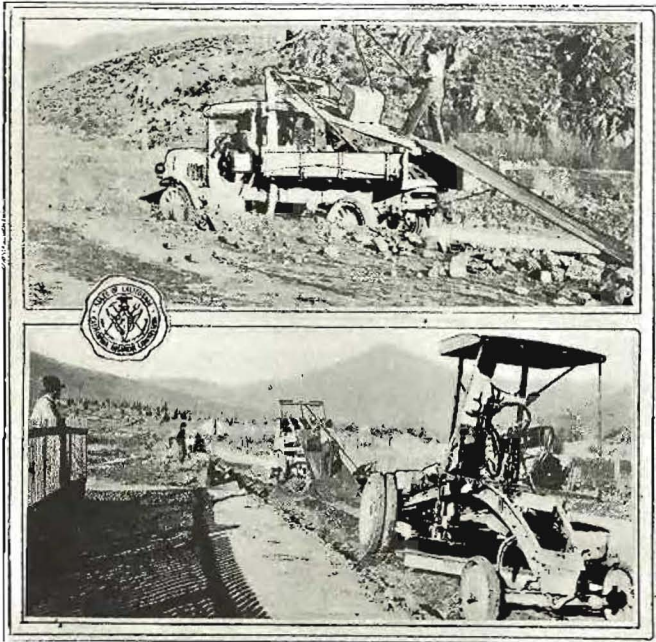
(American Highways.)

THE smaller the political unit compelled to finance a main highway, the greater injustice shown and the less likelihood of having a road improvement to meet the economic need. Yet there are those who would pass the financial responsibility to their neighbors—the national unit to the state unit, and the state unit to the local unit.

It is absolutely unfair for the larger political unit to attempt to make a showing of small expenditures by passing on to the lesser unit its own share of the financial responsibility.

Such reductions of federal expenditures would mean no real saving to the people. Road improvements must go on. Unimproved roads mean added transportation costs. Business, through transportation, has eliminated state lines and made the highways a national function.

There are two sides to every road—the creditor and the debtor. This nation can not ride on one side without returning on the other. Drive to the right.



Device for loading trucks on small jobs worked out by maintenance department of Division II. It is described in this issue.

to the truck by a chain. The tractor then draws the loaded fresno to the dumping point. The usual time for loading is about four minutes.

A crew of three men consisting of a truckdriver, a tractor driver, and a laborer, with one truck and a one-man grader, can loosen and load from 100 to 150 cubic yards of material per day depending upon the length of haul and the nature of the excavation.

A ROAD ACROSS THE AMERICAN SAHARA.

(Lankershim Press.)

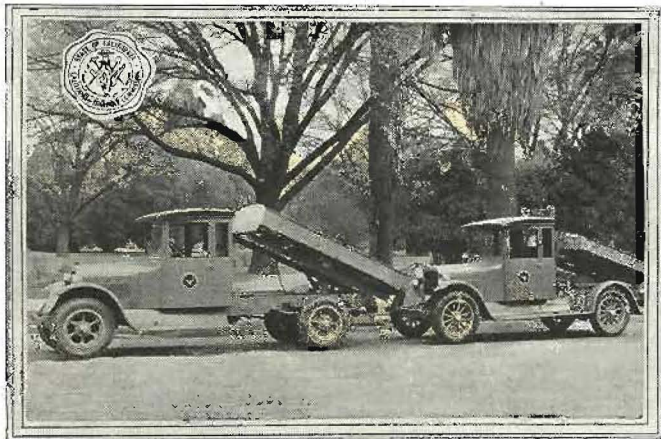
ONE BY ONE, the gaps in the main line highways of the west are being filled in to make better holidays for motorists, which term includes most all of us. Interesting is the news that the

SHOP USES COMPRESSED AIR TO CLEAN TRUCKS FOR PAINTING

AT THE headquarters shop of the California Highway Commission at Sacramento the painting of trucks by compressed air has reduced the cost of this work, as against hand painting, by more than 50 per cent. Formerly it required two men one day to paint a truck by hand brush, but by the air-spray system one man can now paint a truck in one day and do a much better and more satisfactory job, says *Compressed Air Magazine*, a representative of which recently visited the shop.

To facilitate operations, the supply of paint is poured into a bucket which is suspended from the shop ceiling and raised and lowered by the aid of a pulley. Attached to the bottom of the bucket is a hose through which the paint is fed by gravity to the paint spray. When ready to begin work, the bucket is raised to the desired position, thus permitting a steady flow of paint to reach the spray nozzle.

But before a truck is painted it must first be cleaned; and for this purpose compressed air is also used. By means of a stream of air, discharged from a blow gun, the dust and dirt are quickly removed and the car made ready for its new coat of paint.



Two trucks recently turned out at Headquarters Shop, Sacramento, with bodies designed and built by Equipment Department. Truck at left is equipped with a hydraulic hoist.

More and more the small as well as the larger cities of all the states are realizing the importance of routing through highways around the edge of the town rather than straight down "Main Street." Traffic congestion of the cities and towns has been the factor which has brought about the change of ideas. So rapid has been the increase in the number of cars in the last few years that city fathers have had to study ways and means of reducing the congestion rather than increasing it by the old method of diverting outside traffic through the central districts.—*Kentucky Highways*.

CALIFORNIA SPECIFICATIONS TO BE FOLLOWED IN ARGENTINA

SPECIFICATIONS for highway construction and maintenance of the Public Works department of the Argentine Republic are being revised along the lines followed by the California Highway Commission, reports Arturo Monge, subdirector of Bridges and Highways. Director Monge recently requested information on California methods and in reply to the material sent him, he writes as follows:

I take great pleasure in acknowledging receipt of the various publications of the California Highway Commission which you have been kind enough to send me. * * *

I find that the matter contained in those bulletins and papers is most valuable to us, as the work in which we are engaged at present runs very much along the same lines of the work that is conducted by the California Highway Commission.

We are now undertaking the revision and readjustment of
Filteen

our specifications and regulations for public works connected with highway construction and maintenance, and the papers you have sent me contain a good many suggestions which I propose to adopt and adapt to our work.

STRONGER CONCRETE

IN THE face of the phenomenal increase in the volume of motor truck and bus traffic utilizing rural highways, the intelligence, recently made public by the California Highway Commission that the cement concrete highways of the Golden State had increased in strength, on an average, approximately 25 per cent, is pleasant news to the citizenry. That this added strength has been achieved at no additional cost to the State is remarkable. That the efforts of the construction and research divisions of the Highway Commission, to say nothing of the individual contractors, have been so well coordinated, is amazing.

The records show that the average compressive strength of concrete has increased from 3151 pounds in 1924 to 4311 pounds in 1925. Refinements in proportioning of aggregates, of course, is the *primum mobile* for this extraordinary record, but it would have been totally impossible without adequate inspection and the active interest of engineers, in the office and in the field, as well as the contractors.

It is gratifying, moreover, to note that the highway department in developing the strength of concrete has not lost sight of that other and most important desideratum in the construction of hard-surfaced roads, to wit, methods of finishing that insure smooth and comfortable surfaces. If cement concrete highways ever were in poor repute, it was because they disintegrated under heavy traffic and often, through second-rate workmanship, presented a rough and corrugated surface to travel. If the California department can remedy these two faults, it will have contributed immeasurably to the attainment of an ideal road.—*Western Highways Builder*.

THE MAN INSIDE.

There's a man inside of the man that you are,
And he's bigger than you, yes, bigger by far,
And he's checking you up in every way,
And for each transgression he makes you pay;
And for each good deed he will pay you
A reward far beyond the price that is due.
So be good to him and respect this man,
Believe in his judgment, nor fear his ban.
There's a man inside of the man that you are;
If you listen to him you will travel far;
So listen and heed; don't be a fool,
And do what you do by the Golden Rule,
And build the man as you would a ship,
Sturdy and true for life's service trip.
And trust him well, he's your compass and guide,
And ever respond to the man inside.

By Jamie Heron.
From—"Measure of a Man."

HIGHWAY NEWS NOTES

L. E. McDUGAL, formerly with Division X, is now with the headquarters maintenance department as assistant maintenance engineer.

F. C. Hewitt, maintenance superintendent at Stockton, will take Mr. McDougal's place as construction assistant in Division X. W. H. Martin, superintendent in charge of the Big Oak Flat road, will move to Stockton to succeed Mr. Hewitt.

A. K. Nulty has returned to Division X as assistant resident engineer after several months with Division VII in Southern California.

L. D. Packard and A. B. Willett of the Bridge Department attended the Air Service Reserve Officers' Training Camp at Rockwell Field during July.

Misses Kathryn B. Melarkey, Hazel Brown, Grayce Maddox, and Mr. Marion McGriff are members of the headquarters staff who have enjoyed vacations in British Columbia during recent weeks.

George T. Gunston, assistant to Secretary W. F. Mixon, is the proud father of a second daughter, Zoe Marie, who arrived early in July.

Miss Elizabeth Etzel motored as far south as San Diego during a recent vacation. Miss Beulah Francisco spent a week in Yosemite Valley.

Mr. Myron Evans, formerly with the office of prison road camps, is now a member of the staff of the State Controller. Miss Dorothy Addison, of the same department, is now in the San Francisco office of Paul F. Fratessa, attorney for the Commission.

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
476	VIII	San Bernardino	31	D-E-F	COMPLETED AND ACCEPTED SINCE JUNE 8, 1926 Victorville to Hicks	25.74	Grade and Rock Surface	H. G. Fenton	\$182,037.49	July 29, 1925	
					AWARDED SINCE JUNE 8, 1926.						
503	VIII	Imperial	26	H	Between Brawley and Westmoreland	6.46	Grade and Rock Surface	F. C. Payton	120,890.26	June 23, 1926	200
504	VI	Fresno			At Fresno		Division Office Building	Shorb and Neads	18,883.25	June 28, 1926	100
505	VI	Fresno			At Fresno		Plumbing and Heating (Div. Office)	Barrett Hicks Co.	3,513.38	June 28, 1926	100
506	VII	Ventura	60	A	Between Point Magu and Little Sycamore Creek		Reinf. Conc. Pipe Culverts	Christ Thoren	13,616.27	June 28, 1926	75
507	VII	Orange	60	A	Branscan Crossing		Underpass	W. M. Ledbetter Co.	18,669.04	July 14, 1926	125
508	II	Tohama	3	B	Across Reed's Creek at Red Bluff		Concrete Girder Bridge	Holdene Construction Co.	35,732.25	July 14, 1926	150
509	VIII	Riverside	64	D-E	Between Black Butte and Blythe	9.5	Grade and Rock Surface	S. Y. Faucett	76,261.68	July 14, 1926	150
610	IV	Sanoma	1	A	Through Cloverdale	1.33	P. C. Concrete Pavement	J. V. Galbraith	58,570.31	July 14, 1926	125
					Sub-total	17.29			\$346,146.44		
					PENDING AWARD—NONE.						
					Total State Highway Fund Contracts Awarded and Pending Award	17.29			\$346,146.44		

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-103	V	Santa Barbara	2	J	COMPLETED AND ACCEPTED SINCE JUNE 8, 1926. Summerland to Montecito	1.40	Grade and Rock Surface	McCray Co.	\$77,835.15	Oct. 23, 1925	
M-105	VIII	Riverside	26	B	Beaumont to Banning	3.04	P. C. Concrete Pavement	Geo. Herz and Co.	93,771.90	Nov. 13, 1925	
M-109	V	Santa Barbara	2	H	Between Carpinteria and 2 miles Southeast	2.10	A. C. Pave.—Portions widened P.C.C.	Cornwall Construction Co.	58,793.22	Nov. 30, 1925	
M-714	V	Lcs Angeles			At Lankershim		Maintenance Shop Building	Hodge and McMackin	20,070.00	Mar 17, 1926	
					AWARDED SINCE JUNE 8, 1926.						
M-132	V	Santa Barbara	2	K	Aerose San Jose Creek		Concrete Girder Bridge	Matlock and Feesey	11,623.27	June 28, 1926	125
M-133	VIII	Riverside	26	E-F	Between Indio and 6 miles south of Coachella	8.99	P.C.C. Widening and A.C. Surface	Southwestern Paving Co.	210,104.68	July 14, 1926	175
					Sub-total	8.99			\$221,727.95		
					PENDING AWARD.						
	IX	Inyo			At Bishop		Maintenance Shop Building		16,522.88		100
					Total State Highway Maintenance Fund Contracts Awarded and Pending Award	8.99			\$238,260.83		

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.

HIGHWAY GENERAL FUND CONTRACTS

Cont. No.	Di- vision	County	Route	Sec.	Location	Miles	Type	Contractor	Estimated cost	Date contract awarded	Contract time, days
501	IV	San Mateo	68	B	Btw. South San Francisco and San Mateo		Right of way fence	Lozier and Carr	\$9,493.65	May 27, 1926	60
					PENDING AWARD.						
	IV	San Mateo	68	B	South San Francisco Crossing		Undergrade Crossing		243,876.60		400
					Total Highway General Fund Contracts, Awarded and Pending Award				\$253,370.25		