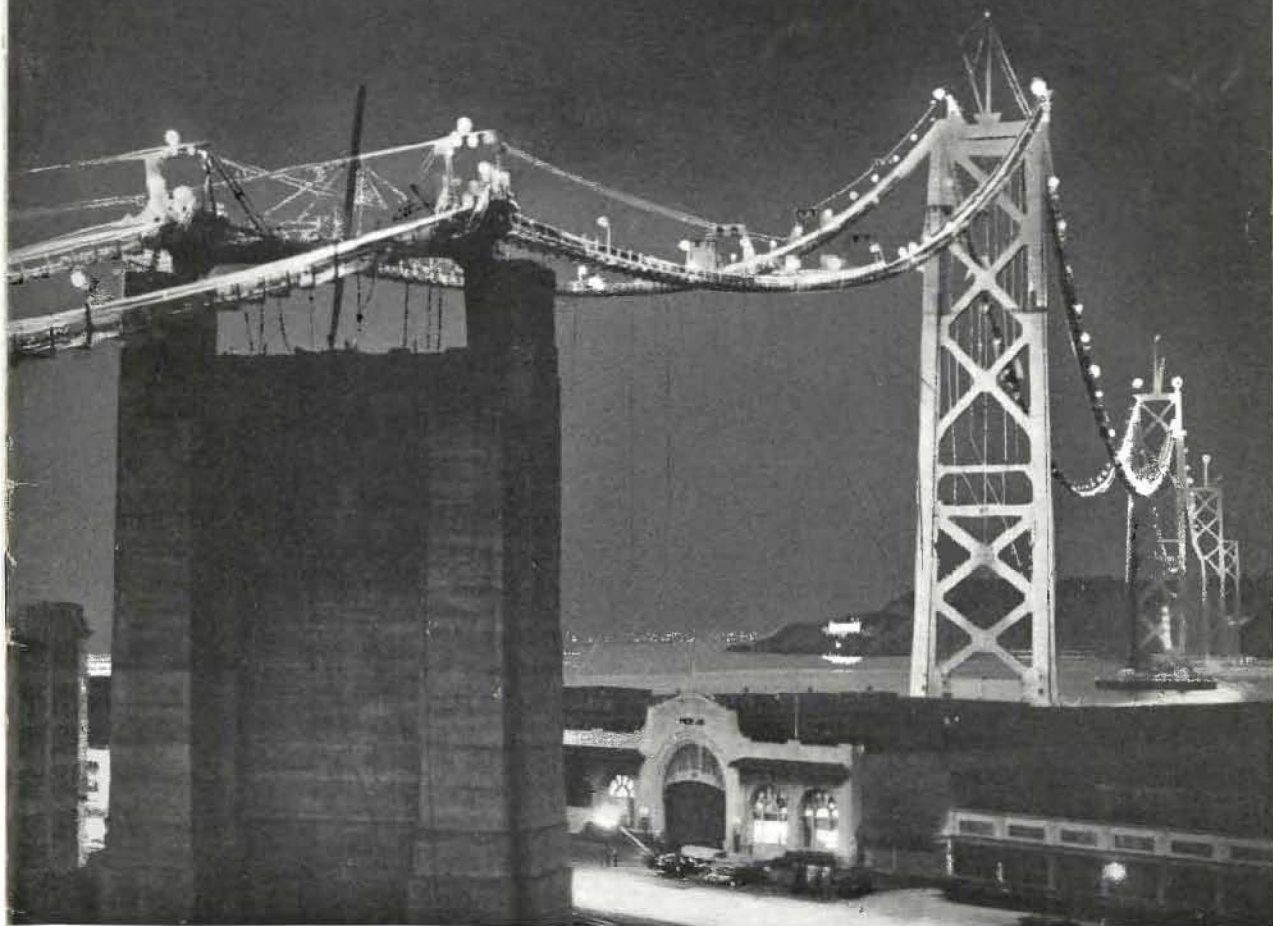


CALIFORNIA

HIGHWAYS AND PUBLIC WORKS

*Nocturne of San Francisco-Oakland Bay
Bridge With Catwalks Lighted for Cable Spinning*



Official Journal of the Department of Public Works
AUGUST • 1935



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State Getting Highway Program Under Way With \$15,234,290 Federal Funds

Division of Highways Adjusting Projects for Employment of Relief Labor With New Man-hour and Compensation Conditions in U. S. Grants of \$7,747,928 for Roads and \$7,476,362 for Grade Separations

By C. H. PURCELL, State Highway Engineer

THE Division of Highways is now engaged in the solution of a number of unprecedented labor and financial problems in connection with enabling California to apply to highway and grade separation construction the \$15,234,290 allotted to this state by the Emergency Relief Apportionment Act of 1935.

Under this act, making an appropriation of \$4,800,000,000 for the relief of unemployment throughout the United States, an apportionment has been made to California, at this time, of \$7,747,928 for road work, and \$7,476,362 for grade separations.

Although the act was signed by President Roosevelt on April 8th, considerable delay was experienced at Washington in formulating the rules and regulations by which the huge sum appropriated might be administered.

These regulations were not brought into workable form until approximately the first of July and were presented and explained to the highway commissioners and state highway engineers of the eleven western states at a meeting in San Francisco on July 16th by A. E. Toms, personal representative of Thomas H. MacDonald, Chief of the U. S. Bureau of Public Roads.

While these regulations in many instances

are the same as the regulations under which the states have been working in administering former apportionments of Federal moneys, there are, however, several additional requirements which seem to make them less workable and less adaptable to actual highway construction practices than those embodied in the

former regulations under previous appropriations.

There are two distinct sets of these rules and regulations: one for administering the moneys apportioned to highways and the other, an entirely separate set, for administering moneys apportioned to railroad grade separation.

In most cases the changes made in the rules governing the new highway apportionment have distinctly added to the difficulty of getting a highway program under way. A few of the most drastic changes are as follows:

1. A section provides that 25

per cent of the money allocated for highways in the State of California shall be applied to secondary or feeder road projects, which must be located outside of municipalities and metropolitan areas and can not be a part of either the State highway system as permitted under former Federal highway apportionments, or of the Federal highway system.



C. H. PURCELL

Deadman's Curve in Grapevine Canyon Abolished By New Ridge Route Unit

By R. M. GILLIS, District Engineer

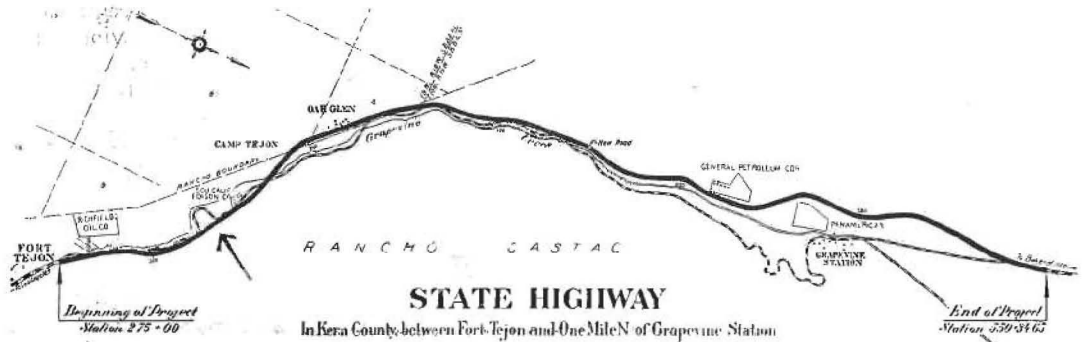
WITHOUT ceremony the last one and one-half mile section of a unit of the Ridge Route relocation in Grapevine Canyon in Kern County, which involved a heavy grading contract was completed and opened to the public on July 22d, finally abolishing the dangerous Deadman's Curve, scene of many accidents on the narrow old road.

The entire unit, now completed at a total cost of over \$900,000, extends from Fort Tejon to Grapevine Station and gives a continuous 30-foot pavement for a distance of 5.2 miles. It supersedes the worst portions

ANOTHER 5-MILE LINK

Five miles more of the Grapevine Canyon section of this improvement remain to be built, extending between Fort Tejon and the Los Angeles County line but it contains no "Deadman's Curve." This new project will complete the three-lane highway from the end of the section just finished, past Lebec to join the Ridge Route alternate and when finished will provide a continuous 30-foot pavement from the city of Los Angeles to the San Joaquin Valley.

Plans are now being completed for this third and final unit of the Ridge Route reloca-



ARROW SHOWS Deadman's Curve on old Grapevine Road. Black line indicates new highway

of the old 20-foot Grapevine Canyon Highway, shortens the length of the road by approximately eight-tenths of a mile and eliminates 2937 degrees of curvature or the equivalent of eight complete circles.

MANY CURVES ELIMINATED

The extent of the improvement that results from the work just completed is shown by the following comparison of the old and new lines between Fort Tejon and Grapevine Station, where the old road was one continuous series of curves in a distance of 6.4 miles.

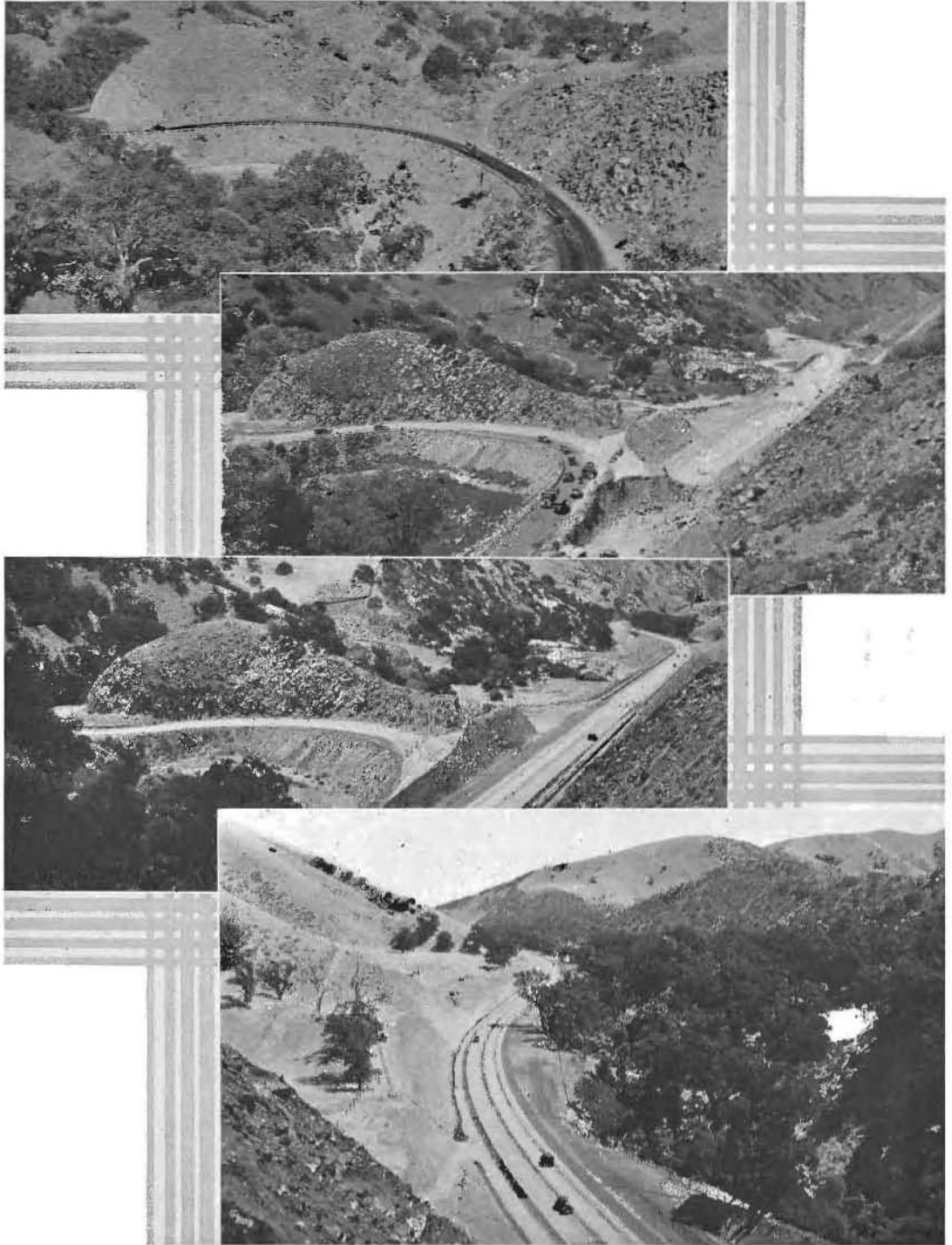
	Old road	New road
Maximum grade	6.3%	6%
Total curvature in degrees	3396	459
Minimum radius of curvature	80 feet	1000 feet
Length in miles	6.4	5.22

tion and the contract will probably be let this fall by the Division of Highways for the last five miles of this improvement to the great Los Angeles-Sacramento arterial.

LEGISLATION SEEKS UNIFORM TRAFFIC LAWS, ADDED SAFETY

Legislation introduced in Congress to provide for means of increasing safety on highways would authorize the U. S. Bureau of Public Roads to make a study of traffic conditions and measures for their improvement. This study would be made in cooperation with state, District of Columbia and municipal authorities, and with other agencies.

Under the bill, a report would be submitted to Congress, within three months of the measure's enactment, on results of the study and research and on the status of uniform motor vehicle traffic laws throughout the country. The Secretary of Agriculture, who would submit the report, would transmit with it recommendations, including suggestions for legislation which "will promote the necessary uniformity" in motor traffic laws.



DEADMAN'S CURVE ELIMINATED—At top a picture of the dangerous curve in Grapevine Canyon on the Ridge Route and the narrow old road, a combination that produced many accidents at that point. Beneath, the same scene at the start of construction improvement showing the heavy grading work under way on the relocation project. The next lower picture affords a comparison of the old road and the new wide highway showing Deadman's Curve entirely cut off from traffic use. At bottom, a view of another part of the new, three-lane unit recently completed through this heavily traveled arterial.

Grade Separation Built by State on Route 4 in City of Bakersfield

By PAUL DUNCKHORST, Assistant Bridge Construction Engineer

ANOTHER important grade separation structure has just been completed by the California Department of Public Works through the Division of Highways. In the city of Bakersfield, on Union avenue at 15th street, an old structure passing local and state highway traffic under the tracks of the Atchison, Topeka and Santa Fe Railway has been replaced with a modern subway.

This grade separation, known as the Union avenue subway, separates State Highway Route 4, which is the main trunk highway from Los Angeles to Sacramento, from the main line of the Santa Fe railroad to Los Angeles.

DENSE TRAFFIC AREA

The structure is located in an area of very heavy motor vehicle travel both of truck and passenger car traffic, the count taken in the recently completed State Transportation Survey showing a total traffic flow of from 5000 to 7000 motor vehicles per day at that point with a daily average of 2000 to 5000 trucks.

In addition to the traffic from the Los Angeles metropolitan area on State Route No. 4 via the Ridge Alternate from the south and the Golden State Highway through the heart of the San Joaquin Valley from the north, three other important state highways contribute their quota: Route 57 from the coast at Santa Maria tapping the Maricopa oil field on the west and connecting with Owens Valley on the east; Route 140 from the Taft district on the west and the Tehachapi and Mojave areas on the east, and Route 58 from Santa Margarita on the coast via McKittrick oil fields on the west and bringing transcontinental travel from the east over U. S. 66 via Needles.

AMPLE DETOUR MAINTAINED

To care for the volume of through traffic and several local street intersections at either end of the project it was necessary to maintain an ample detour during most of the construction period.

The old subway was built by the railway company and the city of Bakersfield. It provided a 24-foot roadway and a 5-foot sidewalk on each side. The inclined approaches had

unprotected earth side slopes with a 24-foot surfacing on the roadway.

With the improvement and widening of Union avenue at the south entrance to Bakersfield and the construction of five miles of new highway with wide bridges and grade separations leading out of Bakersfield to the north, the 24-foot Union avenue subway, with its steep approach grades, was the only remaining constriction on the route of this main valley highway through the city.

PROVIDES WIDE ROADWAY

The new subway has a 45-foot clear roadway with a 5-foot sidewalk on each side. In the subway proper the sidewalks pass through the abutments, as shown in the accompanying photographs.

The steel plate girder superstructure supports a double track railroad. The roadway slopes are protected with a concrete slope pavement.

The project also included improvement of entrances to property in the reconstruction of curbs and sidewalks. Improvement extends in both directions from Union avenue, along Butte street about 125 feet, and about 200 feet along Truxton avenue.

One of the main features of the improvement is the installation of the drainage system. A sump house with two sump pumps having a combined capacity of 2000 gallons per minute is to keep the subway free from standing water during heavy rains.

STORM SEWER CONNECTION

A 24-inch concrete pipe storm sewer, 1600 feet long, carries drainage from the north end of the project around the east abutment of the subway and connects with a new city storm sewer south of the subway.

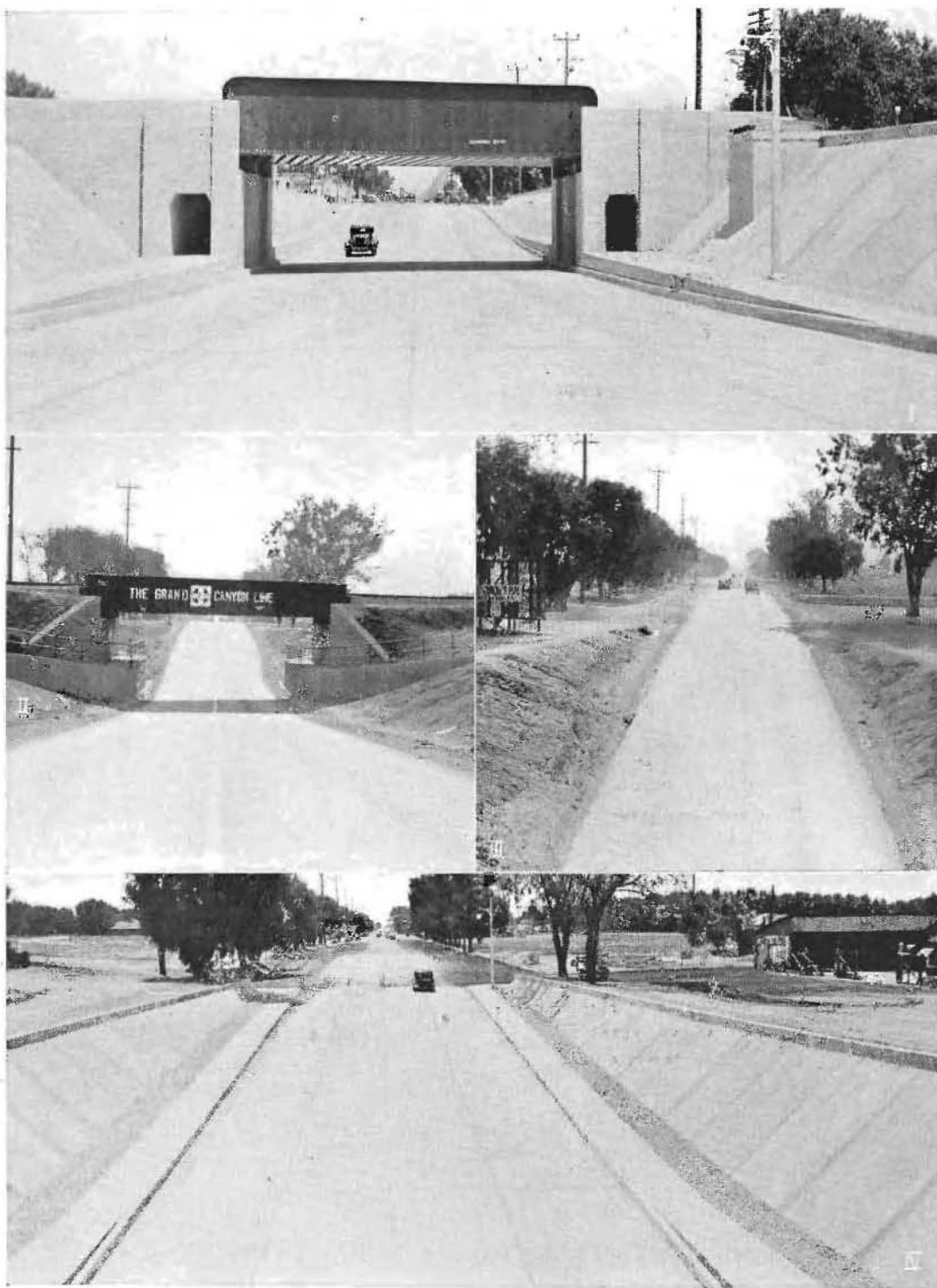
The project was financed from the State gasoline tax at a total cost of \$82,800 and has provided work for as many as 120 men at a time during the past nine months.

Wayne J. Deady was resident engineer in immediate charge of construction.

"I'll have to double my fee for psychoanalyzing you."

"Why so?"

"You have a dual personality."



GRADE SEPARATION recently completed at Union Avenue on the Ridge Route in the city of Bakersfield with State gasoline tax funds. At top is shown the heavy girder span carrying four railroad tracks, the four lane subway with pedestrian walks and concrete slopes. Center pictures show the old structure and narrow road compared with the new wide approach and highway shown below.

New Classification of Feeder Roads

(Continued from page 1)

Formerly there was a 25 per cent apportionment to feeder roads, but the only provision carried in those regulations was that the feeder roads were not to be on the Federal system. There were many roads on the State system not included in the Federal system, which could be improved under the provision.

The added paragraph in the new regulations that the feeder roads must be ones not embraced in the State highway system, makes a more complicated situation as the State officials must now secure cooperation of the county authorities as to the location of projects.

2. The allotment for a man-year, referred to in the following section, is hardly sufficient to complete most of the proposed improvements. It becomes necessary therefore, that the counties contribute a certain percentage of money to be added to this Federal allocation in order to proceed with construction, as under existing statutes State funds can not be used for so-called feeder road construction.

LOW MAN-YEAR BASIS

3. Another section provides that the Federal government's participation in any project will be limited to \$1,400 for each man-year of labor used on the work, which means that the cost of the man-year of labor must be deducted from the \$1,400 and the balance is available for engineering, materials, supplies, equipment and necessary incidentals.

As the average cost of all projects in the state, figured on a man-year basis and including materials, transportation, machinery, operation, etc., has amounted to approximately \$3,000 a man-year for the past two appropriations, it is readily seen that for the accomplishment of a program under the new regulations, either the county or the state must supply additional funds to make up the difference between \$1,400 and \$3,000 or more, in order to carry on work of the same nature we have constructed the last two years, or the standards must be lowered to fit the money available.

The necessary funds to complete a legitimate project which must be added to the

\$1,400 per man per year, will, therefore, have to be contributed by the various counties on feeder road projects or by the State on roads in the State highway system.

4. The regulations require that the administration and the expenditure of the funds, as well as control of the work shall be entirely within the jurisdiction of the State Highway Department, in cooperation with the Bureau of Public Roads.

GRADE CROSSING ELIMINATION

5. Under previous regulations, except for supervisory employees of the contractor, all labor necessarily came through the various Federal employment offices located throughout the state. Under the new provisions a radical change is made, requiring that 90 per cent of the labor must come from the relief roll, which allows the contractor only 10 per cent to choose from his own organization or from whatever source he sees fit.

Under the railroad grade crossing elimination section of the apportionment, the regulations provide that projects must be selected under the four classifications as follows: (a) separation of grades at crossings; (b) protection of grade crossings; (c) reconstruction of existing railroad grade crossing structures; (d) the relocation of highways to eliminate grade crossings.

An added feature not heretofore included for projects of this character is that the roadway 1500 feet each side of the grade crossing measured along the center line may be included in the cost of a grade separation and further that the funds apportioned under this act shall only be available for the elimination and separation of grades at railroad crossings on existing routes and will not be available for any grade crossing, separation or elimination on a newly established highway route.

ALTERNATE PROCEDURE PERMITTED

The \$1,400 per man-year clause, as applied to highway construction, also applies to grade separation projects. An alternate procedure is permitted which provides that 40 per cent of the total cost of the project, including engineering, shall go to persons directly employed on the project.

State Permitted to Underwrite Man-hour Monetary Program

(Continued from preceding page)

There is, however, another alternate plan of procedure which is allowable both under the highway program and the grade crossing elimination program. This plan embodies the execution of an agreement by the State whereby it agrees to underwrite the man-hours of labor employed on whatever monetary program is selected.

In other words, the monetary value of the program as submitted to the government, whether it be for 25 per cent, 50 per cent or for the total allocation, may be underwritten by the state to the extent of dividing the total amount of works progress administration money programmed by 90¢, which represents the amount of man-hours of labor from relief rolls that the State agrees to use on its various activities, either in the construction or maintenance program.

If such a plan is chosen, the State may then proceed on whatever basis it sees fit as to the percentage of labor to come off the relief roll for a particular project. The State, however, or the county or city in the case of feeder roads or city projects, must supplement the Federal funds by the necessary amount to complete the improvement.

COUNTIES BEING CONSULTED

The district engineers of the State Division of Highways have accordingly been instructed to immediately contact the county authorities in their respective districts with the idea of selecting feeder road projects located near centers of relief needs in each county and for which the funds available might be supplemented by the county, so that a completed improvement, adequately surfaced for the needs of the local traffic, might be undertaken.

This work would be under the supervision of the Division of Highways, which department will handle all preliminary details and supervision of construction on the various projects, the county's part being to supplement Federal participation by contributing necessary funds to the cost of the work.

Considerable preliminary work is thus involved in preparing the emergency relief program, but it is expected that these problems may be solved in the near future so that projects may be submitted to the Bureau of Public Roads and work started.

Water Conservation Report Issued for Years 1933 and 1934

THE Division of Water Resources has issued a report covering the work of the Sacramento-San Joaquin Water Supervisor for the years 1933 and 1934.

This work is a measure of relief in the difficulties attendant upon water supply conditions and use of water throughout the Sacramento-San Joaquin territory, particularly on the Sacramento River and in the Delta region. The situation involves the major problem of satisfying the water requirements for irrigation in both up-river areas and the Delta, for the control of salinity in the Delta and Upper Bay areas, and for navigation above Sacramento as demanded by the U. S. War Department.

In nearly every season of the last eleven years, each one of these requirements has exceeded the available summer flow in the rivers and the situation has been met through a provisional administration of stream flow and diversions by the Sacramento-San Joaquin Water Supervisor.

CONSERVATION EFFECTED

In years of extreme water shortage such as 1924, 1926, 1931 and 1934 the water supervisor, working in cooperation with the permanent committee of the Sacramento-San Joaquin Water Problems Conference, has been able to effect conservation measures and regulations which have been highly successful in tiding over the critical situations of these severe seasons.

During the past biennium the investigational work has, due to financial limitations, continued under a considerably reduced program, but along lines similar to those of previous years.

Measurements and records of diversions from the Sacramento, Feather, Yuba, American, Merced, Tuolumne, Stanislaus and San Joaquin rivers were made on the valley floor and above the Delta; return flow to the Sacramento and San Joaquin rivers was recorded, and the advance and retreat of salinity in the Delta channels and upper bays was observed and published. In the last two seasons, however, it has been necessary to omit the census of irrigated crops and water consuming areas in the Delta, as conducted in previous years.

Bay Bridge Center Anchorage Makes Largest "Pin-hole" Camera in World

ODDITIES of the great San Francisco-Oakland Bay Bridge which test the lay imagination vie with the structure's unusual engineering features and its illumined beauty by night in attracting attention to this marvelous construction undertaking.

Perhaps the strangest of these is the existence of a mammoth "box camera," creation of which was entirely unforeseen by the bridge engineers, in the huge concrete hollow of the central anchorage which "takes" a photograph 50 feet high.

"The world's largest camera," as the Anchorage Block now is called, was discovered by Chief Engineer C. H. Purcell.

INVERTED MOVING PICTURES

Descending the stairs in the anchorage, he observed in bright orange an inverted image of one of the bridge towers on the center wall of the anchorage. He was further amazed to see a ferry boat passing upside down across the wall.

Investigation disclosed that four rectangular apertures, each one by two feet in size, two on each side of the anchorage, constituted the "pin holes" or openings corresponding to the lens of a camera.

The plate upon which the images are thrown is the concrete diaphragm running vertically through the middle of the anchorage thus making the latter a combination of four pin-hole cameras set in a box 235 feet high, 197 feet long and 92 feet wide. The apertures are in walls which are about six feet thick and 207 feet above the waters of San Francisco bay.

"PIN-HOLE" CAMERAS

The images, as is the case in all pin-hole cameras, are thrown upside down on the concrete diaphragm in the center of the anchorage. The images are made by the slanting light rays. Those striking the top of the tower continue down to the "pin hole" and through to a point 50 feet below the level of the opening. The light rays that strike, or are reflected from the base of the tower, travel in an ascending slant through the "pin hole" and on to a point above the hole on the opposite wall.

When the sun is shining on the east face of Tower W-3, west of the anchorage camera, a color photo of the tower upside down is visible on the "plate." When the sun is in the west Tower W-3 is photographed in black and white. Similarly, when the sun is in the west, shining on the west face of Tower W-5, east of the camera, the image is in color, and when the sun is to the east of Tower W-5, it is reproduced in black and white on the wall inside the anchorage. The camera photographs passing ships clearly.

Another odd feature causes observant persons on ferryboats passing the East Bay section of the huge bridge to wonder at what appear to be wide cracks in several of the massive tower legs supporting the structure. Close inspection shows that the cracks go through the entire bridge, including the lower and top decks.

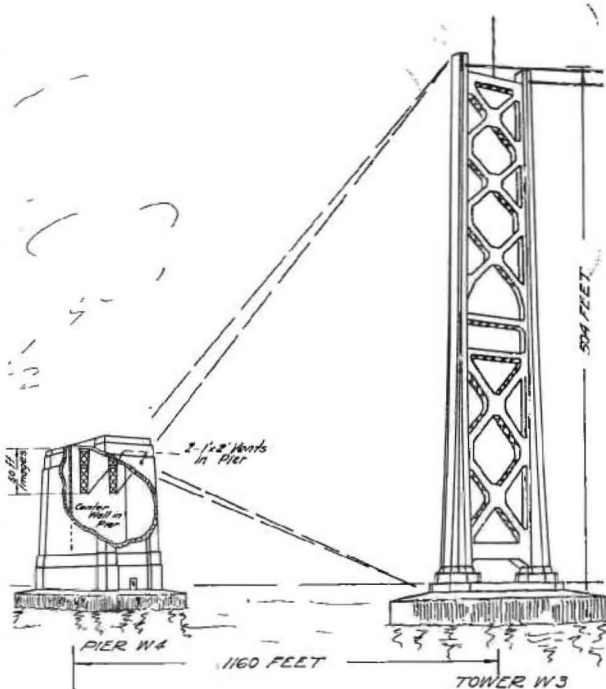
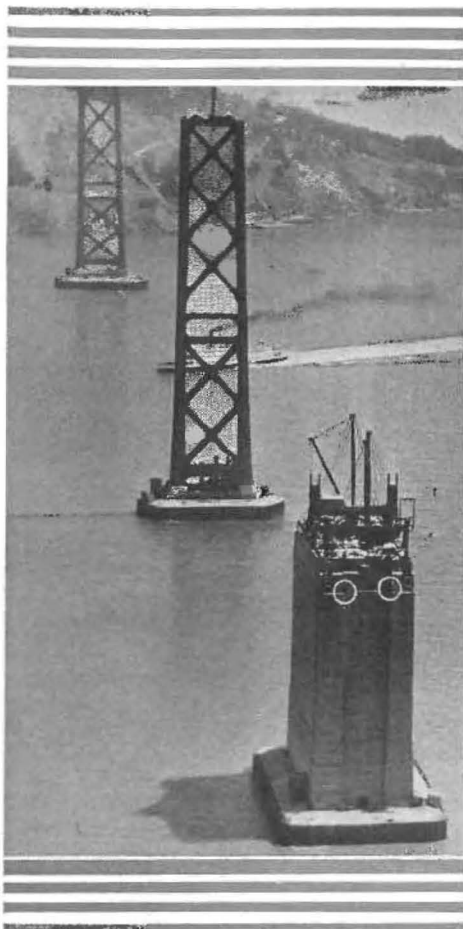
SPLIT TOWERS EXPLAINED

These are expansion joints designed by Chief Engineer Purcell and his staff to permit the bridge spans to lengthen and contract under the influence of heat, cold and load. The split towers make it possible for the spans to be pulled apart nine inches at this point when the spans contract.

The spans are anchored securely to piers several span lengths away and all of the foreshortening, or change in length of the spans, is taken care of by flexing the two parts of this split tower. In the accompanying photograph it will be noted that even the diagonal bracings between the legs of the towers are also in separate units.

Reminiscent to San Franciscans of the beautiful lighting effects of the Panama Pacific International Exposition of 1915 is the night illumination of the bay bridge. Two long ribbons of light are suspended along the catwalks of the structure, high above the bay waters, to aid night workers in the perilous task of "spinning" the 70,000 miles of steel cable wire which will support the bridge.

Ferryboat commuters and visitors entering San Francisco Bay are afforded an unforgettable sight after dark when the bridge illumination is turned on.



A FREAK OF BUILDING CONSTRUCTION has produced the world's largest pin-hole box camera in the huge Central Anchorage of the San Francisco-Oakland Bay Bridge which makes a picture 50 feet high on the great central diaphragm wall in the interior of a "box" 235 feet high, 197 feet long and 92 feet wide. The pictures are due to 1 x 2 foot apertures in the top of the anchorage walls through which images of passing boats and bridge towers are reflected on the great concrete "plate" upside down as shown in the above diagram.

At lower right is shown one of the steel piers of the East Bay truss span structure which seems to be entirely split by a great "crack" that causes the layman to wonder. The "crack" is an expansion joint that permits the spans to be pulled apart 9 inches by heat expansion.



Charles D. Hamilton Takes Office as California Highway Commissioner

CHARLES D. HAMILTON of Banning, Riverside County, president of the California Almond Growers Exchange and former chairman of the Riverside County board of supervisors, was appointed a member of the California Highway Commission by Governor Frank F. Merriam on July 24th, to succeed Commissioner Frank A. Tetley, who had resigned.

The new commissioner, who took office August 1st, is well known throughout the state as a successful business man, and one who is also familiar with highway problems through years of service as county supervisor and road commissioner.

During a long and varied career Mr. Hamilton has filled a number of public offices of trust and responsibility but is probably most widely known as an agriculturist and almond grower.

Coming to California in 1885, Mr. Hamilton took up his residence in Banning, then in San Bernardino County, and in 1892 was elected county clerk. During his term of office Riverside County was formed and Banning was taken into the new county.

Mr. Hamilton engaged in farming for many years quite extensively, farming one tract of 1700 acres continuously for 20 years. In 1894 he became interested in almond culture and has continued in this industry ever since. When the almond growers of California organized, he immediately affiliated with them and for ten years has been president of the California Almond Growers Exchange, one of the outstanding cooperative associations of the state. Taking an active interest in farming and marketing problems, he has held many responsible positions in carrying out agricultural programs.

He was elected supervisor from the fourth district of Riverside County in 1914, serving three terms on that board, the last five years as chairman, when he resigned and spent a year in travel abroad.

During his term as supervisor and chairman of the board he directed a broad program of highway development throughout his jurisdiction that gave him a special knowledge and experience which will prove valuable to the state in his new office.



CHARLES D. HAMILTON

Since resigning from the board of supervisors he has held no public office until his appointment to the California Highway Commission.

Ingels Made Director of Motor Vehicles

Governor Frank F. Merriam has appointed R. Ray Ingels, highway commissioner and former State Senator, to the directorship of the Department of Motor Vehicles.

Entering upon his new duties on August 1st, Director Ingels said:

"Governor Merriam has expressed to me on several occasions his deep concern over the frightful number of motor vehicle accidents in California and his desire that I take all possible steps to reduce them. I shall devote my administration to an attempt to make traffic on the highways safer and to provide efficient registration service to the public."

Flowers Planted By Road Foremen Win Popular Acclaim

IN ADDITION to major planting projects of trees, shrubs and flowering growths under the supervision of the State arboriculturist much interest is frequently taken by highway foremen of the various districts in raising flowers about their station buildings and in likely places along the roadsides they cover in the course of their work.

Seeds are furnished for this purpose by the State Maintenance Department and the results achieved often attract favorable comment as evidenced by the following letter from Supervisor Hastings of San Diego County:

COUNTY OF SAN DIEGO

Board of Supervisors

June 24, 1935

Mr. E. E. Wallace
District Engineer
Division of Highways.

Dear Friend:

On a recent trip to Imperial Valley I noticed, particularly at your road stations at Guatay and Boulevard, that blooming profusely were California poppies. Also I noticed a number of patches along the highway. This gesture I believe is well worth while.

Along the highway that has been cleared back for a number of feet through the heavy brush, I noticed a heavy growth of California wild flowers which had an opportunity to blossom only when the heavy cover was removed.

I am sure this beautiful sight is enjoyed by everyone who travels Route No. 12, from San Diego to Imperial Valley, and especially our visitors. Such beautification is a credit to our county and our State, and I only wish that more of it could be done, as the impression it leaves upon our visitors is a very gratifying one.

Very truly yours,

EDGAR F. HASTINGS,
Supervisor.

The plants referred to by Supervisor Hastings were started by Foremen M. A. Fowler and C. H. Peck when they were stationed at Boulevard, according to District Engineer Wallace and the work has been continued by Foremen F. E. Hansen and R. W. Sorin.

Most of the seeds were raised at the Boulevard maintenance station and have been planted at various locations within the right of way extending to El Cajon.

All of the plantings have grown well and have spread considerably each year from the natural seed. The effect this year has been very noticeable and has attracted much attention.

DUTCH VISITOR LAUDS BEAUTIFUL SCENES VIEWED FROM SKYLINE BOULEVARD

August 1, 1935.

The Chief Engineer,
Highway Department,
Sacramento, California.

Dear Sir:

Having nearly completed my study-trip of American Industrial Life, which took me from the Atlantic to the Pacific, over 23,000 miles of roads, I feel urged to tell you that the impressions I received while traveling over the Skyline Boulevard in California are among the most beautiful ones I have experienced in this country.

My journey from San Diego to Washington took me over that road twice, and the simultaneous view of the Pacific Ocean and Bay district will always be remembered by me as one of my most thrilling sensations.

With best wishes.

Very truly yours,

(Signed) JAN TEDERS.

Editor's Note.—Mr. Teders is an executive of the Association of Directors of Electrical Industries of the Netherlands, with headquarters at Amsterdam, Holland.

TOTAL HIGHWAY AND STREET MILEAGE IN STATE IS 95,957

California has 95,957 miles of roads and streets administered respectively by the State, county and municipal governments. Rural road mileage, which includes roads in the State highway and county systems, increased from 45,069 miles in 1909 to 61,039 miles in 1916, and to 75,889 miles in 1921.

The total rural mileage as logged by the Division of Highways is 77,747 miles. This compilation, resulting from field studies, constitutes the most accurate mileage record thus far prepared for California.

The present State highway system consists of 14,019 miles of road, which includes some 414 miles authorized but not yet constructed. Of this 14,019 miles, 12,617 miles are located in rural territory—that is, outside of cities.

His wife determined to cure him of his bad ways and with the aid of a sheet and an electric torch transformed herself into a very fair imitation of a ghost. Then she went out to the drunkard and shook him.

"Wash that?" murmured the toper.

"Satan," came the reply in a sepulchral tone.

"Shake handsh, old horsh. I married your sister."

There were just as many careless drivers 30 years ago, but the horses had more sense.

New Office Building of District XI at San Diego Dedicated With Ceremony

By **E. E. WALLACE**, District Engineer

THE new office building of District XI of the Division of Highways in San Diego was formally dedicated on Saturday afternoon, August 3d, designated as State Department of Public Works Day at the California Pacific International Exposition.

Dedication ceremonies were preceded by a luncheon at the San Diego Hotel given by the San Diego Chamber of Commerce, city officials and civic bodies in honor of Earl Lee Kelly, Director of Public Works, members of his staff, officials of the Division of Highways and members of the State Highway Commission.

Frank G. Forward, chairman of the Highway Committee of the Chamber of Commerce, presided. Mayor Percy J. Benbough welcomed the guests of honor and expressed San Diego's appreciation of the new building, pointing out that it is the first structure to be erected in what is being developed as a Civic Center for San Diego.

WELCOME FROM SUPERVISORS

On behalf of the county, Edgar F. Hastings, chairman of the San Diego board of supervisors, welcomed the state officials and spoke in praise of the highway work that has been done in the county. Greetings from the San Diego Chamber of Commerce were extended by its president, John Lawrence Fox, following which representatives from Imperial and Riverside counties were introduced.

Brief talks were made by District Engineer E. E. Wallace, T. C. Macaulay, manager of the Chamber of Commerce, and George B. McDougall, Chief of the Division of Architecture.

State Highway Engineer C. H. Purcell made a brief response and introduced Jno. H. Skeggs, District Engineer, District IV, S. V. Cortelyou, District Engineer, District VII, and other members of his staff. He was followed by Harry A. Hopkins, chairman of the State Highway Commission.

NEW BUILDING DEDICATED

The luncheon came to an end with an address by Director Kelly, who introduced

Justus F. Craemer, Assistant Director, and Edward J. Neron, Deputy Director.

After the luncheon, which was attended by more than 300 persons, adjournment was taken to the new office building located at Harbor and Ash streets for the dedication ceremony.

Following selections by the SERA band and introductory remarks by President Fox, of the San Diego Chamber of Commerce, Director Kelly, in a brief address, dedicated the building and then, as the band played the National Anthem, raised an American flag presented to him by Miss Janet Wallace, daughter to the district engineer.

The building was then opened for inspection and the public was received by the staff and employèes of District XI. The latter conducted visitors through the various offices and drafting room and explained the many exhibits which had been arranged in such a manner as to outline the functions of the various employees and the procedure in highway design, construction and maintenance.

NUMEROUS FLORAL GIFTS

Many baskets of beautiful flowers were presented by friends of the district.

Following the dedicatory program, a reception in honor of Director Kelly and the Highway Commission was held at the California State Building at the Exposition in Balboa Park.

The new office building is of early Spanish architectural design 115 by 150 feet in size, and "U" shape. It contains nine offices, a large unusually well-lighted drafting room, blueprint and supply rooms, and a basement containing laboratory, furnace and supply rooms.

The second story provides an attractive conference room. The building fronts on San Diego Harbor, four blocks from Broadway and one block west of Pacific boulevard.

The new quarters provide excellent accommodations for District XI and will result in more efficient handling of the work of the district.

Designed by the Division of Architecture of the Department of Public Works, the building was constructed under its supervision.



DEDICATION SCENES AT SAN DIEGO. At top, the new office building of District XI taken during dedication exercises just before the flag raising. Below in the official group, left to right, are State Construction Engineer C. S. Pope; H. S. Comly; President Jno. Fox, San Diego Chamber of Commerce; Acting Bridge Engineer F. W. Panhorst; Chairman F. G. Forward, Chamber of Commerce; J. F. Craemer, Assistant Director and Earl Lee Kelly, Director of Public Works; Principal Assistant Engineer J. G. Standley; District Engineer E. E. Wallace; H. A. Hopkins, Chairman, C. D. Hamilton, member, and Julien Roussel, secretary, of Highway Commission; C. C. Carleton, Chief Contracts and Rights of Way and Edward Neron, Deputy Director of Public Works.

12,000,000 Tons of State Farm Products Hauled by Trucks

THE importance of motor trucking as an outstanding factor in the farming industry of California is revealed by statistics assembled by the Department of Public Works. Approximately 12,000,000 tons, or two-thirds, of the state's agricultural production, moved by truck during 1932.

Out of a total of 1,051,000 tons of agricultural and animal products delivered in the Los Angeles markets in 1933, 83 per cent arrived by truck. And of 424,000 tons of similar shipments to the San Francisco market, approximately two-thirds were delivered by truck.

The monthly receipts in Los Angeles varied from 58,516 tons in January to 93,037 tons in August, not including 200,000 tons of hay received by truck in the southern city. In San Francisco the minimum tonnage in any one month was 15,644 tons in February and the maximum was 30,909 tons in July.

SOUTH FAVORS TRUCKS

Forty-eight counties shipped agricultural and animal products by truck to Los Angeles and 52 counties shipped to San Francisco. In Los Angeles, 11 counties contributed 95 per cent of the total truck receipts and in San Francisco 17 counties accounted for 91.24 per cent of the total truck tonnage. A further analysis of live stock movements shows that the Los Angeles market favors the truck more generally than do shippers into San Francisco. In both places, trucks are preferred for the movement of calves and hogs, while sheep are shipped primarily by rail.

SAN FRANCISCO EXCEPTION

In each market, the majority of the stock from nearby counties is trucked in. Thus, Los Angeles County is the largest producer for the Los Angeles market. Practically all of its cattle are trucked in. Similarly, Marin, Alameda and Santa Clara counties, which are nearby sources for the San Francisco market, also favor the use of trucks for their stock movements. However, in the case of San Francisco there is a notable exception. From Solano County, also nearby and the second largest source of supply, trucking is negligible.

Week End Traffic 30.6 Per Cent of Average Week Total

THAT California motorists have a decided propensity for week end outings due to ideal climatic conditions is well known. To just what extent this inclination is prevalent was revealed by a road transportation survey made by the Division of Highways.

The investigation disclosed that for the greater part of the state, the combined Sunday and Monday traffic averages 30.6 per cent of the total for a typical week.

The use of motor vehicles, it was found, is confined largely to the period between 6 a.m. and 10 p.m., over 87 per cent of all traffic occurring during this portion of the day.

SLIGHT CITY DIFFERENCE

Seasonal variation of traffic in the larger cities is slight. Last year, July traffic on the main city streets exceeded that of January by only 1 per cent. Traffic on rural roads, on the other hand, shows a pronounced variation during the year, and this variation is more marked on county roads than on rural state highways.

July traffic on the latter exceeded the January traffic by 50 per cent, while on the county roads, the increase was approximately 136 per cent. Records maintained for several years past indicate that about 56.5 per cent of the total annual traffic occurs during the seven months, January to July.

WARNING GIVEN BY EDITOR TO HIGHWAY SIGN VANDALS

Alturas—Last week representatives of the State Division of Highways were here resigning the State highways 395 and 299. This service was meant as a necessary convenience to the traveling public. There were several thousand of them placed at considerable cost to the State.

This week when Wilbur Clark went over the road he discovered that the letters had been shot out of 25 of these signs by vandals.

We wish to state here that the penalty for such vandalism is a \$500 fine and six months in jail. Anyone seeing such mischief done should report it into headquarters at once so that our county will get the benefits these signs are intended to bring us.—*Alturas Plain Dealer.*

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official journal of the Division of Highways of the Department of Public Works, State of California; published for the information of the members of the department and the citizens of California.

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

EARL LES KELLY.....Director

JOHN W. HOWE.....Editor

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

Vol. 13 AUGUST, 1935 No. 8

Highways Feed Millions

We can't eat, we can't dress, we can't go any place without in some way depending on the automobile and the roads and streets over which it runs.

Highway transportation, perhaps the nation's biggest industry, must move on and on. Spinning wheels of the highway, nearly 100,000,000 of them on 24,000,000 motor vehicles, have made themselves a vital part of every man's life.

Everything you buy rides over the highways three to a dozen times. Rural mail carriers travel over 1,350,000 miles of roads daily. Automobile tourists spend \$3,000,000,000 a year. Buses annually carry 2,000,000,000 passengers, which is equal to one bus ride for everybody on earth. All this gives us only a glimpse of our dependence on the automobile and the highway.

The nation on wheels? A car for every five people. Enough to take our entire population for a ride at one time—as you may see for yourself on a sunny Sunday.

Twenty-five billion dollars is our capital investment in automobiles, garages, filling stations, factories and roads and streets; and each year we spend \$9,000,000,000 that makes jobs for those who keep this business going and are engaged in extending it.

Yes, indeed, a nation on wheels! And behind it all runs the chain of employment. Jobs, jobs, 5,000,000 of them for men and women whose task it is to keep these wheels moving. One-seventh of the gainfully employed workers in the United States earn a livelihood for themselves and millions of dependents to supply us with automobiles, gasoline, tires, tubes, accessories, and roads and streets.—*Florida Public Works.*

Auto Registrations Show Gain of 113,464 in Six-month Period

A RECORD gain in motor vehicle registration in first six months of this year, bringing increase in apportionment of funds for highway development and repair, gave new evidence of improved business conditions in California.

Reporting to Governor Frank F. Merriam, Director Ray Ingels of Department of Motor Vehicles and State Highway Commissioner, announced a total of 2,077,350 fee-paid registrations for the six-month period ending June 30 and a consequent apportionment of \$5,565,586.34 for highway construction and repair.

Half of the apportionment, \$2,782,793.17, goes to the Division of Highways for development and repair of state roads. The other half is shared by the 58 counties for highway improvement and construction in their political subdivisions, the allotment being based on vehicle registrations in the counties.

LARGEST SINCE 1929

"With the six-month apportionment figure exceeding that of the same period for 1934 by \$422,217.54 and being greater by \$121,388.10 than the 12-month total of last year, there is no question concerning California's upward business trend," said Director Ingels. "Registration of motor vehicles from January 1 to June 30 was the heaviest since 1929 and every county listed a gain in the total increase of 113,464 registrations over the first six months of 1934."

The six-month total in registrations included the following classifications: Automobiles, 1,870,623; solid tire trucks, 3669; pneumatic tire trucks, 116,438; motorcycles, 7782; solid tire trailers, 5948; pneumatic tire trailers, 72,890.

So-o-o!

Two spinsters were discussing men—"Which would you desire most in your husband—brains, wealth, or appearance?" asked one.

"Appearance," snapped the other, "and the sooner the better."—*Georgia Highways.*

He called on the neighbor to borrow the use of the 'phone. Then he called up the butcher.

"Ye dinna need to send up that pennyworth o' cat meat," he said. "Kitty has caught a mouse."—*Recorder.*

How Land Is Secured for Highways Diplomatic Envoys in State Employ

By C. C. CARLETON, Chief, Division of Contracts and Rights of Way

THIS is the twenty-fourth year of systematic state highway building in California.

While considerable right of way activity has from the outset been prerequisite to the highway work, yet it has been only for a few years that it has become recognized as of major importance on a parity with the engineering itself.

The cost of right of way now represents about 12 per cent of the total state highway construction disbursements.

In earlier years old county roads with their existing widths were adopted as links in the state highway system and any necessary new rights of way were obtained through the county boards of supervisors or civic organizations interested in promoting projects of particular interest to themselves.

FORTY STAFF EMPLOYEES

But with the advent of the gas tax and consequent greater state highway accomplishments and bolder treat-

ment of highway location and construction, it became imperative that the state itself establish its own right of way organization.

The staff consists at present of about forty employees, eight of whom have had legal education, the remainder possessing either a special training in right of way, real estate, or appraising practice, or such other business background as will readily adapt them for successful service in this field. All employees are subject to civil service laws.

The minimum statutory width of right of way for state highway in California is 80 feet.

However, the State Highway Commission has now prescribed a minimum width of 100 feet for the trunk lines.

It becomes obvious that, as the minimum statutory width of county roads was only 40 feet, the present day widening and altering of these old roads to modern state highway standards is creating right of way problems of major proportions, as a large mileage of the state highway has now become closely built up or bordered by expensive improvements.

Moreover, within recent years almost a thousand miles of city streets have been added to the state highway system which further augment the complications of state highway right of way acquisitions.

The policy of the state is to deal with all owners "fairly and squarely," but it requires the "tact and contact" of 40 trained and experienced men to handle the situation, nevertheless.

SETTLED BEFORE TRIAL

Condemnation proceedings are invoked only after friendly

overtures have been unavailing, and even if such proceedings are instituted, a large percentage of them are settled before trial.

The constitution of California was amended in 1918 enabling the state to deposit money security in court when the condemnation proceedings are commenced and to take immediate possession of the desired right of way without awaiting results of a trial.

But despite this summary procedure the right of way agents are admonished to speed up their negotiations to the end that landowners shall have had ample opportunity to



C. C. CARLETON

Right of Way Man an Advance Agent

(Continued from preceding page)

settle before being haled into court and as little personal embarrassment as possible occasioned.

The Division of Contracts and Rights of Way is one of the bureaus of the State Department of Public Works.

HOW THEY WORK

This division is in charge of a chief, who must be an attorney at law, and who coordinates all right of way activities of the department.

The right of way staff consists of two classes: one devoting itself to work largely of a legal nature and the other to visiting those having some interest in the land sought to be obtained and getting their signatures "on the dotted line."

The court work relating to condemnation proceedings is more directly in charge of the Assistant Chief of the Division of Contracts and Rights of Way, an attorney at law, who is aided by three assistants with legal training called "condemnation investigators."

The Assistant Chief specializes in condemnation proceedings and passes upon the sufficiency of land titles.

The condemnation investigators assist him by acting as his field representatives in settling cases before trial, or in the event that cases can not be settled, in visiting the localities where the cases are to be tried and preparing for the impending trials by interviewing witnesses and attending to all other necessary preliminary trial work. They must also be qualified to act as attorneys in cases should the assistant chief be unable personally to handle them due to stress of other duties.

LEGAL FLYING SQUADRON

Practically the entire time of this legal flying squadron is engaged in the trial of the many condemnation cases in progress in the 58 counties of the state.

Also attached to the office of the Chief of the Division of Contracts and Rights of Way are three aides of legal training who are designated as general right of way agents.

They are the liaison agents of the chief in his contacts with the district right of way agents. They are subject to orders to go to any part of the state to deal with the legal or

even the solicitation phases of the district right of way activities.

IN DISTRICT OFFICES

The state highway work in this state is handled regionally by 11 district offices.

The local right of way activities, such as actual field negotiations for necessary rights of way, are ordinarily conducted by district right of way agents attached to the district offices. The district right of way agent is in turn aided by several assistant district right of way agents.

These district right of way agents form the real backbone of the right of way organization, as upon them largely rests the success and the popularity of the state's endeavors to lay its ribbons of roadway over private property with as little private detriment as possible.

REAL DIPLOMATIC AGENTS

They are the advance agents who, without regard to their own personal comfort or convenience, must constantly be at the wheels of their cars visiting landowners, however far off the beaten path they may find them, smilingly attempting to convince such landowners (some very redoubtable) of their sincerity of purpose and their desire to deal fairly with them.

The "right of way man" has now become recognized in this state as being as essential to an effective state highway organization as the engineer. In fact, a good "right of way man" in the complexities of modern highway construction must be quite a paragon.

ALL-ROUND ABILITY NECESSARY

He must be informed concerning the law of land titles, have at least a rudimentary knowledge of engineering and the ability to read maps and blue prints, able properly to appraise property values, a keen analyst of human nature and the possessor of an agreeable personality and an unswerving integrity.

In closing, may the writer be pardoned for the facetious observation that, despite the trials and tribulations of the "right of way men," theirs must really be a very absorbing vocation, evidenced by the fact that in California they rarely if ever voluntarily resign to enter other lines of endeavor.

Coast Boulevard in Laguna Beach Widened and Paved, Grade Improved

By R. C. MYERS, Assistant District Office Engineer

CONSTRUCTION of the latest project on the Coast boulevard in the city of Laguna Beach, from Cypress street to the south city limits, was completed under state highway contract on July 26th, thus eliminating the last unimproved section of this important highway between Long Beach and its junction with the original state highway route to San Diego, at Doheny Park.

Starting work on February 25th, the contractor carried forward this project with such speed that all pavement was completed by May 20th, several days before the opening of the San Diego Exposition on May 29th, which was the scheduled date for the 40-foot pavement to be opened to traffic. This fine record was made in spite of extremely difficult conditions, and several unforeseen obstacles that caused delays in construction operations.

AN EXPENSIVE OPERATION

Reconstructed and widened at a cost of \$141,000 this 1.09 mile section of highway formerly consisted of only a 30-foot oil surfaced roadbed with private improvements crowded so closely on each side as to make the widening of the highway difficult and expensive.

It was recognized from the start that these realty improvements, consisting of business buildings as well as private garages and dwellings located on steep hillsides, would either have to be moved back or expensive retaining walls built.

Each one of these right of way matters was handled as an individual problem, and the cost of moving back the improvements and constructing retaining walls, or a combination of these two methods, was carefully considered, so that the most economical method of handling the problem could be used in each case.

OLD FILLS REBUILT

In addition to these difficult right of way matters which were anticipated and provided for, it was found that the fill material of the existing highway across canyons, which had been put in many years before by the "end

dump" method, was not compacted sufficiently for the placing of a high type modern pavement.

Tests proved that some of these fills were susceptible to settlement of several feet when saturated with water. To eliminate any settlement which might be destructive to the new pavement, it was decided to build "from the ground up." The old fills were torn down and rebuilt by the modern method of spreading in thin layers and watering and rolling.

All of this required additional time and increased the difficulty of having the pavement opened for the beginning of the San Diego Exposition.

In spite of these additional difficulties the work was so well coordinated and the contractor and city officials of Laguna Beach cooperated so whole-heartedly with the State Highway Construction Department that the work was finished well ahead of scheduled time.

This improvement is the last remaining link of the coast highway through Laguna Beach to be permanently improved.

74-FOOT ROADWAY

Construction on this new contract is 72 feet between curbs with 2-foot gutters and a 40-foot pavement, the width of right of way being 80 feet. The previously existing highway consisted of a 30-foot roadbed, and widening this to 74 feet between curbs will be an immense help to traffic. The areas between the edges of pavement and the concrete gutters have been oiled and seal coated, making this entirely suitable for light automobile traffic.

The full 80-foot width of right of way was graded so that a 4-foot width of sidewalk space was left on each side for pedestrians. Formerly all pedestrians had to use the narrow roadbed with hazard not only to them but to the heavy stream of automobile traffic as well.

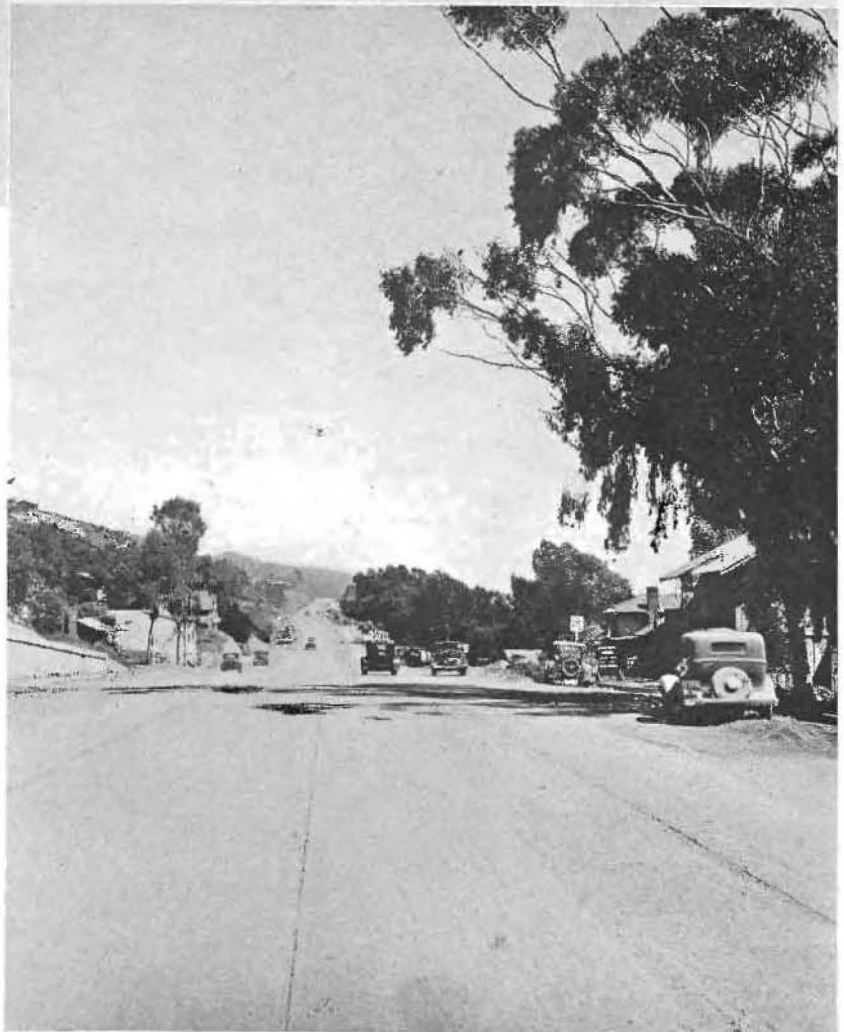
STREET GRADES CHANGED

The project also included many improvements of grade to increase the clear sight dis-

(Continued on page 21)



LAGUNA BEACH
 in Orange County is rejoicing in the completion of a three-lane, hard surfaced sector of highway along the coast and through the city. The work involved construction and right of way problems that included big cuts through hills, rebuilding old fills and setting back improvements for the new, widened grade, particularly in the artist colony area. Above is part of the highway extending north past beautiful vistas of bay and sea and beach. Below, a view of the Coast Boulevard from the south city limits, passing numerous studio villas clustered on the hillsides.



How Cities May Use Extra \$3,000,000 Gasoline Tax Voted by Legislature

By L. V. CAMPBELL, Engineer, City and Cooperative Projects

GOVERNOR FRANK F. MERRIAM affixed his signature to Senate Bill No. 561 on July 15, 1935, completing the enactment of legislation which provides an amount equal to the net revenue derived from one-quarter cent per gallon tax on motor vehicle fuel, or the State gasoline tax, for the improvement and maintenance of city streets other than the streets comprising designated State highway routes within municipalities.

Legislation enacted in 1933 allocated a similar amount of one-quarter cent of the gasoline tax from the State highway fund for the maintenance and improvement of State highway routes within incorporated cities. As a result of the last act the annual expenditure of gasoline tax funds inside cities will be doubled over previous years and it is estimated that there will be available for expenditure \$3,000,000 a year for state highways within cities and \$3,000,000 a year for city streets of major importance.

BASIS OF APPORTIONMENT

Apportionment of the fund is prescribed by the act in the proportion that each city bears to the total population of all cities in the state, using the last preceding Federal census as the basis. Provision is also made to include cities incorporated subsequent to the last, or 1930, Federal census and for the inclusion of unincorporated territory annexed since that date. In both cases, where the population is not in the census, the per capita allowance will be ascertained by multiplying the number of registered electors by a factor of three.

Both the one-quarter cent for State highways and the quarter cent for city streets is to be expended under control of the Department of Public Works. Coupled with this control are restrictions to require expenditure for certain purposes qualifying as traffic benefits.

EXPENDITURE RESTRICTED

In its broadest term, the act restricts expenditure of the city street one-quarter cent to the purchase of right of way, construction, maintenance and improvement of streets of major importance, other than State highways. The designation of the

streets of major importance is to be agreed upon by the city and the State.

A further restriction limits the expenditure to the effective roadway or that portion of the street available for use by vehicular traffic. As traffic benefit is the essential qualification for expenditure an exception is made to include the installation and maintenance of traffic control devices and the construction of pedestrian underpasses where there is a distinct hazard to pedestrians attempting to cross heavy traffic arteries and where such underpasses facilitate traffic movement.

An explicit prohibition is made, however, upon the expenditure for street lighting and upon the construction and maintenance of sidewalks or any structure or facility which is not of direct and primary service to vehicular traffic.

STATE APPROVAL REQUIRED

While full responsibility for the expenditure of the money is placed upon the Department of Public Works, the act requires the department to delegate the expenditure to cities for such work as the department is satisfied can be conducted competently by the city.

To gain approval of work, the act requires each city to submit an annual budget, or program, to the department before the first day of June of each year, showing the estimated cost and nature of the work contemplated. Disapproval of the budget or any item included in the budget is vested with the department to be exercised if the proposed work does not meet the requirements of the law.

Upon approval of a city's budget, the act provides that the department shall remit quarterly, as the gas tax revenue is received in the State highway fund, the proportion of the pro rata share which has been delegated to the city. All money as received from the State is to be deposited in a "special gas tax street improvement fund," to be specifically created by the legislative body of each city for this purpose. According to the act, the



GOVERNOR FRANK F. MERRIAM SIGNING THE BILL increasing allocation of gas tax funds to cities. Left to right: Mayor Arthur Ferguson, Sacramento; Mayor Conje Frank, Stockton; City Manager James S. Dean, Sacramento; Hollis P. Thompson, City Manager, Berkeley; Director of Public Works Earl Lee Kelly; W. B. Hogan, City Manager, Stockton; John F. Hassler, City Manager, Oakland.

delegation of expenditure and the payment of funds to the city shall only be made in relation to approved items of the budget.

The actual expenditure of money for approved projects can not be made, however, until the city submits and receives approval of the department of such plans and specifications as the department may require. With approval of the plans and specifications, the city may proceed to advertise a project for construction bids. If the bids received are in excess of the estimated cost or if the low bidder is not responsible, the act requires that the consent of the department must be obtained before the city may award the contract.

A similar clause stipulates that the written consent of the department must be obtained before the amount of any item in the approved budget may be exceeded, whether for maintenance or purchase of right of way.

In order that cities which contemplate a major improvement beyond the resources of their annual allocation may provide sufficient funds to accomplish the project in its entirety, a section of the act enables such cities to accumulate funds over a period of years until a sufficient amount is available to finance the cost of the improvement.

The stipulation relative to the one-quarter cent previously allocated for state highway routes within cities, received no significant change in the last act. These funds with full responsibility are given to the state for the maintenance and improvement of streets constituting the State highway routes. Expenditure upon the State highways is the primary purpose of this fund, although the act provides that after all the State highways within a city have been improved to adequate standards and adequate provision made for their maintenance, any surplus remaining may be expended upon other streets of major importance within the city.

Enactment of the law compelling the expenditure of an additional one-quarter cent of the gas tax within cities, after the California Highway Commission had adopted its budget for the present biennium ending June 30, 1937, will mean a redrafting of the State highway budget in order to bring proposed construction expenditures in adjustment with the withdrawal of the additional funds to be spent upon city streets during the present biennium. The necessary adjustments will reduce the funds available from State revenues for construction about 20 per cent during the biennium.

Highway Bids and Awards for July

ALAMEDA COUNTY—Thirty-eighth Street and Moss Avenue, between Market Street and Broadway, about 0.9 mile to be graded and paved with Portland cement concrete and asphalt concrete. District IV, Route 5, Section Oak. Union Paving Co., San Francisco, \$113,291; N. M. Ball Sons & J. Catucci, Berkeley, \$106,969; Heafey-Moore Co., Oakland, \$113,566; Fredrickson-Watson Const. Co., Fredrickson Bros., Oakland, \$113,743; Southern California Roads Co., Los Angeles, \$123,748. Contract awarded to Peninsula Paving Co., San Francisco, \$103,826.65.

BUTTE, COLUSA AND GLENN COUNTIES—Furnishing and applying liquid asphalt to existing roadbed for about 41 miles. District III, Routes 21-88, Sections B, B "R," C "R," A-C. A. Teichert & Son, Inc., Sacramento, \$13,665; Lee J. Immel, Berkeley, \$12,818; Hayward Bldg. Mtls. Co., Hayward, \$14,587; C. F. Fredrickson & Sons, Lower Lake, \$12,105. Contract awarded to Edw. F. Hilliard, Sacramento, \$11,620.

CONTRA COSTA COUNTY—Furnish and apply liquid asphalt SC-2 between park boundary near Danville and the summit, and between the forks and the toll house near Walnut Creek, about 19.1 miles. District IV, Route Mt. Diablo Park Road. Lee J. Immel, Berkeley, \$2,607; Ransome Co., Emeryville, \$2,537; Hayward Building Mtl. Co., Hayward, \$2,432. Contract awarded to Palo Alto Road Materials Co., Ltd., Palo Alto, \$2,170.

IMPERIAL COUNTY—Between Bond's corner and Niland, 40.2 miles to be treated with liquid asphalt. District XI, Routes 187 and 201, Sections A, B, C & E, and C. Gilmore Oil Co., Los Angeles, \$5,544; Square Oil Co., Los Angeles, \$10,080; Paulson & March, Los Angeles, \$9,571. Contract awarded to Morgan Bros., Huntington Park, \$8,380.80.

KERN COUNTY—Seal coat Buttonwillow to 4.3 miles west. District VI, Route 58, Section J. John Jurkovich, Fresno, \$4,510. Contract awarded to Palo Alto Rd. Materials Co., Ltd., Palo Alto, \$2,537.82.

KINGS, TULARE COUNTIES—Between 1 mile east of Corcoran and Tulare and between Lindsay and 4.3 miles west. About 20.3 miles to be treated with seal coat. District VI, Route 134, Section A, A-B. E. A. Forde, San Anselmo, \$13,979; Palo Alto Bd. Matl. Co., Ltd., Palo Alto, \$14,073; Oilfields Trucking Co., Bakersfield, \$18,415; A. Teichert & Son, Inc., Sacramento, \$14,650; L. A. Brisco, Arroyo Grande, \$14,229; Clyde W. Wood, Stockton, \$14,107. Contract awarded to Stewart & Nuss, Inc., Fresno, \$13,397.50.

LOS ANGELES AND KERN COUNTY—Between Lancaster and Mojave road-mix surface treatment to be applied to existing roadbed shoulders for a distance of about 13.7 miles and a bituminous seal coat to be applied to treated shoulders for a distance of about 24.9 miles. District VII, Route 23, Section G & A. Cogo & Rodos, Los Angeles, \$30,446; A. S. Vinnell Co., Los Angeles, \$30,628; John Jurkovich, Fresno, \$33,985; M. J. B. Construction Co., Stockton, \$34,218; C. W. Wood, Stockton, \$33,467; Geo. R. Curtis Pav. Co., Los Angeles, \$34,366. Contract awarded to Basich Bros., Torrance, \$27,892.50.

LOS ANGELES COUNTY, CERRITOS AVE.—Between Los Angeles Street and Artesia Ave., 2.1 miles grade and asphalt concrete or Portland cement concrete pavement. District VII, Route 168, Section A. Griffith Co., Los Angeles, \$55,079; Sully Miller Contr. Co., Long Beach, \$55,169; Geo. R. Curtis Pav. Co., Los Angeles, \$67,649. Contract awarded to Oswald Bros., Los Angeles, \$55,064.

LOS ANGELES AND VENTURA COUNTIES—Between Little Sycamore Canyon and Encinal Canyon, 5.8 miles, grade and Portland cement concrete pavement and widen two bridges. District VII, Route 60, Section A. Hanrahan-Wilcox Corporation, San Francisco, \$226,666; Basich Bros., Torrance, \$246,085; C. O. Sparks & Mundo Eng. Co., Los Angeles, \$260,108; Sander Pearson, Santa Monica, \$255,192; Griffith Co., Los Angeles, \$273,584; Sharp & Fellows Contr. Co., Los Angeles, \$240,832; J. E. Haddock, Ltd., Pasadena, \$275,336. Contract awarded to Oswald Bros., Los Angeles, \$219,606.25.

MADERA COUNTY—Between Coarse Gold and Oakhurst about 7.8 miles to be surfaced with plant mixed surface on a crusher run base. District VII, Route 125, Section C. D. Griffith Company, Los Angeles, \$115,347; Central States Contracting Co.,

Oakland, \$125,305; Basich Brothers, Torrance, \$121,933. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$105,708.60.

MODOC AND SISKIYOU COUNTIES—Between 2 1/2 miles SE of Tule Lake and Oregon state line, about 5.5 miles to be graded. District II, Tule Lake Road. Contract awarded to Biasotti, Willard & Biasotti, Stockton, \$144,103.25.

MONTEREY COUNTY—Between King City and San Ardo and between Salinas and Monterey-Santa Cruz County line, about 37.2 miles shoulders to be treated with liquid asphalt. L. A. Brisco, Arroyo Grande, \$7,452; Granite Constr. Co., Inc., Watsonville, \$7,587; Walker B. Roselip, San Luis Obispo, \$7,603; Paulsen & Marsh, Inc., Los Angeles, \$7,614. Contract awarded to Gilmer Oil Co., Los Angeles, \$6,663.

NAPA COUNTY—At various locations between Carneros Creek and Napa, about one and one-tenth miles in length to be graded and surfaced with crusher run base and plant-mixed surfacing. Napa County, District IV, Route 8, Section A. E. A. Forde, San Anselmo, \$18,619; Pacific States Construction Co., San Francisco, \$19,652; Harold Smith, St. Helena, \$19,877. Contract awarded to J. A. Casson, Hayward, \$17,915.

NAPA COUNTY—Between Wooden Valley Junction and Napa-Yolo County line furnishing and applying liquid asphalt, SC-3, about 23 miles. District IV, Route 6, Section B, C. Hayward Building Mtl. Co., Hayward, \$4,381. Contract awarded to Basalt Rock Co., Inc., Napa, \$3,913.

ORANGE COUNTY—Remove and stockpile railroad track material. District VII, Route 174, Section Ana-A. Pacific Crane & Rigging, Inc., Los Angeles, \$1,925; Shannahan Bros., Inc., Los Angeles, \$2,220; C. O. Sparks, Los Angeles, \$2,500; Dimmitt & Taylor, Los Angeles, \$2,812; Paul R. Hughes, Long Beach, \$3,590. Contract awarded to United Commercial Co., Inc., Los Angeles, \$1,303.35.

PLUMAS COUNTY—Between Route 29 and Almani Dam and between south end of Government Section & Route 21 (II-Plu-83-B, C, D). Between Keddie and Quincy between Blairsdien and Delleker, and between Quincy and Meadow Valley (II-Plu-21 C, F, C, "R"). About 59.4 miles to be treated with liquid asphalt. District II, Routes 83, 21, Sections B, C, D-C, F, C "R." A. Teichert & Son, Sacramento, \$25,784; Tiffany Construction Co., San Jose, \$24,383. Contract awarded to C. F. Fredrickson & Sons, Lower Lake, \$22,632.65.

RIVERSIDE AND SAN BERNARDINO COUNTIES—Between miles north of Blythe and Vidal, 33.5 miles to be treated with liquid asphalt. District XI, Route 146, Section C, D, E, & A. J. A. Casson, Hayward, \$44,004; Basich Bros., Torrance, \$44,364; R. E. Hazard Con. Co., San Diego, \$44,434; Martin Bros., Trucking Co., Long Beach, \$49,483; Geo. Herz & Co., San Bernardino, \$64,228; Oswald Bros., Los Angeles, \$67,940. Contract awarded to C. W. Wood, Stockton, \$42,020.90.

SACRAMENTO COUNTY—Grading and surfacing crusher run base. District III, Route 100, Section A. A. Teichert & Son, Inc., Sacramento, \$5,942. Contract awarded to Lee J. Immel, Berkeley, \$5,651.90.

SAN BERNARDINO COUNTY—Between Summit Station and the West Fork of the Mojave River on the Cajon-Lake Arrowhead road about seven and two-tenths (7.2) miles in length to be treated with liquid asphalt. District VIII, Route 59, Section C. Gilmore Oil Co., Los Angeles, \$1,348; Morgan Bros., Huntington Park, \$1,433; Square Oil Co., Los Angeles, \$1,568. Contract awarded to Paulsen & March, Inc., Los Angeles, \$1,324.

SAN DIEGO COUNTY—20.8 miles to be treated with liquid asphalt between Descanso and Julian. District XI, Route 78, Section A & B. Square Oil Co., 916 Adobe St., Los Angeles, \$6,000; Paulson & March, Los Angeles, \$6,115; Gilmore Oil Co., Los Angeles, \$6,490. Contract awarded to Morgan Bros., Huntington Park, \$5,625.

SAN DIEGO COUNTY—Between Bonsall and Rincon and between Santa Ysabel and northerly boundary, 54.7 miles to be treated with liquid asphalt. District XI, Routes 195 and 78, Sections B and C, C, D & E. Square Oil Co., Los Angeles, \$14,575; Paulson & March, Los Angeles, \$12,521; Gilmore Oil Co., Los

Work Put Under Way Last Month

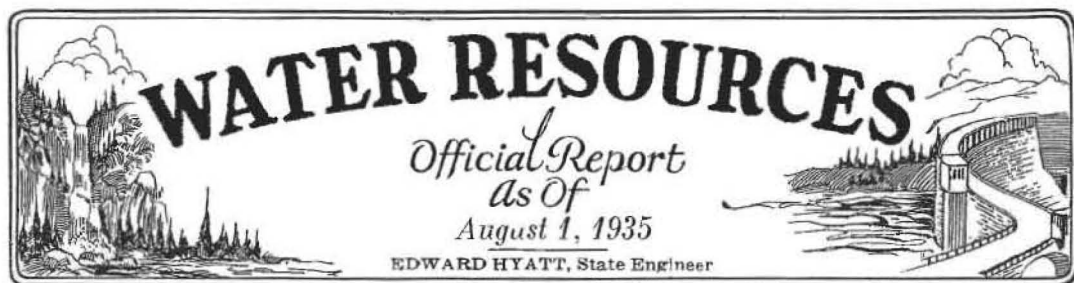
The estimated total of contracts awarded and projects advertised from July 1 to July 31, inclusive, by the Division of Highways is \$2,394,800. The work thus put under way includes 63 miles of grading, paving and bituminous treated crushed rock surfacing, 817 miles of road and shoulder oiling and 4 bridges and grade separations, as follows:

MAJOR CONTRACTS AWARDED

County	Location	Miles	Type
Napa	Carneros Cr. to Napa	1.1	Bit. tr. surf.
Sonoma	In Santa Rosa	1.4	Pavement
Santa Clara	Near Agnew	0.4	Grade separation
Alameda	38th St. & Moss Ave. in Oakland	0.9	Pavement
Los Angeles-Ventura	Little Sycamore Canyon to Encinal Canyon	5.7	Pavement
Kern	1 mile south of Delano	1.0	Grade separation and approaches
Stanislaus	Newman to Crows' Landing	4.5	Bit. tr. rock surf.
San Mateo	Edgemar to Thornton	3.6	Bit. tr. rock surf.
Siskiyou	Weed-Klamath Road	8.2	Graded roadbed
Sacramento	Steamboat Slough to one-half mile east	0.4	Bit. tr. surf.
Madera	Coarsegold to Oakhurst	7.8	Bit. tr. rock surf.
Modoc-Siskiyou	Tule Lake to Oregon Line	6.8	Graded roadbed
Los Angeles	Los Angeles St. to Artesia Ave.	2.1	Pavement
San Bernardino	In Redlands	2.0	Pavement
Santa Cruz	Ocean St. in Santa Cruz	0.4	Pavement
23 counties	Various locations	522.2	Road and shoulder oiling

PROJECTS ADVERTISED

County	Location	Miles	Type
San Bernardino	In Colton	1.2	Pavement and bridge
San Bernardino	In Colton	1.0	Grade separation
Los Angeles	La Veta Terrace to Santa Monica Blvd.	1.4	Pavement
Nevada-Placer	Soda Springs to Donner Summit	3.7	Drainage installation
El Dorado	Kyburz to Strawberry	7.9	Drainage installation
Santa Clara-Santa Cruz	Saratoga Gap to Black Road	1.3	Slide Removal
El Dorado	In Oglesby Canyon	1.0	Bit. surf. treatment
6 counties	Various locations	295.6	Road and shoulder oiling



The Allotment Board of the Works Progress Administration on July 23d, at Washington, approved a list of projects recommended by the U. S. Bureau of Reclamation among which was an apportionment of \$20,000,000 for the construction of California's Central Valley project. No definite details as to the set up proposed for construction of the project under the Bureau of Reclamation have been received to date but it is understood that after presidential approval of the board's action, Dr. Elwood Mead, U. S. Reclamation Commissioner, is to come to Sacramento to initiate arrangements for starting work. Dr. Mead announced the \$20,000,000 allotment saying presidential approval and treasury action will make the money available almost immediately.

News of the irrigation districts, flood control, dam applications and other activities of the division is contained in the regularly monthly report of the State Engineer as follows:

IRRIGATION DISTRICTS

At a hearing in Bakersfield July 17th, conducted by W. P. Boone and D. J. Coyne, executive directors, as provided under section 2 of the California Water Storage District Act, a petition to the State Engineer for the formation of the North Kern Water Storage District was approved. Final action on organization is subject to the decision of the land owners in the proposed district voting at a special election to be called by the State Engineer. The district as proposed contains 53,673 acres of land, extending north from Lerdo to McFarland, and mostly enclosed between the Southern Pacific railroad on the east and the Santa Fe railroad on the west.

Districts Securities Commission

The Districts Securities Commission approved plan of readjustment and filing of petition under Federal Bankruptcy Act by the Jacinto Irrigation District. The commission also approved an agreement between the Reconstruction Finance Corporation, Richvale Irrigation District and Sutter Butte Canal Company.

FLOOD CONTROL AND RECLAMATION

SERA Relief Work

A crew of 28 men is now working on clearing and grubbing Stohlman Ridge in the upper Sutter By-pass. These are from the federal transient camp in Sutter Basin.

A crew of 40 men has been engaged in clearing timber and brush from the right bank of the Mokelumne River near New Hope Landing. To date 14,688 man hours of relief labor have been utilized.

New applications are now being prepared to cover unfinished SERA projects to carry on under the Works Progress Administration. It is expected that much relief labor will be available by early fall, to be applied principally to by-pass and channel clearing.

Sacramento Flood Control Project

Reports have been rendered on a number of applications before the Reclamation Board and several examinations were made of work being done under approved applications.

The Reclamation Board has requested the Division of Water Resources to construct one bridge and install four culverts in the new levee borrow pit about four miles above Colusa, at an estimated cost of \$3,500.

Several conferences have been held with the officers of the Reclamation Board and its consulting engineers in regard to the new program for bank protection and levee construction, including an interview with General Jackson of the United States Engineers.

San Joaquin River

The Governor has approved SB 1131 (Chapter 365) appropriating \$10,000 to be expended by this division for emergency levee work on the San Joaquin River. Surveys have been made and plans are being prepared so work can proceed without delay.

DAMS

Application for repair of the Upper Feeley Lake dam of the Pacific Gas and Electric Company was filed on June 22, 1935. The work consists of the reconstruction of a portion of the downstream face. This application was approved on July 3, 1935.

Application for alteration of the Lake Legunitas dam was filed on July 3, 1935. This dam is owned by the Marin Municipal Water District. The work contemplated is the reconstruction of the spillway and increase in operating freeboard on the structure. This application was approved on July 15, 1935.

Cajalco Dam Application Approved

(Continued from preceding page)

Application for construction of the Cajalco dam in Riverside County by the Metropolitan Water District of southern California was approved on June 26, 1935.

Application for construction of Peoples Weir dam on the Kings River for the Peoples Ditch Company was approved on July 15, 1935.

The state's consulting board consisting of Professor Chas. D. Marx, F. C. Herrmann and W. L. Huber spent several days during this period in the review and consideration of further revisions of plans for construction of San Gabriel No. 1 dam of Los Angeles County Flood Control District.

Preliminary excavation work is under way on construction of the Grant Lake dams on Rush Creek by the city of Los Angeles, Bureau of Light and Power.

Work on the Santa Clara Valley Conservation District's dams is progressing rapidly, requiring frequent inspections by this office.

The construction of a roadway to the Mad River dam of the city of Eureka has been completed and foundation excavation for the structure is to be started shortly.

The usual maintenance and operation inspections have been carried on as well as the inspections required of the work above outlined and repair work now being undertaken on dams in the higher altitudes.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

The report for 1933 and 1934 comprising the records of all diversions, stream flow and return flow throughout the Sacramento-San Joaquin territory and Delta salinity records has been completed and a limited number are available for distribution.

The measurements and records for the 1935 season are continuing under a reduced program. There has been a gradual drop in the flow of the Sacramento River at Sacramento so that on July 22d the discharge was 3700 second feet. This compares with 1100 second feet on the same date in 1934. On July 6th the flow of the San Joaquin River near Vernalis was 4500 second feet as compared to 440 on July 6, 1934.

The salinity at upper Bay and Delta stations as shown by water samples taken on July 14th, is shown in the following tabulation. This shows also a comparison with the corresponding salinity on July 14, 1934.

Comparison of Salinity at Upper Bay and Delta Stations on July 14, 1934, and July 14, 1935

Station	Salinity in parts of chlorine per 100,000	
	7/14/34	7/14/35
Point Orient	1800	1480
Point Davis	1500	1040
Bulls Head	1300	800
O and A Ferry	700	11
Collinsville	620	20
Emmaton	280	3
Antioch	440	10
Jersey	238	3
Rindge Pump	15	9
Middle River	11	4

AUTO CLUB EXECUTIVE THANKS DISTRICT STAFF MEMBERS ON LAGUNA JOB

AUTOMOBILE CLUB OF SOUTHERN
CALIFORNIA
Los Angeles

July 26, 1935.

Mr. S. V. Cortelyou,
District Engineer,
Division of Highways,
Los Angeles, California.

Dear Mr. Cortelyou:

Through you, I wish to express my appreciation to Mr. Mitchell and Mr. Whittemore, of your organization, and Mr. McDaniels, of the J. E. Haddock, Ltd., for their courteous and considerate handling of the numerous and sundry details incident to the improving of State Route No. 3 by our property in Laguna Beach.

The possibilities of inconvenience and misunderstanding were manifold, but throughout, due to their courtesy and consideration, these were nonexistent.

Again thanking them, through you, for their many instances of thoughtfulness, I am

Very truly yours,

E. B. LEFFERTS, Manager,
Public Safety Department.

Editor's Note.—Mr. R. H. Mitchell was the Resident Engineer and E. N. Whittemore, the Right of Way Agent, both of District VII.

WATER RIGHTS

Supervision of Appropriations of Water

Twenty-four applications to appropriate water were received in June, 12 were denied and 16 were approved. During the same period 1 permit was revoked and 6 passed to license.

Inspections of projects preliminary to the issuance of a license or revocation of permit were made during June in Kern, Kings, Fresno, Madera, Amador, Alpine, El Dorado, Placer, Nevada, Sierra and Plumas Counties.

TOPOGRAPHIC MAPPING

The final sheets of the Newport Beach quadrangle in Orange County are now available. This area was resurveyed in 1932 and final sheets are published on a scale of 1:31,680 with a contour interval of 5 feet.

Sulphur Slide in Santa Ana Canyon Eliminated by New Highway Relocation

FOR YEARS a menace to motorists, the steep and dangerous five-mile stretch of road passing Sulphur Slide in Santa Ana Canyon in Orange County has been eliminated by the Division of Highways of the Department of Public Works.

Dedication of the new highway, which is a cutoff 3.44 miles in length doing away with the Sulphur Slide grade, was celebrated with fitting ceremonies attended by State officials and representatives of Riverside, Orange, San Bernardino, Imperial and Los Angeles counties on July 27.

The new strip of highway was built at a cost of \$174,144.36. The roadbed is 50 feet wide with a concrete pavement 20 to 30 feet wide and shoulders of oiled road 10 feet wide on each side. It extends from four-tenths of a mile east of Peralta School to Gypsum Creek.

CHANNEL CHANGE NECESSARY

Construction of the cutoff necessitated changing the course of the Santa Ana River. This was accomplished by building 5534 lineal feet of bank protection fence along the floor of the canyon to protect the new route from damage during high water in the river. Railroad rails bound with wire mesh, backed with tree cuttings and boulders, were used in erecting the fences.

Building of the road required a number of cuts through the canyon, one of which is 160 feet high.

The completed project is a portion of one of the most important routes between Orange County and the coast and inland districts of Riverside and San Bernardino counties. It carries an unusually large volume of traffic with a high percentage of trucking, and is expected to cause a big increase in travel between the fertile valley sections around Riverside, San Bernardino and Orange counties and the southerly coastal counties of California.

The new highway saves about fifteen minutes average driving time between Orange County and inland points besides eliminating the dangerous Sulphur Slide grade where many accidents, some of them fatal, have occurred in the past. The old road presented

difficulties to residents of Riverside County desiring to motor to the beaches of Orange.

DEDICATION CEREMONIES

The dedication celebration was arranged by the Associated Chambers of Commerce of Orange County and the Imperial Highway Association assisted by officials of the State Division of Highways.

Justus F. Craemer, Assistant Director of Public Works, represented Governor Frank F. Merriam, who was unable to attend, and Frank A. Tetley of Riverside, retiring State Highway Commissioner, was the guest of honor and speaker of the day. Illness prevented Phil Stanton, State Highway Commissioner from Anaheim, from attending.

The ceremonies were opened by George Kellogg, secretary of the Imperial Highway Association and president of the Associated Chambers of Commerce of Orange County who introduced Willard Smith, chairman of the board of supervisors, as chairman.

In addition to talks by Craemer and Commissioner Tetley, brief remarks were made by Nat Neff, Orange County highway superintendent; Supervisor LeRoy Lyon of Orange, president of the Imperial Highway Association; John E. McGregor, chairman of the Riverside board of supervisors; Supervisor William Jerome of Orange; Ralph Stanfield of Riverside; S. V. Cortelyou, district engineer in charge of State highway construction; A. C. Fulmore, engineer of Riverside; E. B. Criddle, mayor of Riverside; Dan Hawkins, mayor of Corona; Paul Lewis, secretary of Riverside Chamber of Commerce; Fred Snedecor, president of Corona Chamber of Commerce; Clyde Simons, president of Yorba Linda Chamber of Commerce; J. L. Davis, president of Riverside Chamber of Commerce, and C. R. Butterfield.

Commissioner Tetley spoke of the old route through Santa Ana canyon and told of the difficulties encountered by motorists making a trip to the beaches. He mentioned a number of new projects contemplated by the State Highway Commission for this year.

"I don't like the way you're holding that gun."
"Well, I don't aim to please."



A JUBILEE EVENT was the celebration attending the dedication of the highway relocation in Santa Ana Canyon on July 27 marking the passing of the dangerous Sulphur Slide.

In the group gathered on a high point overlooking the old and new roads are State, county and civic body officials, including Assistant Director of Public Works Justus F. Craemer, representing Governor Merriam; Frank A. Tetley, retiring Highway Commissioner. Below is shown a part of the new highway with its wide concrete pavement and oiled shoulders. Portions of the tortuous old road are seen in the background.



Partington Canyon Bridged by Blast Making a 25,000 Cubic Yard Rockfill

By L. H. GIBSON, District Engineer

IN ADDITION to the many varied construction features involved or undertaken in the past several years in the building of the scenic and picturesque Carmel-San Simeon link of the Roosevelt Highway, is the rockfill roadway embankment now being placed across Partington Canyon, some 38 miles south of Carmel.

Partington Canyon is one of the many deep and narrow gorges encountered along the coast road, and where crossed by the highway now under construction is 110 feet deep and 300 feet across the top of grade elevation. The roadway fill across this gulch is the heaviest per station of any fills yet placed on the Carmel-San Simeon road, being about 135,000 cubic yards in the 300 feet across.

SOLID GRANITE LEDGE

Before crossing the canyon the road travels for a short distance along the sides of the canyon. Exactly opposite the crossing on the southerly canyon wall is a ledge of sound solid granite, one of the few ledges of sound solid rock on the entire coast project. The present or old road was blasted out of this ledge and crosses the canyon some distance upstream.

During the excavation of the old road, several thousand cubic yards of this ledge rock were blasted to the canyon below and deposited itself in large blocks in the V bottom of the canyon to a depth of about 30 feet.

Normal construction conditions at this point would have called for a large reinforced concrete arch culvert similar to the one recently constructed at McWay Canyon a short distance southerly. However, the excavating to foundation through the 30 feet of large rock tightly wedged into the canyon and the disposition of the material together with the arch construction would prove very costly, so other means of solving the drainage problem was sought.

INGENIOUS PLAN CONCEIVED

It had been observed by the Division of Highways that the rock, blasted from the present road in 1923 and lying in the canyon to a great depth, due to its large size formed

a porous fill which has permitted the peak runoff of the stream for the past 15 years to pass through the interstices without overflowing the top.

It was therefore conceived that with much more of this ledge rock available when excavating for the new road that it would be advisable to raise this present rockfill some 25 feet additional and place thereon to grade elevation the ordinary roadway embankment fill material.

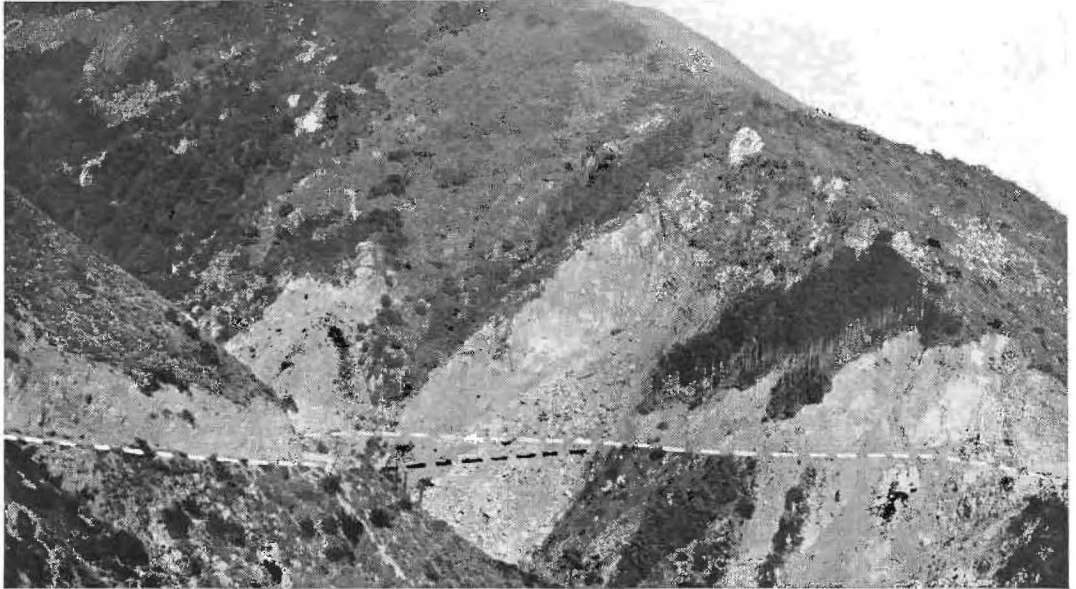
This feat could be accomplished much cheaper than placing a regular drainage structure because of the fact that the required ledge rock lay directly above the location where it was needed and a portion could be blasted into place.

On July 22, 1935, everything was in readiness to blow a portion of the ledge into the canyon below. Coyote holes had been drilled and loaded with 6500 pounds of 40 per cent powder and at 10.15 the charge was set off.

The result was entirely successful, some 25,000 cubic yards of ledge rock was blown loose, of which the majority was catapulted to position below and the balance lying on the present road and slope was broken further and moved to position.

Although the blast was by no means as large or spectacular as some previous blasts set off along the route, it was interesting from the standpoint of the purpose and the results obtained, and from the material saving to the state by the method adopted in bridging this canyon in lieu of the customary expensive deep fill culvert or bridge. It is estimated that a saving of not less than \$20,000 was effected by this type of construction.

Suitable rock and physical conditions are not present at any other location along the coast road where the same scheme may be followed. However, the action and behavior of this fill will be closely watched during the peak flow of the stream this winter, and if entirely successful results are obtained as anticipated a similar type of construction may be found profitable at some other location on the state highway system where satisfactory conditions for this type of construction exist.



BUILDING A FILL BY BLAST, engineers have saved the State approximately \$20,000 by moving granite ledge rock into Partington Canyon on the San Simeon-Carmel highway instead of building a bridge or culvert for the highway crossing. Black dashes show proposed highway crossing at scene of blast. White ones outline the existing road.

TYPE OF PAVEMENT SURFACE HAS SMALL VISIBILITY EFFECT

As a part of the Massachusetts Highway Accident Survey in 1934, more than 5000 tests were made to determine the effect of various factors on the distance at which the driver of a motor vehicle can see a pedestrian at night.

It was found that the type of pavement surface has a relatively small effect. The average visibility distance for concrete was 304 feet, for rough macadam 295 feet, and for smooth macadam 288 feet. A small area of white, such as an unfolded handkerchief, increases the visibility distance about 50 per cent, while light colored clothing increases it about 100 per cent. At speeds above 40 miles an hour, a driver can not see a pedestrian in dark clothes in time to stop before reaching him. But if the pedestrian is equipped with reflector buttons, a driver going 60 miles per hour can see him in time to stop.

In the case of glare from passing cars, these speeds are reduced to 30 and 50 miles per hour. Even these speeds are unsafe in unfavorable weather, or with poor brakes, subnormal eyes, dirty windshield, or inattention by the driver.

Nurse: "I think he's regaining consciousness, doctor; he tried to blow the foam off his medicine."

BAY BRIDGE CENTER ANCHORAGE MAKES LARGEST "PIN-HOLE" CAMERA IN WORLD

(Continued from page 8)

The cover page this month reveals something of the beauty of the bridge at night.

Since the beginning of San Francisco, Yerba Buena Island has seemed a part of the city by the Golden Gate. But it was only a few days ago that the island and the mainland were actually connected for the first time within the memory of man. The placing of the catwalk ropes between the concrete center anchorage in the middle of the bay and Yerba Buena has been completed. Soon the aerial illumination of the bridge will extend from San Francisco to the island adding to the night beauty of the bay.

CALIFORNIA NATIONAL FORESTS GET \$1,116,263 FERA FUNDS

Providing funds for a variety of projects in the eighteen national forests of California, \$1,116,263 has been distributed among the various areas, according to a statement by Regional Forester S. B. Show. The money has been made available to the Forest Service by the Federal Emergency Relief Administration. Projects will include forest trails and roads other than highways and county roads; fire prevention and control; and development of fish and game resources.

Storm Period Kept Snow Crews Busy On 4500 Miles of Highway Last Winter

SNOW removal is one phase of highway maintenance work that stands out with dramatic effect against the routine procedure of ordinary upkeep entailing, as it does, hardship and perils for the snow plow crews that resulted in serious accidents and one fatality this past winter.

During the storm period of this year, it was necessary to remove snow from 4500 miles of road as compared with about 3300 miles during a normally heavy storm.

Four inches of snow fell at Eureka, where even a trace of snow is seldom seen; and on Oregon Mountain in Del Norte County, a location where snow removal is usually a minor matter, there was a fall of 104 inches. Similar conditions obtained throughout the entire snow area.

101 INCH SNOW PACK

The record of total snow fall and of solid pack at Donner Summit for four winter seasons, as shown by the following tabulation, is of interest.

Season	Total fall in inches	Total packed snow Inches	Date
1931-32	544	60	April 16
1932-33	422	29	April 16
1933-34	262	0	April 16
1934-35	505	101	April 16

The extended storm period and severe nature of the storms placed a severe strain on men and equipment. In some cases, the equipment was operated continuously for 175 hours with only sufficient time out for servicing.

The theory of successful snow-removal is to start work with the beginning of the storm and continue operations until the storm ceases and the roads are clear. The work is planned to provide three full crews for each 24-hour period. When the exceptional storm occurs, the crew reliefs can not always be arranged on time.

REGARDLESS OF HOURS

Frequently the men took the equipment out this winter and kept it moving until relieved or until a round trip was made, regardless of the hours worked. While the

work is hard, it is found the men take a special pride in seeing the job through.

The main interstate connections on which snow removal was required this season are as follows:

Routes	Snow removal sections
Redwood Highway, U. S. 101	Crescent City to State line
Pacific Highway, U. S. 99	Dunsmuir to State line
Weed-Klamath Falls U. S. 97	Weed to State line
Alturas Lateral, U. S. 299	Redding to Alturas
Susanville Lateral	Red Bluff to State line
Donner Summit Route, U. S. 40	Colfax to State line
East of the Sierras, U. S. 395	Bishop to State line, and Johnstonville to Oregon State line at New Pine Creek via Alturas
Tehachapi Route, U. S. 466 and U. S. 91	East of Bakersfield to Mojave and vicinity Mountain Pass near Nevada State line
San Diego to Yuma, U. S. 80	In vicinity of Jacumba

The Division of Highways had in service some 160 snow plows, ranging from the straight-blade push plows for use with trucks or tractors, the one-way speed plows for use with trucks, and from the "V"-type to the rotary plows used for opening roads and as widening units.

METHOD OF SNOW REMOVAL

On snow-removal work, the straight-blade push plows are started out at the beginning of the storm, windrowing the snow to the side of the road. In the event the road becomes blocked by drifts too deep for the push plows to handle, the "V" plows are used to break through.

When the road can not be opened by either the straight blade or "V"-type plow, the rotary plows are used.

The extent of winter use, with one or two exceptions, has well justified the expenditures for snow-removal work, which amount to from \$300,000 to \$350,000 in a normal season. The Donner Summit Route, for instance, now carries an average of 500 vehicles daily from November 15 to April 1, a period during which the road was formerly closed.

Landscaping Protected in Road Work

(Continued from page 18)

tance and therefore the safety of the route for the motoring public. In order to increase the width and improve the highway grade on this steep sidehill country it was necessary to change the grades of many of the intersecting streets where they joined the new highway. The city officials of Laguna Beach cooperated to the fullest extent in making the necessary changes of grade for the city streets.

The widening of the highway made connection with intersecting streets so difficult in places that at the east end of Victoria drive, a combination vehicular and pedestrian subway was constructed to carry this drive under the highway to make a safe connection. Construction of this subway made it possible to do away with the old unsightly timber overhead pedestrian bridge located somewhat westerly of the new subway.

SECONDARY ROAD NECESSARY

Just westerly of the new subway, the widening was through a deep cut. The property on the north side of the highway along this portion of the new road is at a considerably higher elevation than the roadway so that access to the property was formerly had via a side road paralleling the highway at a higher elevation and immediately adjacent thereto.

Work of widening the highway completely cut away this existing side road, making it necessary to construct a secondary road located farther back but in general paralleling the highway. The east end of this secondary road terminates at the portal of the Victoria drive subway.

The new improvement project connects at the south city limits of Laguna Beach with a 30-foot pavement on an 80-foot grade, which was constructed during the winter of 1932-1933. At Cypress street, the northwesterly end of the recently completed contract connects with a 56-foot pavement through the business section of Laguna Beach, which was constructed about 8 years ago. This 56-foot pavement in turn connects at Cliff drive with a 72-foot pavement, which extends to Myrtle street, and from this point a 40-foot pavement on an 80-foot grade was built under state contract three years ago to the west city limits.

Under this same contract a 30-foot pavement was constructed on an 80-foot roadbed

to Corona Del Mar. Thirty feet is the present standard width of pavement on the Coast highway except through congested districts.

PROVIDES CONTINUOUS IMPROVEMENT

With the completion of this improvement there is provided a continuous highly improved highway from Long Beach along the coast to Doheny Park, where junction is made with State Highway Route No. 2 leading to San Diego.

The city of Laguna Beach cooperated with the state by agreeing to the use of the entire quota of gas tax funds accruing to the city during the last biennium for this improvement.

Laguna Beach, a community with a large colony of artists and writers, has many beautiful homes with extensive landscape work on the grounds. In widening the highway particular care was taken to preserve existing landscaping effect and add, if possible, rather than detract from the appearance of the work already done by private individuals. The fact that the Division of Highways has succeeded in attaining this end is attested to by numerous letters from private individuals and expressions of appreciation from civic bodies.

ALAMEDA COUNTY LEADS IN STATE TRAFFIC DENSITY COUNT

Alameda heads the list of California counties in the matter of the average daily count of 1652 vehicles per mile of State highway and little Modoc is last with 34 vehicles per mile, according to the road transportation survey of the Division of Highways.

A summary of data on vehicle density reveals that on 95,957 miles of State roads and city streets a total annual travel of 6,600,000,000 vehicle miles is divided as follows: 47 per cent on urban and rural State highways; 11.5 per cent on county highways, and 41.5 per cent on city streets other than State highways.

Foreman (to workman)—"Now then, Bill, what about carrying up some more bricks?"

Bill—"I ain't feelin' well, boss; I'm trembling all over."

Foreman—"Well, get busy with the sieve, then."

Highway Bids and Awards for the Month of July

(Continued from page 22)

Angeles, \$16,414. Contract awarded to Morgan Bros., Huntington Park, \$9,818.25.

SAN FRANCISCO-OAKLAND BAY BRIDGE—Electrical work of San Francisco-Oakland Bay Bridge and its highway approaches. Ne Page-McKenny & Kenney Bros. Co., San Francisco, \$445,845; Radelfinger Bros., San Francisco, \$458,415; Newbery Electric Corporation, Los Angeles, \$569,586; Clinton Construction Co., \$498,399; Bridge Builders, Inc., Oakland, \$647,777; C. C. More & Co., Engineers, San Francisco, \$648,829. Contract awarded to Alta Electric and Mechanical Company, Inc., and American Building Maintenance Company, San Francisco, \$442,939.

SAN FRANCISCO-OAKLAND BAY BRIDGE—Administration Building and Toll Plaza. Contract awarded to Clinton Construction Co. of California, San Francisco, \$360,857.

SAN LUIS OBISPO COUNTY—Various locations to be treated with liquid asphalt about 34.2 miles. District V, Routes 33, 125, 58, Section D E, A, AB, James S. Butler, San Luis Obispo, \$12,775. Contract awarded to L. A. Brisco, Arroyo Grande, \$11,672.50.

SAN LUIS OBISPO COUNTY—Between Morro and Atascadero, new property fence to be constructed and existing fence to be removed. District V, Route 125, Section A, Theo. M. Malno, San Luis Obispo, \$3,885; James S. Butler, San Luis Obispo, \$3,610; Walter E. Roselip, San Luis Obispo, \$3,775; J. R. Reeves, Sacramento, \$4,870. Contract awarded to L. A. Brisco, Arroyo Grande, \$3,093.75.

SANTA CRUZ COUNTY—In the City of Santa Cruz, Ocean Street, between Pryce and Water Streets. District IV, Route 5, Section S.Cr. Resurface with natural rock asphalt, about 0.4 mile. Union Paving Co., San Francisco, \$6,365; Pacific States Construction Co., San Francisco, \$7,392. Contract awarded to Lee J. Immel, Berkeley, \$5,490.

SHASTA COUNTY—Between Route 28 and Four Corners and that portion within McArthur Memorial Park, about 8.1 miles in length. To be treated with liquid asphalt. District II, Route 83, Section A, Tiffany Construction Co., San Jose, \$3,348; C. F. Fredericksen & Sons, Lower Lake, \$3,408; Hayward Bldg. Materials Co., Hayward, \$4,725. Contract awarded to E. F. Hilliard, Sacramento, \$3,089.70.

SISKIYOU COUNTY—Between 0.4 mile east of Mt. Hebron and Dorris, Class "B" Seal Coat to be applied. District II, Route 72, Section C. A. Teichert & Son, Inc., Sacramento, \$12,909. Contract awarded to Dunn & Baker, Klamath Falls, Ore., \$9,975.

SISKIYOU COUNTY—Between Cougar and 4 mi. NE. of Grass Lake station, about 8.2 miles to be graded. District II, Route 72, Section B. N. M. Ball & Larsen Bros., Berkeley, \$147,904; Bayshore Construction Co., Inc., San Francisco, \$154,248; Peninsula Paving Company, San Francisco, \$163,081; A. Teichert & Son, Inc., Sacramento, \$181,965. Contract awarded to Dunn & Baker, Klamath Falls, Oregon, \$148,542.

SONOMA COUNTY—Between College Avenue and the south city limits about 1.2 miles to be widened and paved with Portland cement concrete and asphalt concrete. District IV, Route 1, Section S. Ro. Hanrahan, Wilcox Corp., San Francisco, \$77,891; Fredrickson, Watson Const. Co., Fredrickson Bros., Oakland, \$71,060; Pacific States Const. Co., San Francisco, \$62,628; Healy Moore Co., Oakland, \$75,152; A. C. Ralsch, San Francisco, \$61,234; Peninsula Paving Co., San Francisco, \$68,850. Contract awarded to Union Paving Co., San Francisco, \$69,869.70.

STANISLAUS COUNTY—Between 0.8 mile north of Newman and 0.2 mile south of Crows Landing—about 4.5 miles to be graded and road mix surface to be placed. District X, Route 41, Section B. A. Teichert & Son, Inc., Sacramento, \$109,832; M. J. B. Construction Co., Stockton, \$108,729; Central States Contracting Co., Ltd., Oakland, \$114,235; Earl W. Heple, San Jose, \$101,486; Hanrahan-Wilcox Corporation, San Francisco, \$99,451; Fredrickson & Watson Construction Co., Fredrickson Bros., Oakland, \$108,263; Blasotti, Willard & Blasotti, Stockton, \$97,067. Contract awarded to Union Paving Co., San Francisco, \$95,324.20.

District Engineers Empowered to Issue Overweight Permits

DELAY, inconvenience, and expense attached to the obtaining of a permit to operate overweight vehicles on state highways are done away with in an order recently issued by State Highway Engineer C. H. Purcell of the Department of Public Works.

This order has vested in district highway engineers sole authority for the issuance of all single transportation permits within a given highway district and they, in turn, may delegate this power to maintenance superintendents when deemed advisable. Headquarters approval no longer will be required for such permits.

The new order means that persons desiring emergency permits for the operation of overweight trucks, steam shovels, machinery, etc., over state highways will not have to travel long distances to headquarters offices to obtain them.

"It must be borne in mind," says Mr. Purcell in the general order to district engineers, "that section 91 of the 1933 Vehicle Act authorizes permits to operate otherwise illegal vehicles and/or loads in emergencies, and was not intended to provide a means for evading the law by indiscriminate issuance of permits.

A growing tendency by manufacturers and others to assemble vehicles with illegal features should be discouraged wherever the occasion arises, and contract carriers must not obtain the impression that general hauling of overloads will be tolerated under permit when other means of transportation are available. District engineers will be held strictly accountable for the proper administration of this authority, and employees designated to handle this work should be impressed with their limitations and responsibilities in order that a uniform policy is maintained."

"They say you married her because her aunt left her a fortune."

"That's not true—I would have married her no matter who left her the dough."

TULARE, FRESNO COUNTIES—Between Visalia and Orange Cove (Tul-Fre-132, B, C & A), between Visalia and Woodlake (Tul-133-A), about 34.9 miles shoulders to be road-mix surface treated. District VI, Routes 132, 133, Section B C, A. E. A. Forde, San Anselmo, \$13,850; Stewart & Nuss, Inc., Fresno, \$15,173; Basich Brothers, Torrance, \$15,380; A. Teichert & Son, Inc., Sacramento, \$17,767; John Jurkovich, Fresno, \$15,820; Oilfields Trucking Co., Bakersfield, \$15,028. Contract awarded to Clyde W. Wood, Stockton, \$12,930.

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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PHILIP A. STANTON, Anaheim
CHARLES D. HAMILTON, Ranning
RAY INGELS, Ukiah

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

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J. G. STANDLEY, Principal Assistant Engineer
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C. S. POPE, Construction Engineer
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L. V. CAMPBELL, Engineer of City and Cooperative Projects
R. H. STALNAKER, Equipment Engineer
E. R. HIGGINS, Comptroller

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CHARLES H. WHITMORE, District III, Marysville
J. H. SKEGGS, District IV, San Francisco
L. H. GIBSON, District V, San Luis Obispo
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S. V. CORTELYOU, District VII, Los Angeles
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ROBERT E. REED, General Right of Way Agent

DIVISION OF PORTS

Port of Eureka—William Clark, Sr., Surveyor

MAP SHOWING STATE HIGHWAY SYSTEM

LEGEND
 Primary Roads 
 Secondary Roads 



SAN FRANCISCO AND VICINITY



See Detail Map

Sec Detail Map



LOS ANGELES AND VICINITY