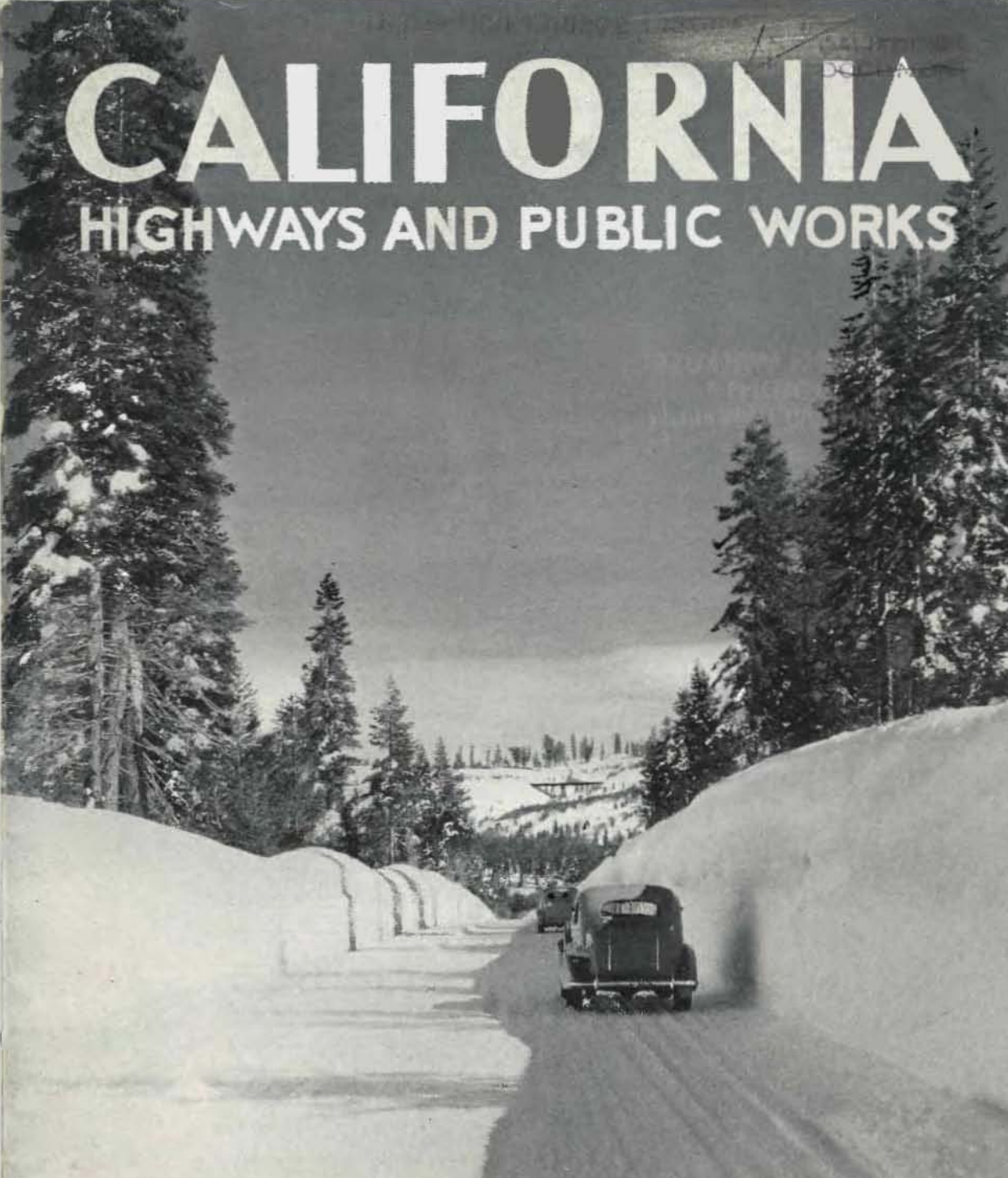


# CALIFORNIA

## HIGHWAYS AND PUBLIC WORKS



*State Route No. 37 (U.S. 40) over Sierras  
Cleared by Snow Plows*

Official Journal of the Department of Public Works  
MARCH ♦ ♦ 1936

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# Traffic Accident Study Reveals

*Major Highway Casualty Factors Are*

## *Bad Driving, High Night Speeds*

*and Pace Differential Between Trucks and Autos*

By **T. H. DENNIS**, Maintenance Engineer

**F**OR several years governmental officials charged with the construction and maintenance of roads and streets and the control of traffic have been perplexed at the attitude of calm acceptance with which the motorists have taken accidents.

There is valid evidence to show that in California motor vehicle accidents vary directly with the volume of traffic, and this despite progressive improvement of roads. There is also a considerable volume of evidence to show that only a small percentage of the accidents are due either to the physical condition of the roads or to the mechanical condition of the vehicles.

The responsibility for a predominant majority of the cases rests upon the drivers of the vehicles and it is their apparent disinterest which has complicated the solution of the traffic accident problem.

Within the past year there has been a notable quickening of public opinion and a distinct effort to awaken the general public to a realization of what is occurring. Newspapers, radio and magazines have pounded at the matter and a much more lively interest has been the result.

The extent to which this new interest may be sustained and made effective in reducing the accident rate will depend largely on the development and adoption of a preventive

program combining the forces of legislation, enforcement, and education.

Realizing the difficulties of successfully coordinating the activities of many unrelated groups, various interested citizens urged the Director of Motor Vehicles to set up two committees composed of those particularly inter-

ested in the subject of accident prevention. The first of these committees is composed of representatives of governmental agencies having a direct interest in the administration of roads, streets, and traffic.

This administrator's committee is composed of representatives of the State Board of Education, the Attorney General's office, the League of Municipalities, State Industrial Accident Commission, Department of Motor Vehicles, and Department of Public Works. This committee is under the chairmanship of the Director of Motor Vehicles.

The second committee acts in an advisory capacity and it is composed of representatives of local groups, acting through subcommittees on legislation, enforcement, education, and engineering.

In addition to constituting a coordinating body, one of the prime functions of the administrators' committee is to collect and analyze data on automobile accidents and to determine, with the assistance of the



**T. H. DENNIS**



# Donner Summit Closed Only 34 Hours During a 24-Day Snowstorm Period

By C. H. WEEKS, Maintenance Superintendent

**N**OT SINCE the state inaugurated snow removal operations on the Donner Summit route over the Sierra Nevada has the Maintenance Department of the Division of Highways been called upon to combat such storm conditions as it encountered in that area last month.

A total of 161 inches of snow fell on the Donner Summit route during 24 days in February. Except for five days of good weather and time out for servicing and repairing equipment, all the snow fighting machinery of the Maintenance Department in that section was operated continuously throughout the storm period.

The mountain highway was closed to all traffic for only 34 hours during the entire month due to poor visibility, drifting or snow slides on four separate occasions.

Trucks were held up on six occasions for a total of 111 hours. The snow removal equipment went through continuously except for about 16 hours on February 24 and 25 while the rotaries removed heavy snow slides.

#### SLIDE ENDANGERED TRAFFIC

With the exception of the period between February 4 and 9, the entire month was very stormy and windy. The 161 inches of snow made twice the fall in depth and three times the amount measured as precipitation for any February since the inception of snow removal work on this route.

In addition to combating the regular snow conditions, maintenance crews had to contend with a dangerous slide which developed just west of Baxter's. At several points the road slid away to such an extent that half the traveled way was unsafe. Flagmen protected traffic at these slides at all times.

The storm came up suddenly on February 1 and, due to poor visibility, all heavy truck traffic over the summit was stopped between 6 p.m. and 11 p.m. Snowfall ceased during the night of February 3 and for five days we had the only fair weather enjoyed during the month.

Due to extremely cold nights, the snow and ice packed on the highway did not melt

### MOTORIST STRANDED IN SNOWSTORM IS AIDED BY STATE HIGHWAY CREW

Carson City, Nevada.

March 1, 1936

Mr. Charles Whitmore,  
District Engineer,  
Marysville, Cal.

Dear Sir:

I am taking this means of congratulating you on the splendid force of men that the state has employed at the summit, at Norden, in the State Highway garage.

I came through there recently in a severe snow storm and all the travelers, as well as myself, could not help but notice the courtesy shown us all and the splendid management of Mr. Weeks.

Each and every one of the men surely deserve all the credit we can give them. My car broke down almost in front of the garage and it was through the courtesy of the kind mechanic and the young man who ran the snow plow (Mr. Taylor) that I finally managed to get to a garage in Truckee.

Such a fine lot of young fellows are truly an asset to your state.

While I am now in Nevada, I am at Lake Tahoe, California, eight months of the year and am proud that I am a taxpayer in California.

Very sincerely,

W. H. JAMES,  
Carson City, Nevada.

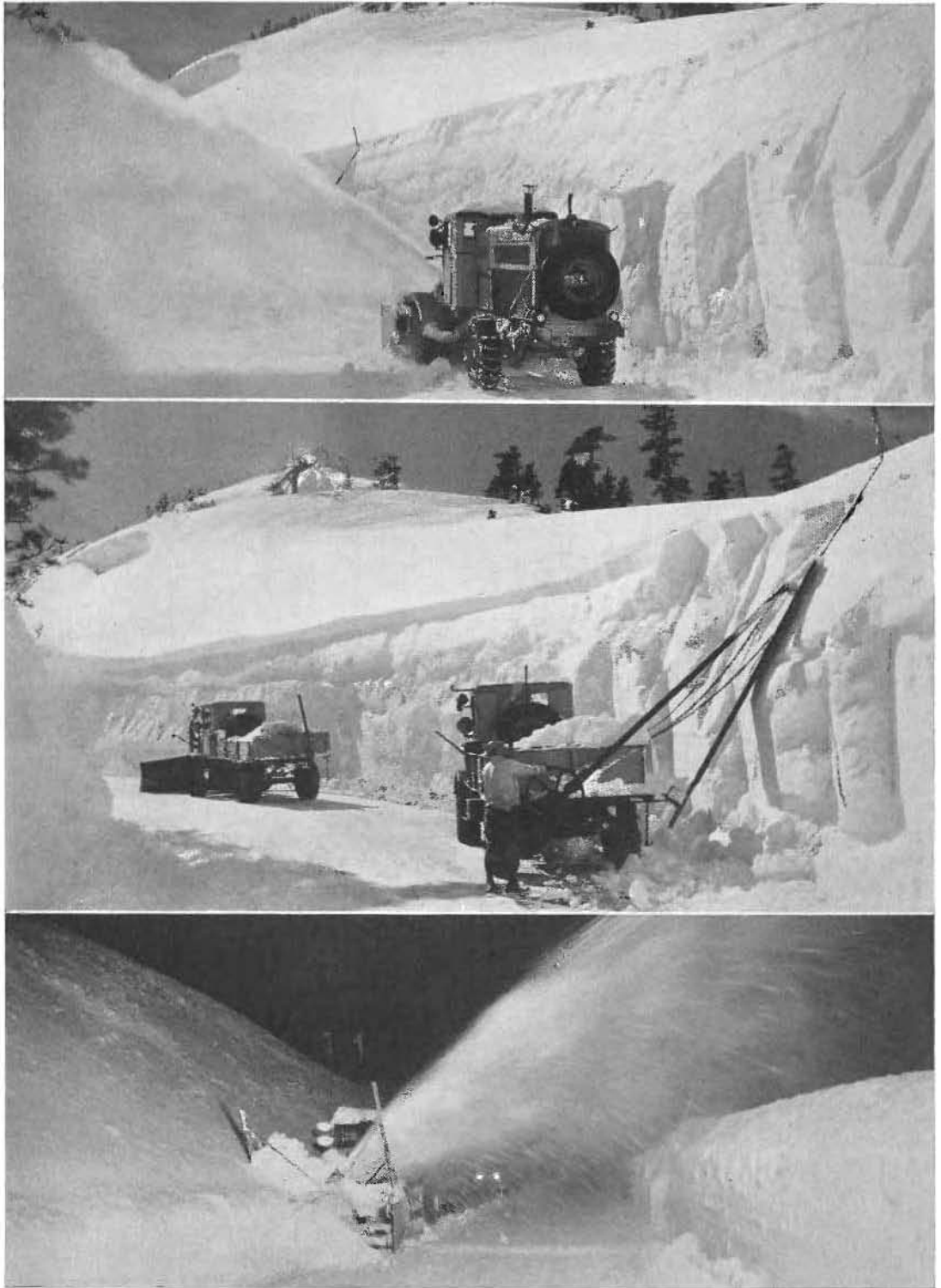
to any appreciable extent and motorists were required to use chains.

#### BLIZZARD-LIKE STORM

On February 11 the big storm broke and did not subside until the 26th. At one time the wind reached a velocity of 64 miles an hour. The maximum temperature recorded was 48 degrees above zero and the minimum was 16 degrees below.

At 8.20 a.m. on February 12 all westbound trucks were stopped and at 1 p.m. the same day eastbound trucks were halted at the Baxter gate. This precaution was taken as a safety measure for the benefit of light traffic.

(Continued on page 20)



**FIGHTING SNOW ON DONNER SUMMIT** section of U. S. 40 kept all equipment busy day and night throughout February. At top, an auger blower type rotary plow hurling snow high over bank. Center, spud type push plow and truck with slope slice bar attachment widening roadway, and below, an auger blower working at night.



## Night Accidents 64 Per Cent of Total

(Continued from page 1)

advisory committee, the most practical remedies.

Analyses of accidents must necessarily be somewhat exhaustive for if otherwise the maximum results will not be obtained. To pass the responsibility for 97 per cent of the accidents to the motorist is of no satisfaction to the administrator and of no help to the motorist.

On the one hand the administrator can not help being beset with doubts as to whether or not he really is right; on the other hand the motorist is put in possession of information which, though probably true, is useless. These twin deficiencies are the main reason for the studies made from time to time by the Division of Highways and which it is planned to conduct more intensively during the current year.

### FACTS REVEALED BY STUDY

A study of the accidents occurring on the rural state highway system in 1935 confirms in many respects observations made in 1934 and in addition produces other interesting evidence. In the first place it is to be noted that accidents, like traffic itself, occur with greatest frequency upon a comparatively small percentage of the road mileage.

Of the total accidents on the rural state highway system, 48.15 per cent took place on 1094.5 miles, or 8.68 per cent, of the mileage.

A study of 1046 accidents occurring on 215 miles of rural state highway where accidents are more prevalent, permits a few general observations which, though not necessarily true for all localities, are fairly typical.

On the two days of the week when travel is heaviest, Saturday and Sunday, 42 per cent of the accidents took place.

### NIGHT ACCIDENTS PREDOMINATE

The number of night accidents, considering traffic, is disproportionately large. Accidents occurring after dark approximate 64 per cent of the total.

Accidents attributable to some condition in the road were 4.1 per cent of the total, but of this percentage 3.3 per cent were due to cars running into others which had

already been in collision and blocked the road.

The physical condition of drivers was noteworthy in 25.2 per cent of the cases. The physical conditions customarily observed were intoxication and asleep at wheel.

Vehicles with mechanical defects were observed in 11.1 per cent of the cases.

The reasons why 25.8 per cent of the accidents involved only single vehicles were not examined, but it is suspected that many were due to the poor physical condition of the drivers or of the cars. However, included in this group there necessarily are many indeterminate instances in which the drivers said other vehicles ran them off the road.

### TWO-CAR ACCIDENTS

Two-car accidents are more numerous than single-car accidents and the greater amount of data available in individual cases presents better opportunity for sound logical inference.

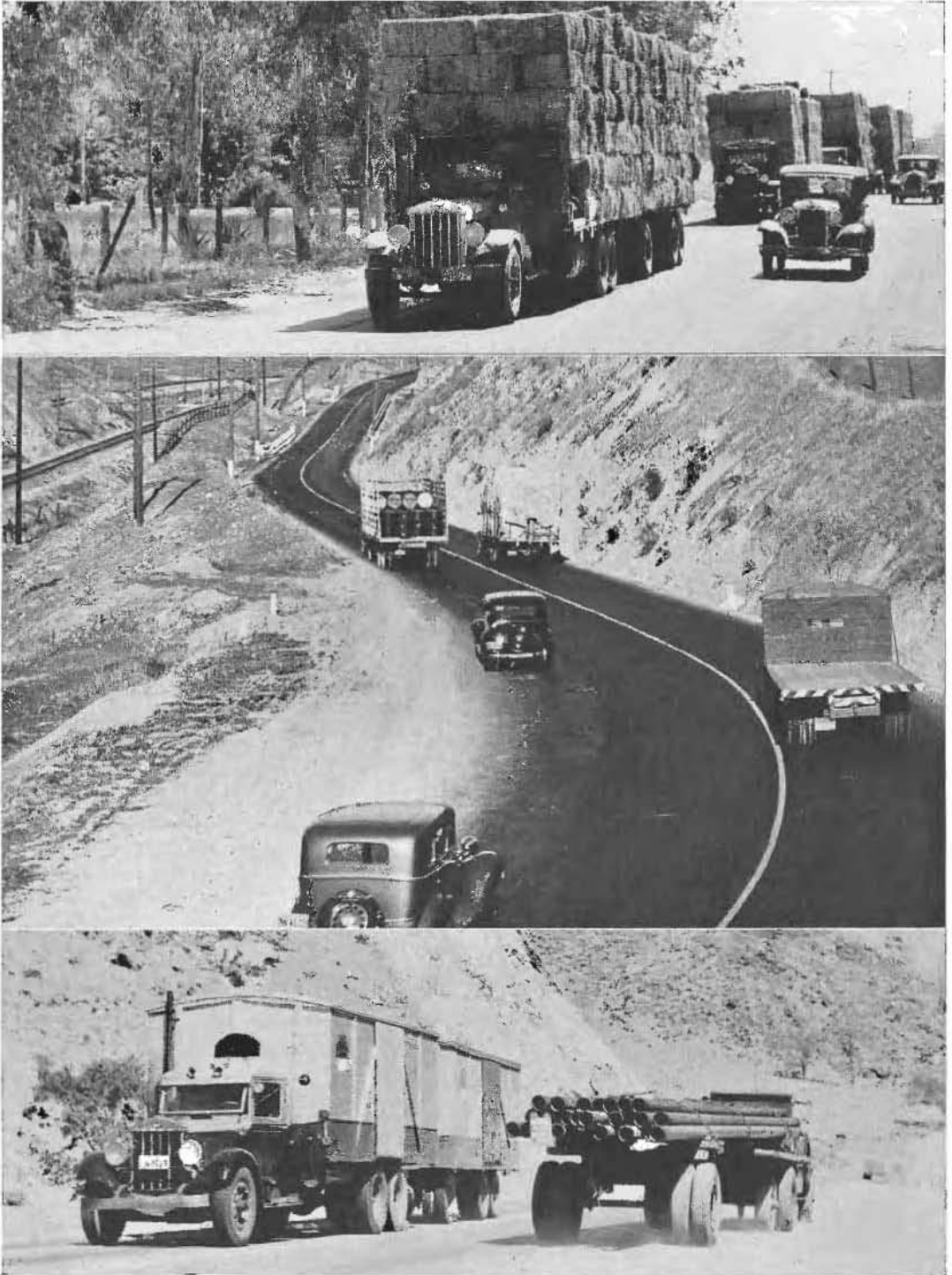
In studying two-car accidents the maneuvers in which the vehicles were engaged are classified under four types: overtaking; approaching; paths intersecting because one vehicle is preparing to leave the road on which both were traveling; and paths intersecting in the case of vehicles which have been traveling different roads. These last two cases embrace typical intersection accidents.

The respective ratios of these two groups to the total two-car accidents are 15.8 per cent and 11.1 per cent. With respect to the state as a whole, these two ratios are without particular significance because the number of heavily traveled intersections is localized. However, the differential between the two is notable. It indicates that as much or more attention must be paid to getting vehicles off the highway as onto it.

### REAR-END COLLISIONS

The accidents occurring during the overtaking and approaching maneuvers are almost identical in number. The former are 35.5 and the latter 35.7 per cent of the total two-car accidents. The reason for the unsuspected number of rear-end collisions

(Continued on page 12)



**SPEED DIFFERENTIAL AN ACCIDENT FACTOR**—The above pictures illustrate how slow moving trucks force faster moving autos into the lane of approaching traffic. At top, a scene on U. S. 99 near Banning showing automobiles trying to pass a line of 5 hay trucks from Imperial Valley. In center, autos are held up by a slow truck passing another in Altamont Pass. Bottom picture shows heavy trucking monopolizing the highway in Grapevine Canyon, Kern County.

## Three Fatalities Caused by Flood that Closed Highway Near Merced

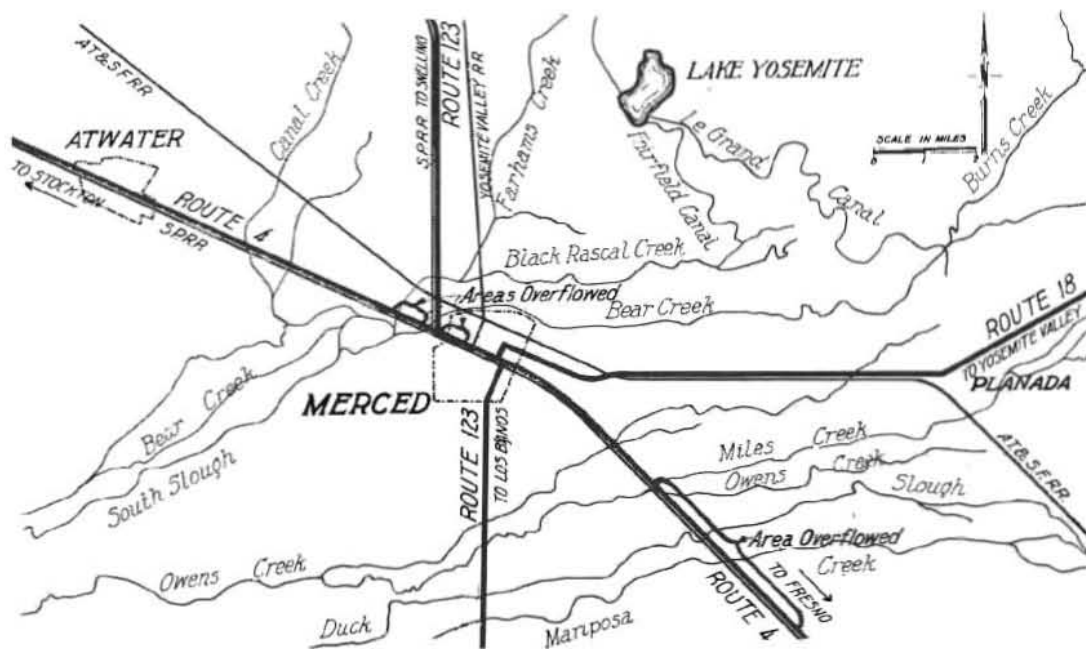
By R. E. PIERCE, District Engineer

**D**URING the most severe and protracted storm experienced in the northern part of the San Joaquin Valley for many years, rain fell at Merced on sixteen out of the first twenty-five days of February, with a total precipitation of 6.84 inches. At Mariposa, thirty miles east, for the same period, 19.03 inches fell.

While the rainfall was probably just as great and doubtless greater in other parts of District X, the only main trunk highway in the district over which traffic could not pass

there was no opening through the Southern Pacific Railroad grade across the city and the waters did not subside until the city authorities washed out a channel under an old bridge, which had been filled in by the railroad company.

The recent storm while being more intense did not flood the city so much, partly because this railroad bridge was still open, and also because there was a strenuous effort by the townspeople to raise the levees on Bear Creek, and hold the water out of the city.



during the storm was a portion of U. S. 99, State Route 4, on either side of the city of Merced, and within the city. This condition occurred twice during the storm period, from February 11 to 15 and again from February 22 to 26.

Last year in April heavy rains caused a flood which closed Highway Route 4 to traffic, and flooded Merced to a considerably greater extent than did the recent storm.

This was due to the fact that last April

In this work the state forces cooperated at the point where our road crosses Bear Creek, placing about 400 sand bags, and while the effort was not entirely successful, the water was held out until the peak of the flood had passed.

### LONG DETOUR FOR TRAFFIC

The most serious condition in so far as the highway was concerned, was the flooding of the highway north and south of

(Continued on page 18)





**THREE FEET DEEP**, on U. S. 99 south of Merced February 14th, and over your head in the ditch.



**WAVES ROLLED INSTEAD OF WHEELS** on morning of February 15th for 5 miles north of Merced.



**NAVIGABLE FOR CARS** following white life line on high side with maximum depth of 8 inches.

## *Late Dr. Elwood Mead Eulogized at Memorial Meeting Held in Redding*

A notable group of citizens of northern California, including federal, state, county and municipal officials, gathered under the auspices of the Redding Chamber of Commerce at a testimonial dinner in Redding, February 19, in memory of the late Elwood Mead, former head of the United States Reclamation Service, whose efforts in that capacity greatly aided the Central Valley Water Project now in progress of construction. Memorial addresses were made by Walker R. Young, Chief Engineer for the U. S. Reclamation Service; Earl Lee Kelly, State Director of Public Works and chairman of the Central Valley Water Authority, and State Senators Jack Metzger and J. B. McColl. The principal eulogy of the occasion was delivered by State Engineer Edward Hyatt, who knew Dr. Mead intimately, and an engrossed resolution was presented by Francis Carr, member of the State Water Commission. Mr. Hyatt's eulogy is reproduced in part in the following article.

By EDWARD HYATT, State Engineer

**E**LWOOD MEAD was born in the village of Patriot, Indiana, January 16, 1858. His early life was spent on a farm, under humble conditions. As a boy he was brilliant in school, and in a time when a college education was a rarity his exceptional abilities were recognized. He worked his way through school as a rodman on a survey crew. His nickname was "Woody."

In 1882 he graduated from Purdue University with a bachelor of science degree. The following year he was made master of science, and in 1886 he received the degree of civil engineer.

In one of his rare intimate moments he related to me his pride and joy in securing his first job after graduation, in 1884, as an assistant engineer with the Army on a survey of the Wabash River, which came about as the result of a personal interview with the Governor of the State of Indiana.

It was not long until he was offered the position of professor of mathematics at Colorado Agricultural College. Whether to leave his job and his native state to go into the unknown land of the West was a serious question, but he decided to cast his lot with the growing West.

### FIRST IRRIGATION PROFESSOR

After two years as professor of mathematics, Dr. Mead in 1886 became professor of irrigation engineering at the Colorado Agriculture College, the first such chair held in an American school. In addition, he served

Colorado as Assistant State Engineer. He went to Wyoming as Territorial Engineer and served as State Engineer from 1888 to 1889. It was during this period that he first gained prominence.

When the new commonwealth was being organized, Dr. Mead, as State Engineer, proposed an entirely new water law for inclusion in the state constitution, one which turned its back upon the common law principle of riparian rights which had thrown into confusion the legal status of water in the arid West.

Under the Mead plan, the state retained title to all water, surface and underground. The success of the fight for this reform made Dr. Mead known throughout the entire West. With the spread of his reputation as an authority on irrigation and water laws, the young engineer was in demand as a speaker before civic and technical associations. His reputation reached the East.

### BECAME CALIFORNIA PROFESSOR

Dr. Mead served as chief of the irrigation and drainage section of the Department of Agriculture for eight years ending in 1907, and then served the University of California concurrently as professor of institutions and practice of irrigation. He was detailed as an expert in the celebrated Kansas-Colorado case to aid in the broad policy to be laid down by the courts, and wrote papers on the influence of state boundaries on water right controversies and water rights within the states.

## Won Fame at Home and Abroad

(Continued from preceding page)

In 1907 Dr. Mead went to Australia as chairman of the State Rivers and Water Supply Commission of Victoria. He inaugurated a comprehensive water conservation and reclamation plan in Victoria during his eight years of service that is one of the models of the British Empire today.

Australia commissioned Dr. Mead and Hon. Hugh McKenzie, Minister for Lands, to visit Italy, Ireland, Denmark and Germany to observe what those governments were doing to bring about a home-owning population. They journeyed to Great Britain to attract settlers to Australia, in which mission they were successful. Dr. Mead later acted as adviser to the governments of New South Wales, Canada, Hawaii, Java and Mexico.

### APPOINTED U. S. RECLAMATION CHIEF

Dr. Mead resigned his position in Victoria in 1913 to accept the new post of professor of rural institutions at the University of California, and chairman of the State Land Settlement Board. In 1917 he acted as consulting engineer on a board in regard to the construction of the All-American Canal to Imperial Valley. In 1923 he was appointed by the Secretary of the Interior as a special adviser on reclamation and on April 3, 1924, President Coolidge appointed him Commissioner of Reclamation. Under his leadership reclamation was placed on a still firmer foundation of usefulness to the nation. Dr. Mead was appointed by the President a special commissioner on the International Water Commission on December 27, 1924.

In 1927, Dr. Mead secured a leave of absence as Commissioner of Reclamation and went to Palestine as head of a commission of six members and mapped out a plan for reclaiming Palestine for the Jews.

### BUILT BOULDER DAM

From 1924 until the time of his death, Dr. Mead was the acting directing head of the vast construction and operating activities of the

United States Bureau of Reclamation. His noteworthy accomplishments during this period included building the greatest dam of all time at Boulder Canyon and some twenty other water storage projects in the West.

Dr. Mead was a member and past director of the American Society of Civil Engineers, a member and past president of the American Society of Engineers, and the British Institute of Civil Engineers.

He was the author of two books used widely as texts, entitled "Helping Men Own Farms" and "Irrigation Institutions." In addition he prepared hundreds of articles, papers, reports and

statements dealing with water rights, irrigation, settlement and kindred subjects.

Dr. Mead was a lovable character, and in his death the United States lost one of its most valuable servants.



DR. ELWOOD MEAD

California, with 5,600,000 population, has more than twice as many automobiles as all of Germany, with 65,000,000 population. Los Angeles County alone has more automobiles than Germany.



# *Last of the Feather River Canyon Highway Bridges Completed at Tobin*

By E. C. BISSELL, Resident Engineer

**F**UTURE motorists traveling over the Feather River Canyon State Highway, may wonder why the road criss-crosses the river and the line of the Western Pacific railway in what to the layman may appear to be an eccentric manner.

To the engineers of the Division of Highways this apparently purposeless meandering of the mountain thoroughfare was one of engineering necessity.

The route of the new highway crosses from one side of the Feather to the other over State-constructed bridges at six points—Oroville, Pulga, Rock Creek, Tobin, Storrie and Howells. The Oroville structure was the first to be completed, followed by those at Howells, Tobin, Rock Creek and Storrie.

At Pulga the highway bridge leap-frogs over the railroad bridge and at Tobin the positions are reversed, the State crossing passing beneath the railway structure.

#### PRESENTED CONSTRUCTION PROBLEM

Preemption of the easier course through the Feather River Canyon by the Western Pacific, when it was built some thirty years ago, occasioned a construction problem for the surveyors of the Division of Highways when they came to lay out the new road.

The slopes of the canyon are very precipitous and there is scarcely room for a railroad and a highway on the same side of the river. When the State highway engineers made the location for the highway through the canyon there was no choice but to locate the road on the opposite side of the river to the railroad, and where the railway line crossed the stream it was necessary for the engineers to figure out how they could cross the river at the same place to the opposite bank and maintain proper alignment, provide for grade separation and effect an economical and efficient crossing.

Several surveys were made by the State Division of Highways to determine how it could obtain the best crossing for the highway at Tobin just completed. After thorough investigation, it was decided to locate the highway beneath the railroad bridge.

#### ABUTMENTS RUB ELBOWS

But there was not enough room to construct another bridge abutment on the rock ledge jutting into the river already occupied by the railroad structure. By close figuring, the problem was solved by building the abutment for the highway bridge so as to form around one corner of the railroad abutment.

As the work of leveling off the solid granite rock for the highway bridge abutment was so close to the existing abutment that any mishap would seriously jeopardize the railroad bridge and the safety of trains, it was decided, after conference with Western Pacific engineers, that no chances should be taken with anything so erratic as dynamite for blasting and that it would be necessary to resort to the "plug and feather" method of breaking the rock.

To those who may be unfamiliar with the term and what it implies, it may be explained that "plugs and feathers" were used by our forefathers to break rock before dynamite was invented.

#### "PLUGS AND FEATHERS"

The procedure is to drill a series of holes about 6 to 8 inches apart and about 2 feet deep into the rock along a line where it is desired to break it. Two tapered shims of iron, flat on one side and rounded on the other, are placed in the hole and an iron wedge inserted between the flat sides of the "feathers." The iron wedges, or "plugs," are then hammered with a large maul until the rock breaks off. It takes a man a day to do what a stick of dynamite could do in a fraction of a second.

The Tobin bridge is a 290-foot through steel "K" truss span on two 35-foot reinforced concrete abutments. The bridge deck is paved with portland cement concrete and is 24 feet wide between curbs.

Construction of the bridge was a National Recovery Project financed by Federal funds. It was designed by and built under the supervision of the Bridge Department of the Division of Highways.



**BRIDGES PLAY LEAP FROG**—New State Highway crosses Feather River above railroad structure at Pulga.



**TURN ABOUT FAIR PLAY**—Recently completed highway bridge crosses almost below railroad bridge at Tobin, 14 miles away.



**TOBIN BRIDGE**, dwarfed in above picture, is larger than railroad structure, being 290 feet long, 24 feet wide.



## *Most Rear End Crashes With Trucks*

(Continued from page 4)

is found in the speed differential between commercial and passenger vehicles. This reason holds even in cases of some three-lane roads where the center lane hazard is popularly supposed to be conducive to head-on collisions.

It is true, for instance, of three-lane sections in Fresno, Kern and Alameda counties, where there is a considerable volume of heavy trucking. On the three-lane sections examined, rear-end collisions outnumbered head-on collisions by 57 per cent.

Other data also emphasize the significance of the speed differential. While on the sections studied freight vehicles were involved in 33.9 per cent of the approaching accidents, the comparable percentage for overtaking accidents was greater—47.1 per cent.

On the heavily traveled truck route between Bakersfield and the Grapevine, and in Dublin Canyon, freight vehicles were involved respectively in 75 per cent and 73 per cent of all the overtaking accidents.

### TAIL LIGHT LAW EFFECTIVE

Quite clearly there were ample grounds for the act of the last legislature that required additional rear lights and red reflectors on trucks and trailers. Even the most casual observer traveling at night can scarcely avoid noticing the improvement.

It is still somewhat early to measure the results of this new legal requirement but a glimpse of its effectiveness may be had by looking at a case previously cited—the road between Bakersfield and the Grapevine.

On this section it is noteworthy that since July, 1935, when additional lights and reflectors were being installed on freight vehicles, until the end of that year there were no further cases of passenger cars running into the rear ends of trucks.

However, regardless of the results of this legislation the question of the speed differential between vehicles requires further examination. It must be determined whether freight vehicles move too slowly or passenger cars too rapidly.

Field studies on prevailing speeds are now

in progress at various locations throughout the state. cursory inspection of the incomplete data shows the average speeds of passenger cars range from 40 to 50 miles an hour either day or night. A wet surface serves to reduce the average no more than five miles an hour, but the reduction is effective chiefly with respect to vehicles which normally travel over 50 miles an hour.

Cars appear to travel more rapidly up grade than down grade. The number of vehicles traveling in excess of 50 miles an hour varies considerably depending upon place and time, and volume of traffic. On good alignment, with traffic able to move freely, it is not uncommon to find approximately 35 per cent of the vehicles exceeding 50 miles an hour. The maximum speed recorded in daylight was 83 miles an hour, and at night 68 miles an hour in the rain and 71 miles an hour on a dry surface.

### SUMMARY OF FINDINGS

The findings of these studies are not conclusive as to all accidents. They do not, for example, apply to city streets, where a majority of the accidents occur. They do not necessarily apply to the entire rural highway system, but they are suggestive of what may be expected.

They indicate that the crux of the rural accident problem is found on a comparatively short road mileage; that increasing attention must be paid to the speed differential between trucks and passenger cars; that night driving speeds for passenger cars are probably too high; and that the intoxicated driver should be the subject of unique attention.

### SAFETY DEVICES IGNORED

The increasing accident toll on our state highways is a matter of great concern to those in charge of their construction and maintenance. The accidents examined occurred on our heavily traveled highways, many of which embrace every accepted safety device—multiple traffic lanes of 10-foot width, with 8-foot oiled shoulders, improved sight distance on both vertical and horizontal curves. However, such features seemly offer no deterrent to the occurrence of accidents.

Thousands of dollars have been spent in safety devices, in the installation of uniform

(Continued on page 26)



## CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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Editors of newspapers and others are privileged to use matter contained herein. Cuts will be gladly loaned upon request.

EARL LES KILLY.....Director

JOHN W. HOWE.....Editor

Address communications to California Highways and Public Works, P. O. Box 1499, Sacramento, California.

Vol. 14

MARCH, 1936

No. 3

### ATTRACTIVE ROADSIDES

The bright days of recent weeks have made us realize that after winter comes the spring. This world seems to be an endurance test and to him who sticks in time comes happiness. But more practically speaking a trip any place in California over our fine roads brings much pure joy. A satin smooth ribbon winding through any part of our state is beautiful.

Not only are the wonders in the state delightful but the state has made an effort to landscape our roads attractively. This helps to attract tourist trade, a primary source of income. Besides enhancing the natural beauty of the surrounding scenery, the planting of shrubbery, vines and trees erases construction scars and prevents the erosion of adjacent slopes and steep banks. From a safety standpoint, attractive roads overcome the tedium and help keep motorists interested.

We all enjoy the roads but do not care about paying for them. But about \$260,000 will be spent in California this year on highway beautification. Plans now being formed by the landscape department of the State Division of Highways will entail an expenditure of \$159,496 federal and state funds. Also about \$100,000 will be expended for maintenance of roadside trees, landscaped areas and various other improvements.—*Woodlake Echo*.

The midday whistle had blown when Murphy shouted, "Has anyone seen me vest?"

"Sure, Murphy," said Pat, "and ye've got it on."

"Right and I have," replied Murphy, gazing solemnly at his bosom, "and it's a good thing ye seen it or I'd have gone home without it."—*Humorist* (London).

## Highways Lauded as "the Most Impressive Improvement in State"

"California has been doing a magnificent job of improving its highways."

This compliment to the State Division of Highways was voiced by C. G. Milham, former executive secretary of the All-Year Club of Southern California, during a recent visit to Los Angeles after an absence of five years.

In an interview granted the Los Angeles Herald and Express on February 20, Mr. Milham said that the most impressive improvement he had observed upon his return is reflected in the state highways.

Mr. Milham, accompanied by Mrs. Milham, has been motoring over the Southwest and California.

"People now have money to spend traveling," said Mr. Milham, "and they are going places. Increased advertising for California will bring much of this travel to this state."

Mr. Milham now resides in Williamsburg, Va.

### MANY CITIES OF SOUTHLAND RECEIVING GAS TAX BENEFITS

Many southland cities are receiving allotments of state gasoline tax funds for street improvements.

Among jobs reported to start soon, it is noted by the Automobile Club of Southern California engineering department, are the following:

Widening and repaving of D Street in San Bernardino between Third Street and Base Line (power and light lines to be placed underground); widening and improvement of Van Buren Street in Riverside from Magnolia Avenue to Hayes Street; surfacing of State, Carrillo, Ortega and Haley streets, and seal coat improvement over Milpas, Anacapa, De la Vina, Cota and San Andreas streets in Santa Barbara; improvement of Florida Avenue from Taylor Street to east city limits in Hemet, reconstructing pavement on North Street at Fifth in Taft; maintenance of Hobson Way, the main street in Blythe; and various street improvements and maintenance works in Perris, Ventura, Bell and Gardena.

A young lady who had never seen a game of baseball attended one with her escort.

"Isn't that pitcher grand?" she said. "He hits their bats no matter how they hold them!"—*Earth Mover*.

## Electricity Made Possible Erection of San Francisco-Oakland Bay Bridge

**U**NDER the watchful and critical eye of thousands of commuters, the San Francisco-Oakland Bay Bridge, with a sureness suggesting an element of fate, daily creeps toward its destination—a long steel serpent throwing itself across a vast body of water.

So rapid has been the progress of this amazing structure, and with such apparent ease have its engineering difficulties seemed to have been surmounted, that not much thought has been given by the layman to one element that has made all this possible.

**Without electricity the San Francisco-Oakland Bay Bridge could not have been built.**

### CABLE FIRST STEP

Earliest plans by Chief Engineer C. H. Purcell included the laying of an electric cable across the floor of San Francisco Bay, from Pier 24 on the San Francisco water front, to Yerba Buena Island and to Oakland along the Key Route Mole.

This cable, four inches in diameter and 25,000 feet in length, was the first actual step taken before any construction was possible.

From this cable flows the life blood of the bridge. It cost the power company \$50,000 to install and its connected load is in excess of 12,000 horsepower, which is sufficient to meet the domestic needs of a community of 50,000 or a city a little less than the population of San Jose, and slightly larger than that of Stockton.

### OPERATED CAISSON PUMPS

Without the electric power furnished through the cable, the pumps, so necessary to the system of caissons used in laying the foundations of the piers, could not have been as efficiently and cheaply operated; the giant hoists and derricks, which swing tons of steel into place with such ease, would not have been practical.

Welding equipment, concrete mixers, air compressors and other modern pieces of machinery, through the agency of which the Bay Bridge is rising to be one of the wonders

of the age, are all fed by the life stream of electric current flowing on the floor of the bay.

### NECKLACE OF LIGHTS

To the layman, the myriad of fantastic lights that at night form a brilliant necklace from San Francisco to Yerba Buena Island, is just something to gasp at and admire. To the engineers and to the workmen of the bridge, they are a means of more quickly accomplishing their task. All night long men work under the lights—building, building. It means, too, that more men can be given employment, for it permits a third shift.

But these arching, looping ropes of light are only temporary. Ordinary incandescent lamps following the curving lines of the catwalks, they will be replaced with the newer, more modern sodium lighting illuminating the straight-lined, two-deck roadbeds.

It may therefore be that the arched beauty of the present lighting may vanish, unless rumored discussions that the cables will be lighted for decorative purposes materialize.

## Higher Gas Taxes Reduce Consumption

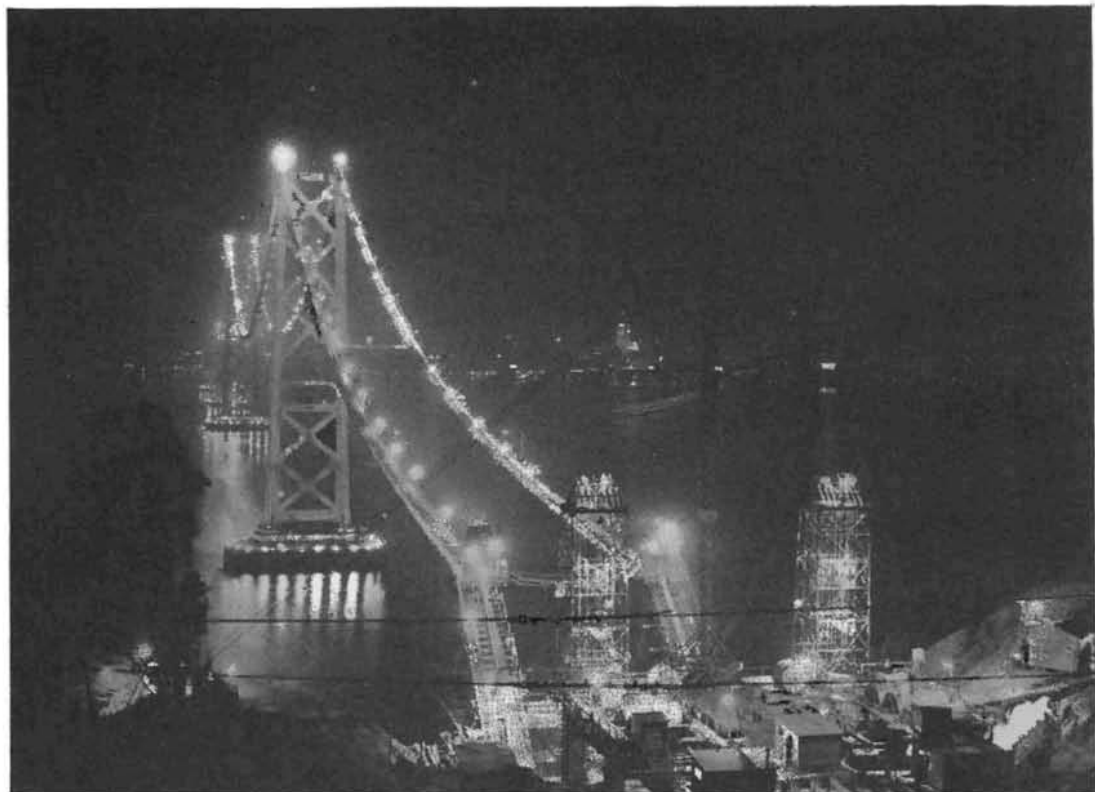
Higher gasoline tax rates imposed in the states of New York, Pennsylvania and Delaware last year had a definitely harmful economic effect, it is revealed in a report received by the Automobile Club of Southern California.

Loss of gasoline and oil business to other states, decreased use of motor vehicles, reduced consumption of motor fuel and lubricants, and an increase in tax evasion have occurred in those states, the report discloses.

Gasoline consumption in Pennsylvania dropped 9.07 per cent as a result of the higher tax; New York lost 6.6 per cent; and Delaware 3.2 per cent.

Teacher: "Does your father pray, Susie?"

Susie: "Yes, teacher. When we sat down to supper last night the first thing he said was, 'Good Lord! We've got beans again.'"



A BRILLIANT NECKLACE OF LIGHTS is suggested by the arching, looping ropes of big incandescent lamps that at night illuminate the San Francisco Bay Bridge catwalks extending from the Golden Gate metropolis to Yerba Buena Island. Beneath them the third shift works all through the hours of darkness.

## Banner Year for Construction Work

**T**HIS YEAR promises to be a banner one in the construction industry in southern California in the opinion of Frank Connolly, manager of the Southern California Chapter Associated General Contractors.

He bases his optimism largely upon the extensive 1936 highway building program undertaken by the State Department of Public Works.

During 1935, Connolly points out, southern California enjoyed the unique distinction of having a proportionately larger volume of contracting business than any other section of the country due to reconstruction of schools, public buildings and other structures made necessary by the 1933 earthquake, construction of the Colorado River aqueduct, and the large state highway program in which the regular state expenditures were augmented by emergency relief appropriations.

"The number of highway projects offered for bids during the latter part of 1935," said Connolly, "almost overtaxed the facilities of the industry but in most cases there was satisfactory competition and a large volume of this construction now is under contract. The work of our highway engineers and contractors has been so excellent that it has attracted the attention of everybody using our roads.

"Motorists marvel at the fine broad highways, easy grades and curves and the wonderful bridges which have been constructed by this group. Most of the emergency funds for highways have been obligated, but the ordinary budget still provides for approximately \$1,000,000 per month in highway construction for the next 18 months."

Green: "You must be keen on the talkies, old boy, to go twice a week."

Howarth: "It's not that exactly. You see, if I don't go regularly I can't understand what my children are saying."—*Toronto Globe*.



# Rebuilding Sector of San Marcos Pass Alternate in Santa Barbara Area

By **LESTER H. GIBSON**, District Engineer

**A**MONG the several hundred miles of roads taken into the state highway system by act of the 1931 legislature was the San Marcos Pass road in Santa Barbara County. This highway's southern terminus was the Coast Highway at a point about 2½ miles west of Santa Barbara, the northern terminus also being the Coast Highway at Zaca, about 50 miles northerly from Santa Barbara.

The old road, upon leaving Santa Barbara, wound a treacherous path up the steep southerly slope of the Santa Ynez range of mountains until reaching an elevation of 2220 feet at San Marcos Pass; thence descended the northerly slope to the Santa Ynez River and followed the westerly bank of this water course to near Santa Ynez where a more or less indirect course was followed through the communities of Santa Ynez and Los Olivos.

## AN ENTRANCING PANORAMA

A portion of the country traversed is one affording much pleasure to the motorist. The ascent from Santa Barbara to the San Marcos Pass unfolds an ever extending panorama of the beautiful foothill region, Santa Barbara, and a broad expanse of the blue Pacific.

The descent of the northern slope is equally interesting, affording a view for many miles of scenic back country.

This old route is some 10 miles shorter than the regular coast route, and because of its many scenic attractions affords a delightful alternate for the motorist. However, traffic has pretty much avoided this road in the past due to the dangerous curves, switchbacks, and steep grades encountered along certain sections.

Shortly after its inclusion in the state highway system in 1931, plans were made for an orderly rebuilding of portions of the road to bring it up to an adequate standard for a secondary route and a number of contracts have since been completed.

January of this year saw the completion of 5.8 miles of new road from Santa Barbara to a point near the San Marcos Pass, this stretch eliminating the former steep and twisting

road up the southerly slope of the Santa Ynez range.

## NEW CONSTRUCTION UNDER WAY

Work started the first of this year and is now in progress on the reconstruction of 5.6 miles of the existing road from Santa Barbara Avenue to Los Olivos. The old route, 7.6 miles long, takes a course common among old roads through sectionized country, that of following closely to section lines resulting in many right angled turns with their accompanying dangers and inconvenience to modern traffic.

The new route is practically a straight line between termini, only bending slightly to avoid local improvements. The section rebuilt in 1934 lies contiguous southerly and is also along the same direct line.

The present contract, except for its directness of route and consequent saving of 2 miles in distance, is not of spectacular significance from a construction standpoint as the country traversed is open and no particular problems are presented.

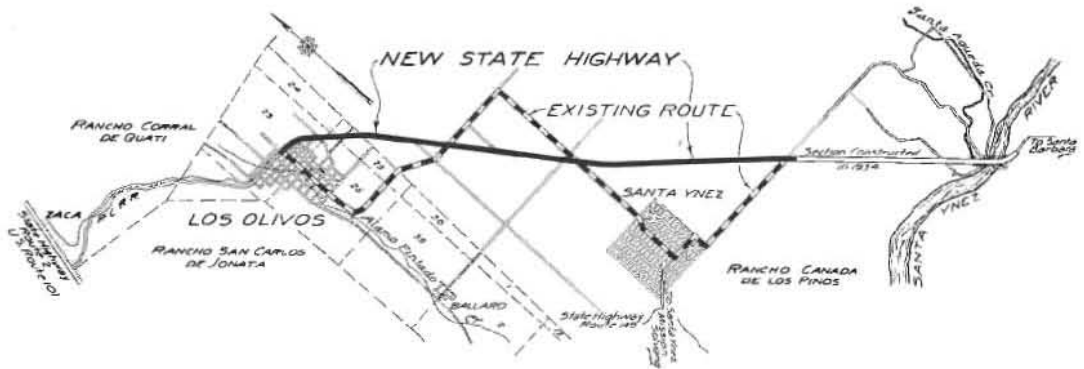
Roadbed width is 24 and 36 feet. On the 24-foot roadbed the fills are being widened one foot to accommodate an intercepting dike to prevent fill slope erosion. Surfacing will consist of a 20 foot by 3 inch screened gravel base, water-bound, topped with a 20 foot by 3 inch road mixed oil and screened gravel pavement. Shoulders are to receive an oil penetration.

## PROVIDES ALTERNATE ROUTE

Major structure work embraces a triple 8 by 7 foot box culvert as well as a number of 6 by 7 foot cattle passes.

This project, scheduled to be finished the latter part of June of this year, together with the recently completed grade relocation north of Santa Barbara, will encourage the motorist using the Coast Highway to consider the San Marcos Road as an alternate route through the Santa Barbara area.

The project is being financed from a \$141,000 allocation of Federal Works Program highway funds and utilizes labor from local communities. Ted Baun is resident engineer for the state.



**DIRECT LINE RECONSTRUCTION** is typified in the realignment of 5.6 miles of San Marcos Pass route through Santa Ynez and Los Olivos in Santa Barbara County. The existing route zigzags back and forth, following section lines, resulting in many right angled turns with their accompanying dangers and inconvenience to modern traffic. The new line on which grading operations are under way goes straight across country with a resulting saving of 2 miles to motorists in time and distance.

## Citizens Urge Flood Control Project

(Continued from page 6)

Merced, making it necessary to detour traffic many miles out of direction, and also making it necessary for Maintenance Superintendent George Marshall to employ sixty-five additional men to direct traffic and rent three additional light trucks for piloting traffic through stretches of road covered by water.

This flooding is caused by the overflowing of several creeks heading in the Sierra foothills east of Merced and flowing westerly to the San Joaquin River.

The principal streams north of Merced are Bear Creek and Black Rascal Creek; south of Merced are Miles Creek, Owens Creek, Duck Slough, Mariposa Creek and Deadman's Creek.

This overflowing is aggravated by the railroad embankment not having sufficient opening to pass the water rapidly. The State Highway being adjacent to and on the upstream side of the railroad and having a low grade line, is soon covered with water every time these creeks overflow.

### FLOOD CONTROL SURVEY MADE

Several years ago an engineering study of this area was made with recommendations for flood control.

The report recommended the construction of several flood control dams, and the combining and enlarging of some of the channels at an estimated cost of about \$1,000,000.

Nothing was ever done toward putting the plan into effect as it was considered too big a financial burden on the property involved.

After the recent flood there was a demand from the property owners that something be done, and a local flood committee was formed to contact federal and state authorities having in mind securing financial assistance to put into effect some plan of flood control.

### ALTERNATIVE SOLUTIONS

If this is done the problem in so far as the State Division of Highways is concerned would be solved by the expenditure of a comparatively small sum for enlarging a few bridges. However, if nothing is done toward flood control, the only relief for the periodical flooding of the highway would be a raising of

the grade for several miles and the enlarging of existing and the building of additional bridges.

The depth of water over the crown of the pavement reached a maximum of thirty-eight inches both north and south of Merced, and in the northerly part of the city the depth was twenty-four inches over the crown of the pavement.

State Highway Route 123 north and south of Merced and Route 18 east of Merced were all covered by water at times but the depth over the pavement did not exceed twelve inches, and traffic was able to get through, in some cases being handled by pilot cars under one way patrol in order to keep cars on the pavement where the force of the water had washed out the shoulders, in some cases to a depth of twelve inches adjacent to the pavement.

### THREE FATALITIES RESULT

Three fatalities occurred during the flooded period; one, a flagman temporarily employed for the emergency was struck at night by an auto he was trying to stop.

The other two were a man and wife who were killed when the car they were in crashed into the rear of a truck standing in a line of traffic waiting to be piloted through flood waters, and after they had been signaled to stop by our flagman.

In other parts of District X the high water caused considerable damage, especially in the foothills along the Mother Lode where the rains reached cloudburst proportions. In numerous places water passed over roads where it had never been observed in the past twenty years.

### PATROL AIDED WORKERS

Our maintenance superintendents and crews in this district were continuously on duty for long periods and traffic was cared for as the necessity arose with a minimum of inconvenience.

The California Highway Patrol of both Merced and Mariposa counties gave wonderful cooperation and can not be too highly praised for it. Our superintendent reports that they were out with our men at all hours and their aid was invaluable.





**GOOD BOATING CONDITIONS** existed on part of State Route 123 near Merced.



**LAND BEGAN TO SHOW ON U. S. 99** south of Merced on February 15 as waters receded.



**WATER SPORTS** began with bicycling and wet feet when the flood had somewhat subsided.

## Donner Crews Succor Trapped Autoists

(Continued from page 2)

By afternoon the wind reached such a velocity and visibility was so poor on the summit that all east and westbound traffic was stopped from 2.45 p.m. until 8 p.m. On February 13, eastbound trucks were allowed to proceed in the morning while westbound trucks were released at noon. Poor visibility and bad drifting necessitated the halting of both east and westbound trucks again between 4.30 a.m. and 9.30 a.m. on February 14.

### DRIFTS CLOSED ROAD

A ski tournament scheduled to be held at Cisco February 15-16 was cancelled as a result of adverse weather conditions. Although the road was kept open, the move was a wise one as our equipment was extremely busy and no parking space could have been provided for cars at the ski grounds.

On February 16, the intensity of the wind increased and falling snow was much drier than in previous storms. As a result, the snow drifted to such an extent that the traveled way became so narrow as to necessitate closing the highway from 5 a.m. to 11.55 p.m. A rock slide occurred on Route 38 down the river from Truckee on February 21, which blocked the road for four and one-half hours.

Saturday, February 22, was a holiday and as the weather appeared favorable, a large number of winter sports enthusiasts came to this region for participation in and enjoyment of a ski meet at Tahoe City. But a severe storm blew up Saturday night and early Sunday and many of them were snowed in between Tahoe City and the state line and between Tahoe City and Meeks Bay.

### TRAFFIC FOLLOWED PILOT

Donner Summit again was closed to all trucks at 9.30 a.m. on the 23d and a rising wind velocity and a number of slides made it necessary to close both safety gates to all traffic at 11.30 a.m. the same day. In order to put traffic over Route 37, a pilot car was then put into use and traffic traveling east was conducted from Baxter's at 7.45 p.m. while westbound cars were allowed to proceed behind the pilot from the Truckee gate at 9.30 p.m.

No heavy trucks were taken care of. The number of cars in the westbound traffic line

was approximately 75. Light traffic was conducted by the pilot car until 10.15 p.m., at which time it was permitted to continue without guidance. Heavy trucks were released at both gates at 4.50 a.m. on the 24th.

### ROTARY FREED SNOWED-INS

During all this time a rotary plow was kept in the Lake Tahoe region in an effort to free snowbound people. By nightfall of February 24 the plow had reached snowed-in groups as far south along the lake as Tahoma and to Brockway on the north. While the plow was proceeding to Brockway a fall of snow two feet in depth behind the plow made it necessary to return at a slow pace to Tahoe City.

The situation on Donner Summit by this time had reached such a critical point that the rotary plow was recalled to that point.

On February 24, the wind increased in velocity and eastbound trucks were stopped at 3.35 p.m. and westbound trucks at 12.35 p.m. Due to an unusually heavy wind which caused heavy driftage across the summit, the gates were closed to all traffic at 5.45 p.m.

During the nights of February 24 and 25, numerous heavy snow slides came in on the Donner grade, some of which were approximately 200 feet long and 20 feet deep and were composed of very solid snow. These slides stopped traffic that was still in between the gates after the gates had been closed.

### CARS TRAPPED BY SLIDES

On the west side of the slides a stage and approximately twenty cars were stopped.

Every effort was made to make these people safe and comfortable. They were given hot coffee and food from the Donner Summit crews' cookhouse and frequent inspection was made of the cars to avoid the occupants' becoming gassed or too cold.

All three rotary plows in the immediate Truckee vicinity were kept working at the slides in an effort to break through as soon as possible. It was not until 9.30 a.m. on the 25th that the stalled traffic was freed and proceeded to Truckee.

Due to the extreme cold, many of the motorists who stayed in their cars while

(Continued on next page)

### U. S. ARMY OFFICER PAYS TRIBUTE OF APPRECIATION TO THIS HIGHWAY MAGAZINE

**I**NFORMATION contained in California Highways and Public Works is of real value to army officers attending schools of instruction at Fort Leavenworth, according to a complimentary letter received from Major Arthur Wilson, formerly of the California National Guard and now an instructor of the General Staff School at Fort Leavenworth.

"The California Highways and Public Works is a fine publication to get, especially while one is connected with these army schools," writes Major Wilson. "Every now and then there is something in it of real military value as we do a lot of study on the geography of certain regions from the military viewpoint. Will you please send me a large size map of California, something like the one on the back of the Highway Bulletin which shows the road system and planned roads up to date."

Major Wilson graduated from the Oroville high school and the University of California. He enlisted in the National Guard of this state and in 1916 went with it to the border for service during the Mexican revolutionary troubles which culminated in General Pershing's expedition into Mexico after Villa in 1917. In those days, Major Wilson was in the old 5th Infantry, 2nd California. He went overseas with his outfit as a lieutenant. In France he transferred to the Field Artillery and when the war ended remained in that branch of the army as a captain.

Major Wilson took the two-year course of the General Staff School at Leavenworth, graduating in 1934, completed the Chemical Warfare course and finished the Army War College instruction last June, when he was assigned to Fort Leavenworth as an instructor.

## Automobile Industry Recorded 45% Gain in Output for 1935

**A**MERICA'S motor vehicle industry forged ahead under the impulse of generally improved business conditions last year to a 45 per cent gain in output over 1934.

An American manufacturers' association report shows foreign sales gained 34 per cent.

The total motor vehicle registration for the year in the United States was approximately 26,000,000, consisting of 22,450,000 motor cars and 3,550,000 trucks. The world registration of motor vehicles was 36,500,000. Thus 71 per cent of the world's motor vehicle population was in the United States.

\$2,186,500,000 BUSINESS

The combined wholesale value of both cars and trucks was \$2,186,500,000. Parts and accessories for replacements and service equipment represented \$565,000,000 additional. The wholesale value of rubber tires for replacement was \$248,000,000. The grand total represented by motor vehicles, parts, accessories, service equipment, and tires was \$2,999,500,000 wholesale value.

Manufacture and use of automobiles contributed to the activity of many other industries. The figures reveal that the automobile industry last year consumed 89 per cent of the nation's gasoline production; 75 per cent of the rubber; 59 per cent of the lubricants; 77 per cent of the plate glass; 33 per cent of the nickel; 16 per cent of the aluminum; 23 per cent of the iron and steel; 8 per cent of the hardwood lumber; 22 per cent of the copper; and 39 per cent of the lead. Cotton fabric used in tires totaled 210,000,000 pounds.

Sign at Library: Only low talk permitted here.  
—*American Humorist.*

### DONNER SUMMIT CLOSED BY SLIDES

(Continued from preceding page)

stalled on the grade over night kept their motors running in an effort to keep warm. Realizing that this procedure would probably exhaust the fuel supply, the highway employees had a local gasoline truck in the immediate vicinity as soon as the slides were removed so that any of the cars lacking in gasoline would not be delayed.

#### TRAFFIC PATROL NECESSARY

Keeping all the rotary plows in the slide area resulted in the rest of the road becoming quite narrow and it was found advisable to use a pilot car for light traffic until 3 p.m., at which time light traffic was allowed to proceed without the traffic patrol. Trucks were not released until February 26 at 1 p.m.

Upon the clearance of the traffic and widening of the traveled way on Route 37, a rotary plow again was dispatched to the Lake Tahoe section and a second plow cleared the road to Hobart Mills.

A commendable feature of the work in connection with the difficulties encountered on the 25th was that no complaints were received at any time from traffic stalled on Donner Summit grade during the heavy storm.



# *New Method of Soil Stabilization a Feature of Coast Highway Project*

By J. M. LACKEY, Assistant District Construction Engineer

**P**AVING the last link of the Roosevelt Highway along the south coast between Oxnard and Santa Monica was completed in the summer of 1929. Traffic immediately became so heavy that preparations for a widening and realignment program were started at once. Plans generally provided for an 80-foot roadbed and improvement in alignment and grades and necessary drainage corrections.

From Santa Monica north for  $7\frac{1}{2}$  miles new pavement was constructed 40 feet to 60 feet in width. The balance for the present is to be 30 feet in width with oiled shoulders.

On July 26, 1935, a contract was awarded for the reconstruction of 5.6 miles between Little Sycamore Canyon and Encinal Canyon. This contract provides for an 80-foot graded roadbed, increasing the pavement width from 20 to 30 feet, oiling shoulders and widening of the Arroyo Sequit Bridge.

## GRADING 80-FOOT WIDTH

The roadbed is being graded to an 80-foot width at this time because of right of way agreements and in anticipation of residential subdivision and improvements which would make future widening expensive.

Four years ago a contract was made with the owners of the Malibu Ranch under which a very valuable right of way was donated to the state, one of the terms being that as a part of the original construction the full 80-foot width of right of way would be graded. This was to avoid making any further cut and fill slopes on their land which was being rapidly subdivided and improved. One line change eliminates two 600-foot radius curves.

Interesting features of the job are the stabilization of adobe and clay soils with sand, the redesign of culvert inlets, and the addition of a fourth traffic lane on vertical curves where the sight distance is short.

## CLAYS STABILIZED WITH SAND

The existing portland cement concrete pavement is remarkably smooth considering that it was laid nearly seven years ago and that soil conditions are generally very bad. The present excellent condition of the pavement is no

doubt due to the fact that it was laid upon a plant-mixed surfacing constructed the year before. This plant-mixed surfacing varied by sections from 2 to 4 inches, the 2-inch courses being supported with a crusher run base of from 2 to 4 inches in thickness.

**Under the present widening and alignment plans, beach sand is being blended in to stabilize the clays for a thickness of 12 inches. Blends containing from 25 to 80 per cent of sand are used.**

In preparation of the grade for blending, the earth was removed to a sufficient depth to allow for displacement of the sand, then scarified to one foot below subgrade. The calculated amount of sand was then spread and blended with the earth with a machine mixer such as is used for oil mixing.

## FIRM SUBBASE PRODUCED

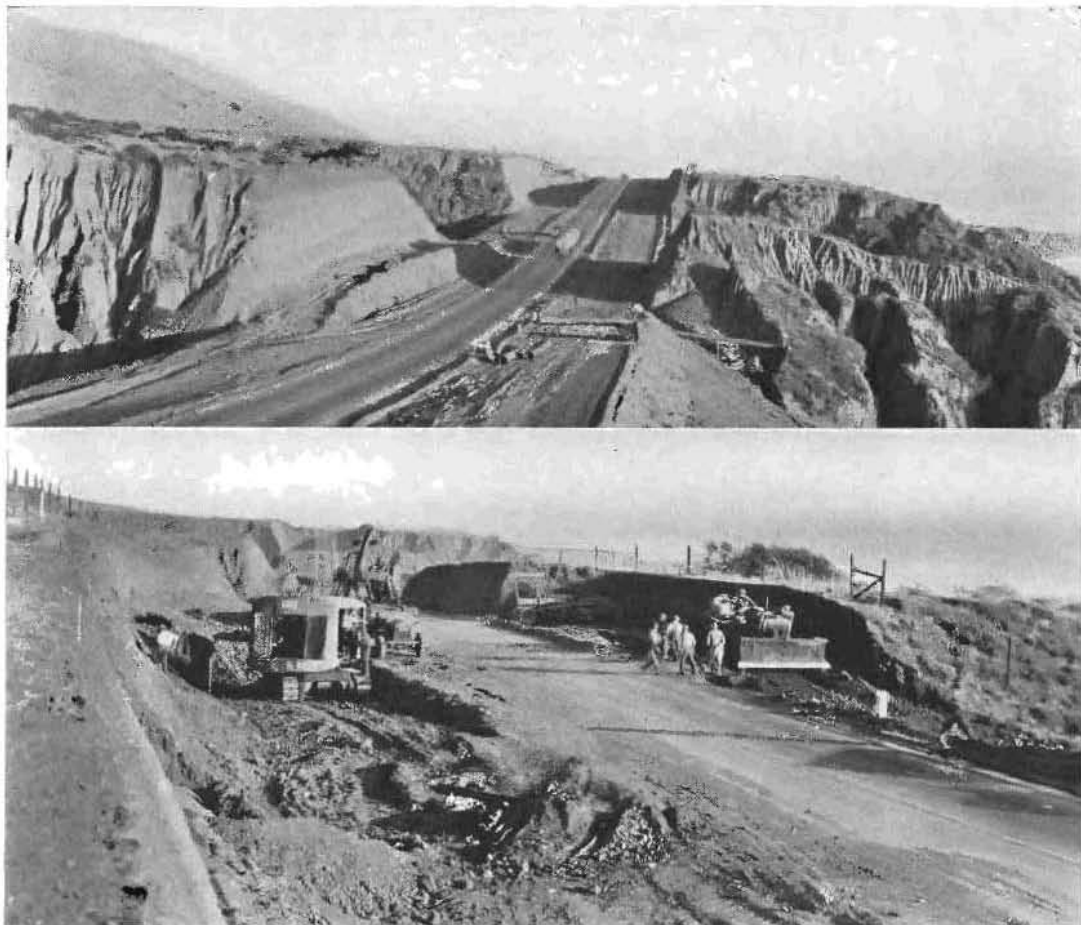
On other jobs where this method of soil stabilization has been used, blending was done by plowing and blading. Best results are obtained when the sand and earth are dry or nearly so. This produces a satisfactory subbase.

**Unlike some types of selected materials and decomposed granite, the stabilized soil is dense and does not readily admit moisture to the underlying adobe or clay. There is also a considerable saving in cost as a satisfactory selected material is not to be found within twenty miles of the work.**

Not the least of the problems of projects in this locality is drainage. This section of the highway is located along a sloping debris bench from  $\frac{3}{4}$  to  $\frac{1}{4}$  mile wide bounded by low rugged hills on one side and ending in seacliffs on the other.

## LITTLE GRAND CANYON

Storm runoff from nearby hills is quite rapid and carries a large amount of silt and small gravel which in many places is deposited in fans on the bench land and in other places the bench is eroded by great gullies, one of which is called the Little Grand Canyon because of its ruggedness and size but is more



WIDENING THE COAST HIGHWAY between Santa Monica and Oxnard to meet traffic and safety requirements. At top—Grading to 80 foot width through scenic erosion area called the Little Grand Canyon. Below—Providing for addition of a fourth traffic lane on vertical curves where sight distance is short.

like a miniature Bryce Canyon with its fantastically eroded formations.

The difficulty is to so locate the culverts that they will carry the storm water without catching the silt. On new construction where such conditions exist, it is generally considered good practice to locate the culvert in such a manner that the inlet will be well above the flow line so as to provide a settling basin.

Where the culverts are already in place at the bottoms of large fills chimney type inlets are being constructed with openings which are many feet above the flow line grade. The chimney may be heightened as the basin fills up.

#### SERVES DOUBLE PURPOSE

This serves the double purpose of preventing the silting up of the culverts and filling

up unsightly washes, appropriately in line with the soil erosion control work of the Civilian Conservation Corps, much of which is being done in this part of the state.

The frequency of the larger washes has made necessary many grades and sharp vertical curves on the existing road, always a menace to traffic on a 20-foot highway. On the new project four traffic lanes are provided over sharp summits where the sight distance is restricted.

Andy: "Ye wouldna buy your sweetie a ring at the five-and-ten, would ye, Sandy?"

Sandy: "Na, mon, it's better to gang to the twenty-five-cent store and get her a guid one."

Mechanics Prof: "Describe the mechanism of a steam shovel."

Frosh Engineer: "Don't kid me. You can't carry steam on a shovel."

# Maintenance Crews Sand 15,000 Miles of Icy Mountain Highways During Winter

By W. A. SMITH, Assistant Maintenance Engineer

**W**INTER, bringing to the Maintenance Department of the Division of Highways problems of snow removal on mountain roads imposes also an additional burden of toil upon the hardy workers of the maintenance crews assigned to the higher altitudes of the State highway system.

Ice prevention and removal, a very important part of the safety program of the Division of Highways, calls for increased labor by the field men of the Maintenance Department throughout the winter season.

Some fifteen hundred miles of highways are given ice protection during the period of cold and stormy weather at an approximate annual cost of \$15,000.

## SAND MIXED WITH SALT

Special equipment is used for this work and each fall the department prepares for the task ahead by storing at strategic points the material used in sanding stretches of icy road and pavement.

The California Division of Highways, which pioneered in ice prevention work, uses a mixture of sand and salt to combat ice on mountain roads and in sections where heavy frost conditions prevail. Sand is mixed with salt in the proportion of about 100 pounds of salt to each cubic yard of sand and spread over dangerous portions of the highways by a special truck known as a sander.

To a motorist, nothing is more treacherous than a road surface covered with a film of ice. This condition may have been caused by a wet snow that has packed down under traffic until it is too slippery for safety. Or it may have been caused by a plating of sleet that came on unnoticed by the driver who, suddenly and to his utter amazement, finds his car out of control. A dash of rain on a mountain road often will turn a safe pavement into a perilous skidway.

## LABOR LONG HOURS

The Maintenance Department does not have special crews for ice prevention work. The snow removal personnel is trained in the use

of sanders and takes in its stride the job of locating and sanding frosty and icy sections of pavement.

It is not unusual for these men to labor for twenty-four hours and more at a stretch at their tasks of snow removal and ice prevention.

Early each fall, before the rains set in, the Maintenance Department stockpiles in galvanized iron shelters at convenient locations huge supplies of the sand and salt mixture. The Division of Highways has found this mixture to be the most effective. The salt breaks up the ice on the roadways and permits the sand to form a surface that insures traction for motor vehicles.

## STOCKPILED ON HIGHWAYS

Sanders are stationed at various points for use on the Donner Summit, Trinity, Alturas, Downieville, Red Bluff-Susanville, Redwood Highway and Yosemite All-Year Highway laterals. They are component parts of the snow removal equipment.

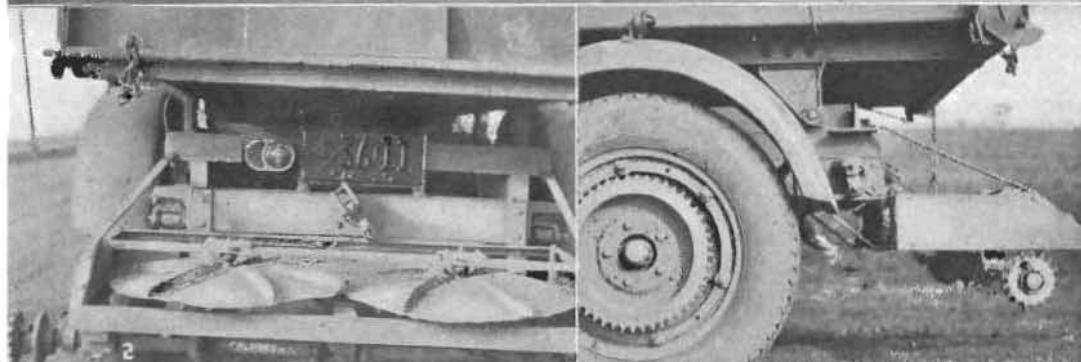
Snowdrift control on certain portions of the mountain highway system has been found to reduce the winter work of snow removal and ice prevention.

In many cases during construction it has been possible to raise the grade of the road so that the fill portions will be kept clear of snow by wind action. Likewise the ditch section is widened and the slopes flattened in cuts to provide storage space for snow. In other areas clearing of brush and trimming lower branches of trees will reduce the eddy action of the wind and consequently reduce the deposit of snow at such points.

## SNOW FENCE EFFECTIVE

In open areas, snow fence made of lath pickets is installed on the windward side at sufficient distance from the road to insure formation of the drift at the desired point off the road. In some cases planting of trees and shrubbery serves the same purpose. At the present time the State has approximately 90,000 lineal feet of snow fences.





**SAFETY FOR ICY PAVEMENTS**—No. 1—Stock piles of sand and salt are stored in galvanized shelters at convenient locations. Nos. 2, 3—Disk spreader equipment attached to rear end of truck. No. 4—On the job with distributor actuated by drive-wheel. No. 5—Sand is purchased by the carload.

## New Motor Touring Records Predicted for this Year in U. S.

**M**OTOR TOURING, which set new high records in 1935, is expected to register even further gains during the coming travel season, according to the Touring Bureau of the California State Automobile Association. In a statement discussing the travel outlook this year the motorists' organization said:

"The urge for travel which was reflected in the unprecedented volume of motor vacationing last year can reasonably be expected to receive further stimulus during the coming months from the rapidly widening extent of car ownership and from the broadening of travel horizons through the building of new and improved roads.

### MORE AUTOS AND ROADS

"According to preliminary registration figures for the nation there are now about a million more automobiles in use throughout the United States than there were at this time last year. This increase naturally represents a sizeable addition to the stream of annual recreational travel.

"Road building, responding to the impetus of large federal expenditures, has gone forward rapidly and some 30,000 miles of new or improved roads have been added throughout the nation opening up new travel objectives and affording better avenues of approach to existing motor tourist attractions.

"Every indication points to a further improvement over the 1935 travel year, which saw the record total of some 37,000,000 motor tourists taking to the highways and spending an aggregate of about \$4,000,000,000 on their journeyings."

### AUTOS GIVE 5,065,000 JOBS

Total employment derived from the manufacture, sale, and operation of motor vehicles in the United States amounts to approximately 5,065,000 persons, or about 12 per cent of all those gainfully employed.

In California, the number of persons gaining their livelihood directly from motor vehicle activities is reported as approximately 313,600.

"I read in a book that Apollo was chasing a nymph and she turned into a tree."

"He was lucky. The one I'm chasing always turns into a jewelry shop or restaurant."

### EVERY 4 MEN EMPLOYED AT WORK ON HIGHWAYS MAKE JOBS FOR 7 MORE WORKERS

"Present consumption of roundly 18 billions of gallons of gasoline annually," says Director B. H. Markham of the American Petroleum Industries Committee, "will produce more than \$500,000,000 yearly revenue from a three-cent gasoline tax. Since every dollar expended upon highways starts a trade movement which results in the ultimate distribution of \$3.15 in business activity and in wages, \$500,000,000 spent upon roads would distribute \$1,575,000,000 in trade and wages among 24 industries.

Every four men put to work on highways make jobs for seven additional workers in industries whose products are used in highway construction, improvement, and maintenance. Certainly this method of creating employment and distributing wages is preferable to spending endlessly and indiscriminately from gasoline tax funds for other state expenses, especially since it gives those who pay this special additional tax for roads the roads for which they are paying. No other method will accomplish that!"

### ACCIDENT PREVENTION STUDY

(Continued from page 12)

warning and directional signs, the separation of traffic at grade crossings, the installation of sight posts on curves, sanding of icy pavement, snow removal; all are of little avail.

All records point to the fact that in the majority of cases it is not the use but the abuse of the present road facilities which is responsible for accidents.

### ALL AGE GROUPS INVOLVED

Considered by age groups, the number of drivers involved in accidents is nearly proportional to the number of registered drivers in each of the age groups. In other words, all classes of drivers, not necessarily the young alone, are laboring under much the same physical and mental handicaps.

The speeders and the drunken drivers, who approximate one-fourth of the offenders, can very properly be taken care of by strict enforcement. The remainder, who we might say comprise the general run of drivers, are admittedly ignorant either of driving conditions, the mechanical operation of their cars, or knowledge of the rules of the road, and must be educated as to these fundamentals.

He: "May I take you home?"

She: "Sure, where do you live?"



The early storms of February increased the flow of the Sacramento River at Sacramento from 75,000 second-feet to about 82,000 second-feet on February 17th plus the additional flow in Yolo By-pass, resulting in a continued recession of salinity so that at present Suisun Bay is practically fresh.

Snow surveys on western Sierra slopes indicated, in general, a snow cover and water content less than that of February 1, 1935. Precipitation data in the north indicated that seasonal totals to February 1st were about 95 per cent of normal.

Applications for repairs and alterations of dams, news of the irrigation districts and other activities of the department are given in report of the State Engineer which follows:

#### IRRIGATION DISTRICTS

Investigation was made in the field of work proposed by the Fair Oaks Irrigation District, for which the directors had requested approval by the Districts Securities Commission. This work consists of the removal of a part of the old main pipe line, installed in 1906 near the eastern boundary of the district, and replacement with 1400 feet of 30-inch welded steel pipe.

A new bulletin containing the revised irrigation district laws, copy for which was compiled and edited by the Division of Water Resources, has just been printed by the Supervisor of Documents, Bureau of State Printing, who will handle distribution under the provisions of Chapter 82, Statutes of 1933.

#### FLOOD CONTROL AND RECLAMATION

##### *Maintenance of Sacramento Flood Control Project*

Routine maintenance was carried on during this period with a small crew. The cracks and washes in the new levee from Butte Creek to Colusa on the east side of the Sacramento River, and the training levees of the Moulton and Colusa weirs, were filled and tamped.

The three drainage pumping plants east of the Sutter By-pass were operated almost continuously during this period. Several washes in the levees of the Sacramento By-pass were filled.

##### *Relief Labor Work*

Approximately 200 relief workers were engaged on projects under the supervision of this office during the period. However, work in the river bottoms was interrupted for a number of days on account of high water, and the men were worked on near-by levees removing brush and trees. This work was all done in Sutter and Yuba counties on the Sutter-Butte By-pass, Feather River and Bear River.

##### *Sacramento Flood Control Project*

Work has been continued on preparing the right of way on the south bank of the American River near Perkins, the work during this period consisting mostly of removing hop poles and constructing new anchorages. Several pipes for irrigation were installed.

Several reports were made upon applications before the Reclamation Board, and a number of inspections were made of construction authorized under applications previously approved.

#### DAMS

Application for the construction of a dam was filed by the Pioneer Dredging Company on February 11, 1936. The dam is to be located on a small drainage in Shasta County approximately six miles north of Redding. The dam will be an earthfill 40 feet in height storing approximately 350 acre-feet of water and is to cost approximately \$3,000.

Application for alteration of the Hughes Dam in Placer County was filed January 27, 1936, by the California Lands, Inc. This is a small structure storing approximately 80 acre-feet which was to be altered to decrease the storage capacity and height to remove it from state jurisdiction. The application was approved February 7, 1936, and the work of alteration has been completed.

Application was filed on January 29, 1936, for repairs to the Modesto dam of the city of Modesto. The work proposed consists of replacing sections of the timber sheet piling cut-off with steel sheet piling. This application was approved February 10, 1936.

Application for the enlargement of the Sheffield dam of the city of Santa Barbara was approved January 29, 1936.

Application for the repair of the Pine Grove dam in Nevada County was approved January 27, 1936.

Applications were filed for the approval of Grub Flat and Morgan earthfill dams in Butte County which had not previously been filed. The owner of these dams is the Cherokee Drift Mining Company. The Grub Flat dam has a height of approximately 19 feet from streambed to spillway crest and a capacity of 216 acre-feet. The Morgan dam has a height of 19½ feet and a capacity of 130 acre-feet.

(Continued on page 28)



# Snow Surveys Reveal Some Deficiency

(Continued from page 27)

## SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

Office work during the past month has been in compilation of the 1935 report covering the diversions, stream flow and return flow in the Sacramento-San Joaquin territory and salinity in the delta.

Field work has comprised only maintenance of the delta tide gages and salinity sampling at permanent stations in the delta.

Subsequent to a flow of approximately 75,000 second-feet in the Sacramento River at Sacramento, resulting from the storms in the middle of January, the flow gradually receded to about 15,000 second-feet on February 10th. Since the latter date the recent storm again brought the flow on February 17th to about 82,000 second-feet, plus the additional flow in Yolo By-pass.

The sustained river flow has resulted in a continued recession of the salinity so that at present Suisun Bay is practically fresh.

## CALIFORNIA COOPERATIVE SNOW SURVEYS

In the latter part of January and early February, the first snow surveys of the season were made at key courses throughout the major drainage basins and the results of these surveys, together with available precipitation data from all stations in the foothill and mountain areas, were published in the first monthly bulletin of snow survey and precipitation data.

Pending compilation of snow course "normals" to be completed in time for the April 1st bulletin, the results of the recent surveys were compared to the snow cover as shown by the corresponding snow surveys last year. In general the surveys of the western Sierra slope indicated a snow cover and water content less than that of February 1st a year ago; from upper Sacramento River basin to Mokelumne River basin about 90 per cent of last year and south of Mokelumne River basin from 60 per cent to 80 per cent of last year.

The data from the precipitation stations indicated some deficiency on February 1st in almost all basins of the western slope of the Sierra, only slight, however, in the north where seasonal totals to February 1st were about 95 per cent of normal but very marked in the south where in the San Gabriel and Los Angeles basins the seasonal total to February 1st was only about 25 per cent of normal.

## WATER RIGHTS

### *Supervision of Appropriations of Water*

Nineteen applications to appropriate water were received in January; 25 were denied and 16 were approved. Nine permits were revoked and three licenses were issued.

Imperial Irrigation District filed an application for

8000 second-feet from Colorado River for the development of power on the All-American Canal.

During the past month a great deal of work has been done in the Los Angeles office in connection with decision on the hearing on the applications of Fallbrook Irrigation District, city of Oceanside and Carlsbad Mutual Water Company for permits to divert water from San Luis Rey River. The physical and legal situation on this river is extremely involved and decision has not as yet been made.

## FEDERAL COOPERATION—TOPOGRAPHIC MAPPING

Topographic mapping proceeded in January on Kreyenhagen Hills Quadrangle in Fresno County and the San Bernardino No. 1 and San Bernardino No. 2 Quadrangles in San Bernardino County. Some work was done also in the field in connection with the cultural revision of Hesperia, San Antonio, San Bernardino and Cucamonga Quadrangles in San Bernardino County along the San Andreas Fault. Office work was carried on in connection with the Paynes Creek Quadrangle in Tehama County, the Burney Quadrangle in Shasta County, the Sebastopol Quadrangle in Sonoma County, and the Cucamonga No. 4 Quadrangle in San Bernardino County.

## WATER RESOURCES

### *South Coastal Basin Investigation*

Work on the South Coastal Basin investigation proceeded along routine lines during the month.

### *Central Valley Project*

The United States Bureau of Reclamation is proceeding with plans for construction of the project. Both the Denver and local offices of the bureau are exerting every effort to get construction started on the Kennett dam; the necessary relocation of the Southern Pacific Railroad to replace several miles of the present line which will be flooded by the reservoir created; the Contra Costa conduit; the Friant dam, and portions of the Madera and Friant-Kern canals.

The State Division of Highways has started drilling operations at the proposed site of the combination highway-railroad bridge on the Pit River and the State Department of Public Works is cooperating in every possible way with the Bureau of Reclamation in speeding work on the project.

As the doorman ran down to open the limousine door, he tripped and rolled down the last four steps.

"For heaven's sake, be careful," cried the club manager. "They'll think you're a member."

Ross: "There are two dollars missing from this drawer and only you and I have a key to it."

Office Boy: "Well, let's each put a dollar back and forget it."

## Old Timer, Do You Hold a Card to Beat This?

**A**TIE has developed in the friendly contest for the honor of being head man of the Old Timers' Club of the State Division of Highways.

Credit for this development goes to C. M. Butts of Stockton, District Construction Engineer of District X.

In applying for membership in the club, Mr. Butts sent along the identification card given him by the old Highway Commission dated February 1, 1912, the day on which he went to work as an instrumentman attached to Division V.

His credentials gave him a tie with George Mattis of Emeryville, one of the resident engineers of the San Francisco-Oakland Bay Bridge, in the matter of years elapsed since his original appointment.

### CALIFORNIA HIGHWAY COMMISSION

COMMISSIONERS  
CHAS. D. BLANEY  
H. O. DARLINGTON  
BURTON A. TOWNE, CHAIRMAN

Forum Bldg.  
SACRAMENTO, CALIFORNIA.

HIGHWAY ENGINEER  
AUSTIN B. FLETCHER  
SECRETARY  
WILSON R. ELLIS

*THIS IS TO CERTIFY that:*  
Chas. M. Butts of Berkeley, Calif.,  
was duly appointed, February 1st, 1912, to be  
Instrumentman attached to Division V

of the CALIFORNIA HIGHWAY COMMISSION, his term  
of office to be at the pleasure of the Commission.

*A. B. Fletcher*  
HIGHWAY ENGINEER

*M. R. Ellis*  
SECRETARY

**TIES THE CONTEST**—The card of District Construction Engineer C. M. Butts bears the same date as that of George Mattis shown last month.

So, until an older veteran comes along, the Old Timers' Club will have two head men.

Mr. Butts is a native of Marquette, Michigan, but came west to accept employment with

(Continued on page 30)



**IN THE FIELD IN 1913**—This picture of an Old Timers locating party was supplied by C. M. Butts, whose photograph appears in the inset. The scene is at San Miguel in San Luis Obispo County and the party was engaged on a preliminary survey of the Coast Highway in that vicinity. Lunching beside their Davenport wagon outfit are: (left to right) Chester Cain, axeman; Charles M. Butts, instrumentman; Harold Fisher, chainman; Warren Burch, chief of party, and the teamster, whose name Butts does not recall.

## Old Timer Jumped From Railroad to State Highway Job

(Continued from page 29)

the Western Pacific Railroad. In 1912 he was working as instrumentman for the Western Pacific in Nevada.

"At this time," writes Mr. Butts, "T. J. Wyche, Chief Engineer of the Western Pacific, told me he wanted me to go to Portola to help survey the townsite. I remarked that I had heard the California Highway Commission then being organized, planned extensive road construction work and that I would like to obtain employment with the state as an instrumentman.

"He advised me to get in touch with the late W. S. Caruthers, then division engineer of old Division V, San Luis Obispo. I had known Mr. Caruthers as a locating engineer for the Western Pacific and wrote to him.

"I received a letter from him on January 15, 1912, in which he said he had recommended me to the commission and on January 23 I was notified by the commission of my appointment as instrumentman and instructed to report to Mr. Caruthers for duty on February 1.

### REPORTED AT SAN LUIS OBISPO

"I reported to Mr. Caruthers at San Luis Obispo on that date and found he had a survey party assembled and was planning for its disposition. The Highway Commission allowed expenses for an employee for only ten days in any one town. The party remained in San Luis Obispo for ten days and then went to Salinas, where we remained seven days. Then we were directed to move to San Juan for location work on the San Juan grade on the state highway system.

"On January 25, 1914, I was transferred to Division III as a draftsman and served until June, 1914, when I was named resident engineer in charge of concrete road construction between Yuba City and Live Oak in Sutter County. I remained as resident engineer, on various highway construction projects until four years ago, when I was appointed district construction engineer of District X, with headquarters in Sacramento, since moved to Stockton.

### TWENTY-FOUR YEARS SERVICE

"On February 1, last, I had enjoyed twenty-four years continuous service with the

## Caissons Afloat

UNLOVELY rectangles of wood and steel,  
Swarming with men and lit by lurid  
lights—

But those of us who "mothered" them still  
feel

They ranked among the world's most thrill-  
ing sights.

No "bouncing infant" ever bounced as they,  
Or called for such exquisite, precise care,  
When winter storms brought white-caps to  
the bay

And "gaffers" barked: "Take off two pounds  
of air!"

Which calmed their turbulent tossings for a  
while,

And let the engineers draw a full breath!  
Yes, viewed in retrospect, it brings a smile,  
But, then, disaster loomed as clear as death.  
Concrete for half a city fed their maws  
As they grew downward toward the ocean  
floor;

Ten feet above the mud we gave them pause  
Until "high slack," then SIs swore,  
Turned angles swiftly, signaled: "To the  
right!"

We hauled the anchors tighter on that side,  
And released air, that our huge "infant"  
might

Sink into mud on the receding tide!

Peter W. Mourer, Jr.,  
Junior Construction Engineer,  
San Francisco-Oakland Bay Bridge

"Mother," said a little boy after coming from a walk, "I've seen a man who makes horses."

"Are you sure?" asked the mother.

"Yes," he replied. "He had a horse nearly finished when I saw him; he was just nailing on his back feet."

Division of Highways, with the exception of a period of seven months with the Montana Highway Commission on construction work between Butte and Anaconda, Montana."

With his identification card, Mr. Butts sent in some interesting old photographs showing the locating party of which he was instrumentman in the field at San Juan Bautista, San Miguel, Paso Robles, King City and Templeton back in 1912 and 1913.

In those days his party traveled in a spring wagon, which carried not only members of the crew, but their equipment and grub as well, and this ancient vehicle, drawn by a span of hefty horses, figures prominently in the photos and provides quite a contrast when compared with the modern trucks, automobiles and construction equipment of the Division of Highways today.



# Highway Bids and Awards

for February, 1936

**ALAMEDA, CONTRA COSTA and SANTA CLARA COUNTIES**—Apply Diesel Oil to roadside vegetation over a distance of about 111.4 roadside miles. Dist. IV, various routes and locations. Oilfields Trucking Co., Bakersfield, \$4,725; Hayward Bldg. Mtls. Co., Hayward, \$3,375. Contract awarded to Pacific Truck Service, San Jose, \$2,855.

**AMADOR, CALAVERAS, TUOLUMNE and STANISLAUS COUNTIES**—Diesel oil to be applied to roadside vegetation for a distance of about 185.1 roadside miles. Dist. X, various routes and sections. Oilfields Trucking Co., Bakersfield, \$3,660. Contract awarded to Sheldon Oil Co., Suisun, \$3,037.80.

**INYO COUNTY**—Road-mix Surface Treatment for 7.3 mi. between Death Valley Jct. & Easterly Bndry. Dist. IX, Route 128, Section A. Ssquare Oil Co., Los Angeles, \$14,840; Basich Bros., Torrance, \$11,302; U. B. Lee, San Leandro, \$9,620; Oilfield Trucking Co., Bakersfield, \$10,574; P. R. Hughes, Long Beach, \$10,008; A. S. Vinnall Co., Los Angeles, \$12,287; J. C. Compton Co., McMinnville, Ore., \$9,237. Contract awarded to C. W. Wood, Stockton, \$8,435.

**INYO COUNTY**—Between Big Pine and Keough Hot Springs, about 7.2 mi. to be graded and surfaced with road-mix surfacing. Dist. IX, Route 23, Section C.D. Union Paving Co., San Francisco, \$131,410; V. R. Dennis Const. Co., San Diego, \$113,251; Fredricksen & Westbrook, Lower Lake, \$120,037; M. J. B. Const. Co., Stockton, \$132,575; Young & Son, Ltd., Berkeley, \$130,511; Gibbons & Reed Co., Burbank, \$119,429; C. W. Caletti & Co., San Rafael, \$146,280; Hemstreet & Bell, Marysville, \$143,513; Mundo Eng. Co., & Sander Pearson, Los Angeles, \$129,261; R. R. Carlson, Stockton, \$139,028; Isbell Const. Co., Reno, Nev., \$134,774; Oswald Bros., Los Angeles, \$118,332. Contract awarded to Basich Bros., Torrance, \$109,721.70.

**LOS ANGELES COUNTY**—Sepulveda Blvd., between San Fernando Road & Brand Blvd., about 3.7 mi. to be graded. Dist. VII, Route 158, Section L.A. Oswald Bros., Los Angeles, \$476,307; J. E. Haddock, Ltd., Pasadena, \$471,956; P. J. Akmadzich, Los Angeles, \$485,486; Gibbons & Reed Co., Burbank, \$482,881; Guy E. Atkinson Co., San Francisco, \$490,862; Granfield, Farrar & Carlin, San Francisco, \$503,813; Sander Pearson & Mundo Eng. Co., Los Angeles, \$481,469. Contract awarded to Griffith Co., Los Angeles, \$464,533.

**LOS ANGELES COUNTY**—Through Sunland between Fenwick Street and Scoville Ave., about 0.6 mile to be graded and paved with asphalt concrete. Dist. VII, Route 9, Section L.A. P. J. Akmadzich, Los Angeles, \$35,930; Geo. R. Curtis Paving Co., Los Angeles, \$37,518; Oswald Bros., Los Angeles, \$40,851; Basich Bros., Torrance, \$39,477. Contract awarded to Southwest Paving Co., Roscoe, \$35,811.75.

**LOS ANGELES COUNTY**—Between Traffic Circle & Los Angeles St., about 2.7 mi. to be widened and paved with asphalt concrete. Dist. VII, Route 168, Sec. A. Griffith Co., Los Angeles, \$49,171; C. O. Sparks, Los Angeles, \$47,363; Geo. R. Curtis Pav. Co., Los Angeles, \$46,227; Basich Bros., Torrance, \$48,353; Oswald Bros., Los Angeles, \$11,304. Contract awarded to Sully-Miller Contr. Co., Long Beach, \$38,567.75.

**MENDOCINO COUNTY**—Between Longvale and Dos Rios, about 14.5 miles to be graded. Dist. I, Route 1, Longvale-Dos Rios Feeder. Union Paving Co., San Francisco, \$345,762; Granfield, Farrar & Carlin, San Francisco, \$347,420; George Pollock Co., Sacramento, \$354,985. Contract awarded to Hemstreet & Bell, Marysville, \$341,232.50.

**MONTEREY COUNTY**—Between Bradley & 6 mi. So. of San Ardo, about 6.8 mi. to be graded and paved with P. C. C. and a Reinf. Conc. Bridge to be constructed. Dist. V, Route 2, Section H & I. V. R. Dennis Construction Co., San Diego, \$375,900; Wood and Bevanda, Stockton, \$346,774; Oswald Bros., Los Angeles, \$365,673; Heafey-Moore Co., Oakland, \$358,862; A. Teichert & Son, Inc., Sacramento, \$354,791; Union Paving Co., San Francisco, \$348,879; N. M. Ball Sons & Bodenhamer Const. Co., Oakland, \$348,998; David H. Ryan, San Diego, \$327,008; Mitty Bros. Const. Co., Los Angeles, \$390,815; J. E. Had-

dock, Ltd., Pasadena, \$387,815; Hanrahan Company, San Francisco, \$393,710. Contract awarded to Peninsula Paving Co., San Francisco, \$316,342.70.

**SACRAMENTO COUNTY**—Between Isleton & Walnut Grove, about 0.6 mi. riprap slope protection to be constructed. Dist. X, Route 53, Section B, 1st. Healy-Tibbitts Construction Co., San Francisco, \$21,665; Hutchinson Co., Oakland, \$21,740. Contract awarded to Blake Brothers Company, San Francisco, \$20,862.37.

**SAN BENITO, MONTEREY, SAN LUIS OBISPO and SANTA BARBARA COUNTIES**—In Dist. V at various locations. Diesel oil to be applied to roadside vegetation for a distance of about 200 Rdsd. miles. Routes 2, 10, 33, 56, 57, 58, 80, 119, 149, various sections. L. A. Brisco, Arroyo Grande, \$7,843; Consumer's Oil Co., Los Angeles, \$7,375; Walter Rosellip, San Luis Obispo, \$7,969; Oilfields Trucking Co., Bakersfield, \$8,190. Contract awarded to Bradley Truck Co., Santa Maria, \$6,678.

**SAN DIEGO COUNTY**—On Palomar Mt. Road, between Iron Spring Cr. and the Observatory Site about 3.3 miles to be graded. Dist. XI, Palomar Mt. Feeder Rd. Daley Corporation, San Diego, \$313,133; Granfield, Farrar & Carlin, San Francisco, \$342,848; V. R. Dennis Constr. Co., San Diego, \$363,555; C. W. Caletti & Co., San Rafael, \$293,233; J. E. Haddock, Ltd., Pasadena, \$323,601; Oswald Bros., Los Angeles, \$325,745; Shafer & Gordon, Los Angeles, \$315,116. Contract awarded to Basich Bros., Torrance, \$297,396.70.

**SAN JOAQUIN COUNTY**—Potato Slough at Terminous about 1/2 mile to be graded and surf. with road mix surf. & bridge const. Dist. X, Route 53, Sec. C. M. B. McGowan and C. W. Caletti & Co., San Francisco, \$197,935; Lord & Bishop, Sacramento, \$176,932; E. T. Lesure, Oakland, \$176,446; George G. Pollack Company, Sacramento, \$210,240. Contract awarded to Bodenhamer Construction Co., Oakland, \$171,869.25.

**SAN JOAQUIN, STANISLAUS, CALAVERAS, AMADOR, TUOLUMNE and MARIPOSA COUNTIES**—Apply Diesel oil to roadside vegetation over 156.7 roadside miles. Dist. X, various routes and sections. Geo. French, Jr., Stockton, \$2,911; Oilfields Trucking Co., Bakersfield, \$3,564. Contract awarded to Sheldon Oil Co., Suisun, \$2,811.20.

**SANTA BARBARA COUNTY**—Between Tajiguas Cr. & Arroyo Hondo, about 3.1 mi. to be graded and paved with P. C. C. Dist. V, Route 2, Section F. Sander Pearson and Mundo Engineering Co., Los Angeles, \$218,697; J. E. Haddock, Ltd., Pasadena, \$203,839; Oswald Bros., Los Angeles, \$214,735; George R. Curtis Pvg. Co., Los Angeles, \$211,271. Contract awarded to Granfield, Farrar & Carlin, San Francisco, \$202,819.

**SANTA BARBARA and SAN LUIS OBISPO COUNTIES**—Between Richfield Tower and Santa Maria River. About 2.4 mi. to be graded and paved with Asph. Conc. Dist. V, Route 2, Section A & F. Oswald Bros., Los Angeles, \$67,090; J. A. Casson, Hayward, \$72,039; Basich Brothers, Torrance, \$69,583. Contract awarded to Heafey-Moore Co., Oakland, \$66,562.30.

**SANTA CRUZ COUNTY**—Between Scotts Valley & 1 mi. N. of Santa Cruz, about 3.9 mi. in length to be graded and surfaced with crusher run base & natural rock asphalt surfacing or crusher run base & plant-mixed surfacing. Dist. IV, Route 5, Section A. R. R. Carlton, Stockton, Alt. "A" \$206,056. Alt. "B" \$206,433; David H. Ryan, San Diego, Alt. "A" \$203,470; Young & Son Co., Ltd., Berkeley, Alt. "A" \$204,451. Alt. "B" \$207,450; Poulos & McEwen, Sacramento, Alt. "A" \$205,997; Union Paving Co., San Francisco, Alt. "B" \$219,479; Mitty Bros. Const. Co., Los Angeles, Alt. "A" \$215,083. Alt. "B" \$220,712; A. J. Raisch, San Jose, Alt. "A" \$224,201. Alt. "B" \$224,027; Gibbons & Reed Co., Burbank, Alt. "A" \$234,314. Alt. "B" \$238,763; A. Teichert & Son, Inc., Sacramento, Alt. "A" \$240,926. Alt. "B" \$225,803; Hanrahan Co., San Francisco, Alt. "A" \$252,053; Wood & Bevanda, Stockton, Alt. "A" \$268,371. Alt. "B" \$294,879; V. R. Dennis Construction Co., San Diego, \$282,272. Alt. "B" \$280,730. Contract awarded

(Continued on page 32)

## State and Counties Share \$5,835,836 Motor Vehicle Fees

**M**OTORISTS of California contributed \$2,917,918.31 in 1935 to develop county roads and a like amount to build and maintain state highways from last year's motor vehicle registration fees.

The 65 per cent of vehicle registration levies allotted equally in 1935 to state and county highway development amounting to \$5,835,836.62, exceeds by \$391,638.38 the amount apportioned in 1934 when 2,080,884 vehicles were registered in comparison with the record of 2,254,828 registrations in the last year.

County treasuries received \$2,782,793.17 in the August settlement and the remaining \$135,125.14 of the 1935 apportionment from motor vehicle funds now is being paid. The state highway system receives similar amounts, explains Ray Ingels, Director of Motor Vehicles.

Los Angeles County, with 916,842 registrations, receives a total of \$1,186,463.03 as its share of the 1935 apportionment. Alameda County, with 158,225 registrations, is second with an allotment of \$204,755.14; San Francisco County, with 157,960 vehicles, is third with \$204,412.21, and San Diego County, with 88,872 registrations, was fourth with an apportionment of \$115,007.10.

### 2,254,828 CALIFORNIA MOTOR VEHICLES IN 1935

Shattering all records, California rolled forward to prosperity on rubber tires in 1935 to list 2,254,828 motor vehicles as having paid registration fees in comparison with 2,080,884 in the 12-month period of 1934.

In addition to showing a gain of 173,944 fee-paid registrations of vehicles in the last year, the 1935 total smashed the previous high mark of 1931, when 2,107,275 car owners paid for number plates, representing an increase of 8.36 per cent in fee-paid registrations over the 1934 figure.

Automobiles made up the bulk of registration, totaling 2,015,018 in comparison with 1,876,192 in 1934.

Teacher: "Write a sentence with the word 'analysis' in it."

Pupil's Exam Paper: "The teacher told us to look up the word 'analysis' in the dictionary."—*Chelsea (Mass.) Record*.

### In Memoriam

**ALBERT NELSON BURCH**, irrigation engineer and the oldest employee of the Division of Water Resources, passed away at his home, February 21st, at the age of 71 years and 8 months, following an attack of pneumonia.

He was born at Fayette, Iowa, on June 21, 1864, and received his education in the public schools and normal school of that state, later taking a special course in civil engineering at the University of Wisconsin.

In the late nineties Mr. Burch came to California and entered the field of irrigation engineering, his first position of importance being that of superintendent of the Stanislaus Water and Power Company at Oakdale.

Late in the year 1907 he entered the United States Reclamation Service, and after a few years as irrigation engineer on the Umatilla project in Oregon, was assigned to the Orland project in this state which, under his regime as project engineer, became one of the most successful within the scope of the service.

Resigning as project engineer, he was appointed a consulting engineer by the Reclamation Service. For the next six years he was retained as a consultant by the service, and also was employed by the state as a consultant and special investigator of problems connected with California water resources. During 1924 he was employed as chief engineer of the Hollister Irrigation District and in 1927 returned to the state service as irrigation engineer and remained in that position until his death.

Mr. Burch was a recognized authority in irrigation matters. Naturally of a retiring nature, he was respected by all who knew him for his wide knowledge and sound common sense and loved for his unfailing kindness and subtle sense of humor.

### HIGHWAY BIDS AND AWARDS

(Continued from page 31)

to Peninsula Paving Co., San Francisco, Alt. "A" \$202,813.50.

**SOLANO and SAN JOAQUIN COUNTIES**—At various valley locations on the westerly side of the San Joaquin Valley, Diesel oil to be applied to roadside vegetation for a distance of about 128.1 roadside miles. Dist. X. Hayward Building Material Co., Hayward, \$2,797; Oilfields Trucking Co., Bakersfield, \$2,508. Contract awarded to Sheldon Oil Company, Suisun, \$2,208.96.

**SONOMA, MARIN, NAPA and SOLANO COUNTIES**—Apply Diesel oil to roadside vegetation over a distance of 197.2 roadside miles. Dist. IV, various routes and locations. Oilfields Trucking Co., Bakersfield, \$8,190; E. A. Forde, San Anselmo, \$5,850; Chas. Kuppinger, Lakeport, \$6,214. Contract awarded to Basalt Rock Co., Inc., Napa, \$5,408.

**STANISLAUS, MERCED and MARIPOSA COUNTIES**—At various locations, Diesel oil to be applied to roadside vegetation for a distance of about 141.4 roadside miles. Dist. X. Oilfields Trucking Co., Bakersfield, \$2,562; Hayward Building Material Co., Hayward, \$2,782. Contract awarded to Sheldon Oil Company, Suisun, \$2,425.50.

There were approximately 320,000 retail gasoline outlets operated in the United States last year, according to figures.

STATE OF CALIFORNIA  
**Department of Public Works**

Headquarters: Public Works Building, Eleventh and P Sts., Sacramento

FRANK F. MERRIAM.....Governor  
 EARL LEE KELLY.....Director  
 JUSTUS F. CRAEMER.....Assistant Director  
 EDWARD J. NERON.....Deputy Director

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**CALIFORNIA HIGHWAY COMMISSION**

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 CHARLES D. HAMILTON, Banning  
 C. H. PURCELL, State Highway Engineer, Sacramento  
 JULIEN D. ROUSSEL, Secretary

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 J. G. STANDLEY, Principal Assistant Engineer  
 R. H. WILSON, Office Engineer  
 T. E. STANTON, Materials and Research Engineer  
 FRED J. GRUMM, Engineer of Surveys and Plans  
 C. S. POPE, Construction Engineer  
 T. H. DENNIS, Maintenance Engineer  
 F. W. PANHORST (Acting), Bridge Engineer  
 L. V. CAMPBELL, Engineer of City and Cooperative Projects  
 R. H. STALNAKER, Equipment Engineer  
 E. R. HIGGINS, Comptroller

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 F. W. HASELWOOD, District II, Redding  
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 JNO. H. SKEGGS, District IV, San Francisco  
 L. H. GIBSON, District V, San Luis Obispo  
 R. M. GILLIS, District VI, Fresno  
 S. V. CORTELYOU, District VII, Los Angeles  
 E. Q. SULLIVAN, District VIII, San Bernardino  
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 R. E. PIERCE, District X, Stockton  
 E. E. WALLACE, District XI, San Diego  
 General Headquarters, Public Works Building,  
 Eleventh and P Streets, Sacramento, California

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 J. J. HALEY, Jr., Administrative Assistant  
 HAROLD CONKLING, Deputy in Charge Water Rights

A. D. EDMONSTON, Deputy in Charge Water Resources Investigation  
 R. L. JONES, Deputy in Charge Flood Control and Reclamation  
 GEORGE W. HAWLEY, Deputy in Charge Dams  
 SPENCER BURROUGHS, Attorney  
 EVERETT N. BRYAN, Hydraulic Engineer, Water Rights  
 A. N. BURCH, Irrigation Investigations  
 H. M. STAFFORD, Sacramento-San Joaquin Water Supervisor  
 GORDON ZANDER, Adjudication, Water Distribution

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 C. H. KROMER, Principal Structural Engineer  
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Port of Eureka—William Clark, Sr., Surveyor



