



# CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official Journal of the Division of Highways, Department of Public Works, State of California

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# Work of Division of Highways During the Last Fiscal Year

By G. T. McCOY, State Highway Engineer

**T**HE completed fiscal year which ended June 30 was of more than ordinary importance to the California Division of Highways as the end of the war marked a distinct change in the activities of the department.

From the rush of wartime construction of access roads and bridges for the Army, Navy and other Federal agencies the State was faced with the postwar problem of rehabilitation and development of a deteriorated highway system.

To make a start on the postwar program, work totalling \$82,047,600 was put under way by the Division of Highways between July 1, 1945 and June 30, 1946.

This unusually large volume of work for a single year was made possible by the reserve of State highway funds accumulated during the war years and \$17,000,000 of postwar Federal aid.

The value of this work is the largest ever initiated in a single year by California's State highway organization.

Of the \$82,000,000 total, work orders for construction off the State highway system, on access road improvement performed for Federal agencies and on county roads being improved under the Federal Aid Secondary program, amounted to \$7,600,000, leaving an amount of nearly \$74,500,000 in work on the State Highway System.

Broken down to the several functions of the department's principal activities, the \$82,000,000 is composed of \$64,970,000 for construction, right of way, and construction-engineering phases of the work, \$13,906,700 for maintenance, \$2,316,500 for preliminary engineering and \$854,400 for operation and maintenance of the San Francisco-Oakland Bay Bridge.

Progress in development of the California State Highway System toward standards which will serve more adequately the demands of the rapidly increasing traffic, is indicated mostly by \$64,970,000 in work orders written for the construction phase. Comprising this figure are totals of \$54,907,700 for construction and repair operations,

## State Highway Heads Coming to California

**T**HE American Association of State Highway Officials comes to California again this year for its annual meeting.

The convention will be held in Los Angeles December 17-20. Highway officials from all of the 48 States and from Alaska and Hawaii are expected to participate in the session. The Association held its last far-western meeting in San Francisco in December, 1936.

Preliminary plans for the convention are being made by a program committee appointed by the president of the Association, M. J. Hoffman, State Highway Commissioner of Minnesota.

George T. McCoy, State Highway Engineer of California, is chairman, and serving with him are Dr. L. I. Hewes, Chief, Western Region, Public Roads Administration; C. B. Shain, Director of Highways of Washington; and R. A. Allen, State Highway Engineer of Nevada.

by both contract and day labor, and construction engineering, and \$10,062,300 for right of way costs.

The improvement to be accomplished to roads in the State under this \$64,970,000 include construction of 266 miles and repair to 506 miles, or total work on 772 miles during the war. Of the 266 miles of construction, 187 miles were located on the State Highway System, 24 miles were access roads built for the U. S. Army and Navy and 56 miles were county roads included in the Federal Aid Secondary System.

Also financed under construction activities was the building of 72 bridges and major repairs to 14 others. Of the 72 bridges constructed, four are located on access roads, one on the Federal Aid Secondary System and 67 on the State

System. Thirty-one highway and railroad grade separation projects were also let to contract, of which 28 are on the State Highway System and three are on Federal access road projects.

The financing of postwar highway construction is based upon estimated revenues from the State sources of motor fuel taxes and registration fees and from Federal apportionments of funds appropriated by Congress for postwar aid to the States in improving the rural and urban sections of the Federal Aid System. For each of the three years California receives an annual apportionment of \$17,000,000 for these two Federal aid purposes. As customary, the Federal funds must be matched with State highway dollars.

In addition to these funds for improvement to the Federal Aid System, California is apportioned \$5,000,000 during each of the three postwar years, for improvement to a Federal Aid Secondary System. In California, the Federal Aid Secondary System has been selected from the several county-road systems through collaboration between county supervisors, the Division of Highways, and the Public Roads Administration.

The funds necessary to match the Federal Secondary apportionments to California were provided to the counties by a \$12,000,000 appropriation made by the State Legislature in 1945. The statute appropriating these funds stipulated that 87½ per cent of the Federal secondary apportionments be used for improvement to county roads which the Public Roads Administration would approve for inclusion within the Federal Aid Secondary System.

Among the larger and more outstanding improvements to State highways inaugurated during the last fiscal year, are included the following major development projects:

Construction on new alignment of U. S. 101 from San Jose southerly to Ford Road. This improvement to four-lane divided highway standards involved four contracts including grade separations at Santa Clara Street in San Jose and Coyote and Ford Roads

(Continued on page 23)

# Liability Insurance as Related to California Highway Contracts

KENNETH A. KEYES, Assistant Engineer

**A**S A general policy, the California Division of Highways does not specify that contractors furnish public liability and property damage liability insurance as a prerequisite part of contracts for the construction of highways and bridges on the State Highway System. However, in the construction of railroad grade separation structures, the railroad companies have insisted that, because of the magnitude of the risks involved, they be given adequate protection.

This protection first took the form of indemnity agreements executed by the contractor and backed by so-called "save harmless bonds," guaranteeing that the contractor and a bonding company as co-surety, would indemnify the railroad for any expense or liability in the case of an accident. This "bond" form of protection to the railroads was used in State highway contracts until January 27, 1937, when the Federal Bureau of Public Roads, now the Public Roads Administration, under a general memorandum for the U. S. Works Program prescribed that on all grade separation projects, financed with Federal funds, the railroad must be protected by standard liability insurance. The regulation established at that time is still in force and in general use throughout the United States.

## THREE TYPES OF INSURANCE

This regulation requires that a contractor performing work in connection with railroad grade separation structures be required to furnish the following three types of insurance:

1. **Contractors' public liability and property damage insurance covering all accidents occasioned by work under his direct control.**

2. **Contractors' protective public liability and property damage insurance protecting the contractor from accidents in connection with work being performed for him by subcontractors on the project.**

3. **Contractors' protective public liability and property damage insurance specifically protecting the railroad company in any accident arising from the construction work.**

By far the greater portion of highway-railroad grade separation work is

financed with Federal funds; however, as the various railroads insist on protection for all work in proximity to their property, insurance similar to that specified under the 1937 Federal Memorandum is also required of contractors on contracts financed with other than Federal funds.

## SUBCONTRACTOR'S INSURANCE

The amounts of insurance that are required vary in accordance with the magnitude of the risks and are determined by agreement between the State and the railroad for each project. In general, the minimum requirement for public liability insurance is \$100,000 per person and \$200,000 per accident and for property damage liability the coverage is \$25,000 per accident and \$50,000 aggregate per job or policy period.

In order to complete the insurance protection, subcontractors, where insurance is specified, are required to carry the direct coverage outlined under Item 1 above.

Because the various insurance companies, in furnishing this protection use adaptations of their standard forms, in which some of the hazards encountered in highway construction are often excluded, it has been necessary to require that certified copies of all insurance policies be submitted for approval with the contract documents. The nonacceptable exclusions include hazards due to blasting, excavating of foundations, the use of automotive equipment and in some cases all damage caused by work on streets and roads.

## OVERSIGHT CAUSES DELAY

In order to assure full compliance with the State's obligations and agreements with the railroads, all policies must carry a certification that the State shall receive a minimum of five days' prior notice, mailed by registered mail to the Department of Public Works at Sacramento, of any cancellation or reduction in coverage afforded by the policy. This is not an unusual stipulation and is found as a contract requirement in many contracts where the hazards justify an insurance requirement for construction work.

One of the principal troubles encountered in connection with liability insurance is that the endorsement providing this certification is very often overlooked when the policies are submitted by contractors. This oversight always causes delay in contract approval by the State's attorneys.

Another recurring problem involves the insurance provided for property damage by automotive equipment as a number of insurance companies separate the automotive property damage liability from other property damage liability. In these policies the automotive coverage is usually limited to a lesser amount, often \$5,000, per accident and though no aggregate limit is placed on the number of accidents covered, the State's agreements will not permit acceptance of a lesser limit per accident and such policies must be revised to meet the contract minimum (usually \$25,000 per accident and \$50,000 aggregate) before they can be approved.

## PROCESSING PROBLEMS

One underwriter has recently taken the stand that its policy written with the automotive coverage separated from and in lesser amount than non-automotive coverage would cover any accident on the job site. However, the State's attorneys have ruled that automobile coverage at the job site must be definitely covered in the full amount by a direct commitment in the policy in order for the State to fulfill its insurance obligations.

The greatest problem is in processing insurance required of subcontractors. These concerns, often performing very minor portions of the work, or working on the completed deck of an overhead crossing or pavement of an undercrossing, find that the minimum requirements apparently exceed the value of the work or apparent hazard involved. The fact is overlooked that the primary reason for the insurance is to provide protection for the railroad, where, because of the number of people that may be involved, the total liability in an accident is greatly increased.

(Continued on page 25)

# Relics of Pioneer Highway Days Found

M. J. WRIGHT,  
Surveyor-General and Ex-officio Register  
State Land Office.

F. E. WRIGHT, Deputy

STATE OF CALIFORNIA,  
OFFICE OF  
SURVEYOR-GENERAL  
AND  
REGISTER STATE LAND OFFICE.

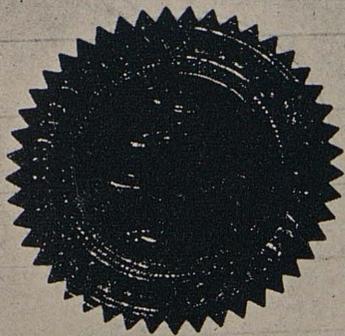
*Sacramento, April 11<sup>th</sup>, 1895.*

*This is to certify that at a meeting of the members of the Bureau of Highways, viz: Marsden Manson, Joseph Lees Maude and Richard C. Irvine; held in the office of the State Surveyor General this 11<sup>th</sup> day of April 1895 at 11<sup>30</sup> a.m. under Section 7, Chapter CCIII, of the Act Approved March 27, 1895.*

*Marsden Manson was unanimously elected chairman of said Bureau.*

*M. J. Wright,  
Surveyor General.*

*By, F. E. Wright, Deputy.*



**F**IFTY-ONE years ago, the California Legislature created the State Bureau of Highways. Governor James H. Budd appointed as

members of the Bureau, R. C. Irvine, Sacramento, Marsden Manson, San Francisco, and J. L. Maude, Riverside. On April 11, 1895, the then Sur-

veyor General, M. J. Wright, certified that the bureau had held its first meeting and elected Mr. Manson chairman. On that same date, the bureau chose

Mr. Irvine as its temporary secretary and the first minutes of the new agency were duly recorded in longhand by Commissioner Irvine.

Recent expiration of a State lease on an old warehouse in Sacramento and the resultant move required sorting of many cases of dusty and yellowed documents stored there by the State Engineer many years ago. Among these musty records, engineers of the Division of Highways unearthed the original certification of Surveyor General Wright and the large minute book in which for several years the records of the Bureau of Highways were painstakingly written with a pen. The certificate of the Surveyor General and the first page of the minute book are herewith reproduced.

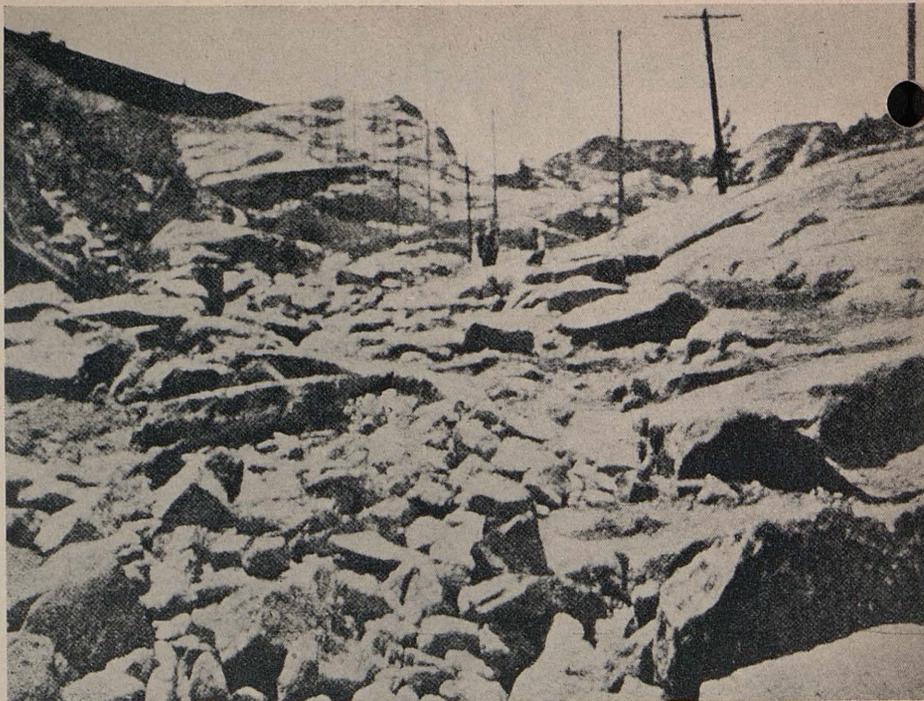
Through the years, with many legislative changes, there have evolved from the old Bureau of Highways the present Division of Highways of the Department of Public Works and the California Highway Commission.

In 1895 the first link of the magnificent State Highway System of today was acquired. The Legislature designated the Lake Tahoe Wagon Road, one of California's pioneer stage toll roads, as a State highway, and from this humble start there was developed the California highways system totaling 14,000 miles of paved public roadways serving every section of the State.

Over the historic Lake Tahoe Toll Road flowed the variegated travel of pioneer days. It began near Smith's Flat, three miles east of Placerville, and extended easterly to the State line, a distance of 65 miles. History records that on this old route between Placerville and Carson City and Virginia City, there were 93 hotels and the Pioneer Stage Line employed 50 men and used 600 horses.

Today thousands of motorists travel yearly over this same highway, U. S. 50.

During 1895 and 1896, Commissioners Irvine and Maude, purchasing a team of horses and a buckboard wagon, drove into every county of the State. They covered 7,000 miles along the coast, through valleys, mountains and deserts, and on November 25, 1896, submitted to the Governor a report recommending a system of State highways "traversing the great belts of natural wealth which our State possesses, connecting all large centers of population, reaching the county seat of every county, and tapping the lines of county roads so as to utilize them to the fullest extent."



Pioneer State highway engineers constructed a route, now U. S. 40, over these granite heaps between Emigrant Gap and Donner Summit

"In submitting this report," says the late Ben Blow in his excellent work, *California Highways*, "the Bureau of Highways prepared and filed therewith a map of the proposed highway system which in its main features corresponds almost exactly with the California Highway System of today and discloses a breadth of vision that saw and pictured what now is practically an accomplished fact, in all fairness entitling Messrs. Irvine, Manson and Maude to that respectful appreciation so seldom granted to the men who pioneer the way; for they left behind them footprints which lead up from the mist of the early '90's to the present when on every side smooth vistas of roads serve to help humanity advance."

The Legislature of 1897 dissolved the Bureau of Highways and created a Department of Highways of which Marsden Manson, J. R. Price and W. L. Ashe were appointed commissioners to serve for two years, at the end of which time their offices automatically should cease and all powers attached to them be vested in one man, who must be a civil engineer, to be appointed by the Governor and hold office for four years.

The members of the new Department of Highways devoted their efforts to an exhaustive study of road construction practices and economics. Mr. Manson made a tour of Europe to ob-

serve the methods followed in England, France, Germany, Russia and other countries.

At the close of the two-year period of activity of the three commissioners, Mr. Maude, of the original Bureau of Highways, was appointed to the office of Highway Commissioner.

Motorists of today surely will find occasion to reflect upon the tremendous advance in modern transportation if they will read an essay, "The Effect of Roads Upon Industrial Development," written by Mr. Irvine and published in a bulletin of the Bureau of Highways in 1896, in which the author said:

"The influence of the bicycle upon this agitation for improved highways can not be overestimated. Millions of dollars have been invested in the manufacture of these easy and graceful machines of locomotion and this agitation for better roads is due more directly to the efforts of the wheelmen than to any other one cause."

Last year more than 3,000,000 motor vehicles were licensed by the State of California and visiting motorists by the thousands joined the owners of State licenses in using the great system of highways planned 51 years ago by men who had the bicycle riders of that day in mind.

Thursday, April 11, 1895.

A meeting of the Bureau of Highways was held in its office in the Capitol Room 547 on this date, Commissioner Manson presiding.

Upon roll call, it was found that all the members of the Bureau were present.

A resolution was introduced by Commissioner Maude to the effect that Commissioner Irvine act as temporary secretary.

Upon roll call, the vote was as follows: Ayes: Commissioners Irvine, Maude, and the Chairman. The Chairman declared the resolution adopted.

A resolution was introduced by Commissioner Maude to the effect that the following letters be written and sent out: One to General Ray Stone of Washington, notifying him of the organization of the Bureau of Highways, another to His Excellency Governor James M. Budd, to the same import, another to the State Prison Directors, advising them similarly, and another to the Attorney-General, requesting an opinion as to when the operations of the Bureau can be commenced, all of which letters should be made part of the records of the Bureau.

Upon roll call, the vote was as follows: Ayes: Commissioners Irvine, Maude and the Chairman. The Chairman declared the resolution adopted.

Letters to General Ray Stone, Gov. Budd, Atty. Gen. Fitzgerald, State Prison Directors, in reference to the organization.

Form of letter to applicants for Clerkship.

Consultation with Prison Directors. A resolution was introduced by Commissioner Manson to the effect that Commissioner Maude be appointed a committee of one to consult with the State Prison Directors.

Upon roll call, the vote was as follows: Ayes: Commissioners Irvine, Maude, and the Chairman. The Chairman declared the resolution adopted.

A resolution was introduced by Commissioner Irvine to the effect that the Bureau adjourn subject to the call of the Chair.

Upon roll call, the vote was as follows: Ayes:

No reply from Atty. Gen.

# Four-Lane Highway Construction on El Camino Real in Monterey County

By V. E. PEARSON, Associate Highway Engineer

**T**HE first step in the correction of a congested section of U. S. Highway 101 was initiated with letting of the contract for construction between Santa Rita and 0.8 mile north of Crazy Horse Summit in Monterey County, a total length of 8.4 miles.

This is the first of two projects contemplated to develop the Prundale Cutoff into a four-lane divided highway by widening so as to add two lanes separated from the existing two lanes by a central dividing strip. The project will cost approximately \$830,000.

The present two-lane highway which was opened to traffic on July 20, 1932, supplanted the narrow, twisting San Juan Grade which in-

creased speed and volume of traffic had made obsolete after 17 years of service. Continued increase in traffic on this main route along the coast between the metropolitan areas of San Francisco and Los Angeles resulted in the traffic on this stretch rising from three to four thousand vehicles daily in 1932 when it was opened to traffic to six to nine thousand vehicles in 1941, of which over 10 per cent are trucks and trailers.

#### TRAFFIC SLOWED

Congestion is at present caused by the slowing up of trucks on the rolling grades, thereby holding up the faster moving automobiles and creating definite driving hazards if safe driving rules are not followed. It is

the policy of the State Division of Highways to correct such situations as rapidly as possible.

Construction crosses several unstable marshy areas composed of saturated unstable clayey sand, soft plastic clay and peat to depths of from three to 14 feet. These areas are being treated in a manner similar to that employed during the original construction which was successful in stabilizing the areas as evidenced by the absence of any appreciable settlement in the existing roadbed.

This treatment consists of excavating the saturated unstable material to the underlying hard pan, placing it in piles to dewater, installing 8-inch perforated metal pipe underdrains

(Continued on page 32)

This view shows widening activities and existing two-lane roadbed on right





Mississippi wagon used to haul excavation materials involving hauls up to two miles

View of embankment construction activities showing piles of material excavated in treatment of fill area



# Life on San Francisco-Oakland Bay Bridge Has Its Drawbacks—For Those Who Work There

**W**E pulled off to the side of the road by the toll plaza building of the San Francisco-Oakland Bay Bridge the other day and dropped in on the folks who keep more than 2,000,000 cars rolling across the bay every month.

We found a hard-working, harried group of citizens who come to work each day to wrestle with a problem that is somewhat like sending Junior off to his college classes in the clothes he outgrew in the low seventh grade. In a recent month, 2,202,000 cars passed through the toll plaza that was designed to accommodate a maximum of 1,600,000.

The bridge people are convinced we need a new bridge—but quick. And they also are planning to build new toll stations and lanes around the north side of the plaza building. If they get enough new lanes, all stations will collect your money from the driver's side of the car. At any rate, they'll route all lower-deck traffic around the north side.

\* \* \* \*

From Toll Captain Minor L. Silvey and Principal Bridge Engineer Howard C. Wood we learned much of the life and labor of the bridge staff.

For instance, we learned that Sunday no longer is the big day of the week for bridge traffic. The top load, for some months now, has come on Friday. Apparently, what with unlimited gas and such, many San Franciscans are scooting out of town on Fridays for the weekend, while traveling salesmen are scurrying back into the city to file their expense accounts, mow the lawn and get acquainted with the family at home.

The bridge's all-time high, however, came last Easter Sunday when 79,016 cars rolled across the bay.

Women toll collectors, the captain told us, are becoming more or less extinct, what with returning veterans reporting back on their old jobs.

During the war, he hired between 200 and 300 of them. Fifteen are left and only two of these have permanent civil service appointments to the toll squad of 57 collectors and 14 sergeants. Collecting was rugged work for the women and few could take it for long. Some male motorists seemed to achieve great satisfaction in barking lewd and lascivious cracks into their tender ears, then speeding away.

Others had a charming habit of trying to hold hands with the girls when they paid their toll. Some even pulled the women to their cars for a try at a little concentrated rough stuff.

Then there was a group of correspondence Casanovas, more harmless but mighty bothersome. They'd write notes giving their address or phone numbers and impassioned pleas for dates, wrap them around their quarters and hand them to the girls.

\* \* \* \*

Many collectors handle more than 4,000 automobiles a day, yet the average error rate among all the collectors is a mere 21½ cents per \$1,000. (Their cash must tally with an electric car-counter.)

We also learned, during our visit, the reason why (during off-peak periods) you sometimes find toll stations on the right-hand side of your car operating while the more convenient left-hand stations are unmanned. It isn't, we learned, because the bridge people want you to stretch.

It's because collectors on what the trade calls "on-side," or left-hand stations, handle so many cars at such a rapid rate they get punchy and will foul up their cash, cut paper dolls and start yodeling in high Hindustani un-

less they receive 15-minute rest periods every once in a while.

And, we were told, the monetary confusion would be something akin to a Washington budget discussion if they switched an "off-side" collector away from his cash, had him suddenly take over the money and station of an "on-side" collector during the relief period, then switched him back to his own station.

\* \* \* \*

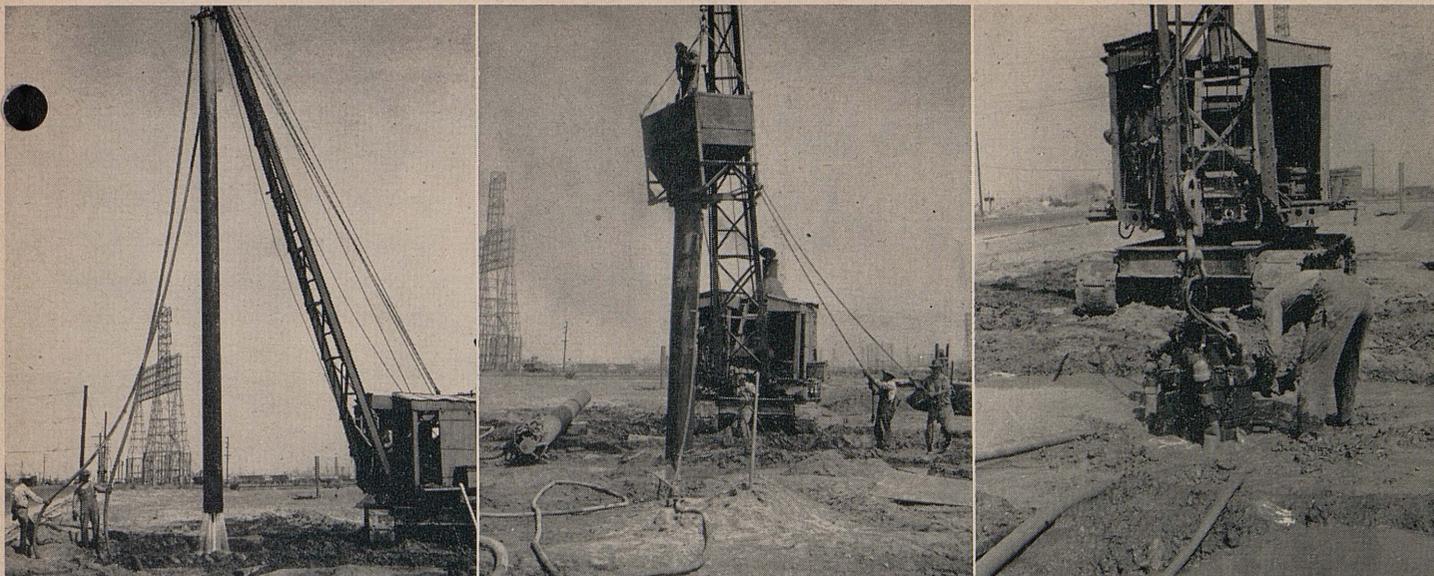
One of the biggest headaches is stalled cars, despite the fact the new \$5 penalty for running out of gas has cut the no-fuel cases in half. On Easter Sunday, for example, tow-cars were called out 86 times. On last month's lightest traffic day there were 52 service-car alarms. And, the bridge people explain, all traffic in one direction immediately drops 33⅓ per cent when a single stalled car blocks one of the three lanes. Within a few moments, the load in that direction suffers a 40 per cent drop because of increased traffic in the remaining lanes.

The bridge, incidentally, is real chivalrous about women and will change a tire for a stalled gal without charge. Rate for men: 50 cents.

Captain Silvey would like us to remind you, too, that those red alarm boxes every 1,000 feet are dual purposed. Break one little glass window and a tow-car will rush to your aid. Break the other glass if you want the fire department.

\* \* \* \*

Saddest note is that the bridge people clear away most of the stalls and wrecks so quickly that only a few of the delayed motorists see what caused the traffic jam. So they blame it all on slow toll-taking and bawl hell out of the collectors when they reach the plaza.—Jack S. McDowell in the *San Francisco Call-Bulletin*.



Left—Outer and inner casing with jets in operation. Center—Loading sand in outer casing. Inner casing in left foreground. Right—Preparing to pull inner jet casing from outer casing

## Embankment Stabilization at Terminal Island

**R**ELOCATION of a portion of Pacific Coast Highway (formerly State Street) and its construction as a freeway to carry the highway over the Terminal Island Freeway, the tracks of the Union Pacific Railroad, and the tracks of the Los Angeles City Harbor Department on separation structures, was started in June. A crossing of Dominguez Channel, a Los Angeles Flood Control Channel, and relocation of a portion thereof also is necessary.

Because of the unsettled nature of the area through which this highway passes—settlement of 0.2 feet to 0.4 feet during 1941-43 has been recorded—the high embankments require the installation of vertical sand drains to puncture impervious strata and tap the water storage in the pervious layers.

The water storage is being tapped in order to minimize the increase in water pressure which is anticipated due to the added load when embankments are constructed. Such increase in water pressure in material of the type found in the many-layered formation throughout this project tends to cause a lateral flow of material.

The controlled rates of construction of the embankments are one foot per day or three feet per week maximum.

Sand drain construction is the first operation on this project. Several methods of constructing the holes, in

some cases to be 50 feet deep, have been studied, and tried.

The method adopted on this project is to sink a casing and jet the material out, around the outside of the casing. After the holes have been completed, they are backfilled with a clean coarse-graded sand to allow for the upward passage of water.

A two-foot layer sand-blanket is to be constructed full width of embankments to permit lateral escape of water rising from sand-filled drains.

James I. Barnes Construction Co. is the contractor. Frank B. Cressy is Acting District Construction Engineer and W. D. Eaton is Resident Engineer, both for the State.

PROJECT COST \$14,000,000

The Terminal Island Access Road Project is being financed by the Navy at a cost of \$14,000,000. Its outstanding feature is a vertical lift bridge spanning Cerritos Channel, replacing the old swing bridge.

Situated alongside the still serviceable bascule bridge, the new structure will afford a direct route for the Terminal Island Freeway as well as permit unhampered navigation in Cerritos Channel. It will allow navigation a clearance of 50 feet above high water when the lift is at roadway grade, and 125 feet when the span is raised to its maximum lift. Thus, with a channel of

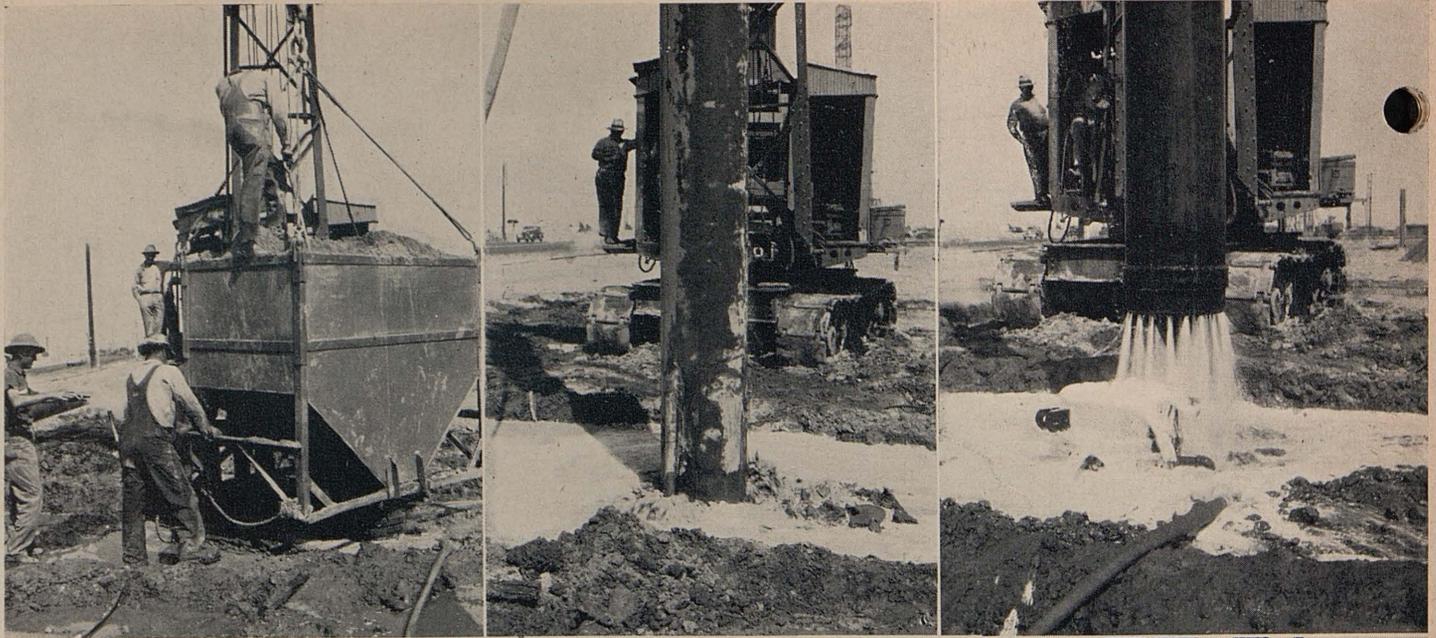
35-foot depth and a maximum clearance above water of 175 feet, the needs of practically all types of modern vessels are provided for.

The lift bridge proper will consist of three channel spans and 42 approach spans, 26 on the south side and 16 on the north. The lift span is 240 feet in length, between bridge seats. The north and south spans, excluding towers, are each 184 feet.

The total length of the bridge and approaches is 4,000 feet, measured between Seaside Boulevard and Station 50. The three bridge spans are of steel truss design of the Warren subdivided type, with split panel points, a through truss bridge of standard design. Approach spans will be constructed of steel plate girders on reinforced concrete columns. The viaduct spans will be supported on four-post bents resting on continuous footings and 35-foot piling.

BRIDGE PLANNED BY STATE ENGINEERS

Plans for the bridge were prepared by the State Division of Highways under the direction of F. W. Panhorst, State Bridge Engineer, and J. W. Green, Southern Representative of the Bridge Department. State highway, bridge, and Navy construction were coordinated with the railroads and oil companies involved by S. V. Cortelyou, State Highway District Engineer, and



Left—Placing sand in outer casing from sand hopper. Center—Jetting casing into position. Right—Removing inner jet casing from outer fill.

A. D. Griffin, Assistant District Engineer.

The roadway of the bridge and approaches will be of standard State highway design and will consist of two 35-foot lanes divided by a five-foot strip, with two three-foot sidewalks for maintenance crews.

State Highway contracts for four important structures and over two miles of highway have been let by the Division of Highways with a view to completing the Terminal Island Freeway between Seaside Boulevard and Willow Street. Including the Navy's vertical lift bridge across Cerritos Channel, all portions of the route have been contracted for except a 400-foot strip between Seaside Boulevard and the south approach to the Cerritos Channel Bridge, and a 1,300-foot section on the north side of the channel between Station 44 and Station 57. These two sections will be let by the Navy.

#### CONTRACTS AWARDED

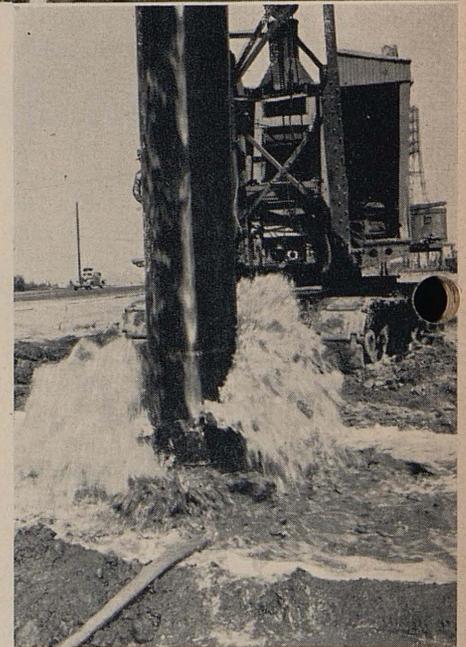
North from Station 57 (toward Los Angeles) Macco Construction Company of Clearwater has a contract with the State for paving about 2.1 miles of the Terminal Island Freeway with asphaltic concrete. This portion extends from Henry Ford Avenue to Willow Street, and will cost \$1,141,080. The work involves 58 acres of clearing and grubbing, 14,500 cubic yards roadway excavation, 23,500 cubic yards structural excavation, 4,700 cubic yards

ditch and channel excavation, 144,000 lineal feet vertical sand drain holes, 16,500 tons sand backfill (drains), 680,000 tons imported borrow, 72,000 tons imported subgrade material, 125,500 square yards preparing Class C subgrade, 290 tons RC-2 liquid asphalt (bituminous surface treatment), 24,000 square yards prepare, mix, and shape surface (bituminous treatment), 540 tons plant mix surfacing, 50,500 tons asphaltic concrete (pavement base), 720 cubic yards concrete in structures, 315 tons gravel backfill, 400 lineal feet rubber water-stops, 410 cubic yards Class C concrete in pipe reinforcement, 34,500 lineal feet chain link fence, 15 gates, 10,520 lineal feet 18-inch to 66-inch reinforced concrete pipe, 50,000 pounds bar reinforcing steel, 35,000 pounds miscellaneous iron and steel, and 145,000 plants for bank protection, pump-house and pumping equipment.

Macco Construction Company was also awarded a contract by the State for constructing an overhead crossing on the freeway over the tracks of the Union Pacific Railway. This structure is located in the City of Los Angeles. The estimated cost is \$599,121.

The project will involve 5,960 cubic yards of concrete, 2,743,000 pounds of structural steel, 1,024,000 pounds reinforcing steel, 53,950 lineal feet of timber piling, 3,224 feet steel piling, and 2,250 feet of steel railing.

At Anaheim Street, the State is constructing a steel overcrossing to carry



Removing outer casing and backfilling with sand. Note displacement of water by sand backfill.

the freeway over the tracks of the Union Pacific, Southern Pacific, and Pacific Electric Railroads. This contract was awarded to the E. W. Elliott Construction Company of Lynwood, on April 18, at \$849,357.

The work involves 9,000 cubic yards of structural excavation, 8,300 cubic yards Class A concrete, 4,049,000 pounds structural steel, 75,160 feet timber piles, 3,770 feet steel piles, 1,622,000 pounds reinforcing steel, and 3,566 lineal feet of steel railing.

Oberg Bros. of Inglewood have contract at \$264,297 for constructing

(Continued on page 29)

# Two Postwar Highway Projects on U.S. 40 in Solano County Are Well Under Way

By P. O. HARDING, District Engineer

**T**HE first two postwar projects to get under way in District X are located on State Route 7 (U. S. Highway 40) between Vacaville and north of Dixon.

The first project from Vacaville to Midway, a distance of 6.02 miles, was advertised for bids to be taken November 28, 1945. The second project, from Midway to 1.3 miles north of Dixon, a distance of 6.13 miles, was advertised for bids to be taken on December 19, 1945. The same contractor was the low bidder on both of these projects.

We, therefore, have 12.15 continuous miles of limited access freeway on nearly straight alignment under construction at the same time by the same contractor, Fredrickson Brothers of Emeryville, California. Each project is approximately the same length. Both projects are under the supervision of the same Resident Engineer, George R. Hubbard. Two major stream crossings are involved on each project with the same representative of the Bridge Department, G. A. Crayton, in charge of major structures. Both sections naturally carry almost identical volumes of heavy traffic requiring concrete pavement construction.

## TWO SEPARATE PROJECTS

In contrast to the many common features of these two projects they are not the same in many respects. The first contract between Vacaville and Midway Corners involves the construction of two new lanes which, with the existing two traffic lanes, will provide a four-lane divided highway. The second contract is on entirely new alignment and involves the construction of the complete four-lane divided highway requiring, in effect, double the amount of construction for the same length of highway.

The first project from Ulatis Creek in Vacaville to the junction with the old original highway east of Vacaville is located in rugged terrain involving the widening of existing heavy cuts and fills. This section of road, some three-quarters of a mile in length, required widening on the northerly side with a center division strip 12 feet in

width. The remainder of this project involves the construction of two new lanes on the southerly side of the existing road with a minimum width of center division strip of 36 feet.

## DIVISION STRIP

For a distance of approximately a mile within this section the two sides of the highway are separated by a division strip of variable width with a maximum separation of approximately 136 feet, this variable spread being caused by the location of a creek in the division strip acting as a natural barrier between the two sides of the road. Pine Tree Creek from the north crosses the existing State highway making a right angle turn to the east paralleling the existing State highway on the southerly side for a distance of approximately one-quarter mile at which point it merges into Horse Creek from the north which continues parallel on the southerly side of the existing road some 0.8 mile before it veers southeasterly away from the highway.

About 700 feet westerly from the latter point another branch of Horse Creek enters it from the north across the existing road, at which point the project calls for the construction of a new bridge over the new two lanes and a channel change located entirely south of the new highway to provide the proper connection with Creek as it angles southeasterly from the project.

## TWO BRIDGES ON PROJECT

The new Horse Creek Bridge has a total length of 86.54 feet consisting of a center span of 23 feet with two 15 foot approach spans on either end, all being constructed on a 45-degree skew. Approximately two miles easterly of Horse Creek the highway crosses Gibson Canyon Creek with a right angle crossing requiring a bridge length of 89.5 feet consisting of three central spans of 19 feet and two end approach spans of 15 feet. Both the bridges are of reinforced concrete construction on reinforced concrete piling of from 25 feet to 30 feet in length.

The second project from Midway Corners east involves the crossing of

two creeks, namely, Sweeney Creek located approximately 1,000 feet easterly of the Midway Corners, and McCune Creek located approximately 1.6 miles east of Sweeney Creek. The twin bridges across Sweeney Creek are at right angles and consist of a 30-foot central span and two end spans of 22.5 feet with an over-all length of each bridge of 77.5 feet. The twin bridges across McCune Creek each involve a 48-degree skew and a total length of 108.35 feet consisting of two central spans of 30 feet with two end spans at 22.5 feet. As with the previous contract these bridges are of reinforced concrete on reinforced concrete piles approximately 28 feet in length.

## RIGHT OF WAY PROBLEMS

The right of way problems on these two projects were quite different. The first project involved the acquisition of a total of 56 parcels of rights of way, 30 of which were required in the additional width required for the two new lanes of highway and 26 of which were required for additional widening to provide a uniform section, and for access rights along the existing highway. With the exception of about one-half mile of access rights at the westerly end of this project on the southerly side of the highway which had been acquired under a previous contract for constructing the highway through Vacaville it was necessary to acquire all of the access rights on both sides of this project.

In contrast to this, the right of way on the second project from Midway Corners to 1.3 miles north of Dixon involved very minor acquisition of access rights at a few county road intersections only. This section being on new location throughout, there was no existing road where full frontage usage had prevailed prior to the construction of this project. On the other hand the 160-foot width of right of way of this project did involve very complicated severance problems on relatively large holdings of property. There were but 20 parcels of right of way on this project but the acquisition required the complete study and analysis of the in-



Vibrator spreader attached to tamping and kneading machine. Operator is backing up header where key is attached

fluence of the new highway on the complete farming operations of each of these properties involved.

#### BIG TRAFFIC INCREASE

The traffic on U. S. Highway 40 per the monthly counts at given stations throughout the district increased 136.5 per cent in June of 1946 as compared to June of 1945 which was prior to V-J Day. Prior to the war, 1941 traffic represented the peak on this route. The traffic in June of the respective years showed a steady decline to 1945 at which time the traffic was approximately 57.5 per cent of the 1941 peak. In contrast the June traffic of 1946 is 35 per cent above the 1941 prewar peak. It is believed that this is a condition generally prevalent throughout the State on our entire highway system but a check of all the district stations compared to our 1945 June counts indicates an average of a 70 per cent in-

crease as compared to the 136.5 per cent of this particular route.

The first project effects no saving in distance, but the second will involve a saving over the existing route of one and one-third miles for over 10,000 vehicles per 16-hour day at the present time. The basis of design is 2,500 vehicles per hour for mixed truck and automobile traffic for speeds of 60 miles per hour. This traffic peak should be reached by the year 1970.

#### PRESENT HIGHWAY INADEQUATE

The present two-lane road has been carrying traffic far in excess of its capacity for many years prior to the war. While total traffic during the war dropped off the volume of heavy truck traffic increased steadily. It now represents approximately 20 per cent of the total volume of traffic. It is rather amazing that speed checks taken on the two-lane highway in 1941 at two places

within the limits of these sections showed average speeds of over 46 miles per hour.

The economic evaluation of time is difficult of exact analysis. Heavy dump trucks have operated rental rates in excess of 6 cents per minute. The minimum labor rate is in excess of 1½ cents, the average in excess of 2 cents per minute. Overtime labor rates are from 1½ to 2 times these figures, but it is doubtful if the average person off the job, particularly if on recreation places any value on his or her time. If we evaluate the time of the driver only and each vehicle, it is believed a value of 1½ cents per minute for all vehicles using this route can be substantiated.

#### ANNUAL SAVING HIGH

The total cost of the first project including preliminary and construction engineering, right of way and construction will approximate \$725,000.

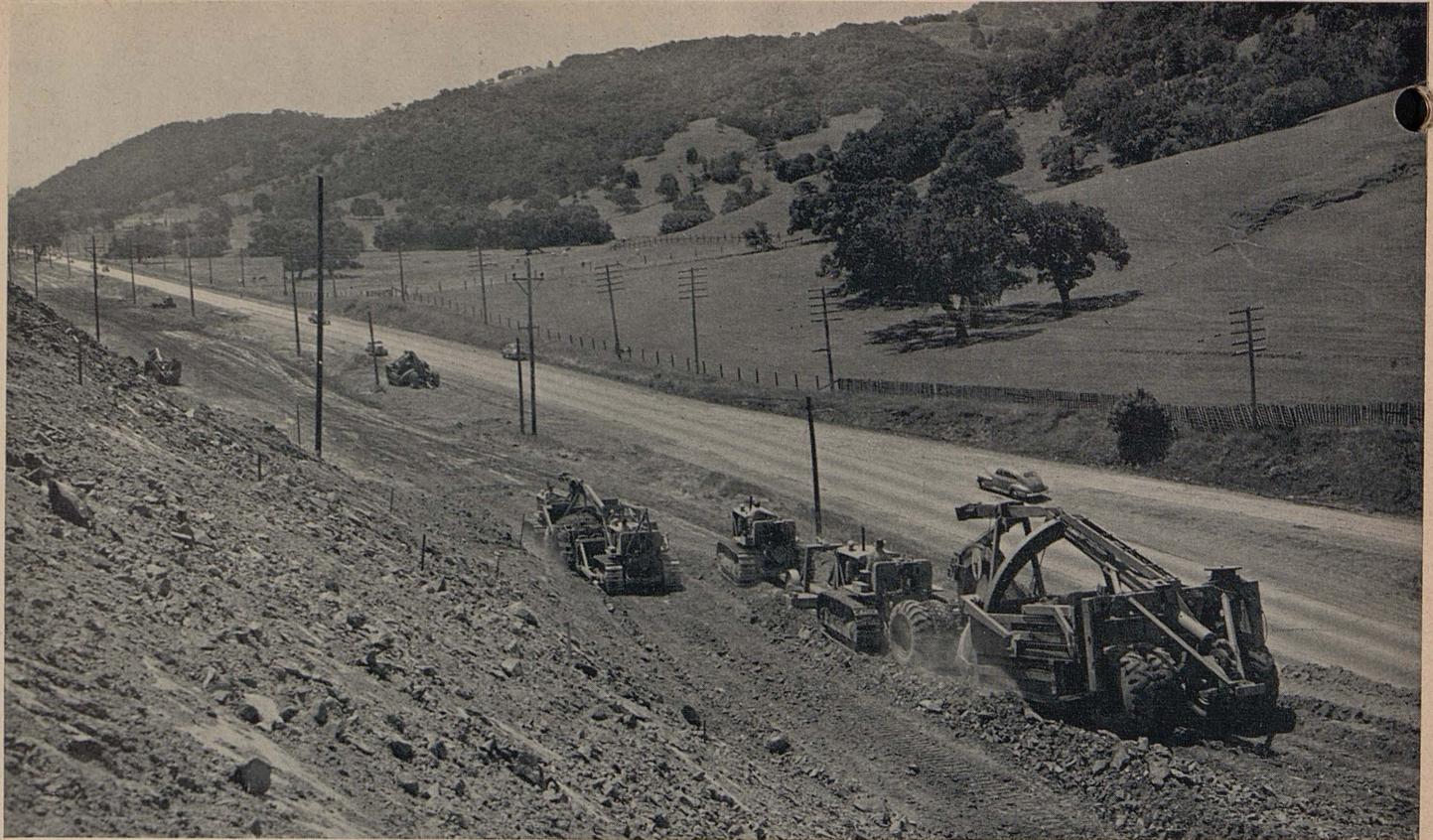
(Continued on page 25)



Cut widening at the south end of the project near Vacaville

Construction crew is placing headers while traffic is using the existing road





Tractor and carryall combination excavating cut. This view is looking south

# NEW REDWOOD HIGHWAY PROJECT

By R. P. DUFFY, District Construction Engineer

**T**HE Redwood Highway (U. S. 101) serving the Northern California coast counties is being converted into a four-lane limited access freeway between Ignacio and Petaluma in Marin and Sonoma counties for a distance of 11.8 miles.

The present road between these points consists of a two-lane 20-foot Portland cement concrete pavement on a 38-foot roadbed.

Studies for the expansion of this highway developed that the new line should be laid to cause the least interference with the heavy traffic using the present road during construction as well as to cause the least property damage and to most economically traverse the topography of the country within the limits of the project.

To accomplish this, a portion of the new construction lies to the west of the present road and a portion lies on the easterly side thereof.

Additional right of way width was necessary for this purpose and in such acquisitions, only limited access to the roadway was permitted in the deed transferring the property to the State, thereby reducing the points of access to the roadway from adjacent properties to a minimum.

Through the town of Novato considerable movement of business and residential buildings was necessary to clear the right of way for the improvement. Elsewhere along the route, occasional moves of farm buildings or roadside establishments were necessary while the facilities of the public utilities required relocation throughout most of the length of the project.

A portion of the work crosses some of the marshland areas of northern Marin County where soft foundations are encountered. In these areas provision has been made for placing overloads of earth on the roadway embank-

ments to accelerate settlement, such overloads being left in place until the project is ready for paving. The overloads which are from two to five feet above profile grade are then removed and the material therefrom used to flatten the embankment slopes.

The new roadway will be paved with Portland cement concrete 23 feet in width and will be separated from the existing roadway by a 39-foot division strip over the major portion of the project.

Improved shoulders of crusher run base and armor coat surfacing three feet wide will be constructed adjacent to both sides of old pavement.

Crossovers between the two roadways are to be located at strategic points along the route as well as at the principal street crossings in the town of Novato which is bisected by the highway.



Woolridge Terra-Cobra scrapers excavating cut. The relation of the present road to the new construction is shown

The construction of two reinforced concrete bridges, one over Novato Creek in Marin County and one over

San Antonio Creek at the Marin-Sonoma County Line are included in the contract.

Base reinforcing to be placed under the concrete pavement is being produced locally on the job from material

(Continued on page 28)

Link Belt power shovel and trucks excavating rocky material from cut. This view is looking north





Engineer's sketch of Fifth Avenue Overhead, initial unit of the East Shore Freeway in Oakland, now under construction. The overhead structure carries the tracks of the Western Pacific Railroad, the tracks of the Southern Pacific Company, and finally Fifth Avenue. After an easy descent, the overhead structure will cross over the tracks of the Southern Pacific Company and, finally, Fifth Avenue.

PROGRESS has been resumed on the extension of the East Shore Freeway southeasterly through the City of Oakland in Alameda County. The section upon which construction has started will extend from Oak Street, between Fifth and Sixth Streets, to 0.3 mile south of High Street, near Alameda Avenue, a distance of 3.7 miles.

The Fifth Avenue Overhead is the initial unit in this section of the East Shore Freeway. A contract was awarded June 21st for the construction of a six-lane overhead structure 2554 feet in length together with appurtenant tracks and roads at an estimated cost of \$1,692,897. The overhead structure will start about 0.2 mile east of Oak Street. Going easterly on a gradually rising grade, it will cross over in succession, the Lake Merritt Canal, the tracks of the Western Pacific Railroad,

## Fifth Avenue Overhead on East

By JASON PLOWE, Assoc.

the tracks of the Southern Pacific Company and, finally, Fifth Avenue. After an easy descent the overhead will reach street level at a point between the Southern Pacific tracks and Oakland Inner Harbor opposite Eighth Avenue.

### DESCRIPTION OF ROUTE

State Highway Route 69, known as the East Shore Freeway, when completed, will connect Richmond on the north with San Jose on the south. A major portion of the route will be a modern, limited access, divided highway. On the section from Oak Street

to High Street there will be three large, overhead structures across railroad tracks and streets. In addition there are planned three structures carrying important city streets over the freeway.

There will be no crossing of freeway or railroad traffic at the same level, and pedestrians will not be permitted on the highway. The result will be that a large volume of traffic will flow over the route with speed and safety. It is estimated that in excess of 45,000 vehicles per day will use this first section even though it is only a portion of a much larger project. Its true poten-



Overhead structure starts 0.2 mile east of Oak Street, going easterly on a gradually rising grade, crosses over in succession the Lake Merritt Canal, the Southern Pacific tracks, and the Oakland inner harbor opposite Eighth Avenue. At the end of the structure, the overhead will reach street level at a point between the Southern Pacific tracks and the Oakland inner harbor opposite Eighth Avenue.

# East Shore Freeway is Started

E. J. ... Associate Bridge Engineer

...tialities will not be realized until more of the route is completed.

Traffic using the freeway will have been drawn from other existing routes, which in turn will assist in relieving the traffic congestion on these routes. Provision is being made to care for local as well as through traffic in the over all planning of the project.

A portion of the route from Richmond to the approach of the San Francisco-Oakland Bay Bridge is now in progress. It will be extended south from Oakland as succeeding contracts are awarded for its construction.

## DIMENSIONS OF STRUCTURE

In its almost half-mile of length, the Fifth Avenue Overhead will carry six traffic lanes, three in each direction, to a clear height of 22 feet 6 inches over four main line railroad tracks and three streets. Two 38-foot roadways with a 4-foot central division strip and 1-foot 9-inch safety curbs are to be built. Provision is made for the construction of additional lanes on the outside of the present lanes at such time as increased traffic demands. Change in horizontal alignment is

made by a 2,000-foot radius curve, and a 1,550-foot vertical curve carries the structure gracefully over its highest points.

## DESIGN FEATURES

Two factors, in general, governed the selection of type of structure to be used. The first was the type of foundation material found over the entire site, consisting of nominal depths of fill overlying many feet of unstable mud. This made piling necessary to reach stable material and support the footings. An economical structure in this case is the lightest structure consistent with structural requirements.

The second factor considered was the numerous spans over railroad tracks. A type requiring no falsework will offer the least hindrance to railroad traffic. In addition, a minimum depth of supporting girders is an

(Continued on page 31)

# Garcès Circle - Memorial to a Pathfinder

By H. F. BRIGGS, Assistant District Office Engineer

PROBABLY few of the thousands of motorists traveling through Bakersfield, Kern County, and gazing for the first time at the 25-foot statue located in the center of the traffic circle on U. S. Highway 99 at its intersection with Chester Avenue, realize that the limestone figure perpetuates the memory of the friar reputed to be the first white man to visit the site of the present City of Bakersfield.

His name was Fray Francisco Hermenegildo Garcès. The traffic circle constructed by the Division of Highways in 1933 has been dedicated to him and is known as Garcès Circle. The imposing image of the Franciscan missionary priest is the culmination of the efforts of the Native Sons and Daughters of the Golden West, the Knights of Columbus, the Kern County Historical Society and others to honor and perpetuate his memory. The sculptor was John Palo-Kangas, a southern California artist.

The statue was dedicated on May 7, 1939, the anniversary of Garcès' first crossing of what is now known as Kern River. This crossing took place 170 years ago, at a time when another band of pioneers was struggling on the Atlantic Seaboard, to found a new Nation.

## RECORD OF PADRE'S TRAVELS

Fr. Garcès left the record of his missionary travels in the form of diaries which reveal the enthusiasm of the explorer along with the crusading zeal of the missionary. He records the incredible 2,000-mile journey from New Mexico to the Southern San Joaquin Valley. The trip was made on foot and except for an Indian companion and a pack mule, was a solitary pilgrimage.

Garcès was a contemporary of the better known Junìpero Serra, founder of California's chain of Franciscan Missions, one being educated at the missionary college at San Fernando at Mexico City, the other at a sister college of Santa Cruz at Querètaro. Garcès was a member of the St. Xavier Mission in Sonora, Mexico. He was associated with Juan Batista da Anza, who

founded the first Spanish settlement in San Francisco. He did not, however, participate in the latter work, having separated from the main expedition at Yuma.



Statue of Frey Francisco Hermenegildo Garcès

Convinced that Monterey and the city now known as San Francisco could be more easily reached than by the exhausting trip along the coast, he set out to find the route. Unfortunately he failed to reach the easy outlet from the valley to the coast via Pacheco Pass. The White River in southern Tulare County marked the northernmost extent of his California travels.

## SEASONED EXPLORER

Garcès was a seasoned explorer, having made long trips of discovery in the region adjoining the Colorado River. He was also one of the first white men to reach San Gabriel overland from missions farther south.

Accompanying Father Garcès on his trips into the south San Joaquin Valley was a Mojave Indian by the name of Sebastiàn Tarabal, known as "El peregrino" because of his exten-

sive travels. Originally from Baja California, Tarabal had been taken to Mission San Gabriel from which he had run away, crossed the Colorado Desert and reached Altar in Sonora, Mexico.

Leaving San Gabriel on April 9, 1776, Garcès, Tarabal and several Indian guides proceeded to San Fernando. The following year, a mission was established at this location. From here the party crossed Newhall Pass to the region of Castaic where a delay was incurred due to illness of one of the Indians. Father Garcès used the wait as an opportunity to carry on missionary work among the neighboring rancherías. The conversion to Christianity of one of the Indian Chiefs resulted.

## ENTERS SAN JOAQUIN VALLEY

The exact point at which Garcès entered the San Joaquin Valley is uncertain as the record in Garcès diaries is not entirely clear on the point. He called the mountains now known as the Tehachapi, the Sierra de San Marcos and evidently journeyed northward toward this chain. It is believed that he descended into the valley via Cottonwood and Tejon Creeks visiting an Indian Villiage in the vicinity of what later became the Tejon Ranch. Garcès referred to it as the Rancheria de San Pasquale and used it as a sort of headquarters for his operations. The Indians were of a tribe now identified as the Kit-anemuk and at first feared the white man, which is considered evidence that they had had unfortunate previous contact with other white men, presumably Spanish soldiers.

Father Garcès soon won their confidence and greatly impressed them with his missionary hymns, prayers and reciting of the Rosary. He found during the rest of his journey that his fame had preceded him. His later dark skinned hosts clamored for songs and prayers and even attempted to bargain with him for his crucifix, believing it to have magic powers.

Anxious to pursue his quest for a new route to Monterey he urged his



Traffic circle on U. S. Highway 99 at its intersection with Chester Avenue in Bakersfield. Statue of Father Garcès in center of circle

Indian guides to continue with him. However, his recent hosts warned that Indian tribes to the north, now identified as the Yokuts, were unfriendly. Tarabal and the Mojaves refused to go on. Finally an old Yokuts tribesman who had married a Kitane-muk woman, volunteered to act as guide. The journey was resumed on April 27. The first contact with the supposedly unfriendly Indians proved their evil reputation to be unfounded.

Garcès reached the Kern River near the mouth of the canyon, some 14 miles northeast of Bakersfield. Greatly pleased with its clear waters he christened it "Rio de San Felipe." It is of interest to know that Kern River has had two other names. One of Indian derivation was Posuncola, the other was a local designation known as Rio Bravo. The modern name, as is well known, honors Edward M. Kern, the topographer who accompanied John C. Fremont on his second California expedition in 1845.

#### WELCOMED BY INDIANS

Dissuaded by his guide from attempting to cross the river, now swollen and turbulent, Garcès journeyed downstream to a rancharia where he was welcomed by the Indians and found that it afforded a safe place to cross. He tried to persuade the Indians to make a raft but was unable to convey this idea effectively. Finally after much argument as to

the amount of clothing to be worn, the priest was carried across, clad only in his undergarments, by four Indians. His diary records his enjoyment of his bath in the river.

Pressing on along the foot hills on the east fringe of the valley he reached another river which he named the Rio de Santiago. This was probably Poso Creek. Here he found another rancharia. His old guide, unable to continue over the steep hills, left him. Securing another, Garcès continued to an Indian village in the vicinity of Woody. His diary states that the Indians at this village were bearded. The next day's march brought him to the vicinity of the present southerly boundary of Tulare County and White River, which he called Rio de la Santa Cruz.

#### FIRST CHRISTIAN BURIAL

Temporarily resting at a rancharia of some 150 Indians, Garcès received visitors from neighboring rancharias and carried on the work of his priestly offices. He administered the sacrament to a dying little Indian boy and gave a piece of cloth of gold from his meager supply of bargaining gifts for the child's shroud. This was undoubtedly the first Christian burial in the south San Joaquin Valley.

Garcès by this time had exhausted his store of presents and was compelled to turn back as the Indians refused to provide him with a guide.

They thought by this means they could persuade him to remain with them. The ruse failed and when he boldly set out again on his way south, guides hastily followed him. They accompanied him to the vicinity of Poso Creek. This time he crossed the creek farther up in the hills and his guides, fearing bears which they claimed were there, left him. Garcès traveled all night through the rugged and lonely hills.

The priest reached Kern River farther upstream than he had been before and followed the river downstream to the rancharia he had first visited. The Indians directed him to a point still further downstream where he learned he could cross dryshod. The friar's diaries furnish a description of this spot which unmistakably indicates it to be the present site of Bakersfield. He mentions a commanding bluff later to be known as Kern Mesa. This area is now reached by a winding drive called the China Grade, from the early day Chinese vegetable gardens at its foot. It is rapidly developing into a fine residence district.

#### INDIANS CELEBRATE RETURN

The river divided into two forks forming what was once known as Kern Island, south of Bakersfield. This island is so designated on old Kern County maps. At the river fork Garcès found a large Indian Village

(Continued on page 32)

# Highways Under Construction in District VIII Total \$3,500,000

By CLYDE V. KANE, Senior Highway Engineer

**U**NDER the Postwar Highway Construction Program, District VIII has highways under construction in San Bernardino and Riverside Counties on three State highway routes. This work is being done under five separate contracts at a total cost of \$3,500,000.

## HIGHWAY 99, ONTARIO-TO-COLTON

The Ontario-to-Colton freeway is for the most part being constructed on new rights of way parallel to and separate from the existing highway. An economic study of loss of investment versus cost of access rights dictated the necessity for the new location in lieu of expanding existing facilities. It was found less costly to build on a new location rather than acquire numerous established access rights, move back the wayside improvements, and widen the existing pavement.

It has been possible to close some of the cross streets. A grade separation is being constructed on one, and rights of way sufficient for future separation



Cedar Avenue separation structure across the Ontario-to-Colton Freeway under construction

structures and ramp facilities have been acquired on the remainder.

Design provides for four 12-foot concrete lanes with bituminous surfaced shoulders and an 86-foot dividing strip.

Future expansion can be accomplished by constructing two lanes in the center.

A feature of the project is a requirement in the specifications providing that three inches of the subgrade immediately below the pavement be bituminous treated. Saturated subgrade material is commonly forced out at the pavement joints by the rocking action of the pavement slabs functioning as a diaphragm pump activated by moving traffic loads. The more material that is lost at the joints the more vigorous the pumping action becomes, which contributes to an accumulative pavement deterioration. The subgrade treatment is intended to prevent "loss of material" at the joints, thereby eliminating the deterioration of the smooth-riding qualities of concrete pavement. The contractor has elected to pre-mix this material in a continuous-mixer type of asphalt plant after crushing all material to minus three-quarters inch. The cost of the crushing and pre-mixing, in lieu of the cheap road-mixing of pit-run material, was

Concrete paving on bituminous treated subgrade on the Ontario-to-Colton Freeway





Redlands project showing old road on right and grading for new 4-lane highway construction on left

absorbed by him to avoid the difficult factors involved in preparing an accurate subgrade using road-mixed material.

The section from Ontario to Etiwanda Avenue, a distance of 5.7 miles, is under contract to Matich Brothers at a cost of \$478,000. The Resident Engineer is J. M. Cowgill.

Between Mulberry Street and Colton, a distance of 9.8 miles, the work is being done by the Griffith Company under a \$1,387,000 contract. The Resident Engineer is Berndt Nelson.

Between Etiwanda Avenue and Mulberry Street, a distance of one mile, the work is being deferred pending negotiations with the Southern Pacific Railroad Company. In this section, a railroad separation structure and a structure providing separation of distributing traffic lanes connecting to the highway are to be constructed. The estimated cost of the section is \$600,000.

This hazardous curve at the bottom of a long, steep grade in Redlands is eliminated





Drilling rock prior to excavating roadway cut near Mira Loma

### HIGHWAY 99 IN THE CITY OF REDLANDS

The Redlands highway work extends from State Street near the center of the city to the east city limits. The construction expands the modern existing two-lane highway but deviates from the route of an old city street now being used, by a change avoiding two sharp curves that could not be flattened.

Access rights have been acquired throughout except for the portion being constructed on an existing city street of three blocks. The plans provide for four lanes of concrete pavement with bituminous shoulders and a dividing strip.

This project covering a distance of 2.8 miles is under contract to Match Brothers at a cost of \$310,000. J. M. Hollister is Resident Engineer.

### HIGHWAY 60, POMONA-TO-RIVERSIDE

Work is being continued on the Pomona-to-Riverside highway planned with four-lane divided construction having limited access rights of way acquired along existing and new location.

The portion at present under construction between Mira Loma and a point  $2\frac{1}{2}$  miles west of Riverside will have bituminous plant-mix surfacing placed on a cement-treated subgrade. Disintegrated granite material of an excellent quality for this subgrade is being produced from within the roadway excavation prisms.

The work, covering a distance of 5.9 miles, is under contract with George Herz, Contractor, at a cost of \$633,000. E. A. Bannister is Resident Engineer.

### CITY CREEK ROAD

The City Creek Road to provide an alternate route for the rapidly increasing recreational traffic to the San Bernardino mountains is to be constructed in several units. The first unit, from Highland Avenue near Patton to the City Creek Bridge, is now being constructed on new rights of way acquired with limited access.

This project, providing for two-lane bituminous surfacing on a 26-foot roadbed with 300-foot minimum radius curves, is considered an exceptionally high standard recreational road for the precipitous terrain traversed. Roadway excavation for the 3.2 miles distance will require moving 486,000 cu. yds. of rock and cemented material. In addition, some slide removal is anticipated.

The contract provides for the construction of numerous concrete and new design metal bin-type retaining walls. Also provided is a 430-foot reinforced concrete arch bridge. The high embankment slopes will be protected from erosion by the incorporation of brush mats in the outer five feet and the ample provisions for planting and seeding.

The work is under contract to the Denni Investment Corporation at a cost of \$652,000. Wayne Crawford is Resident Engineer.

### Illegal Tree Cutting Brings Stiff Penalty

IT doesn't pay to cut down trees on State highway rights of way without permission, as Fil Gianatti, owner of Connelley's Inn at Bijou, Lake Tahoe, will attest.

The Division of Highways has received a check for \$1,500 from Gianatti in settlement of a suit for damages brought by the division after Gianatti had ordered the cutting down of 56 tamarack and 85 pine trees which lined the highway in front of Connelley's Bijou Inn.

According to State Highway Engineer George T. McCoy, Gianatti requested permission to remove the trees, was refused, and on November 7th last instructed his manager, H. R. Pace, to cut them down. McCoy said that the destroyed trees will be replaced with new plantings at a cost of \$4 per tree which will be paid for out of the check received today from Gianatti.

"Protection of trees within State highway rights of way is vested in the Department of Public Works by law," McCoy said. "It is the policy of the Division of Highways to protect for beautification purposes trees and shrubbery either of natural growth or by planting by the division and in accordance with this policy Mr. Gianatti was refused a permit to destroy the trees involved in the suit which was instituted by the Legal Division of the Department of Public Works. We hope the penalty assessed against Mr. Gianatti will deter others from illegal cutting or defacing of trees growing on State-owned highway property."

Bobby—"Pop, what is woman's intuition?"  
Father—"Son, I think it's about three-fourths suspicion."

### BUS SERVICE SWEDEN-SWITZERLAND

According to reports from Stockholm, regular bus service between Sweden and Switzerland has been inaugurated. Two and one-half days are required for the one-way trip.

# Work of Division of Highways

(Continued from page 1)

on the southerly portion of the improvement.

Development of the Balboa Park Freeway in the City of San Diego on the inland route to Riverside, progressed through the award of seven contracts, six of which provided for nine grade separation and bridge structures and one for roadway grading and paving. Two additional contracts for highway grade separations are now pending award.

A start also was made in developing the northerly end of the Santa Ana Parkway in Los Angeles through the letting of six contracts including four major grade separations.

One of the larger single contracts awarded, provides for the construction of a million and a half dollar bridge across the Feather River between Marysville and Yuba City on U. S. 99 E. Construction of this bridge and its approaches in the two cities was planned for 1942, but the improvement was deferred by wartime restrictions.

Another important development in the Sacramento Valley is the construction of the North Sacramento Freeway U. S. 40. This project connects with the viaduct at the north end of the Sixteenth Street Bridge which was completed early in the war years and will provide a modern freeway approach to Sacramento from the east and north.

The rerouting of U. S. 40 in the city of Auburn in Placer County, including three major grade separations, also is under construction and further improvement to U. S. 40 is under way by two large contracts located between Vacaville and a mile north of Dixon. This latter construction continues the four-lane divided standards begun before the war from the Yolo Causeway to Dixon on the route between the San Francisco Bay area and Sacramento.

Development to four-lane arterial standards on sections of U. S. 99 in San Bernardino County, between Colton and Redlands and on U. S. 60 west of Riverside in Riverside County were also features of the department's construction activities for the year.

In Marin and Sonoma Counties, that section of the Redwood Highway between Ignacio and Petaluma is being developed to modern divided arterial standards, as are sections of U. S. 101 in Monterey County, in the vicinity of

Salinas and in Santa Barbara County northerly of the City of Santa Barbara.

Similar divided arterial development is under way to several sections of the Valley Route (U. S. 99) in Kern, Fresno, Merced and San Joaquin Counties.

While not a part of the State's postwar program, nevertheless an appreciable portion of the Division's current construction activity is the building for the U. S. Navy of the \$6,000,000 Federal Access approach to Terminal Island at Long Beach in Los Angeles County.

**The work of the Division on the State Highway System during the first postwar year marks an excellent start on the rehabilitation of the State's highways. The program, and it is a large one, has, however, only scratched the surface in meeting the needs of traffic. If these needs are to be met, construction and reconstruction must be continued on similar State-wide scales in the years ahead. To accomplish this end, adequate provision must be made for the ample financing of such future programs.**

For many months prior to the end of the war, Division of Highways engineers bent every effort possible, in the face of the heavy wartime access construction for Federal agencies, toward preparation of plans and specifications for projects included in the postwar program.

This preparation made possible immediate action as soon as Federal approval was received for the first postwar year's program. The approval by the Public Roads Administration was received on October 29, 1945, and the Division of Highways issued the first calls for bids on projects included in the program on November 9, 1945.

Between that date and June 30, 1946, bids for highway construction and repair were opened on 170 projects which, including construction items, right of way and construction engineering, amounted to a value of approximately \$53,000,000. By June 30, 1946, 153 contracts with a value of \$50,000,000 had been awarded by the department.

**While this progress in placing the postwar highway program under construction covered only seven months, it accounts for nearly 80 per cent of the contracts awarded during the entire fiscal year.**

## Message from Madrid

THE FOREIGN SERVICE  
OF THE  
UNITED STATES OF AMERICA

American Embassy,  
Madrid, Spain,  
June 11, 1946

Mr. Kenneth C. Adams, Editor,  
California Highways and  
Public Works,  
Sacramento, California

Dear Mr. Adams: It was very kind of you to send the California Missions series of your magazine. I have been away from California since 1941 and I assure you it was like a breath of heaven to me to see all those beautiful photographs, not only of the Missions but of the highways and the beloved familiar landscapes.

Your Mission articles are splendid and the up-to-date pictures were of great interest here. We had a series of slides made, copying several of your photographs. I gave three lectures in Spanish and one in English, showing the illustrations each time. While I hated to part with the magazines, I have given them to the permanent collection of the Casa Americana Library. This institution is an adjunct of the American Embassy in Madrid, open to free use by Spaniards who are studying English or wish information about the United States.

There is great interest here in American engineering methods. If it would be feasible for you to send the magazine regularly to the Casa Americana it could be circulated from there to the libraries of the University and the Engineering School.

Again thanking you,  
Very sincerely,

Marion Parks

"Darling Daisy," wrote Clem to his beloved, "I would swim the mighty ocean for one glance from your dear eyes. I would walk through a wall of flame for one touch of your little hands. I would leap the widest stream for one word from your lovely lips. As Always, your Clem."

"P. S.—'I'll be over Saturday night if it doesn't rain."

"Say, do you realize you have your wedding ring on the wrong finger?"

"Yes. I married the wrong man."

# California Construction Program For Second Postwar Year Approved

**C**H. PURCELL, Director of Public Works, and Chairman of the California Highway Commission, informed the commission at its meeting on July 18th that he had been notified by G. T. McCoy, State Highway Engineer, that the \$46,000,000 State highway construction program for the second postwar year was approved in Washington by Thos. H. MacDonald, U. S. Commissioner of Public Roads on July 15, 1946.

This construction program, adopted by the Highway Commission, is designed to continue the postwar rehabilitation and development of the California State Highway System which was begun last November under the program for the first postwar year which was adopted by the commission on September 24, 1945.

Projects included in the program involve work located in 35 of the 58 counties and provides for all types of construction including grading, surfacing, paving on nearly 240 miles of State highway and the construction of some 30 major bridges. The program also provides for numerous grade separation structures as units of proposed metropolitan area freeways.

As practically all of the projects included in the program for the first postwar year are under way, the Division of Highways expects to start advertising for bids on the projects of the second year program immediately.

Since November of last year, contracts have been awarded for State highway construction projects amounting in cost to approximately \$50,000,000.

The projects for the second postwar year are listed in the following table:

County	*Route	Description	Miles	County	*Route	Description	Miles
Alameda	SR 17	6th and Oak Streets to High Street in Oakland (portions), grade, pave and structures	3.3	Orange	SR 18	Santa Ana Canyon Road, Peralta to Olive Cutoff, grade and surface	4.5
El Dorado, Placer	SR 49	North Fork American River, bridge and approaches	0.2	Orange	Alt		
Fresno	US 99	¼ mile south of Fowler to Calwa Overhead, grade and pave	7.3		US 101	Laguna Beach to Dana Point (portions), grade and pave	4.9
Fresno	SR 41	Shields Avenue to Herndon Avenue, grade, pave and structures	4.0	Placer	SR 49	Junction new Route 37 in Auburn to U.S. General Hospital, grade, surface and structures	3.5
Humboldt	SR 96	Klamath River at Weitchpec, bridge and approaches	0.6	Placer, El Dorado	SR 49	North Fork American River, bridge and approaches	0.2
Imperial	US 80	At New River, bridge and approaches	12.9	Riverside,			
Imperial	US 99	El Centro to Brawley, grade, pave and structures	2.2	San Bernardino	US 60	0.8 mile east of Ontario to Mira Loma, grade, pave and structures	6.4
Imperial	US 99	At San Felipe Wash, bridge and approaches	2.2	Riverside	SR 111	Whitewater Point to 0.5 mile north of Palm Springs, grade, surface and structures	5.5
Inyo	US 6	Five Mile Canyon, grade, surface and structures	3.5	Sacramento	SR 24	Three Mile Slough, bridge and approaches	---
	US 395		6.7	San Benito, Monterey	US 101	0.8 mile north of Crazy Horse Summit to Chittenden Road, grade, surface and structures	6.7
Kern	US 99	Bakersfield to Snow Road, grade, pave and structures	1.6	San Bernardino,			
Kern	US 99	Cawelo to Famoso, grade, pave and structures	2.2	Riverside	US 60	0.8 mile east of Ontario to Mira Loma, grade, pave and structures	6.4
Kern	US 6	Ricardo to Freeman Station (portions), grade, surface and structures	9.0	San Bernardino	SR 18	1.2 miles east of Victorville to Victorville, grade and surface	1.2
Kern	US 6	Indian Wells Canyon, grade, surface and structures	10.2	San Diego	SR 94	At Dulzura Creek, bridge and approaches	---
Kern	US 466	Mojave to Muroc Junction, grade and surface	---	San Joaquin	US 99	Junction Mariposa Road south of Stockton to Calaveras River and Wilson Way to Route 4 (portions), grade, pave and structures	7.2
Kern	US 466	Keene to Tehachapi, grade, surface and structures	---		US 50		---
Kern	US 466	Three overflow bridges between Buttonwillow and Enos Lane, replace with culverts and fills	23.4	San Joaquin	US 50	San Joaquin River bridge at Mossdale	---
Kern, Tulare	SR 85	Route 4 to Ducor, grade, surface and structures	9.0	San Luis Obispo	US 101	San Luis Obispo to Cuesta Grade, grade and pave	2.7
Lake	SR 29	Kelsey Creek at Cobb, bridge and approaches	4.1	San Luis Obispo	SR 41	Santa Rosa Creek, Black Mountain Creek, and Rocky Creek, bridges	---
Los Angeles	US 101	Aliso Street to Vermont Avenue (portions), grade, pave and structures	4.2	San Mateo	Bay Shore Freeway	0.3 mile south of S.P. Underpass to Broadway in Burlingame, grade, pave and structures	4.6
Los Angeles	US 101	Vermont Avenue to Highland Avenue (portions), grade, pave and structures	1.6				
Los Angeles	US 101	Barham Overpass to Vineland Avenue, grade, pave and structures	0.7	Santa Barbara	US 101	Sheffield Drive to San Ysidro Road, grade, pave and structures	1.3
Los Angeles	19	Route 77 to Pomona, grade and pave	4.2	Santa Barbara	US 101	Las Varas Creek to one mile east of El Capitan Creek, grade, pave and structures	2.9
Los Angeles	Alt		1.2	Santa Clara	SR 17	Bascom Avenue to Park Avenue, grade and pave	1.3
	US 101	Latigo Creek Canyon to Malibu Creek, grade, pave and structures	3.4	Shasta	US 99	South County Boundary to Clear Creek, surface and structures	10.7
Los Angeles	SR 2	Angeles Crest Highway, grade and surface	3.4	Shasta	US 299	Shasta to Schilling, grade, surface and structures	4.6
Los Angeles	US 6	Adobe Street to Fifth Street (portions), grade, pave and structures	0.8	Shasta	US 299	Sacramento River at Redding, bridge and approaches	1.3
Marin	US 101	At Linden Lane in San Rafael, grade separation and approaches	2.5	Siskiyou	US 99	Camp Lowe to Bailey Hill, grade separation and bridge	---
Mendocino	US 101	Red Mountain Creek to Piercy, grade, surface and structures	0.1	Solano	90	Route 7 to 0.5 mile north of Sweeny Creek, grade, pave and structures	5.7
Mendocino	US 101	Northwestern Pacific Railroad to Underpass, grade and surface	2.6	Trinity	US 299	East Weaver Creek, bridge and approaches	---
Mendocino	SR 28	At Lost Creek and Red Bank Creek, bridges and approaches	0.1	Tulare, Kern	SR 65	Route 4 to Ducor, grade, surface and structures	23.4
Mendocino	SR 1	Mitchell and Hare Creeks and Noyo River, bridges and approaches	0.8	Tulare	132	Packwood Creek to Route 10, grade and surface	2.3
Modoc	US 395	South Fork of Pit River, bridge and approaches	2.6	Tuolumne	SR 108	Stockton Street entrance to Sonora, Solinsky Street to Washington Street, grade, surface and structures	0.4
Modoc	US 395	Junction with Route 28 to State Line (portions), grade and surface	2.6	Ventura	US 101	Ventura Avenue to S.P. Overpass, grade and pave	1.0
Mono	111	Grant Lake to Route 23, grade and surface	0.9	Ventura	US 101	El Rio to Ventura, grade and pave	---
Monterey, San Benito	US 101	0.8 mile north of Crazy Horse Summit to Chittenden Road, grade, surface and structures	3.8				
Nevada	SR 49	1.5 miles north of Rattlesnake Creek to Grass Valley, grade and surface	0.9				
Orange	US 101	Doheny Park to San Juan Creek, grade and pave					

\* Unless designated as a U. S. Route or State Sign Route, route number is a State Route.

# Two Postwar Highway Projects on U.S. 40 in Solano County

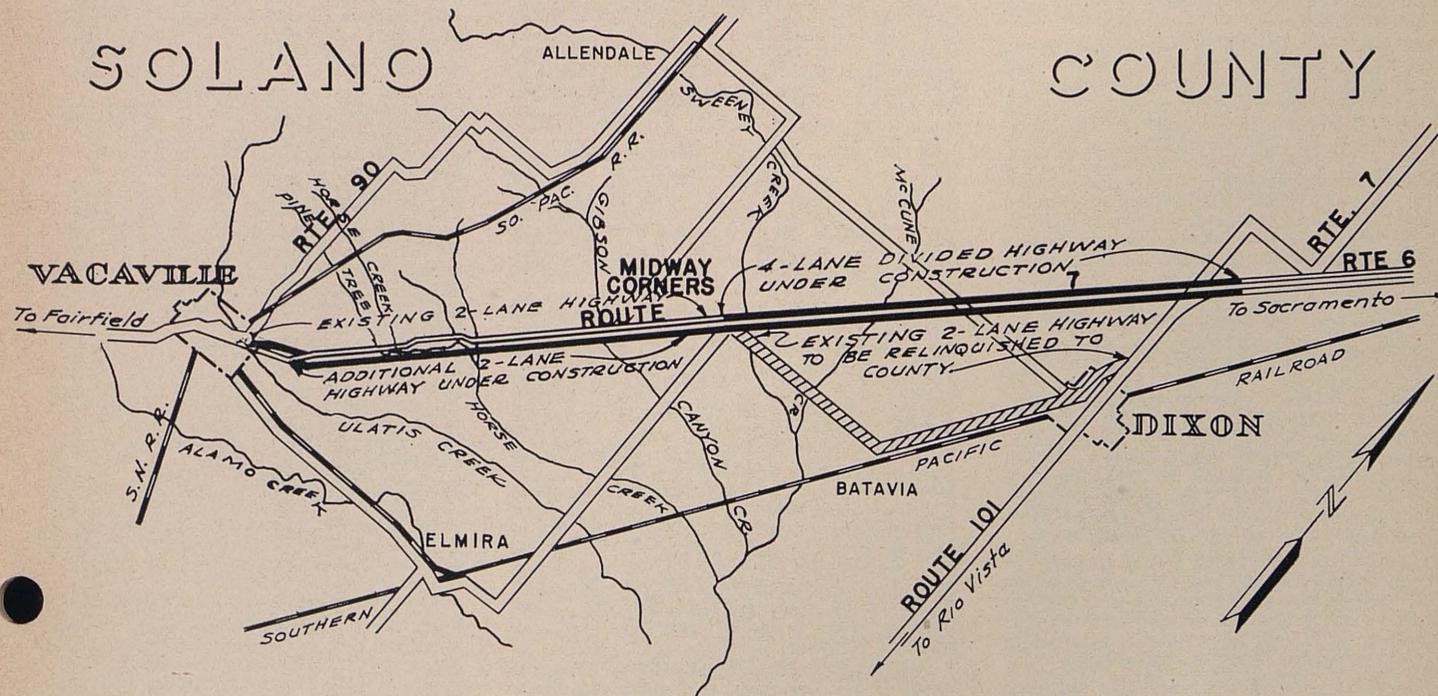
(Continued from page 12)

It is estimated that at least 1.6 minutes driving time or 2.4 cents will be saved for 10,000 vehicles traversing this six-mile section at the present time. This represents \$240 per day or \$86,500 per year. The comparable annual saving in 1970 would be some \$217,000, the total

Using the very low figure of 3 cents per vehicle mile, this project will save in vehicle operating costs \$400 per day on present traffic or \$146,000 annually. In 1970 this would amount to \$1,000 per day or \$365,000 annually. Comparable time savings are 3.6 minutes or

ect will, therefore, reimburse the motorist who pays for it in a period of about five years in the combined distance and time saving effected.

The first project has a time limit of 310 weather-working days, the second project a time limit of 460 days. The



for this 24-year period \$3,650,000. This project will more than pay for itself from the standpoint of time saving alone in seven years.

The total cost of the second project is approximately \$2,000,000. This project has a savings in distance of 1½ miles reflecting reduced vehicle operating costs in addition to more appreciable time savings than on the first project.

5.4 cents per vehicle amounting to \$540 per day or \$197,000 per year now. In 1970 this would amount to \$1,350 per day or \$493,000 annually. The combined vehicle operating and time saving costs would, therefore, be \$940 per day or \$343,000 per year on the basis of present traffic or \$2,350 per day and \$868,000 annually in 1970. This proj-

contractor is expediting the work in every way possible and it is not unreasonable to expect that the traveling public may be enjoying the use of a major part of this 12-mile section of highway by the end of this year. When completed these projects, together with projects constructed previously, will provide a continuous four-lane highway from Sacramento to Vacaville.

# Liability Insurance as Related to California Highway Contracts

(Continued from page 2)

In the postwar construction program now under way, it has frequently been found expedient to combine certain work in connection with grade crossing elimination projects with adjacent roadway construction. On these projects only a small portion of the work usually is on railroad property. However, because of the railroad hazard and in accordance with agreements between the State and the railroads, it is

necessary to incorporate insurance requirements in the contracts.

In resume, liability insurance, in general, is specified in State highway construction contracts only to fulfill the State's obligations with another agency, usually a railroad. Insurance must be provided which will give a complete coverage for all risks, and full coverage must be provided throughout

the life of the contract. Each subcontractor performing work that might endanger a railroad must also furnish direct insurance coverage. Each policy must certify that the State shall receive prior notice of cancellation or any reduction in coverage as discussed above. One certified copy of all insurance policies must be approved by the State's attorneys and be placed on file with the contract documents.

# Highway Bids and Contract Awards for June and July, 1946

## June, 1946

**ALAMEDA COUNTY**—Between Dublin and Mission San Jose and between Alvarado and San Leandro, about 7.6 miles to be repaired with crusher run base and plant-mixed surfacing. District IV, Routes 5, 69, Sections B,C,B. Hayward Building Material Co., Hayward, \$159,276; Lee J. Immel, San Pablo, \$179,362.40. Contract awarded to A. S. Jones, Napa, \$158,786.

**ALAMEDA COUNTY**—On East Shore Freeway, in the city of Oakland, an overhead crossing over the tracks of the Southern Pacific and Western Pacific Railroads, at Fifth Avenue, to be constructed. District IV, Route 69, Chas. L. Harney, San Francisco, \$1,747,187.15; A. Soda & Son, Oakland, \$1,793,565.84; Clinton Construction Co., San Francisco, \$1,892,611.88; Fredrickson & Watson Construction Co. and M & K Corp., Oakland, \$1,945,468.44. Contract awarded to Stolte Inc. and The Duncanson-Harrelson Co., Oakland, \$1,692,897.20.

**ALAMEDA COUNTY**—Across Alameda Creek and over the tracks of Western Pacific Railroad Co. about 2.7 miles west of Sunol, a bridge and overhead crossing and approaches to be constructed. District IV, Route 107, Section A. Dan Caputo & Edward Keeble, San Jose, \$445,278.75; Chas. L. Harney, San Francisco, \$468,608.50; A. Soda & Son, Oakland, \$499,984.84; Fredrickson & Watson Construction Co., Oakland, \$537,744.95; M & K Corporation, San Francisco, \$548,371. Contract awarded to R. G. Clifford and Louis Biasotti & Son, Stockton, \$427,966.

**CALAVERAS COUNTY**—In the city of Angels, across Angels Creek, a concrete bridge and approaches to be constructed. District X, Route 24, Transwestern Construction Co., Sacramento, \$46,450.30; Contract awarded to J. Henry Harris, Berkeley, \$40,410.83.

**CONTRA COSTA COUNTY**—Between Broadway Tunnel and Orinda Junction and between Walnut Creek and 3.5 miles easterly, about 5.3 miles, placing plant-mixed surfacing on existing plant-mixed tapers and applying seal coat thereto, constructing shoulders of imported borrow and C.R.B. and applying penetration treatment thereto. District IV, Route 75, Sections A,B. Lee J. Immel, San Pablo, \$24,514; J. Henry Harris, Berkeley, \$30,341.27; McGuire & Hester, Oakland, \$34,065. Contract awarded to N. M. Ball Sons, Berkeley, \$23,634.

**DEL NORTE COUNTY**—Between Second Crossing of Smith River and Idlewild, about 0.6 mile, roadbed to be repaired and sacked concrete riprap placed. District I, Route 1, Sections C,E. W. C. Railing, Redwood City, \$109,505. Contract awarded to John Burman and Sons, Eureka, \$102,004.50.

**KERN COUNTY**—Between 8.7 miles and 2.0 miles west of Wasco, about 6.7 miles to be repaired with road-mixed surfacing and seal coat. District VI, Route 33, Section C. Clyde W. Wood, Inc., North Hollywood, \$55,405; Oilfields Trucking Company & Phoenix Construction Co., Bakersfield, \$59,550. Contract awarded to Griffith Co., Los Angeles, \$53,629.

**LASSEN COUNTY**—Furnishing and stockpiling plant-mixed surfacing between Litchfield and Ravendale. District II, Route 73, Sections A,B,D. Contract awarded to E. B. Bishop, Orland, \$7,200.

**LASSEN COUNTY**—Furnishing and stockpiling plant-mixed surfacing at Doyle Maintenance Yard and at Long Valley Maintenance Yard. District II, Route 29, Sections D,E. Contract awarded to Isbell Construction Co., Reno, \$3,464.60.

**LOS ANGELES AND ORANGE COUNTIES**—At intersection of Rosemead Blvd. and Washington Blvd., and in Orange County at intersections of Coast Highway with Main Street and with Bay Blvd. in Seal Beach, traffic signal systems to be furnished and installed. District VII, Routes 168,60, Section B,SIB. C. D. Draucker Co., Los Angeles, \$25,352. Contract awarded to Econolite Corp., Los Angeles, \$20,995.

**MENDOCINO COUNTY**—Between Burke Hill and one mile north, about one mile to be repaired with imported base material and plant-mixed surfacing. District I, Route 1, Section B. Louis Biasotti & Son, Stockton, \$37,593.50. Contract awarded to C. M. Syar, Vallejo, \$33,764.

**MERCED COUNTY**—Between San Joaquin River and Madera County line, about 3.0 miles to be repaired with untreated rock base and plant-mixed surfacing. District X, Route 32, Section C. M. J. Ruddy & Son, Modesto, \$85,673.50; Gunner Corp., Pasadena, \$87,663.50. Contract awarded to Frank B. Marks & Sons, Tracy, \$82,421.70.

**MERCED COUNTY**—Between 3 and 4.3 miles northeast of Gustine, a bridge across Mud Slough and a culvert at Garzas Creek to be constructed. District X, Route 122, Section A. Erickson, Phillips & Weisberg, Oakland, \$59,888; George M. Carr & Bati Rocca, Santa Rosa, \$64,783. Contract awarded to Dan Caputo, San Jose, \$51,731.

**MONTEREY COUNTY**—Between Del Monte Junction and Seaside Junction, about 3 miles to be graded and paved with Class B Portland cement concrete. District V, Routes 117, 56, Sections A,I. Granite Construction Co., Watsonville, \$474,793.90; A. Teichert & Son, Inc., Sacramento, \$475,344; Marshall S. Hanrahan, Redwood City, \$562,260. Contract awarded to N. M. Ball Sons, Los Angeles, \$470,026.50.

**ORANGE COUNTY**—Between 1.4 miles north of El Toro Road and south city limits of Tustin, a distance of about 8.3 miles, shoulders to be widened with bituminous surface treatment and a portion of the project to be resurfaced with plant-mixed surfacing. District VII, Route 2, Sections B,C. Sully-Miller Contracting Co., Long Beach, \$92,770; Oswald Bros., Los Angeles, \$94,040; Cox Bros. Construction Co., Stanton, \$102,340; Jesse S. Smith, Glendale, \$105,070; Griffith Co., Los Angeles, \$105,465. Contract awarded to John J. Swigart Co., Torrance, \$92,082.

**ORANGE COUNTY**—Between Verano Street and west city limits of Santa Ana, about 1.8 miles to be resurfaced with plant-mixed surfacing and shoulders to be widened with imported borrow and bituminous surface treatment applied thereto. District VII, Route 183, Section A. Cox Bros. Construction Co., Stanton, \$29,795; Jesse S. Smith, Glendale, \$29,875; Sully Miller Contracting Co., Long Beach, \$30,285; Oswald Bros., Los Angeles, \$30,760. Contract awarded to John J. Swigart Co., Torrance, \$29,363.

**PLACER COUNTY**—Between 0.1 mile westerly of Nevada Street in Auburn and 1.0 mile northeasterly of the north city limits of Auburn, about 2.6 miles, to be graded and surfaced with Portland cement concrete pavement and plant-mixed surfacing. District III, Routes 17 & 37, Sections B, Aub., A. N. M. Ball Sons and H. W. Ruby, Berkeley, \$683,676.25; Harms Bros., Sacramento, \$749,175; Guy F. Atkinson Company, South San Francisco, \$788,315; A. Teichert & Son, Inc., Sacramento, \$816,619.30. Contract awarded to Fredrickson & Watson Construction Co., Oakland, \$614,492.50.

**PLACER, NEVADA AND YUBA COUNTIES**—At various locations, seal coat to be applied on a net distance of about 35.2 miles.

District III, Routes 3, 15, 37, 38. Folsom and Drollinger, Sacramento, \$37,200.60. Contract awarded to J. Henry Harris, Berkeley, \$35,181.35.

**RIVERSIDE COUNTY**—Between Midway and east city limits of Banning, about 3.1 miles, shoulders on a portion to be graded and the entire project to be repaired by placing plant-mixed surfacing over the existing pavement and shoulders and applying Class "C" medium seal coat. District VIII, Route 26, Section B,Ban. E. L. Yeager, Riverside, \$56,190; Oswald Bros., Los Angeles, \$56,242.50. Contract awarded to Herz Paving Co., San Bernardino, \$52,450.

**SACRAMENTO AND YOLO COUNTIES**—Between Sacramento city limits and 0.5 mile east and between 0.4 mile and 9.6 miles north of Solano County line, about 6.1 miles to be repaired with plant-mixed surfacing. District III, Routes 11, 99, Sections B,A. McGillivray Construction Co., Sacramento, \$38,967.50; Folsom & Drollinger, Sacramento, \$38,867; A. Teichert & Son, Inc., Sacramento, \$39,291; E. A. Forde, San Anselmo, \$41,075. Contract awarded to Harms Bros., Sacramento, \$38,405.

**SACRAMENTO COUNTY**—Between the Antioch Bridge and Emmaton, about 3.4 miles, to be repaired with imported borrow and bituminous surface treatment. District X, Route 11, Section C. Milo A. Browne, Palo Alto, \$45,530; J. Henry Harris, Berkeley, \$49,045; Asta Construction Co., Rio Vista, \$49,180; Combs Bros., San Leandro, \$49,992.50; E. A. Forde, San Anselmo, \$53,305; Peter Sorensen, Redwood City, \$55,555; Fredrickson & Watson Construction Co., Oakland, \$61,500. Contract awarded to Sheldon Oil Company, Suisun, \$39,990.

**SANTA BARBARA COUNTY**—At E. H. Wye between Santa Barbara and Golea about 0.9 mile to be graded and surfaced with plant-mixed surfacing. District V, Route 2, Sections P,Q. Dimmit & Taylor, Los Angeles, \$197,770; Haddock Company, Pasadena, \$229,507.60. Contract awarded to Jesse S. Smith, Glendale, \$152,165.50.

**SAN BERNARDINO COUNTY**—Across Mill Creek about 8 miles east of Redlands, a bridge and approaches to be constructed. District VIII, Route 190, Section D. Spencer Webb, Inglewood, \$105,590. Contract awarded to Bent Construction Co., Los Angeles, \$94,370.

**SAN BERNARDINO COUNTY**—At two locations: (1) about 1.5 miles west of Ontario, and (2) between about  $\frac{1}{4}$  mile and 2.75 mile east of Upland, trees to be cleared. District VIII, Routes 26, 9, Sections C,A. Contract awarded to California Tree Service, Hollywood, \$2,312.

**SAN BENITO COUNTY**—Between Prunedale Junction and the Santa Clara County line, about 1.6 miles to be repaired by cement treatment of existing base and surfacing, placing plant-mixed surfacing thereon and placing imported borrow on shoulders and applying bituminous surface treatment thereto. District V, Route 2, Section A. A. Teichert & Son, Inc., Sacramento, \$65,626.50. Contract awarded to Granite Construction Company, Watsonville, \$59,949.09.

**SAN BERNARDINO COUNTY**—Between Victorville and Oro Grande Underpass, about 4.7 miles to be repaired with plant-mixed surfacing. District VIII, Route 31, Section D. Contract awarded to George Herz & Co., San Bernardino, \$38,367.

**SAN BERNARDINO COUNTY**—Between Squirrel Inn and Big Bear Dam, about 13.8 miles, to be repaired with road-mixed surfacing and seal coat. District VIII, Route 43, Sections B,C. Arthur A. Johnson, La-

guna Beach, \$91,545; Clyde W. Wood, Inc., North Hollywood, \$98,210; Warren Southwest, Inc., Los Angeles, \$105,312; Herz Paving Co., San Bernardino, \$116,732. Contract awarded to R. R. Hensler, Glendale, \$79,500.

**SAN BERNARDINO COUNTY**—Between Alpine and Lake Arrowhead and between Lake Arrowhead Dam and Burnt Mill, 6.3 miles to be repaired with road-mixed surfacing and seal coat. District VIII, Routes 189, 59, Sections A, E, F. Arthur A. Johnson, Laguna Beach, \$38,330; Bonadiman-McCain, Inc., Los Angeles, \$45,999.20. Contract awarded to R. R. Hensler, Glendale, \$34,600.

**SAN DIEGO COUNTY**—A reinforced concrete overcrossing over Balboa Parkway, at University Avenue, in San Diego, to be constructed. District XI, Route 77. Carroll & Foster, San Diego, \$147,444. Contract awarded to M. H. Golden Construction Co., San Diego, \$134,631.50.

**SAN DIEGO COUNTY**—At Route 77 and Mission Valley Road in San Diego, two reinforced concrete overcrossings to be constructed. District XI, Route 77, Carroll & Foster, San Diego, \$276,086. Contract awarded to M. H. Golden Construction Co., San Diego, \$269,453.75.

**SAN DIEGO COUNTY**—A steel girder overcrossing on Route 77 at Friar's Road, in San Diego, to be constructed. District XI, Route 77. Carroll & Foster, San Diego, \$69,772; M. H. Golden Construction Co., San Diego, \$70,359; Haddock Engr. Ltd., Oceanside, \$96,985. Contract awarded to Fred D. Kyle, Pasadena, \$63,936.

**SAN JOAQUIN COUNTY**—Between Calaveras River and Lodi, about 8.2 miles to be graded and paved with Portland cement concrete and three bridges to be constructed. District X, Route 4, Section C. N. M. Ball Sons and H. W. Ruby, Berkeley, \$853,361; Bressi & Bevanda Constructors, Inc., Los Angeles, \$870,495.05; A. Teichert & Son, Inc., Sacramento, \$873,601.80; Clyde W. Wood, Inc., North Hollywood, \$879,487.45; Marshall S. Hanrahan, Redwood City, \$883,330.05; Fredrickson Bros., Emeryville, \$1,051,202.30. Contract awarded to Fredrickson & Watson Construction Co., Oakland, \$811,180.86.

**SAN MATEO COUNTY**—Bay Shore Freeway from Broadway in Burlingame to State Street in San Mateo, about 2.2 miles to be graded and paved with Portland cement concrete on crusher run base. District IV, Route 68. Macco Construction Co. & Morrison Knudsen Co., Inc., San Bruno, \$696,492.50; Chas. L. Harney, San Francisco, \$760,212.55; Fredrickson & Watson Construction Co., Oakland, \$874,926.70. Contract awarded to Guy F. Atkinson Company, South San Francisco, \$627,781.90.

**SAN MATEO COUNTY**—In South San Francisco, between Southern Pacific Railroad and 0.5 mile southerly, about 1/2 mile to be graded and sand drains to be constructed. District IV, Route 68. Morrison Knudsen Co., Inc., and Macco Construction Co., San Bruno, \$294,182.50; Dan Caputo & Edward Keeble, San Jose, \$304,671; Chas. L. Harney, San Francisco, \$328,165.80; Guy F. Atkinson Co., South San Francisco, \$333,637; Eaton & Smith, San Francisco, \$342,134.89; Peter Sorensen, Redwood City, \$379,782.50. Contract awarded to Piombo Bros. & Co., San Francisco, \$270,446.50.

**SAN LUIS OBISPO COUNTY**—Between Santa Maria River and 1.5 miles south of Nipomo, about 2.1 miles, the existing surfacing to be repaired by constructing crusher run base, placing plant-mixed surfacing thereon and applying Class "C-Fine" seal coat and Class "D" seal coat thereto. District V, Route 2, Section F. Brown-Doko & Baun, Pismo Beach, \$98,813; Granite Construction Co., Watsonville, \$106,568. Contract awarded to Grey-Hammond, Inc., San Francisco, \$95,000.

**SHASTA COUNTY**—Between Cottonwood and Anderson, about 10.8 miles to be

graded and surfaced with plant-mixed surfacing. District II, Route 1072. Marshall S. Hanrahan, Redwood City, \$208,990.50; A. Teichert & Son, Inc., Sacramento, \$256,370.50; Harms Bros., Sacramento, \$271,953. Contract awarded to Oilfields Trucking Co. & Phoenix Construction Co., Bakersfield, \$206,123.50.

**SOLANO AND SONOMA COUNTIES**—Across Sonoma Creek, about 10 miles west of Vallejo, the steel floor system of the existing bascule span to be replaced. Districts X, IV, Route 208, Sections A, A. Lord & Bishop, Sacramento, \$3,200. Contract awarded to M. A. Jenkins, Sacramento, \$2,190.

**TULARE COUNTY**—Between 3.6 miles and 0.4 mile south of Kingsburg, about 3 miles in length to be repaired with plant-mixed surfacing and seal coat. District VI, Route 4, Section E. Contract awarded to Valley Paving & Construction Co., Inc., Fresno, \$32,160.

**YOLO COUNTY**—Between Woodland and Knights Landing, about 9.5 miles, crusher run base borders to be constructed and seal coat applied thereto. District III, Route 87, Section A. McGillivray Construction Co., Sacramento, \$37,575; Milo A. Browne, Palo Alto, \$38,817.50; Fredrickson Bros., Emeryville, \$39,679.50; J. Henry Harris, Berkeley, \$40,174.20; Harms Bros., Sacramento, \$41,023.50. Contract awarded to Folsom & Drollinger, Sacramento, \$34,553.

**YOLO COUNTY**—At Tule Canal about six miles east of Woodland, a reinforced concrete slab bridge to be constructed and 0.24 mile of approaches to be graded and bituminous surface treatment applied thereto. District III, Route 50, Section E. Erickson, Phillips & Weisberg, Oakland, \$99,685.30; Transwestern Construction Company, Sacramento, \$118,747.29. Contract awarded to M. A. Jenkins, Sacramento, \$79,740.

**YUBA AND SUTTER COUNTIES**—Between D Street Bridge in Marysville and Route 15 in Yuba City, a length of about 2 miles, a four lane divided highway to be constructed and surfaced with asphalt concrete pavement on cement treated base. District III, Route 3. H. Earl Parker and N. M. Ball Sons, Marysville, \$634,708. Contract awarded to Lester L. Rice, Marysville, \$594,741.

## JULY, 1946

**ALAMEDA COUNTY**—Between Maitland Drive and Earhart Road in the Auxiliary Naval Air Station, Oakland Airport, about 0.2 mile to be repaired with plant-mixed surfacing and shoulders to be constructed of crusher run base. District IV, Independent Construction Co., Ltd., Oakland, \$4,203.50; Fredrickson & Watson Construction Co., Oakland, \$4,241.50; J. R. Armstrong, El Cerrito, \$4,307.04; Lee J. Immel, San Pablo, \$4,642.50. Contract awarded to Gallagher & Burk, Oakland, \$4,180.30.

**ALAMEDA COUNTY**—Over the tracks of the Southern Pacific Co., near El Cerrito Hill, in the city of Albany, painting steel superstructure of overhead crossing on State highway. District IV, Route 69. D. E. Burgess Co., San Francisco, \$10,928; D. Zelinsky & Sons, San Francisco, \$11,795; Kiss Crane Co., San Pablo, \$17,800.07. Contract awarded to Pacific Bridge Painting Co., San Francisco, \$8,303.95.

**CONTRA COSTA COUNTY**—Between junction of Routes 106 and 75 and 0.1 mile east of Port Chicago Road, about 2.6 miles to be graded, paved with Portland cement concrete and asphalt concrete pavement placed on crusher run base and plant-mixed surfacing placed on the shoulders. District IV, Route 75, Sections B, C. Fredrickson & Watson Construction Co., Oakland, \$569,069.95; N. M. Ball Sons, Berkeley, \$578,668.75; Fredrickson Bros., Emeryville, \$580,708.90; A. Teichert & Son, Inc., Sacramento, \$620,275; Guy F. Atkinson Company, South San Francisco, \$653,020.50; Chas. L. Harney & Piombo Bros. & Co., San Francisco, \$668,436; Marshall S.

Hanrahan, Redwood City, \$769,055.50. Contract awarded to Harms Bros., Sacramento, \$564,202.

**LAKE COUNTY**—Across Kelsey Creek at Kelseyville, a structural steel girder bridge and approaches to be constructed. District I, Route 89, Section D. Peter Sorensen, Redwood City, \$206,472. Contract awarded to A. Soda and Son, Oakland, \$201,714.84.

**LOS ANGELES CITY**—On and adjacent to Santa Ana Parkway between Soto and Indiana Streets, grading, storm drain and sanitary sewer construction to be performed. District VII, Route 2. Haddock Co., Pasadena, \$424,004.25; Chas. T. Brown Co., San Fernando, \$430,032.70; Peter Kiewit Sons' Co., Arcadia, \$498,397. Contract awarded to Mike Radich & Co., Burbank, \$389,654.50.

**LOS ANGELES COUNTY**—On Santa Ana Parkway, at First Street in the city of Los Angeles, a reinforced concrete undercrossing to be constructed. District VII, Route 2. The Contracting Engineer's Co., Los Angeles, \$183,823; Guy F. Atkinson Co., Long Beach, \$197,779; Peter Kiewit Sons' Co., Arcadia, \$205,635.50. Contract awarded to Haddock Company, Pasadena, \$170,356.36.

**LOS ANGELES COUNTY**—At intersection of Anaheim-Telegraph Road and Washington Blvd., and at intersections of Sepulveda Blvd. with El Segundo Blvd. and Rosecrans Ave., traffic signal systems to be furnished and installed. District VII, Routes 166, 60. C. D. Draucker Co., Los Angeles, \$24,540. Contract awarded to Econolite Corp., Los Angeles, \$23,434.

**MADERA, KINGS, TULARE COUNTIES**—Near Califa and between Hanford and Route 4, about 16.8 miles, seal coat to be applied. District VI, Routes 4, 10, Sections BC, A, A. Vinnel Company, Alhambra, \$21,479. Contract awarded to Valley Paving & Construction Co., Fresno, \$17,050.

**MARIN COUNTY**—Between Waldo and Ignacio, a length of about 1.5 miles to be repaired with asphalt concrete pavement and shoulders to be constructed of crusher run base and penetration treatment applied. District IV, Route 1, Sections D, C, A. E. A. Forde, San Anselmo, \$67,306.50; A. G. Raisch Co., San Francisco, \$69,324. Contract awarded to Brown-Ely Co., Contractors, El Cerrito, \$64,301.50.

**MARIN COUNTY**—Across Novato Creek about 9 miles north of San Rafael, repairing a portion of a bridge. District IV, Route 8, Section A. Evans Construction Co., Berkeley, \$10,222.50; Kiss Crane Co., San Pablo, \$11,995. Contract awarded to Wm. B. Willett Co., San Francisco, \$5,607.16.

**MONO COUNTY**—Between Route 23 and Sheep Corral, about 6.3 miles to be surfaced with road-mixed surfacing. District IX, Route 40, Section C. Basich Bros. Construction Co. and Basich Brothers, Alhambra, \$35,212; Brown, Doko & Baun, Pismo Beach, \$36,128; Roland T. Reynolds, Anaheim, \$39,435.50; Pacific Rock & Gravel Co., Monrovia, \$39,977.40. Contract awarded to Geo. E. France, Visalia, \$20,937.

**PLACER AND NEVADA COUNTIES**—Between 4.7 miles west of Tahoe City and 1.7 miles south of Nevada County line and between Truckee Wye and Church Street in Truckee, about 8.5 miles, portions to be repaired with plant-mixed surfacing and seal coat and a portion to be graded and surfaced with crusher run base and plant-mixed surfacing. District III, Route 38, Sections B, C, A. Fairey-Hammond Inc. and R. A. Parish, San Francisco, \$164,367. Contract awarded to Clements & Co., Hayward, \$135,790.

**SAN DIEGO COUNTY**—At Main Entrance to Camp Pendleton, a traffic signal system to be furnished and installed. District XI, Route 2, Section C. California Electrical Works, San Diego, \$7,800; Econolite Corp., Los Angeles, \$8,100. Contract awarded to Tri-Cities Electrical Service, Oceanside, \$5,490.

(Continued on next page)

## New Law Clarifies Toll-Free Privileges of Federal Government on Bay Bridge

**S**IGNING by President Truman on July 1 of H.R. 3565 (Public Law 477—Seventy-ninth Congress—Chapter 528, Second Session) clarifies the toll-free privileges of government traffic on the San Francisco-Oakland Bay Bridge. Submission of the question to Congress rather than court action was determined upon as the better plan to eliminate friction between State and Federal agencies over interpretation of provisions respecting tolls inserted in the Federal permit of August 20, 1932, and the subsequent interpreting agreement of December 16, 1938.

Incidentally, the act will increase revenues of the bridge \$300 to \$400 per day, or approximately \$9,000 per month. It is estimated the new law will eliminate 1,200 to 1,500 vehicles per day from the toll-free traffic using the span.

The act was drafted by the Legal Division of the Department of Public Works and presented to California Congressional representatives with the approval of the California Toll Bridge Authority. It became effective on July 31, and accomplishes these purposes:

The act, which was drafted by the Legal Division of the Department of Public Works, and which became effective on July 31, accomplishes these purposes:

1. Military, Coast Guard, and Naval personnel, and civilian employees of the Army, Navy and Coast Guard, and personnel and employees of the Coast and Geodetic Survey, when such personnel or employee are engaged in the performance of official duties requiring the use of the bridge, together with the conveyances being used by them in the performance of such duties.

2. Military, Coast Guard and Naval personnel, civilian employees of the Army, Navy and Coast Guard and personnel and employees of the Coast and Geodetic Survey, and their dependents, when such personnel, employees or dependents are resident or employed on Yerba Buena Island or Treasure Island, or any vessel berthed at any point on said islands, together with the conveyances being used by

them when proceeding to or from the island.

Toll-free privileges enjoyed by civilian departments of the Federal Government and contractors of the government are abolished. These privileges originally were demanded by the Federal Government as consideration for the use of the right of way for the bridge across Yerba Buena Island accorded by the joint permit of 1932.

The measure was sponsored in the House of Representatives by Congressmen Franck R. Havenner and Richard J. Welch of San Francisco, Congressmen John H. Tolan, Oakland, and George P. Miller, Alameda, and in the Senate by Senator Wm. F. Knowland of Oakland, a member of the subcommittee of the Commerce Committee of the Senate which considered the bill and reported it out favorably.

The act provides that the authorization for toll-free privileges shall be issued and signed by an officer or official designated for such purposes, in accordance with regulations to be prescribed by the Secretary of the Department having control of the personnel exempted by the act, namely, Secretary of War, Secretary of the Navy, Secretary of the Treasury, and Secretary of Commerce. This is a change from the previous procedure whereby all such passes were issued through the Commandant of the Twelfth Naval District.

## Redwood Highway Project

(Continued from page 15)

from two of the large rocky cuts near the southerly limits of the project.

Roadway grading is still the major operation on the project involving the use of various types of excavating equipment including two 2-cubic yard power shovels, four Wooldridge Terra Cobra earth movers and several caterpillar tractor and LeTourneau carry-all units.

For paving materials, the contractor is erecting a batching plant adjacent to the Northwestern Pacific Railroad about midway on the project.

Travel on this highway is heavy the year around, augmented during the summer season by a large volume of vacation traffic between the San Francisco Bay Area and the Russian River resort district as well as northern interstate traffic through the Redwood Empire.

This project was prepared during the war for construction as a postwar project and was awarded to A. G. Raisch Company and Harms Brothers on January 17, 1946, at a construction cost of \$1,680,000. Three hundred and ninety working days were allowed to complete the project which should make the improvement available for the heavy summer traffic of 1947.

P. S. Harless of A. G. Raisch Company and J. A. Sheldon of Harms Brothers are superintendents in charge of construction.

The work is under the general supervision of Jno. H. Skeggs, District Engineer, District IV, Division of Highways, with W. A. Rice as Resident Engineer.

### Highway Bids and Awards

(Continued from preceding page)

**SANTA CLARA COUNTY**—At San Jose, between Bascom Avenue and Park Avenue, about 1.3 miles to be graded and paved with asphalt concrete on Portland cement concrete base and existing pavement. District IV, Route 5, Sections B,SJs. A. J. Raisch Paving Co., San Jose, \$189,174.95; Chas. L. Harney, San Francisco, \$201,520.30. Contract awarded to Union Paving Co., San Francisco, \$183,663.40.

**STANISLAUS AND SAN JOAQUIN COUNTIES**—Between Salida and one mile north of Ripon, about 4.5 miles to be graded and paved with Portland cement concrete. District X, Route 4, Section B,A,Rip. M. J. B. Construction Co., Stockton, \$428,649; Louis Biasotti & Son, Stockton, \$429,809.70; N. M. Ball Sons, Berkeley, \$448,440.98; Clyde W. Wood, Inc., North Hollywood, \$457,016.50; Marshall S. Hanrahan, Redwood City, \$479,008.10. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$420,336.85.

**TEHAMA COUNTY**—Between 3 miles east of Paynes Creek and Morgan Summit, a

distance of about 21.4 miles, seal coat to be applied. District II, Routes 29, 86, Sections B,A. J. Henry Harris, Berkeley, \$46,433.25; Sheldon Oil Company, Suisun, \$50,210. Contract awarded to Morgan Construction Co., Pleasanton, \$38,815.

**SOLANO AND YOLO COUNTIES**—Across Putah Creek, about 6 miles north of Dixon, a bridge to be repaired. District X, Route 7, Sections E,A. Fred Kaus, Stockton, \$11,847.60; Evans Construction Co., Berkeley, \$12,913; C. C. Gildersleeve, Willows, \$13,910; Kiss Crane Co., San Pablo, \$14,647.07; Bati Rocca, Stockton, \$13,954. Contract awarded to M. A. Jenkins, Sacramento, \$8,086.50.

**LOS ANGELES COUNTY**—Between Sixth Street and 0.4 mile north of Imperial Highway about 1.0 mile to be repaired with plant-mixed surfacing and shoulders to be widened with imported borrow and bituminous surface treatment applied thereto. District VII, Route 170, Section A. Oswald Brothers, Los Angeles, \$17,906; Griffith Co., Los Angeles, \$18,460. Contract awarded to Cox Bros. Construction Co., Stanton, \$16,696.

## In Memoriam Abram A. George

ON May 6, 1946, Abram N. George, one of the original employees of the Division of Highways, passed away at Los Angeles.

During his many years in State service, Mr. George was one of the most capable, conscientious and outstanding employees, whose leadership and helpful cooperation endeared him to all who knew him.

Mr. George was born on May 27, 1890, at Hastings, Nebraska, and his family moved to California during his childhood, settling at San Diego. Shortly after finishing school he entered the employ of the San Diego County Highway Commission where he worked until 1912.

When the State Highway Department was organized in 1912 Mr. George started as instrumentman and his name appears on the first pay roll of District VII. He was soon promoted to Chief of Party, in which position he worked until 1917 when he entered the Army Air Force. During the first World War he rendered distinguished service in France.

On April 7, 1919, he returned to work in District VII and worked as Chief of Party and Resident Engineer until 1932, at which time he was appointed Assistant District Construction Engineer. On June 15, 1934, he received the appointment of District Construction Engineer, which position he held until his death.

Mr. George is survived by his widow, Josephine K. George, two sons, Abram N. George, Jr., USNR, and Jack Alan George, of Pasadena, and a sister, Mrs. Emma Sherburn of San Diego.

## S. F. POLICE URGE CARE IN PARKING ON CITY'S HILLS

Motorists planning to visit San Francisco are urged by Police Chief Charles W. Dullea to make certain, when parking on any of the city's hills, that their wheels are cramped against the curb and their emergency brakes are effectively set.

"The menace of runaway automobiles in San Francisco is ever-present," declared Chief Dullea. "Not a month passes that 60 or more runaway cars are not reported to the police department. At times, we have had as many as 80 reported during a month. A number of persons, including little children, have been killed by these driverless cars. Many others have been injured. The property damage, to the runaway car, to other automobiles, and to stores and homes, runs into thousands of dollars.

"In view of this danger, we want to appeal to every motorist to do two things, if he must park on any perceptible grade, no matter how slight. The first is to make certain the emergency or parking brake is pulled on just as far as it will go. The second is that the wheels are firmly blocked against the curb. As an extra precaution, the car can also be left in gear—reverse if the car is headed downhill, low gear if it is headed upgrade."

## In Memoriam Ray Edwards

ON May 24, 1946, death claimed Mr. Raymond Phillip Edwards, Assistant Engineer in District X Office. Mr. Edwards had been with the Division of Highways since May, 1934, and continuously with District X from May 3, 1936, to the date of his death. Mr. Edwards' untimely death followed a brief illness which confined him to a hospital, resulting in surgery, from which he failed to recover.

The district and the Division of Highways will feel his loss as he was a very congenial individual and an excellent and efficient worker. Because of physical handicap, Mr. Edwards was not able to get into military or armed services of this country but was a great help to the boys of the department that were in the armed services and particularly to those who went overseas. He maintained a letter contact with each and every service man from the staff of District X office and through this contact, kept each of the several employees informed of the whereabouts of the others. Mr. Edwards' appearance in any group was as welcome as a ray of sunshine.

He was born in Chicago on October 1, 1911, and received his education in public schools in San Francisco and later attended Healds Engineering College where he received his engineering education.

Mr. Edwards leaves a mother, Mrs. Esther Edwards, and two brothers, Mr. Carl Edwards and Mr. Robert Edwards, all residing in San Francisco.

## Embankment Stabilization at Terminal Island

(Continued from page 10)

the Anaheim Street approach overhead crossing at Nicholson Avenue.

The quantities involve 682,000 pounds of structural steel, 1,468 cubic yards Class A concrete, 188,000 pounds bar reinforcing steel, and 1,560 tons asphaltic concrete (paving).

### HIGHWAY STRUCTURES

James I. Barnes Construction Company, Santa Monica, holds an important contract on the route, consisting of highway and structures in both the Cities of Los Angeles and Long Beach, on the Pacific Coast Highway between Dominguez Channel and San Gabriel Avenue, about 0.7 mile. Work includes grading, paving with asphaltic con-

crete, and constructing four bridges. The total cost is about \$1,672,000.

Individual units in the bridge construction are: An overpass across Terminal Island Freeway; a bridge over the Union Pacific Railway; a bridge over the Harbor Commission marshaling yards; and a bridge over Dominguez Channel.

Some of the major items in the quantities are: 48,400 cubic yards excavation, 20,000 cubic yards compact original ground, 712,600 tons imported borrow, 37,500 tons imported subgrade material, 53,000 square yards prepare Class C subgrade, 1,400 tons plant mix surfacing, 21,500 tons asphaltic con-

crete, 7,716 cubic yards Class A concrete in structures, 685 cubic yards Class A concrete in footing blocks, 3,788,000 pounds structural steel, 1,171,000 pounds bar reinforcing steel, 42,380 lineal feet timber piling, 1,700 lineal feet cast-in-place concrete piles, 22,920 lineal feet steel piling, 1,300 cubic yards concrete in curbs, gutters, sidewalks, 950 feet pipe and rail, 2,800 lineal feet chain link fence, about 5,000 lineal feet 18-inch to 36-inch reinforced concrete pipe, 29,000 pounds iron and steel, 2,445 feet steel railing, 18,300 plants for bank stabilization, and a galvanized metal bin-type retaining wall.

# SHADE TREE CONFERENCE BRINGS OUT VALUABLE INFORMATION

By H. N. BOSWORTH, Assistant Highway Landscape Engineer

INTEREST in the profession and the desire for a better understanding of their work was the incentive for 13 highway tree maintenance foremen, one groundsman and gardener, and two assistant highway landscape engineers from the Division of Highways to attend the thirteenth meeting of the Western Chapter of the National Shade Tree Conference in Riverside, California, recently.

Members of the National Shade Tree Conference represent municipal, county, State and Federal agencies, universities, private concerns specializing in landscape and ornamental tree work, many industries affiliated with such work and some who are "just tree lovers." These men are mutually interested in trees, and represent every phase of the work necessary in the perpetuance of trees. Needless to say there is much of value for the Division of Highways in such a gathering, and conversely the Division of Highways with its extended territory and variety of environmental conditions can offer much to the conference through its tree foremen who are handling that work.

Field demonstrations convincingly told the practical story of the use of power-driven equipment in modern tree care. Chain-saws of various makes vied for honors in cutting trees down and into fireplace lengths; an air-driven model was used to top a towering eucalyptus 40 feet off the ground; holes for tree planting 24 inches in diameter and five feet deep were dug by machine in less time than the top layer could be dug out by hand with a shovel; trees were sprayed from atop a hydraulically lifted tower 30 feet above its parent body, the high pressure spray rig, with pressures up to 600 pounds and a discharge of 50-60 gallons per minute, and the practical use of rope when climbing in trees, were all part of the action picture.

A number of vital papers were presented to the conference. Of particular value to our tree foremen were the two dealing with newly developed fungicides and insecticides.



Field demonstrations of new power-driven tree cutting equipment

Dr. A. M. Boyce of the Citrus Experiment Station, Riverside, California, presented a comprehensive review of the newest developments in the field of insecticides.

In the past, insecticides have been developed to act on the insect either by contact with its outer body as a caustic, or on its respiratory system as a suffocant, or as a stomach poison. A new development in the form of DDT acts upon the nervous system of the insect. The much publicized DDT, according to Dr. Boyce, may be only the forerunner of more startling insecticides to come.

A British product known as "666" and a United States product called "1068" are now more powerful than DDT, but are too dangerous for general use. New insecticides are so chemically complex, with the difference sometimes of only a molecule or two between two products, that the use of numbers or letters for names has been accepted by the trade in preference to complicated meaningless names to confuse the public. The numbers are often the collection of molecules represented but in no way indicate chemical content.

(Continued on page 32)

# Fifth Avenue Overhead on East Shore Freeway is Started

(Continued from page 17)

economy since it reduces the total vertical rise of the roadway. As best suited to the conditions, 36-inch steel rolled beam spans of lengths varying from 50-feet to 80-feet were selected.

Timber piles will be driven to support reinforced concrete footings. Most of the bents carrying the beams will consist of reinforced concrete columns and caps. At the crossing over the Western Pacific Railroad, restricted clearance and high column loading made the use of structural steel columns and floor beams desirable.

Earth embankment heights on the approaches were limited to less than 10 feet, due to the low supporting capacity of the foundation material. This consideration determined the length of the structure.

A subway type structure was not used, since high ground water and unfavorable foundation material would have made construction and maintenance costs prohibitive.

The span layout consists of beams continuous over two bents, alternating with suspended beams carried on hinges at the cantilever ends of the continuous spans. This provides for maximum amount of flexibility if the footings should move.

An interesting feature of the design is the use of a simplified type of hinge, especially adaptable to change in alignment between successive girders. Instead of the usual two steel pins and hanger bars, a single horizontal steel bar set on a shelf of the supporting beam will carry the end of the suspended span. Keeper plates will maintain the position of the girders. Fabrication and erection problems are thus simplified.

Bearings supporting the beams at the bents are of a similar type. A single horizontal steel bar resting on a base plate supports the beams. Keeper plates are used to prevent lateral shifting. This design eliminates the usual more elaborate top and bottom bearing assemblies and steel pin.

A reinforced concrete deck slab and curbs will form the roadway surface. Steel hand railing will be used to provide a reasonably unobstructed view from the roadway, and also to accentuate the lightness of the structure as a whole.

Drainage will be removed from the deck through drains and discharge

pipes to disposal points at each end of the structure.

Temporary tracks and turnouts will be laid to maintain traffic during construction of footings. Three thousand feet of new drill track and turnouts will be placed to maintain permanent connections to existing sidings along the south side of the structure. Two thousand six hundred feet of new track and guard rail will be laid to restore the tracks to order, within railroad right of way.

This work will be done by the contractor's forces due to a shortage of labor on the railroad crews.

## CONSTRUCTION OF STREETS

An embarcadero street will be constructed along the south side of the structure, parallel to the new drill track from Fifth Avenue to Ninth Avenue. This will provide vehicular access to properties in this area.

At the time the approach highways are built other outer highways that will encircle a portion of each end of the overhead structure will also be constructed to give access to further property in this vicinity.

An indication of the complexity of clearing the various phases of a structure of this type and location for contract is indicated by listing the various agencies represented at a general conference held some time ago. They were:

Bridge Department, State of California; District IV, Division of Highways; Right of Way Department, State of California; City of Oakland; Port of Oakland; Southern Pacific Company.

Not present at this meeting, but also interested in the project are: Western Pacific Railroad Company; Pacific Gas and Electric Company; East Bay Municipal Utility District; Public Roads Administration, United States Government.

The design problem is thus seen to be not merely a relatively simple problem of laying out a highway and series of crossing structures. Immediately as decision was made to locate the freeway through this area, it became obligatory for the personnel of the Division of Highways to see that all proper interests were protected and provided for. It is a far cry from completing plans for a modern freeway in a metropolitan area to doing the same in open rural areas.

The route to follow must be located to serve the most persons anticipated to use it, and at the same time to cause the minimum amount of damage and inconvenience to persons and property already in that area. Right of ways, easements and other agreements must be obtained to permit the freeway to traverse the site. The detail layout and design of the structures and highway proper follow. This is not all.

Approaches must be provided at suitable points to allow vehicles to enter or leave the freeway. This involves construction of connecting roads, outer highways and often other crossing structures.

Opportunity to cross from streets on one side of the freeway to the other are planned at intervals. To avoid conflicting streams of traffic at the same level, these crossings will be made on structures passing over the freeway.

Finally, the interests and rights of the railroads and public utilities must be cared for.

## CONTRACT DATA

A period of 14 months has been allotted for the completion of the work.

The estimated major quantities of work are:

Roadway Excavation	-----	3,800 cu. yds.
Structure Excavation	-----	15,030 cu. yds.
Gravel base	-----	2,000 tons
Asphalt concrete	-----	850 tons
Class "A" footing block concrete	-----	4,450 cu. yds.
Class "A" structure concrete	-----	10,610 cu. yds.
Structural steel	-----	3,250 tons
Timber piles	-----	2,917 each
Reinforcing steel	-----	1,375 tons
Removing track	-----	4,100 lin. ft.
Track ballast	-----	1,825 tons
New track	-----	5,720 lin. ft.

The Fifth Avenue Overhead is a portion of the postwar program adopted by the Highway Commission on November 18, 1943. It is being financed jointly by State and Federal funds. The estimated total cost of the structure including contract and supplemental work by the railroads and utilities is \$1,832,732.16.

The contract was awarded to A. Stolte, Inc. and The Duncanson-Harrelson Co., Oakland, as joint bidders.

J. E. Burke will act as Resident Engineer for the State during construction.

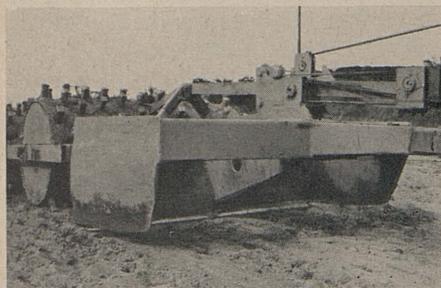
## Four-Lane Highway Construction

(Continued from page 6)

and blind stone drains as required to carry off the indicated seepage, and backfilling the areas with selected granular material which tests indicate will be stable even though saturated.

In a few locations, a blanket of beach sand is being placed in the excavated area to provide a drain for disposing of the seepage. After the planned embankments are constructed, the material excavated from the marshy areas is to be used to construct supporting fills against the previously constructed roadway embankment or where suitable, used as topsoil.

Treatment of these marshy areas involves 90,000 cubic yards fill treatment excavation, 3,200 cubic yards sand filling material, 900 cubic yards



Scraper used to level off embankment material ahead of tamping roller

filter material (underdrains), 3,000 lineal feet of 8-inch perforated metal pipe underdrains and about 90,000 cubic yards of roadway excavation.

Excavation materials, in general, are not suitable for subgrade purposes, having lower bearing ratios than considered necessary to provide adequate support for the surfacing. A blanket, or subbase of material selected because of its high bearing ratio and other satisfactory qualities, is being placed full width of the portion of roadbed being added. This subbase is to have a minimum thickness of 6 inches or 9 inches depending on the bearing ratio of the materials over which it is to be placed. Material for this purpose and for backfilling fill treatment areas is being obtained by widening excavation at a location where suitable material was encountered to provide a total of 108,000 cubic yards.

A base course consisting of a 12-inch thickness of crusher run base is

to be placed to a width of 24 feet on the traffic lanes. Plant-mixed surfacing is to be placed to a 3-inch thickness over the crusher run base, shoulders, gutters and inside face of embankment dikes. A Class "C-Fine" seal coat consisting of penetration type emulsion and medium fine screenings will be applied to the plant-mixed surfacing on the traffic lanes.

The embankment and cut slopes are composed of materials of a sandy nature that are very erosive. The plans provide, therefore, for treatment of the slopes to preclude excessive future maintenance costs. Excavation slopes are to be covered with top soil removed from within the roadway prism. A 6-10-6 fertilizer is to be mixed with this top soil at the approximate rate of 20 pounds for each 110 square yards of slope area. Straw will then be spread over the excavation slopes and shoved into the loose surface. Top soil selected from fill treatment excavation for its high humus content will be placed over embankment slopes and the central dividing strip.

Upon completion of excavation slope erosion protection and placing of top soil on embankment slopes and the central dividing strip, mesembryanthemum edule (ice plant) cuttings are to be planted on excavation slopes, along the tops of embankment slopes and in the central dividing strip. In addition, the slope areas will be seeded to provide an early protective growth of vegetation.

The contractor is A. Teichert and Son, Inc., Sacramento. The work is being done under the general direction of District Construction Engineer C. E. Waite and District Engineer L. H. Gibson.

## Shade Tree Conference

(Continued from page 30)

Dr. George Zentmeyer of the Citrus Experiment Station told of new fungicides developed during the war. Of special value to the Division of Highways was his report that anthracnose or blight on our native sycamores and Oriental planes may now be controlled with one of several new products.

A growing interest and respect is being shown by our highway tree main-

## Garcès Circle - Memorial

(Continued from page 19)

which he refers to as "San Miguel los Noches por El Santo Principe." Had the Franciscan plans for establishing a mission at this location as a part of a chain of interior missions been carried out, Bakersfield might now be known by some contraction of this sonorous Spanish title.

Garcès crossed the river on a flimsy log bridge and pushed on southward to his first valley base, San Pasquale (Tejon Ranch). The Indians celebrated his return with a feast and dancing.

The missionary left the valley traveling through Tehachapi Pass and returned to his work among the Indians of the Colorado. His entire sojourn in the San Joaquin Valley consumed only a little more than a month. It is considered one of the epic journeys in all North American history.

The missionary explorer could not know that more than a century and a half later his stone likeness would be benignly surveying multitudes of travelers, passing in swift self-propelled vehicles, over part of the same route on which he had laboriously trudged on foot. Nor could he know that the barren wasteland he viewed from the foothills, would one day become a vast agricultural empire settled by peoples from nearly every country on the earth. He would sorely miss the simple children of the rancherias.

A fine statue commemorates his martyrdom at Fort Yuma in 1781.

tenance foremen for the benefits which they derive from the National Shade Tree Conference. Exchange of ideas; contact with commercial men handling tree maintenance products; contact with university instructors and research men, and contact with men of City, State and Federal agencies, give these men a rare opportunity to broaden their knowledge of their chosen work and to apply it in their respective districts.

Those in attendance from the Division of Highways included:

Lloyd Marshall, II; A. J. Bellue, III; Otto Gast and Lewis Barrett, IV; Sylvester Evans, V; Henry Marshall, VI; Aaron Olmstead, Jack Groff, John Mackie, Ordie Marvel and Pete Cowie, VII; Cleveland Taylor and L. L. Brown, VIII; H. D. Martin, XI; E. S. Whitaker and H. N. Bosworth, Headquarters office, Sacramento.

State of California  
EARL WARREN, Governor

# Department of Public Works

Headquarters: Public Works Building, Twelfth and N Streets, Sacramento

CHARLES H. PURCELL, Director of Public Works

A. H. HENDERSON, Assistant Director

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HOMER P. BROWN, Placerville  
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C. ARNHOLT SMITH, San Diego  
CHESTER H. WARLOW, Fresno  
FORD A. CHATTERS, Lindsay, Secretary

## DIVISION OF HIGHWAYS

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FRED J. GRUMM, Assistant State Highway Engineer  
J. G. STANDLEY, Principal Assistant Engineer  
RICHARD H. WILSON, Office Engineer  
T. E. STANTON, Materials and Research Engineer  
R. M. GILLIS, Construction Engineer  
T. H. DENNIS, Maintenance Engineer  
F. W. PANHORST, Bridge Engineer  
A. M. NASH, Engineer of Surveys and Plans  
L. V. CAMPBELL, Engineer of City and Cooperative Projects  
R. H. STALNAKER, Equipment Engineer  
J. W. VICKREY, Traffic Engineer  
E. R. HIGGINS, Comptroller  
FRANK C. BALFOUR, Chief Right of Way Agent

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F. W. HASELWOOD, District II, Redding  
CHARLES H. WHITMORE, District III, Marysville  
JNO. 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  
E. Q. SULLIVAN, District VIII, San Bernardino  
S. W. LOWDEN (Acting), District IX, Bishop  
PAUL O. HARDING, District X, Stockton  
E. E. WALLACE, District XI, San Diego  
HOWARD C. WOOD, Bridge Engineer, San Francisco-Oakland Bay Bridge and Carquinez Bridge

## DIVISION OF WATER RESOURCES

EDWARD HYATT, State Engineer, Chief of Division  
A. D. EDMONSTON, Assistant State Engineer  
GORDON ZANDER, Water Rights  
G. H. JONES, Flood Control and Reclamation  
W. H. HOLMES, Supervision of Dams  
SPENCER BURROUGHS, Attorney  
H. SEARANCKE, Acting Administrative Assistant

## DIVISION OF ARCHITECTURE

ANSON BOYD, State Architect  
W. K. DANIELS, Assistant State Architect, Administrative  
P. T. POAGE, Assistant State Architect, Design and Planning

## HEADQUARTERS

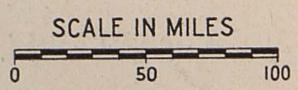
H. W. DEHAVEN, Supervising Architectural Draftsman  
D. C. WILLETT, Supervising Structural Engineer,  
School Buildings  
CARLETON PIERSON, Supervising Specification Writer  
FRANK A. JOHNSON, Supervising Structural Engineer,  
State Buildings  
C. A. HENDERLONG, Principal Mechanical and Electrical  
Engineer  
WADE HALSTEAD, Associate Estimator of Building Construction

## DIVISION OF CONTRACTS AND RIGHTS OF WAY (LEGAL)

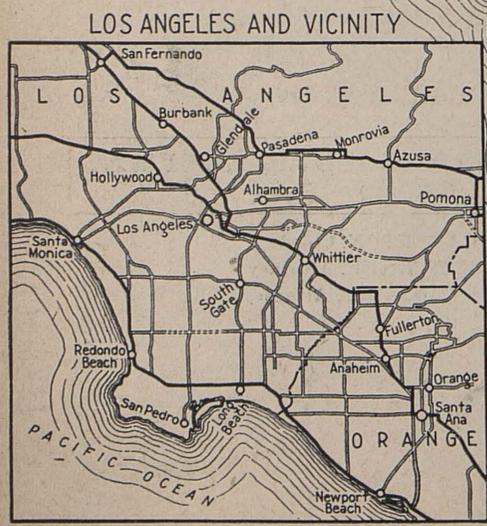
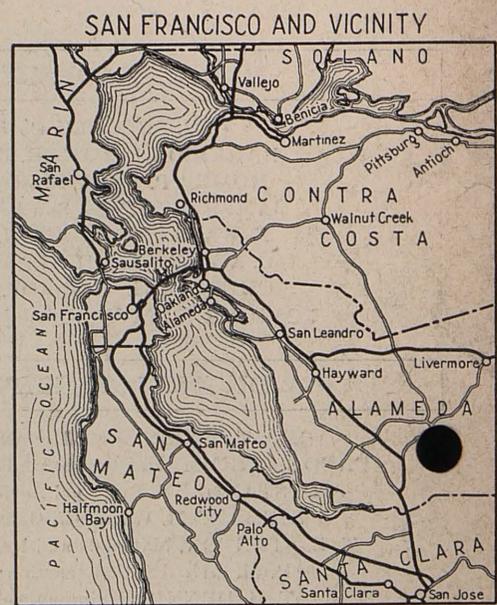
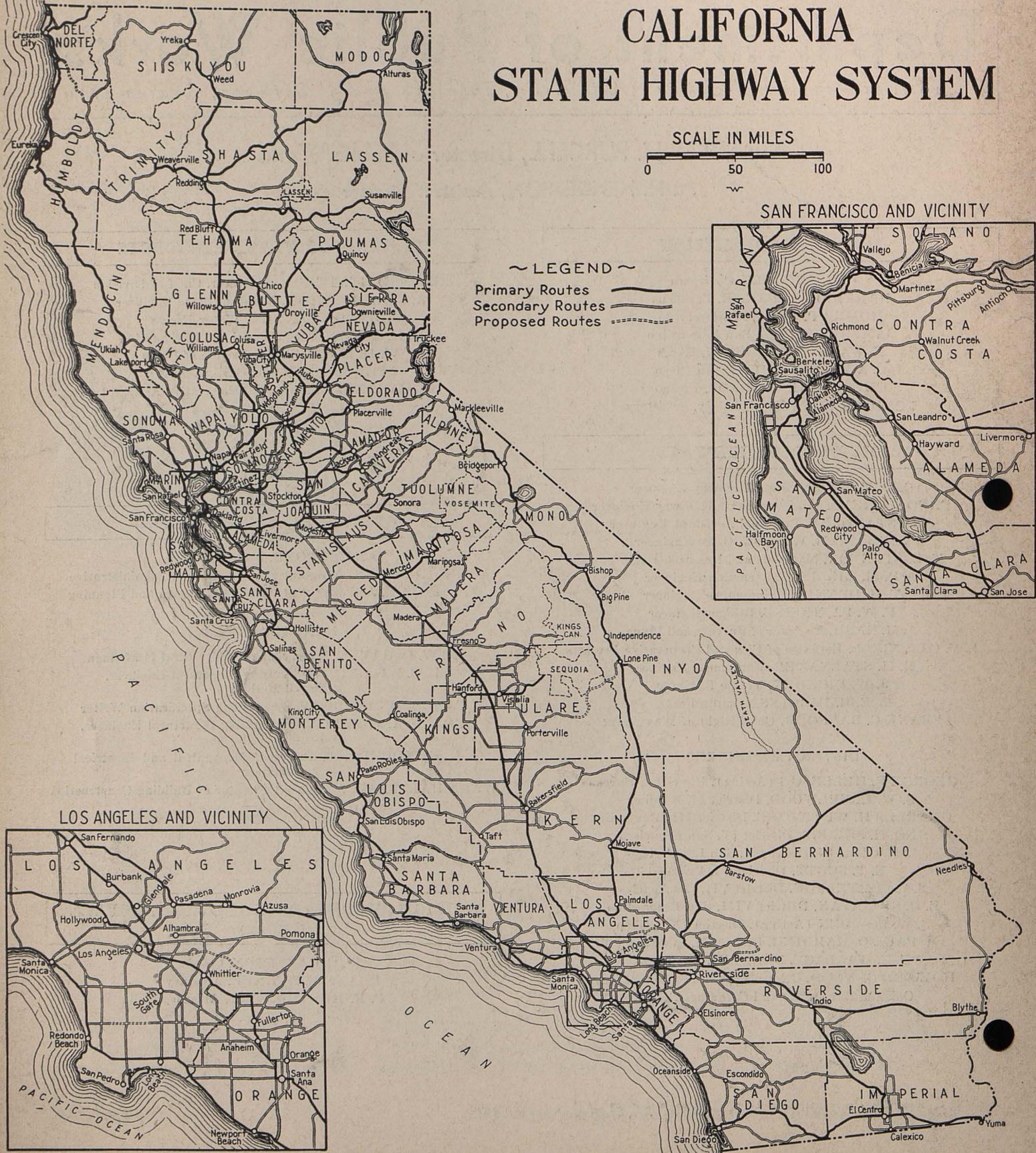
C. C. CARLETON, Chief  
FRANK B. DURKEE, Attorney  
C. R. MONTGOMERY, Attorney

California Highways and Public Works  
 Division of Highways  
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# CALIFORNIA STATE HIGHWAY SYSTEM



~ LEGEND ~  
 Primary Routes ———  
 Secondary Routes ———  
 Proposed Routes - - - - -



Centimeters

Golden Thread

1	2	3	4	5	6	7	8	9	10	11(A)	12	13	14	15
L*	39.12	65.43	49.87	44.26	55.56	70.82	39.92	52.24	97.06	52.02	67.34	62.14	72.06	62.15
a*	13.24	18.11	-4.34	-13.30	11.81	48.55	3.43	59.61	-0.40	0.37	0.28	0.43	0.28	0.19
b*	15.07	18.72	-22.29	-22.65	-24.49	-0.35	-59.60	-46.07	18.51	1.13	0.23	0.21	0.43	0.28
Density									0.04	0.09	0.15	0.22	0.36	0.51

D50 Illuminant, 2 degree observer

Inches

Colors by Munsell Color Services Lab