

# CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



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# California Highways and Public Works

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

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HELEN HALSTED, Assistant Editor

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### COVER

Men and equipment at work. Concrete paving on Paso Robles Bypass on U. S. 101 in San Luis Obispo County. Photo by Robert Munroe, Photographic Section, Department of Public Works, M. R. Nickerson, Chief.

### BACK COVER

Construction scene on new Redwood Highway in Humboldt County. Earthmovers being towed up the ramp of the "big cut." All four cables can be operated simultaneously by four separate donkey engines. Photo by Robert Munroe.

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# U.S. Highway 91

In Riverside and San Bernardino Counties

By C. V. KANE  
District Engineer

# Southland Freeway

An important north-south highway extending through the Great Basin and Rocky Mountain regions of the western United States is US 91. Beginning in Long Beach, California, it can be followed all the way to the Canadian border, whence it continues through Lethbridge, Alberta, as an important connection to the Alcan Highway.

For most of its length US 91 is a part of the National System of Inter-

state and Defense Highways. Recent opening of the Riverside Freeway through the City of Riverside calls attention to the mounting pace of freeway development along this route. The accompanying maps and aerial photographs illustrate the active planning and construction program now underway on US 91 throughout Riverside and San Bernardino Counties, a distance of some 210 miles. The route for the freeway has been

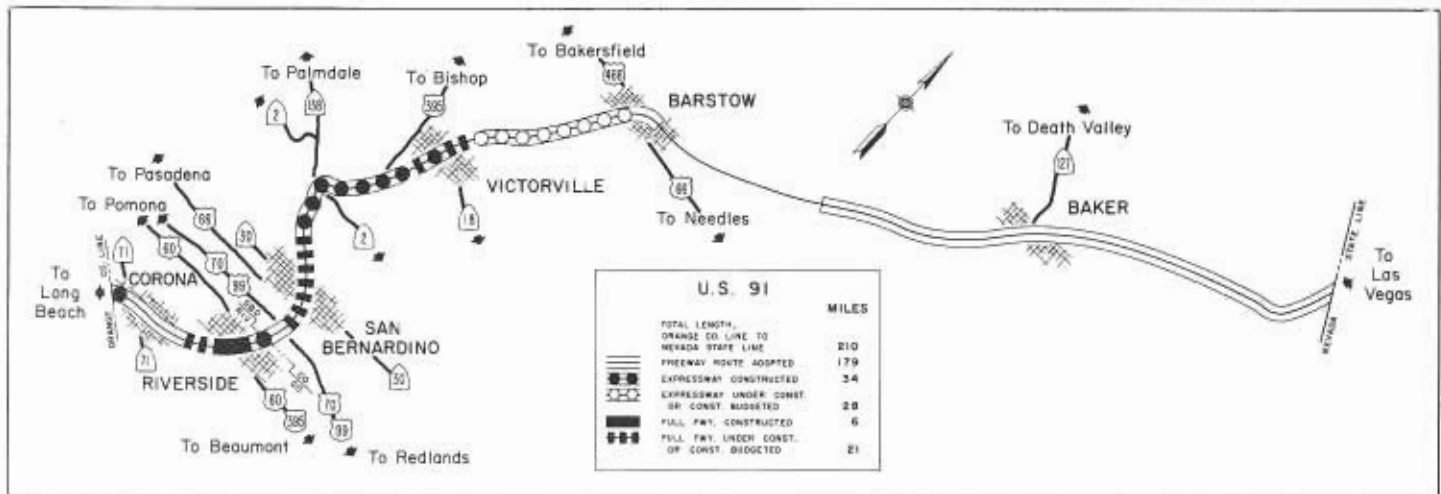
adopted by the California Highway Commission for the entire length except a 31-mile section immediately east of Barstow (through Yermo).

### Important Routes

US 91 carries several other important Federal and State routes over certain sections. It is State Sign Route 18 in the section from the Orange county line to San Bernardino. From Riverside to a point north of Cajon



LEFT—Grading under way at south end of Fredericksen & Kasler contract. Bridge piers under construction for the first crossing of Stoddard-Wells Road, a county road. CENTER—North end of completed Victorville bypass showing construction under way by Gordon H. Ball, contractor on Victorville Overhead and Mojave River Bridge. RIGHT—Closer view of construction at Victorville Overhead and Mojave River Bridge. First crossing of Stoddard-Wells Road in right background.



## Aerial Photos Tell Picture Story of U. S. 91 Freeway Progress



PHOTO No. 1—Looking north along route of the third unit of Riverside Freeway, which soon will be under construction. Freeway will lie to the left of Indiana Avenue, where housemoving operations can be seen underway. Jackson Street crosses through the center of the picture. This third unit will extend from Polk Avenue to the end of the second unit at Arlington Avenue, which can be seen in the background. PHOTO No. 2—Looking north from the south end of the second unit of the Riverside Freeway, which is now under construction by Griffith Company. Arlington Avenue Undercrossing and interchange ramps are in the foreground; Pachappa Hill is in the left center. This \$2,000,000 contract extends from Arlington Avenue to 14th Street, with estimated completion in September, 1957. PHOTO No. 3—Looking north from the Ivy Street Overcrossing, showing construction underway through the City of Riverside. Pachappa Underpass of the Union Pacific Railroad is in the center.

PHOTO No. 4—Looking north along the Riverside Freeway, showing Cridge Street Overcrossing in the foreground, and 14th Street Overcrossing in the center. The first unit of the Riverside Freeway is under contract with Griffith Company, and extends from 14th Street to Russell Street in the background. PHOTO No. 5—Looking north along the Riverside Freeway from above Eighth Street. The existing expressway along La Cadena Drive shows at top of photo, and the Third Street Undercrossing near the center. This unit, a \$1,900,000 contract, is estimated to be completed in July, 1957. PHOTO No. 6—Future extension of the Riverside Freeway is indicated by the line running northeast from a point north of the present junction of Iowa Avenue and La Cadena Drive at lower edge of photo. Barton Road, a major county highway, extends across through the Grand Terrace area at the top of the picture.







PHOTO No. 7—Looking east toward the Grand Terrace area. The north end of the future Riverside Freeway shows in the fill construction near the grain bins at the extreme left center of the picture. A future freeway contract for which plans are now in the design stage will traverse the farmland east of the Santa Ana River in the foreground. PHOTO No. 8—Looking north along the San Bernardino Freeway from a point above the Colton Avenue interchange. The Mill Street Undercrossing and the Lytle Creek Bridge are under construction in the center of the picture. I Street lies parallel to and just west of the freeway. The portion from Mill Street to Sixth Street in San Bernardino is now under construction by E. L. Yeager Company, the completion estimated in January, 1958. PHOTO No. 9—Looking north along the San Bernardino Freeway from above Rialto Avenue. The Santa Fe railroad yards and the Fifth Street Viaduct show in the center of the photo. Construction of the northbound freeway lanes across Fifth Street (US 66 Business) required the closing of Fifth Street for approximately six months. This structure was completed and Fifth Street reopened to traffic on June 15, 1957. Future extension of the freeway to the north, with two contracts expected to be advertised for bids this summer, is indicated by the line on the photo.

PHOTO No. 10—This is a photo looking southward along the San Bernardino Freeway from a point above Fifth Street. The large fills under construction for the US 70-99-91-395 interchange are visible in the far background. PHOTO No. 11—A view looking north along I Street from above Fifth Street, showing right-of-way clearance operations underway immediately east of I Street. PHOTO No. 12—Looking east along Highland Avenue, State Sign Route 30. The large graded area in the lower left will be the location of additional interchange ramps to be constructed in conjunction with the US 91 freeway project.



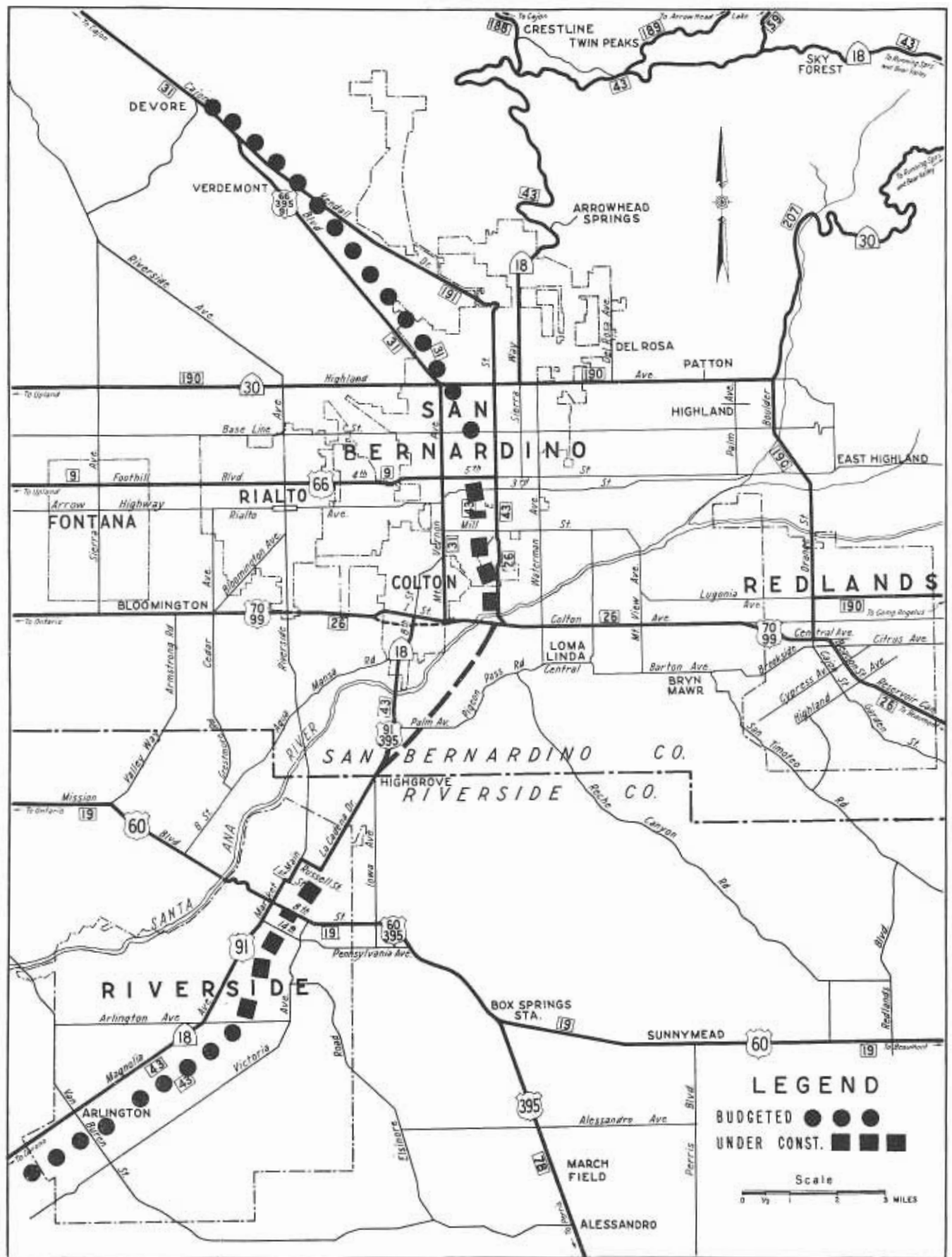






PHOTO No. 13—Construction now underway by Charles McCloskey and Crowell and Larson includes the junction of the Riverside Freeway and the San Bernardino Freeway. Embankments being built in the foreground of the photo will be the northerly terminus of the Riverside Freeway. The San Bernardino Freeway enters the interchange area on the left side of the photo, and turns northward to enter the City of San Bernardino in the background. Bridge construction in the center of the photo spans the Santa Ana River. This \$3,300,000 contract is expected to be completed in February, 1958. The present US 99 crosses from west to east in the middle of the photo.

PHOTO No. 14—Looking northwest toward the entrance to Cajon Pass. The street in the left foreground is I Street, recently adopted as a state highway between the freeway and Highland Avenue, which crosses through the center of the photo. Highland Avenue is State Sign Route 30, and the separation structure carrying it over the railroad and the freeway, completed last year, can be seen on the left. PHOTO No. 15—Looking northwest from the Highland Avenue Separation along the route of the third and fourth units of this freeway, which will be advertised for construction in the near future. Existing US 66-91-395 along left side of picture.





LEFT—Looking south along recently completed Riverside Freeway from above Third Street. Seventh Street and Eighth Street crossing near middle of photo.  
 RIGHT—Looking north along Riverside Freeway through center of Riverside. Fourteenth Street Overcrossing in middle of photo.

Pass it is also designated US 395. And from San Bernardino to Barstow it carries the additional traffic of US 66.

Between the Orange county line and Corona, the freeway route has been established since 1949. Design work is now under way on plans to convert the existing grade intersections of the expressway to full freeway standards with grade separations and interchange ramps.

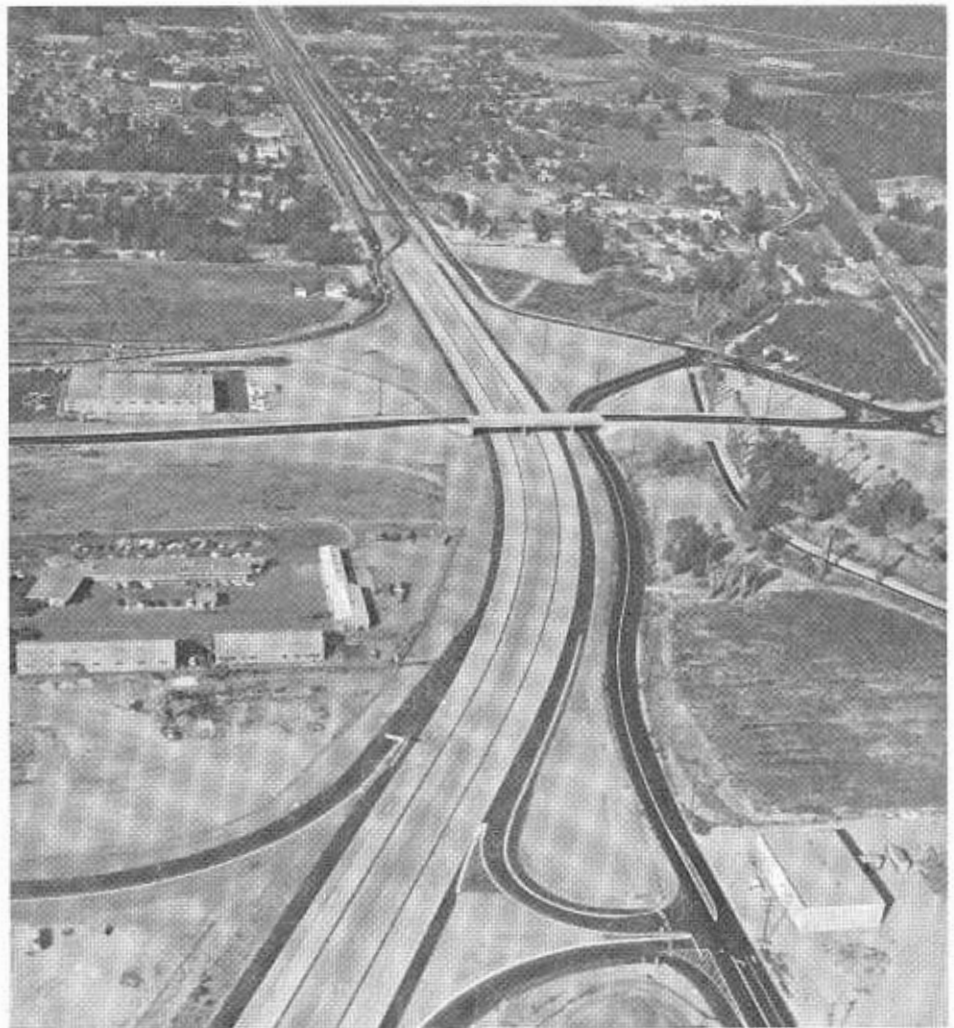
Through Corona and the territory between Corona and Riverside, the freeway route was adopted on June 30, 1956, by the California Highway Commission, following a public meeting held by the Division of Highways in Corona in March, 1956. Design work on plans for this construction is well advanced and some right of way has been acquired.

#### Two Units in Riverside

As mentioned above, two units in the City of Riverside, totaling 4.7 miles in length, were opened to traffic on September 20, 1957. Total cost of these units was approximately \$8,300,000, \$4,500,000 for rights of way and \$3,800,000 for construction.

A third unit, extending 3.7 miles southwesterly from Arlington Avenue is included in the current fiscal year budget for construction. Bids will be opened in Los Angeles on November 7, 1957.

North end of recently completed Griffith Company contract in Riverside showing Spruce Street Overcrossing in center and La Cadena Expressway in background.





Construction is under way on two units, totaling 3.5 miles in length, in the San Bernardino area. Here US 91 is on the San Bernardino Freeway, and becomes a part of the Federal Interstate and Defense Highway System. Bids for a unit of US 91 from 27th Street in San Bernardino to Devore in Cajon Pass will be opened in October, and another unit, from Sixth Street to 27th Street, is included in the current year construction budget. These two sections total 11.6 miles in length.

Between the Riverside and San Bernardino sections of the Riverside Freeway lie two miles of La Cadena Avenue expressway, which will be converted to full freeway standards, and four miles where the freeway will be on new location. Design work is well advanced on both these portions and right of way is being purchased.

#### Freeway to Victorville

North of Devore, US 91 passes over Cajon Pass and on to Victorville as an existing four-lane divided expressway, constructed under contracts in 1954 and 1955. This 30-mile section will be converted to full freeway standards in the future, in accordance with requirements of the Interstate and Defense Highway System.

The first unit of the "Victorville Bypass" was completed in 1956 as a combination expressway and full freeway. This means intersections at grade for the minor cross streets but separation structures at the major roads. The second unit, a \$1,800,000 project, including overhead crossing of the Union Pacific and Santa Fe Railroads and the Mojave River Bridge is now under construction and about 80 percent complete.

#### Project Through Barstow

From Victorville to Barstow, Fredricksen and Kasler, Contractors, have recently started construction of 29 miles of US 91 on new location. This project is scheduled for completion in May, 1959, and should eliminate one of the most aggravating and hazardous stretches.

Through the City of Barstow, US 91 will be constructed as a full free-

way on new location. The route was adopted by the Highway Commission in October, 1955, following a public meeting by the Division of Highways in August. Plans for this work are well advanced in the design stage.

As mentioned before, the freeway route has not yet been adopted between Barstow and Field, a distance of about 31 miles, including the portion through Yermo. Preliminary studies by the Division of Highways are under way for this section and a public meeting in Yermo will be scheduled in the near future to present and discuss the results of these studies.

North of Field the freeway route was established by the Highway Commission in August, 1957, after a public meeting in Baker in April. This route adoption covered approximately 83 miles, terminating at the Nevada state line. Design work and preparation of construction plans for all units of this section are now in progress.

### THE DIVISION THANKS YOU

J. T. McCLELLAN  
Real Estate

SAN FRANCISCO 2, CALIFORNIA

*Division of Highways  
Sacramento, California*

GENTLEMEN: This letter is addressed to everyone in the Division of Highways. I want to say "thank you" to all of the personnel of this department. This is because you have given me the pleasure of riding on the new part of the highway from San Francisco to South San Francisco.

I join you in feeling proud of what you have done. For the money spent, you have all done a very fine job. Many thanks from a taxpayer and rider.

Yours very truly,

J. T. McCLELLAN

### DRIVERS' LICENSES

A total of 7,036,566 California drivers' licenses were outstanding as of June 30, 1957, reports the National Automobile Club. Of this total, 6,659,661 were operators' licenses and 376,905 were chauffeurs' licenses.

## Richard Winn Named Editor of Magazine

With the November-December issue, *California Highways and Public Works* will have a new editor. Richard Winn, former California newspaperman and retired Navy public information officer, succeeds Kenneth C. Adams, information officer of the Department of Public Works and magazine editor, who reached the mandatory retirement age of 70 on October 6, 1957, after more than 50 years of newspaper and public relations work in this Country and abroad, 22 years of which have been in state service.

Winn has been a Californian since 1910. He was appointed to his new post by the Director of Public Works following a civil service examination.

After he was graduated from the University of California in 1929, he went to work as a reporter on the *Oakland Tribune*. Winn remained at the *Tribune* until a few months before World War II started, when he went on active duty as a naval reserve officer. He served afloat in the Pacific during all of the war years, except for six months' study at the Naval War College.

Winn's navy duty since mid-1946 has been in public information. He was in charge of the news section and, earlier, the motion picture section of the Navy's Office of Public Information in Washington. He also headed the newsreel section of the Department of Defense Office of Public Information in Washington.

Toward the end of the Korean War, Winn was assigned to the staff of Commander Naval Forces, Far East, with headquarters in Japan. He headed public information for that command for a year. He served during another of his duty periods as public information officer for the Commandant, Sixth Naval District, at Charleston, South Carolina.

Winn returned to California after his retirement from active navy duty in January, 1957, as a Commander. He and his wife have established their home in Sacramento.

The retiring editor of *California Highways and Public Works* takes this opportunity to thank the many thousands of readers of the magazine for the kindly and complimentary letters they have sent in over the years.—K. C. A.

### CALIFORNIA'S PEAKS

California has 171 peaks that exceed 8,000 feet.

# Case History

## High Capacity Through Medians and Signals

By A. L. HIMELHOCH, Assistant District Engineer

### INTRODUCTION

THE rapid industrial growth around the Los Angeles International Airport is generating an increasing amount of commuter traffic to and from the area. Streets and highways feeding the area are, therefore, becoming more and more congested. Leading south from the airport is only one major through highway, US 101 Alternate. As a result, extremely heavy peak traffic volumes have developed on this route. Congestion and delay increased to a point where some type of improvement was essential. The highway was a four-lane, undivided road, with considerable roadside business throughout. The expense of additional right-of-way for widening was not considered economically feasible, particularly in view of ultimate freeway development in three or four years.

The plan, therefore, was for improvement within existing curbs. The improvement consisted of:

1. The installation of additional traffic signal controls to allow cross traffic through the barrier created by heavy traffic flow on US 101A.

2. The conversion of existing traffic signals to three-way operation because of very heavy left-turn volumes.

3. The supervision of all traffic signals within this system by a traffic-controlled variable cycle and preferential master electronic computer to provide maximum traffic-handling ability, automatically adapting to favor the heavier direction.

4. The construction of a curbed median divider throughout the system providing left-turn lanes to reduce accidents and to allow smooth and efficient traffic flow.

The project was completed this year at a cost of \$185,400. After testing and adjustments, the results of the observation of operation and traffic-handling ability were outstanding. With hourly volumes up to 1,500 vehicles per lane and 780 left turns, the system

proves that traffic engineering can alleviate many surface street congestion problems heretofore thought insolvable.

THE morning and evening rush-hour traffic congestion on our highways is a constant and ever-increasing problem in metropolitan areas throughout the Country. Mr. John Q. Public is constantly applying pressure on the traffic engineer to eliminate "bottle-necks" and congestion on the route to and from his place of employment. He is always in a rush to get to work and in a bigger rush to get home. Delays are aggravating. He is a member of a large group of commuters comprising nearly 50 percent of the total traffic using many metropolitan area highways on any working day. In driving with the peak traffic or on the crest of the wave, he receives the impression that the congestion period is nearly endless, when actually at any given point on his route it will last only for about an hour, morning and evening.

This of course, is the hour of congestion that we would all like to see eliminated.

In the Greater Los Angeles metropolitan area there are many arterial highways leading to and from commercial and industrial areas that are becoming increasingly congested during the morning and evening peak "rush hours." Freeways are being built as rapidly as possible to alleviate these congested surface streets. However, many existing highways require immediate improvement because of very rapid increase in traffic volumes and congestion.

### Industrial Development

The southwestern section of the Los Angeles metropolitan area has grown and developed in the past few years at a rate exceeded only by very few areas in the Country. This has been

mainly due to an aircraft industrial development, growing around Los Angeles International Airport. Two of the many plants in the area presently employ about 45,000 people. In addition, an estimated 35,000 passengers per day will use the expanded airport facilities in the near future. Many other plants in the immediate area employ thousands more. As a result, highways leading to and from the area are presently heavily overloaded during the peak "rush hours."

U. S. Sign Route 101 Alternate, Sepulveda Boulevard, is the only major highway leading from the airport area to the beaches and coastal areas to the south (Figure 1). This route is the major north-south coastal highway along the Pacific Coast, serving coastwise through traffic. In addition, State Sign Route 7 merges from the north into US 101 Alternate at the airport, feeding traffic from the San Fernando Valley and western sections of Los Angeles.

The peak load of relatively local commuter traffic is therefore superimposed onto the normal through coastwise commercial and recreational traffic, creating an extremely heavy and prolonged traffic "rush hour."

### Cross-traffic Barrier

As there are no through parallel north-south routes close enough to be used as alternate routes, this heavy stream of traffic flows south on Sepulveda Boulevard through the residential beach city of Manhattan Beach. This resulted in extreme congestion along the route and, in addition, a barrier to the local beach area cross traffic that was nearly impassable. As the freeway planned to relieve this route will not be completed for several years, an immediate improvement in the area was indicated.

The real problem existed on Sepulveda Boulevard between Rosecrans Avenue on the north to Gould Lane





LOS ANGELES AND VICINITY

SCALE IN MILES  
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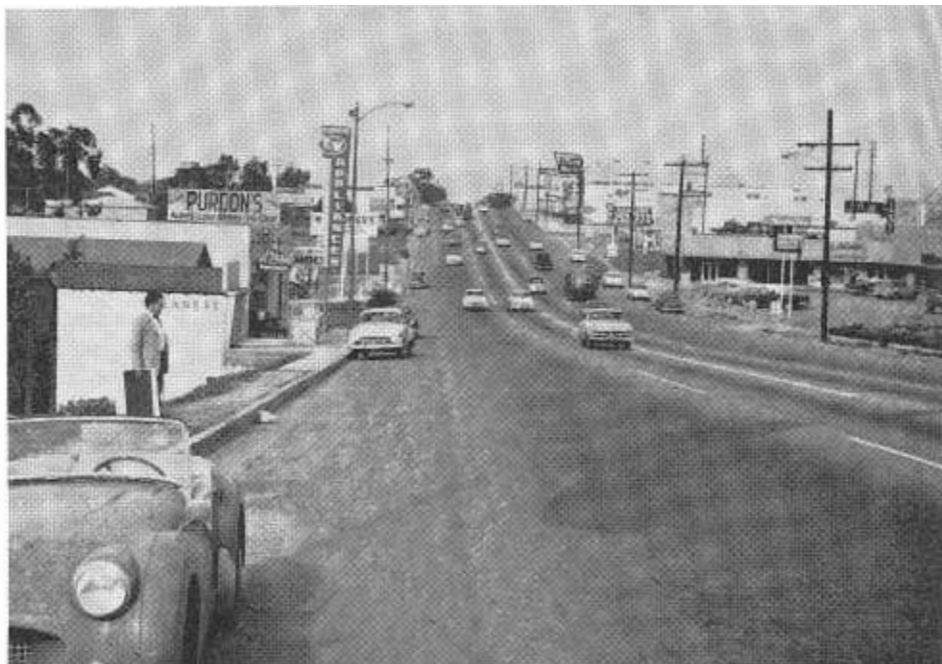
on the south—a distance of two miles. The highway within these limits was undivided, striped for four lanes, 76 feet wide curb to curb, of adequate structural section, and with relatively straight alignment. Vertical alignment introduced an extra problem, since most of the major cross streets intersected at the summits of the hills. Typical conditions are illustrated in *Figure 2*. There is considerable roadside business with unrestricted parking. Developed areas east and west of the highway are residential. It was not considered economically feasible to purchase additional right-of-way or to widen the roadway because of high business property costs and, particularly, in view of near future freeway development. The improvement, therefore, had to take place within existing curbs.

In order to proceed logically with an improvement plan for the highway, a complete study and analysis of the conditions before improvement were necessary.

#### Heavy Turning Movements

First, as previously mentioned, Sepulveda Boulevard traffic was a barrier to local vehicle and pedestrian cross traffic. Second, because of the relatively few major through cross streets in this area, there existed a considerable volume of cross traffic and heavy turning movements at these major intersections. The intersections of Sepulveda Boulevard with the four major cross streets—Rosecrans Avenue, Marine Avenue, Manhattan Beach Boulevard, and Gould Lane (*Figure 3*) were controlled by existing two-phase, full-traffic-actuated, volume-density type traffic signals. This equipment provided the highest available type of isolated intersection two-phase control. These signalized intersections were all one-half mile or more apart, and, of course, were not co-ordinated to provide any progressive or platooned traffic flow. However, due to heavy left-turn traffic, the efficiency of the traffic-handling ability of these two-phase controls was poor.

Third, the accident records revealed a high rate of accidents with a predominance of the left-turn type at the major intersections, but showing also



Looking north on Sepulveda Boulevard (U. S. 101 Alternate), showing conditions before improvement. Marine Avenue at summit in background.

an abnormal number of head-on and rear-end types. At the minor intersections accidents were equally divided between intersecting, rear-end and turning types. The three-year study gave a total of 233 reported accidents—101 night and 132 day.

Fourth, the traffic flow pattern shown in *Figures 4 and 5* is highly directional, being extremely heavy northbound in the morning with relatively few left turns, while in the evening the major movement is southbound with heavy left-turn traffic.

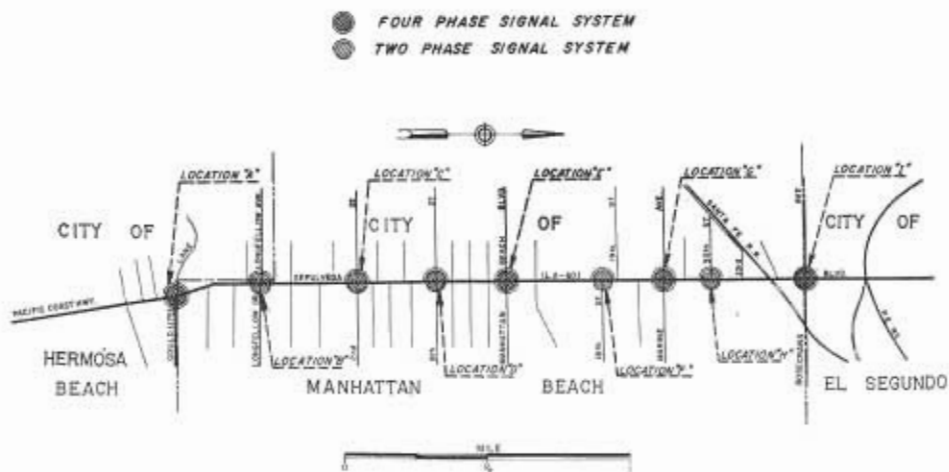
This pattern is generally the same at all four of the major intersections.

#### Several Solutions Possible

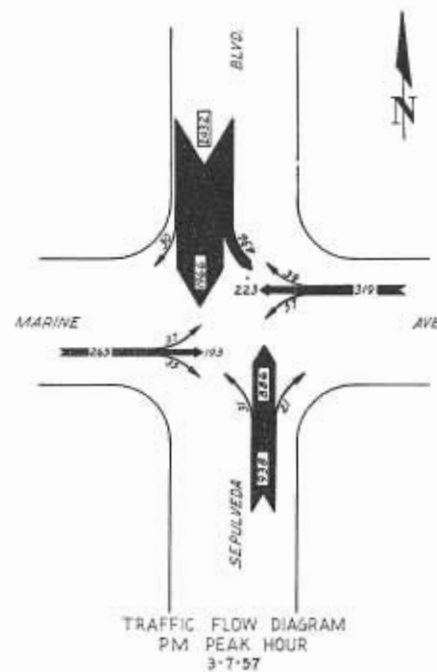
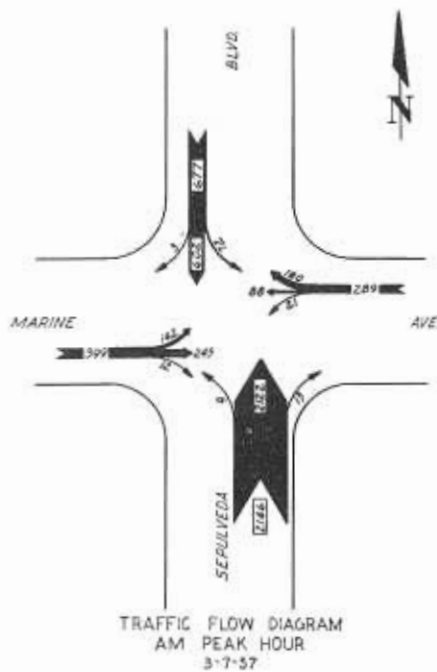
An analysis of the above conditions led to consideration of a number of possible improvement solutions or plans.

1. To relieve the barrier problem, it would be necessary to provide gaps in the traffic flow along Sepulveda Boulevard by co-ordination of the existing traffic signals. These gaps in traffic would allow pedestrians and ve-

### PROJECT LOCATION MAP







hicles to cross Sepulveda Boulevard. Unfortunately, with the half mile and more spacing between the existing traffic signals, the platoons would spread out generally resulting in gaps too short to allow sufficient crossing time. To insure a gap of sufficient duration to allow crossing, traffic signals could be installed at intermediate intersections to provide approximately one-fourth mile spacing.

2. The conditions of heavy left-turn volumes and high turning and rear-end accident rates at the major intersections would only be alleviated by left-turn lane channelization and protective three-phase signalization. Five additional intermediate signals would provide a system consisting of nine signalized intersections all co-ordinated to provide progressive platooning of traffic. However, a platoon of traffic should be unobstructed in traveling through a signal system. Left-turn lanes were required at every intersection since one car waiting to turn left at an intermediate nonchannelized intersection may hold up one lane of the platoon, reducing the efficiency of operation by as much as 50 percent. Therefore, a continuous divider providing left-turn lanes for all the cross streets was essential. This was, of course, also a solution to the head-on accident rate as well as other

accident types between and at the minor cross streets.

#### Two Wide Roadways

With a continuous divider, the 76-foot roadway could be developed to provide two 31-foot roadways each consisting of two 11-foot lanes and 9 feet for parking, separated by a 14-foot curbed median. The median furnishes area for a 10-foot left-turn lane of varying length depending upon left-turn volumes.

The peak-hour traffic flow diagrams not only show the need for some type of left-turn phasing at the major intersections, but also show that the Sepulveda Boulevard traffic volume will require a relatively high percentage of the available green time. This means that long signal cycles will be needed during the peak hours, but shorter cycles will be sufficient during off-peak periods. Ideally, the cycles and resultant green times should match as nearly as possible the traffic volume demand. The equipment selected was, therefore, a master traffic computer to detect the traffic volume on Sepulveda Boulevard and select the proper background cycle.

In addition, the flow diagrams show a definite directional flow, extremely heavy northbound in the morning and southbound in the evening. It was necessary then to provide for direc-

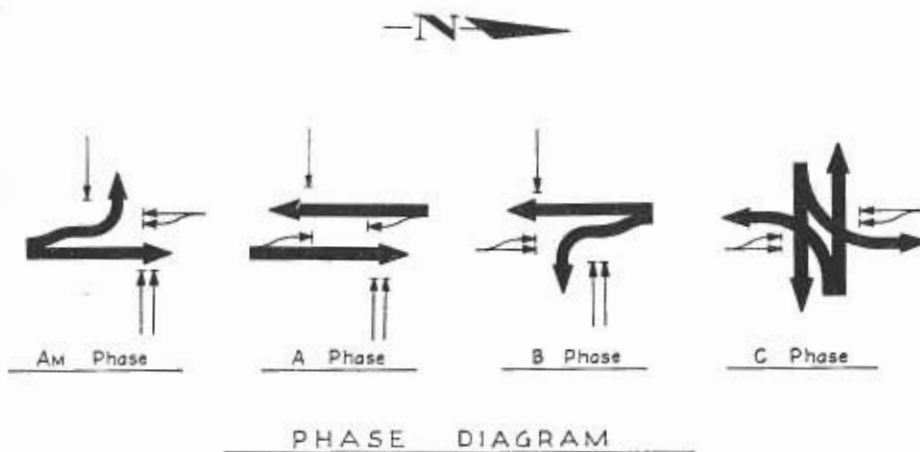
tional detection and analysis. To adjust for the directional characteristic of the traffic, a second master traffic computer was selected. The cycle length for the system could then be determined by the computer detecting the heavier directional flow. A difference in directional flow could also be detected and preference given to the direction of heavier flow.

#### Continuous Supervision

The system thus developed may be called a co-ordinated variable cycle, preferential traffic-controlled traffic signal system. This provides continuous automatic supervision of the nine signalized intersections controlled by the vehicular traffic flowing on the highway.

The local intersection signal control selected was of the semi-traffic-actuated type, allowing side street green only on pedestrian and vehicular demand. This provides the maximum amount of green for Sepulveda Boulevard. The five minor intersections are two-phase and, as previously mentioned, the four major intersections required an additional phase for the left-turn movement.

The usual type of phasing used when the left turn is given separate phasing might be A phase for the through movement on the main artery, B phase for both left-turn lanes, and C phase for the cross street movement. Inspection of the typical flow diagrams will show that, due to a fairly well-balanced opposing left-turn volume during the morning peak hour, this type of phasing would be satisfactory. However, the evening peak-hour flow diagram will show extremely unbalanced opposing left-turn volumes which would result in very poor operating efficiency were this type of phasing to be used. Therefore the more standard phasing was abandoned. It was noted that all four of the major intersections show similar traffic patterns. Furthermore, the pattern should remain fairly constant in the future because of the topography. The narrow strip of developed land between Sepulveda Boulevard and the Pacific Ocean is principally residential and incapable of generating a large traffic volume.



Phase diagram showing four-movement type of control

#### Convenient Pattern

The phasing shown in *Figure 6* was therefore developed. It provides an overlapping green for the heavy southbound evening through movement during the heavy B phase left-turn movement. This is a very convenient traffic pattern in that the maximum amount of green time is utilized. During the morning peak hours, B phase traffic is light and southbound traffic is also light, so the additional green provided by the overlap was not needed. As B phase green time will be short due to light traffic demand, unused available green will be automatically added to the unactuated A phase green time. This additional green for A phase is greedily used up by the morning heavy northbound through traffic.

It may be noted that the phase diagram actually shows four movements. With the A, B, and C phasing as

shown, something had to be done about the northbound to west left-turn movement. Although it is a consistently light movement, a protected left-turn phase was considered necessary because of the extremely heavy opposing southbound through movement in the afternoon peak period. An auxiliary minor movement controller was selected to provide an extendible and separately actuated phase, time for which is taken out of the beginning of the parent controller A phase green time. This phase is called the A minor phase, and, as shown on the phase diagram, merely holds up the southbound through movement until the northbound left-turn traffic clears.

#### Cost Total \$185,400

The highway development and signalization discussed above were considered to be the most feasible improvement combination that would

provide the traffic-handling efficiency desired. Plans and specifications for the improvement were then completed and the project advertised. The contract was awarded on August 8, 1956, and construction completed and accepted on January 24, 1957, at a cost of \$185,400. *Figures 7, 8, 9, and 10* are views showing the completed improvement.

Following the completion of the system, the Division of Highways conducted a period of testing and adjustment to provide maximum operating efficiency. Seven pen graphic recorders were installed to provide a continuous record of the operation, both for the southbound traffic and for the northbound traffic. *Figure 11* shows a graphical record of a typical day's operation, showing (1) the volume at any time on a per-hour, per-lane basis; (2) the cycle length being used at any time; (3) offsets in use, northbound, southbound preferential offsets, or average offsets. It may be noted that the chart is calibrated in percent on the volume scale and that cycle lines are labeled A, B, C, D, E, and F. On the volume scale 100 percent represents 1,000 vehicles per hour per lane. The lettered cycles have equivalent times as follows:

- Cycle A—Free running or non-co-ordinated
- Cycle B— 60 seconds
- Cycle C— 65 seconds
- Cycle D— 80 seconds
- Cycle E—100 seconds
- Cycle F—120 seconds

LEFT—Looking south on Sepulveda Boulevard from Manhattan Beach Boulevard, showing conditions of roadway after completed improvement. Note sampling detectors in right foreground. RIGHT—Looking south from Manhattan Beach Boulevard, showing vehicles moving during A minor phase.





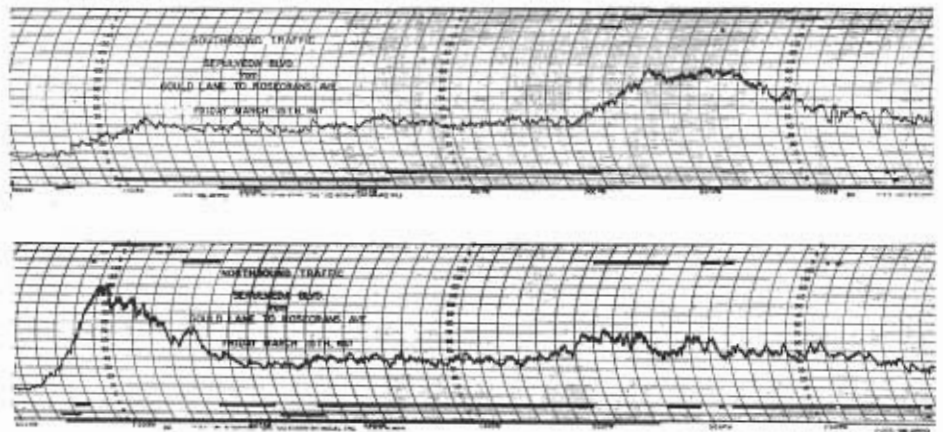


LEFT—Looking north from Manhattan Beach Boulevard, showing 12-inch left-turn green arrow during A minor phase. RIGHT—Looking north on Sepulveda Boulevard from Gould Lane showing 780 vehicles per hour left-turn movement.

### Smooth Operation

A comparison of the volume curve with the cycle lines will show that very light traffic will require cycle A or non-co-ordinated operation. With semi-traffic-actuated intersection controllers, a progressive band is non-existent during very light traffic conditions such that co-ordination is not necessary. Waiting time is reduced considerably. Cycle F will be required during the peak traffic load, with cycles B, C, D, and E used for traffic volumes between the heaviest and the lightest. The traffic volumes requiring the various cycles may also be taken from the curves. The volume to select a particular cycle is adjustable. That is, by adjustment of controls on the master supervisory equipment, any particular amount or volume of traffic detected may be chosen to select a particular cycle. Considerable refinement in these adjustments was necessary in order to provide smooth operation.

The offset timing for the various intersections also required some refined adjustment. The southbound preferential offsets for the two-phase controllers were set later than normal in relation to the three-phase intersections to allow the B phase overlap portion of a platoon to flow through the system. Normally the bottom of the through traffic band is determined by the beginning of B phase. However, in this particular system southbound, the bottom of this band is the end of B phase at the three-phase in-



Graph showing typical day's operation of the variable cycle system. The 100 on the chart represents 1,000 vehicles per hour per lane. Horizontal heavy lines show cycle in use, except Cycle A, which indicates desire for preferential offset.

tersections, which means that the two-phase intersection offsets are additionally offset by the amount of B phase green time used at the three-phase intersections. The northbound preferential offset relationships were normal, as the bottom of the northbound band is the beginning of B phase at the three-phase intersections.

An analysis of before and after operation indicates the traffic-handling ability of the system has exceeded all estimates. Traffic counts taken before and after have indicated an average total intersection peak-hour increase of about 15 percent. The south-to-east evening peak-hour turning movement at all major intersections has increased approximately 100 percent. The following are outstanding before and after peak-hour comparisons:

	Before	After	Percent Increase
Northbound through movement:			
Morning parking hour at Rosecrans	2,900	3,250	12
Morning parking hour at Gould Lane	1,300	1,500	15
Southbound left-turn movement:			
Afternoon parking hour at Marine	200	436	118
Afternoon parking hour at Gould Lane	390	780	100
Eastbound through movement:			
Morning parking hour at Gould Lane	169	448	265

### No Left Turn Accidents

Although the five months since the improvement was completed is a relatively short period for before and after comparison of accident data, the following tabulation indicates a definite decrease in accident severity with-

... Continued on page 64

# OPERATIONS AND ACTIVITIES OF MATERIALS AND RESEARCH DEPARTMENT

## PART III—TECHNICAL SECTION

By BAILEY TREMPER

Supervising Materials and Research Engineer

THIS is the third of a series presenting the operations and activities of the Materials and Research Department. This article describes the functions of the Technical Section, one of the five major subdivisions of the department. The "Technical" Section is neither more nor less technical than the other sections—the term was adopted because of the various and dissimilar activities grouped in this unit.

The Technical Section performs a variety of tests that cannot be made economically in branch or district laboratories. These tests require costly equipment and highly specialized personnel, and the amount of work for a given district would not justify the equipment and specialists.

The Technical Section is composed of four units or subsections. They are designated as the portland cement, portland cement concrete, chemical, and the research correlation units.

### PORTLAND CEMENT UNIT

The portland cement unit, under the direction of W. E. Haskell, Associate Materials and Research Engineer, regularly makes routine physical tests of samples representing approximately 8,000,000 sacks of portland cement per year. The tests are made upon samples that are selected from each shipment of cement received on the work. This amount of cement means an annual investment of over \$47,000,000 in concrete for pavements and structures.

In a year's time, about 2,000 physical tests are made on routine samples of portland cement. There are 13 portland cement manufacturing plants in California that furnish cement for highway use. As the acceptance or rejection of materials is based on tests, it is obvious that the cement companies should be greatly concerned with the accuracy and precision of the tests conducted by the laboratory of the

Materials and Research Department as well as those performed in their control work. This department has promoted co-operative tests between the cement manufacturers and the division, and as a result it is rare that there is any serious disagreement between the cement companies and the division with respect to the results obtained by their respective laboratories. Present specifications of the Division of Highways are more restrictive than those of many organizations, but they result in better and more uniform cement than was obtained formerly under less restrictive specifications.

The cement unit also handles routine tests on concrete and tests over 6,000 job-made concrete cylinders per year. These represent the concrete as it is mixed for use in structures in all parts of the State. Tests are made for unit weight and compressive strength. Recently concrete cylinders originating in Southern California are being tested in the Los Angeles branch laboratory saving time and expense of shipment.

### Important Routine Work

Other routine work, minor in quantity but important in its significance, consists of tests of concrete curing compounds for compliance with the specifications and of concrete sands for the development of strength in portland cement mortar.

In addition to routine testing, a substantial part of the cement unit is given over to research and investigation. In common with the other sections of the Materials and Research Department, its research activities have in several instances been accorded international recognition in the scientific and engineering literature, and have earned awards of medals and citations of merit from learned societies and technical organizations.

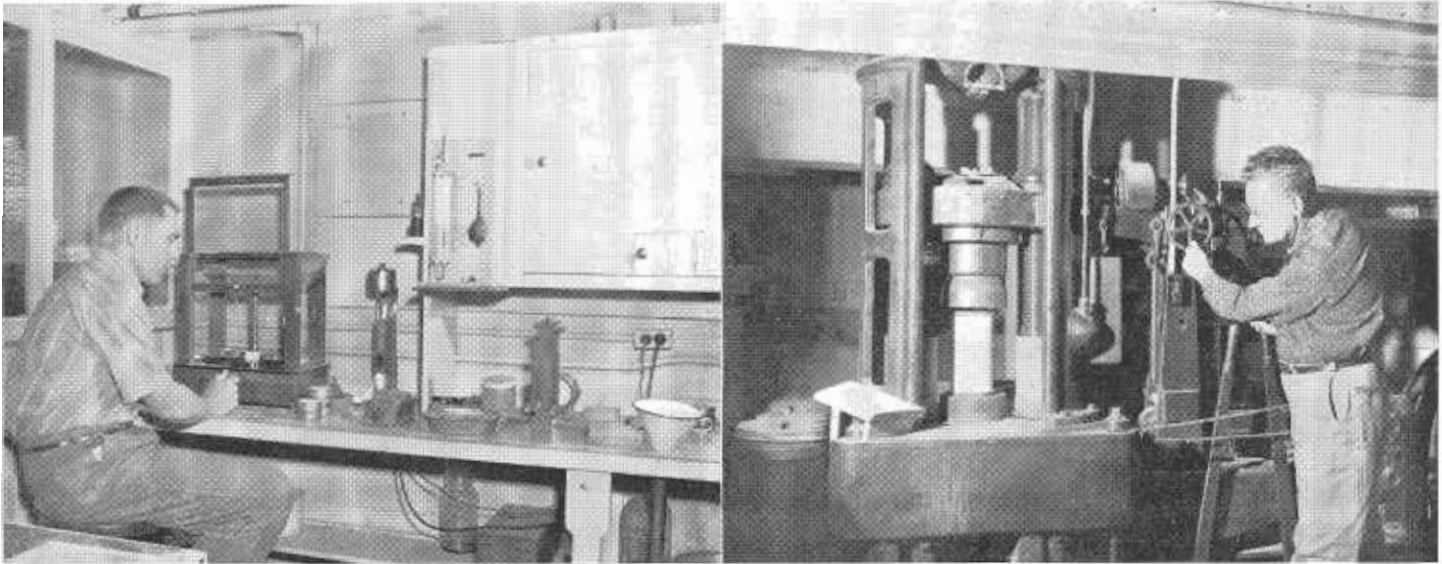
### Reducing Volume Change

Much of the research work of the cement unit is now directed toward means of reducing the volume change of concrete during wetting and drying. Volume change is responsible for much of the cracking and deterioration that occasionally take place with age. Any means of reducing volume change without sacrifice of strength and durability is of distinct benefit. One line of attack lies in improving the properties of portland cement by better regulation of the gypsum content. Portland cement is manufactured by first mixing limestone and clay, then heating until the carefully proportioned mixture fuses to form a clinker. Gypsum, a naturally occurring mineral, is added to the clinker before it is ground into portland cement. The proportion can be varied at will, but the optimum amount varies with the particular cement, and at present can be determined only by tests of long duration. The cement unit is now working on a short-time test that can be applied both by the manufacturer and the user to determine whether gypsum is present in the most favorable percentage. An illustration of the effect of the gypsum content of a particular cement on volume change, expansion and contraction, during wetting and drying, is shown in *Figure 3*.

### Laboratory

Another line of attack lies in the sands, gravel or crushed stone used in making concrete. The laboratory has established that claylike particles in sand and gravel can cause high volume change. It has found that the percentage of clay that must be removed by washing during manufacture can be controlled within satisfactory limits by means of the sand equivalent test and the cleanness test (formerly called the sedimentation test). By applica-



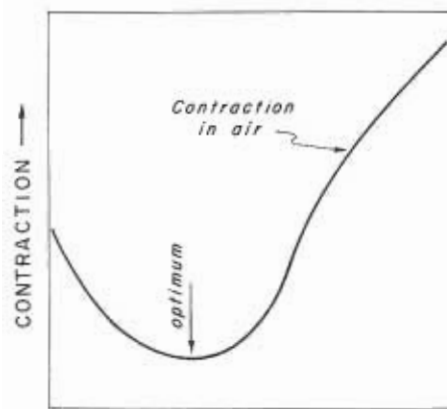
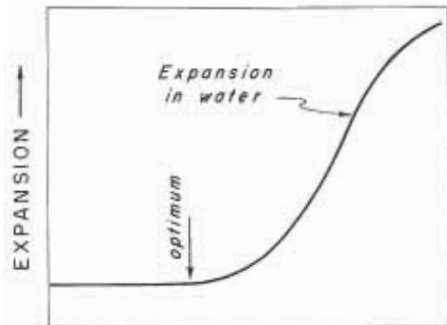


LEFT—Determining fineness of portland cement. RIGHT—Determining compressive strength of concrete.

tion of these tests, concrete sands and coarse aggregate can be obtained that are truly clean and free from deleterious amounts of clay.

The cement unit participates regularly in the work of committees of the

Minimum volume change in concrete is obtained when gypsum is present in portland cement in the optimum amount



INCREASING GYPSUM →

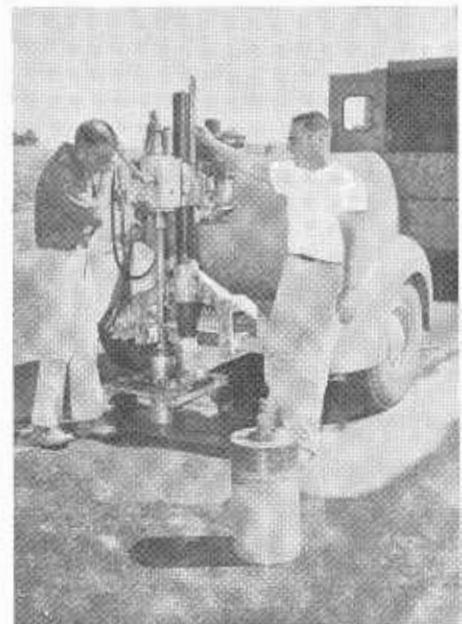
American Society for Testing Materials in "round-robin" tests designed to improve the specifications and methods of test for portland cement on a nationwide basis.

Another project now under way in the cement unit is directed toward the development of means for testing and specifying against unfavorable shapes in aggregates for concrete. Flaky and elongated particles tend toward poor workability and excessive water requirements in mixing concrete. While such particles have long been considered objectionable, there has been no definite test procedure to differentiate exactly between satisfactory and unsatisfactory particle shape. Correction of these defects is believed to be possible through improved methods of crushing during the manufacture of aggregates.

Because of the wide variety of natural materials and differences in cement, one of the characteristics of cement and concrete research is that a large number of tests must be made. In one research program conducted some years ago, the cement unit had at one time over 7,000 individual test specimens on which physical tests were being performed at periodic intervals. In some cases, from 100 to 200 or more of these specimens would be tested per day. The final results of this particular program demonstrated that alkalis in portland cement react

with certain minerals present in some aggregates to cause excessive expansion. The results have affected cement and concrete technology all over the world, and have resulted in important savings and increased durability in the highways and bridges in California, and in concrete in general in other states and countries. The work of the cement unit is confined almost entirely to laboratory activities with occasional visits to cement mills.

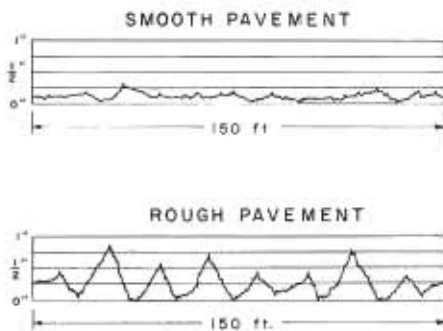
The core drill is used to study pavement performance



## PORTLAND CEMENT CONCRETE UNIT

The concrete unit is under the direct supervision of D. L. Spellman, Associate Materials and Research Engineer. Its primary purpose is to help produce high-quality concrete on the jobsite in highway construction.

The work of this unit is applied both in the field and the laboratory. In the field, assistance is given to the districts and the Bridge Department during construction. Much of the field work is devoted to investigations of completed work at various ages. Cores of pavements of any type are secured with diamond bits. The cored samples are delivered to the proper laboratory section for testing. Beneath the pavement, boring is often continued to obtain samples of underlying layers to the desired depth. At times diamond-cut cores are obtained from bridges and other structures.



Profilograms show riding qualities of pavement

### Use of Soniscope

A measure of the overall quality of concrete in place is obtained with a soniscope. This instrument measures to a small fraction of a second the time required for an induced mechanical wave to pass through a section of concrete. The wave travels at very high speeds through dense, high-strength concrete; it travels more slowly through softer, weaker materials. The velocity of the wave is therefore an indication of the quality of the concrete as it exists at the time of measurement. It is useful in evaluating visible or hidden defects.

### Surface Irregularities

Crews from the concrete section study the development of surface irregularities in pavements by use of an

instrument known as the profilograph. This device plots a curve showing departures from a true plane that is established between a series of integrating wheels 25 feet apart. One type of profilograph is operated manually and may be used on new work to detect irregularities due to construction methods. Being light in weight and portable it can be used to check the previous day's work and to point to defects that can be corrected as the work progresses. Another type of profilograph is mounted on a truck. The record produced is virtually identical with that of the manual model. The advantage of the truck model lies in the better protection to the operator when working on heavily traveled roads and the speed with which records may be obtained. Not only do the profilograph records provide an index to riding comfort, but they also furnish information as to changes that may be occurring and thus indicate the adequacy of the components of the pavement. In order to find out whether bases and foundation soils are affecting the pavement, it is necessary to study the shape as well as the magnitude of pavement inequalities. Figure 5 illustrates differences in profilograms of smooth and rough pavements. It is axiomatic that before an engineer can correct a defect he must know what he is trying to correct.

### Reflective Markers

The concrete unit has co-operated with the chemical unit in the development of reflective markers for pavements and bridges. These markers are intended to improve the visibility of the highway and are particularly effective during rainy or foggy nights when the painted center stripe is obscured by a film of water.

The construction of portland cement concrete pavements and bridges over the high Sierras introduces problems in durability under freezing and thawing conditions that are not encountered in the lower elevations of the State. The factors affecting durability of concrete under severe climatic conditions are not perfectly understood, although much work has been done by other agencies. Basic data needed to plan and interpret laboratory tests are being obtained from

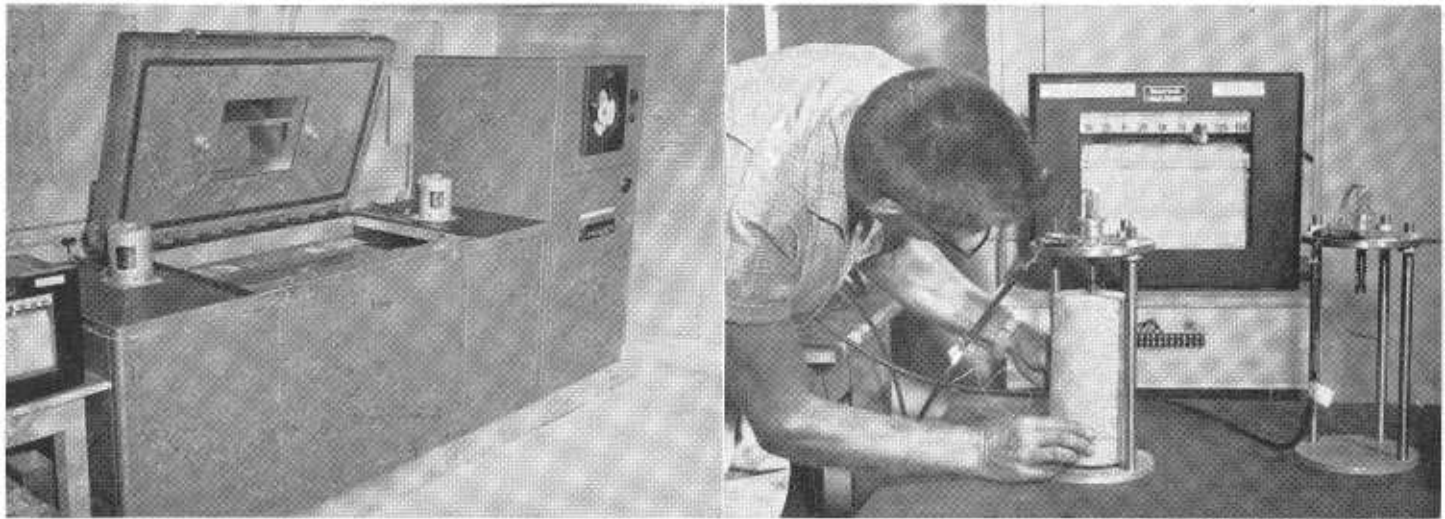
test slabs located at strategic locations in the mountains along Route 40. Regular tests are being made for movement of moisture and frost during the winter months. Laboratory tests are then modified in accordance with the field information to yield results that will be in accordance with the conditions to be met in the actual pavements. A very serious problem exists. If the State uses local sand and gravel that will give trouble, it means jeopardizing a large investment in concrete; if sound materials are imported, it means a great increase in construction costs. It is essential that exact information be available.

### Durability Tests

One type of equipment being used in the laboratory to investigate the durability of concrete is illustrated in Figure 6. In this apparatus, 36 concrete test specimens are subjected to six cycles of freezing and thawing per day. The entire operation is controlled automatically and requires a minimum of personal attention. In a few months the concrete can be made to undergo as many cycles as will occur in several years on the road.

Another type of test for frost resistance of concrete, suggested by T. C. Powers of the Portland Cement Association, consists in measuring the change in length of a specimen as its temperature is reduced slowly to well below freezing. As illustrated in Figure 7, a gauge is attached to a specimen which is then placed in a freezing chamber. An automatic recorder prints changes in length of the specimen within an accuracy of a few millionths of an inch. At the same time the falling temperature of the concrete is recorded on another instrument. The results of the records are plotted in graph form as shown in Figure 8 to indicate the rate at which the concrete becomes shorter as its temperature falls. If the charted line is substantially straight it indicates that the concrete has contracted normally in accordance with its thermal coefficient and therefore has remained undamaged. However, a pronounced offset (to the right) in the plotted line at a temperature slightly below the freezing point indicates that the concrete has expanded because of the pressure





LEFT—Automatic equipment for freezing and thawing test for concrete. RIGHT—Gages and recorder to measure length changes of concrete as it is frozen.

exerted by ice forming in the pores. The broken line of *Figure 8* illustrates such a situation and is a certain indication that the concrete in the condition in which it was tested is not durable under freezing and thawing conditions. In the case illustrated, the concrete was thoroughly saturated with water at the start of the test. Had it been partially dry, it is possible that it would not have suffered damage during the freezing.

Durability of concrete is determined by the sand, gravel or rock used in it more than by the cement which can be made frost resistant by the addition of certain compounds known as air-entraining agents.

The problem is to find the probable moisture content to be expected in the concrete during the winter and then to select sand, gravel or rock that will make concrete that is resistant under the moisture and temperature conditions that are characteristic of the locality under consideration.

#### CHEMICAL UNIT

All work of the Materials and Research Department involving chemical analysis of materials is referred to the chemical unit, which is under the direction of E. D. Botts, Senior Chemical Testing Engineer. Chemical analyses are made on a multitude of materials, as might be expected from the variety of products used by the Division of Highways. Some of the products or materials analyzed are engine antifreeze, hydraulic brake fluid,

portland cement, wood preservatives, detergents, fuel oils, diesel oils, metals, galvanized coatings, paints, waters and soils. Since standard methods of analysis, as specified by the various technical societies, frequently are inadequate when special problems are encountered, it is often necessary to develop new methods and techniques.

The reasons for making chemical analyses of materials of construction, are twofold:

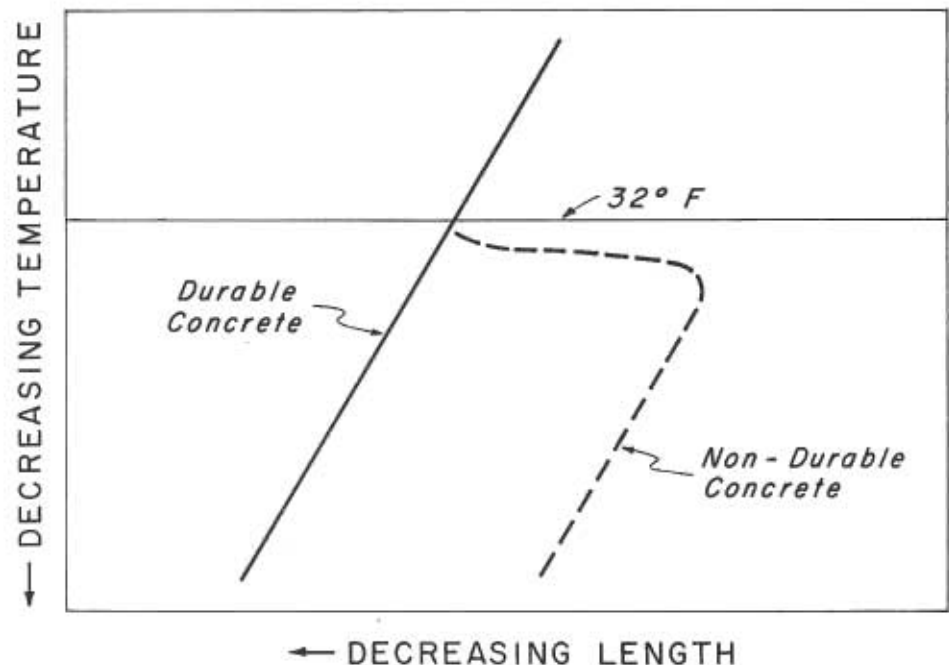
1. To detect wilful adulteration or unintentional contamination.

2. To determine that specified chemical elements or compounds are within established limits.

#### Close Tolerances

As an example of the second class, it may be pointed out that, although portland cement is manufactured from a wide variety of raw materials, the proportions of the chemical compounds formed during manufacture must be held within close tolerances to assure its expected strength and durability in service. Certain elements

Chart showing typical length-temperature changes in concrete during freezing



that occur in the raw materials from which steel is manufactured must be kept close to the vanishing point in the final product if it is to give a long life in service. Other elements must be present in prescribed proportions to produce the special properties desired in certain steels. Chemical analyses are frequently found to be more indicative of performance than are physical tests, especially for longtime performance.

The research and development phase of the chemical unit is of equal scope and importance in the search for new and better materials. The formulations for almost all paints used by the Division of Highways have been developed in this laboratory. Only those paints which meet the rigid laboratory and field testing performance standards are considered as suitable for adoption in the Standard Specifications. In co-operation with the Bridge Department of the Division of Highways, several steel bridges along the ocean have been used to test the effect of salt air weathering on experimentally developed paints. Standard paints giving good service inland have a very short life along the coast. Traffic line paint, with which every motorist is familiar, is subjected to the most severe conditions of weather and wear, and must be durable and able to withstand a wide variety of climatic conditions. The chemical unit constantly formulates and tests new types. Traffic lines present difficult problems, as such paints must set very quickly to prevent smearing by traffic, and rapid setting is generally opposed to durability. Experimental traffic paints made in the laboratory are placed across test sections of the highway and periodically evaluated for their wearing qualities.

#### Use of Epoxy Adhesives

Much experimental and development work has been done by the chemical unit in the use of the relatively new epoxy adhesives as a repair material. Extensive work has been done in co-operation with the various highway districts and the Bridge Department in the repairing of spalled and cracked concrete structures and highways. (Figure 9.)

The chemical unit, in co-operation with the Pavement Section of the laboratory, has done extensive and analytical research work on the correlation of the chemical analysis of asphalts with their long term durability. Both the original asphalts and asphalts extracted from pavements are analyzed for the various types of hydrocarbons present seeking to discover whether a relationship exists between durability of the asphalts and their chemical composition.

#### RESEARCH CORRELATION UNIT

The research correlation unit, under the direct supervision of C. G. Gates, Senior Materials and Research Engineer, is one of the newest units of our laboratory. As the name implies, research correlation consists of determining the relationship between laboratory or field research data and actual performance. The Materials and Research Department has been engaged in research activities for over 30 years. Some projects have been small, but many have extended over several years.

So far, correlation work has consisted of assembling old and current research records, cross-indexing the

data and maintaining a central research file. Another phase, which will be started soon, is to review old test roads and field installations to determine whether additional tests, measurements or studies are needed to more clearly evaluate the results of the projects.

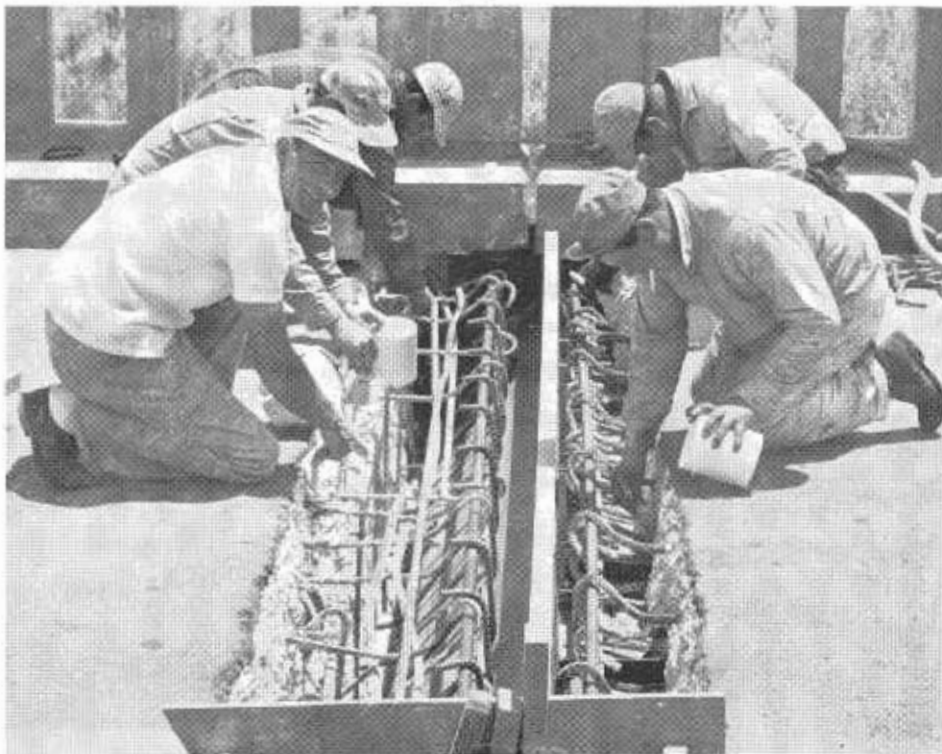
#### Periodic Reports

Periodic reports of our research activities are made to the Highway Research Board, to other co-operating research agencies and to our own organization.

The research correlation unit maintains the Materials and Research Department's archives; i.e., converts all construction records to research reference after contracts are completed. Unusual and important design or construction features are indexed for future reference.

The library of the Materials and Research Department is now a part of the research correlation unit. The library functions primarily as an information service for the entire department. In carrying out this function, the library is responsible for acquiring and maintaining a collection of scientific and technical literature in a num-

Application of modified epoxy adhesive in bridge repair







A corner in the library of the Materials and Research Laboratory

ber of fields. Some of the other services are literature searching, preparing bibliographies, translating technical articles written in foreign languages, compiling special reference files and indexes, routing of periodicals and other technical literature to staff members, and various other reference and information services. The library also arranges for the loan of material from other libraries and organizations.

As a special assignment, the research correlation unit was given the responsibility of assembling, editing and publishing a much needed Materials Manual of Testing and Control Procedures. This manual consists of two volumes and describes some 145 testing and control procedures normally performed in our laboratory.

The research correlation unit has also been assigned the initial work on preparing training films on sampling and testing procedures that are used by field engineers on construction projects.

#### General

The Technical Section co-operated with the Structural Materials Section in determining the basic causes of de-

terioration of an important reinforced concrete bridge by reason of corrosion of the reinforcing steel. Published reports on this project have attracted worldwide interest.

The section has prepared technical papers or discussions for meetings of the American Society for Testing Materials, the American Concrete Institute and the Highway Research Board. The Technical Section serves as a "clearinghouse" for correspondence and discussions with the various technical agencies and organizations.

Various units of the section are called upon frequently for assistance in solving the problems that arise in construction and maintenance operations of other state agencies as well as those of counties and cities. Its facilities and staff are available whenever a specific request for assistance is made by any public organization.

This report would not be complete without giving recognition to the efficient work performed by the clerical and stenographic staff. Without such assistance, the fruits of the section's labor would remain largely unharvested.

## Curtis M. Brown Authors New Book

Seldom is a book written which relates two professions and, even less frequent, when it involves the fields of engineering and law, but Curtis M. Brown has done just that in his recent publication entitled "Boundary Control and Legal Principles." As stated by Brown, this is a book which fills the need for correlating law and surveying.

The forerunner of this book was "Boundary Control for Surveyors in California," which was introduced by Brown in the early part of 1954. This was immediately accepted by surveyors and attorneys alike, but it was recognized that a better organized and more comprehensive work was needed. We must agree with Brown that he has now filled that need.

The excellence of this book is exemplified by the simplification of law to the surveyor and surveying to the lawyer. The book has a systematic plan which begins with an easy explanation on the systems used to describe property and ends with procedures for writing the descriptive parts of deeds. Throughout there are stated clear basic principles with simple explanations of the application which are often illustrated by common situations. Principles relating to specialized situations involving description of lands with riparian rights and federal mining claims indicate the fine coverage of this book.

To give his work real completeness, Brown has included such things as a table of abbreviations commonly used in property descriptions, a glossary and excellent index, some of which were missing in his earlier publication.

This book is a "must" for the library of the surveyor and for every lawyer whose practice touches on real property law.—J. B. M.

#### VEHICLES REGISTERED

A total of 6,998,805 vehicles were registered in California from January 1st through June 30th this year, reports the National Automobile Club.

# Golden State Freeway

By J. F. SMITH, Associate Highway Engineer, and  
C. J. WOODBRIDGE, Senior Bridge Engineer

THE San Fernando Valley, lying between the Santa Monica Mountains and the San Gabriel Mountains, is a very important residential and industrial area of metropolitan Los Angeles. The latest official estimate of population in Los Angeles County indicates a total of 5,401,274 persons of which 609,300 are in the rapidly growing San Fernando Valley. There are five main gateways to the valley through which thousands of people pass each day in entering and leaving it. Ingress and egress through the east gateway at Burbank will be greatly facilitated by developments currently being carried out by the State Division of Highways on the Golden State Freeway.

## Completed Unit

The first unit of this freeway development serving the immediate needs of the East San Fernando Valley was completed and opened to public traffic on September 6, 1957. The completed unit is 2.4 miles in

length and extends from the northeast corner of Griffith Park in the City of Los Angeles near the site of the old Rodger Young Village (long since demolished) across the Los Angeles River, through a small section of the City of Glendale, to Ash Street in the City of Burbank.

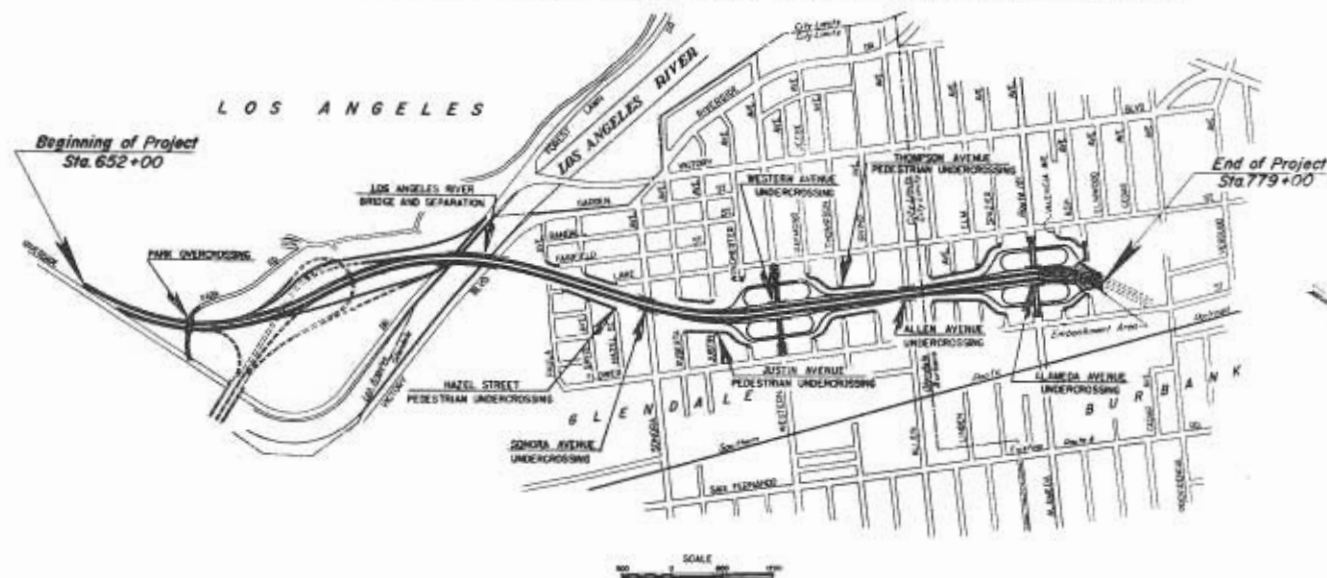
In the overall picture the Golden State Freeway within the limits of District VII is 72.7 miles long. It extends from the southerly terminus at junction with the Santa Ana and Santa Monica Freeways near Soto Street in East Los Angeles to the Los Angeles-Kern county line in vicinity of Gorman. In 1952, a length of 45.2 miles of this State highway route was completed to expressway standards over "The Ridge Route" between Tunnel Station on the Southern Pacific Railroad at the junction with U. S. Highway 6, locally called the "Sierra Highway," and the Los Angeles-Kern county line.

## Full Freeway Standards

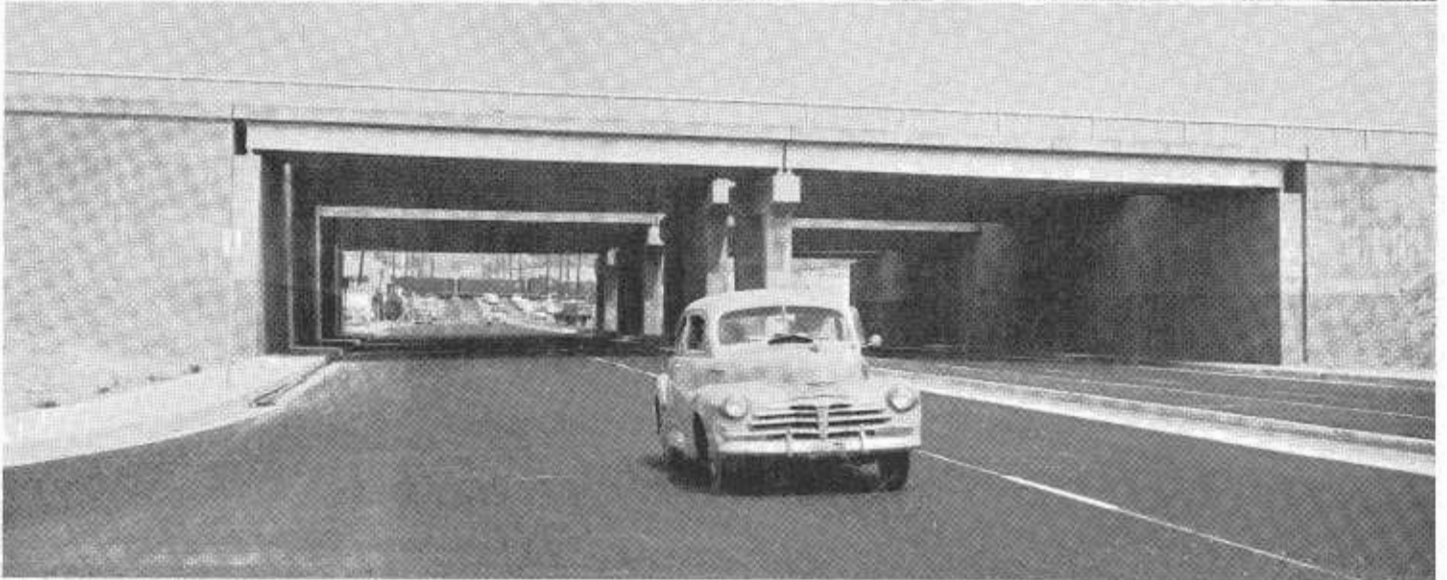
From Tunnel Station to its southerly terminus the Golden State Freeway will be constructed to full freeway standards, and a three-mile length from Tunnel Station southerly to Sepulveda Boulevard was completed to full freeway standards with interchange facilities to San Fernando Road and Foothill Boulevard, as well as Sepulveda Boulevard, in August, 1955. The cost of this construction, sometimes referred to as "The Tunnel Station Job" was \$3,300,000.

The 2.4 miles unit of the Golden State Freeway at the east gateway to the San Fernando Valley that was opened to public traffic on September 6, 1957 involved a total construction cost of \$4,400,000. Two years have elapsed since the call for bids was made for this project. Bids were opened in the District VII office in Los Angeles on September 29, 1955, and the contract was awarded to the low bidder, Vinnell Company, Inc.

In Los Angeles, Glendale and Burbank between 0.9 mile south of the Los Angeles River and Ash Avenue



Length of Project 12,474.55 feet = 2.36 miles



UPPER—Looking northerly along completed unit of Golden State Freeway in Griffith Park area showing in center Park Road Overcrossing. CENTER—Looking easterly along Alameda Avenue, Burbank, showing completed bridges carrying Golden State Freeway over this important traffic arterial. LOWER—Looking southerly along completed Golden State Freeway showing Los Angeles River Bridge and Griffith Park in background.



and Vinnell Constructors on October 3, 1955. The contractor has carried out his operations efficiently and expeditiously and completed this complex freeway project a full month ahead of schedule.

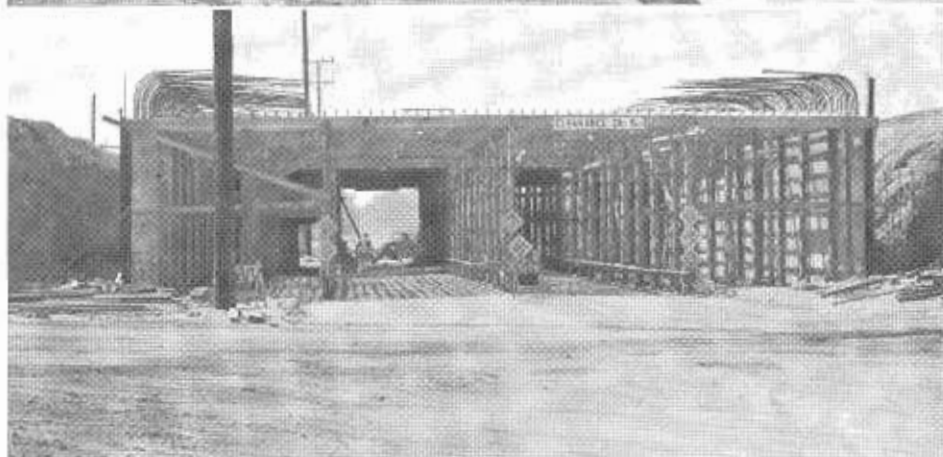
#### **Eight-lane Freeway**

Essentially the completed construction is an eight-lane freeway with a 22-foot uncurbed median. Emergency parking is provided by an eight-foot paved shoulder adjacent to each of the inside lanes and a standard three-foot rolled gutter with five-foot paved shoulder next to the outside lanes. Concrete paving eight inches thick on a four-inch cement treated subgrade is used on the main freeway and interchange roadways with plant-mix paving being placed on the collector roads, ramps and frontage roads. Ramps and collector roads have cement treated base varying in thickness from six inches to eight inches. Stub lanes and interchange roads near the beginning of job will accommodate connections with the future Ventura and Colorado freeways. Two complete traffic interchanges at Western Avenue and at Alameda Avenue provide the motorist with a traffic facility completely devoid of all left turn conflicts.

All roadway excavation within the job limits was at the south end near the beginning of the project and it balanced out within the first 3,800 feet. The remainder of the project was finished with imported borrow obtained from Forest Lawn, located a haul distance of two miles from the middle of the job.

#### **Borrow Problem Solved**

Under an agreement with Forest Lawn, the State was given borrow material free in return for leaving the borrow area graded to contours suitable for their planned cemetery development. Material in the area is a high grade of decomposed granite which normally breaks up and loads easily. On this basis, the contractor developed a 48-inch belt loader which worked very well and with which he was able to obtain daily production rates on the order of 8,000 cubic yards. Hauling was performed with



UPPER—Looking westerly along Riverside Drive in Griffith Park showing stub ends of recently completed pavement to provide traffic interchange connections between Golden State Freeway and future Ventura Freeway. To the right is shown the bed of the Los Angeles River and a portion of the contractor's haul road. LOWER—Allen Avenue Undercrossing in City of Glendale under construction on Golden State Freeway.

22 cubic yard bottom-dump trucks. Loading time was approximately 30 seconds per truck.

As the top layer of material was stripped from part of the pit, it became apparent that portions of the designated borrow areas were underlaid with rock ridges of varying degrees of hardness. Some of the rock was sufficiently decomposed to succumb to a tractor and ripper. Much of it, however, was still well consolidated and it was necessary to drill and shoot in order to break the material up. Two power shovels were used to load the rock into 10-wheeler end-dump trucks. Approximately 62,000 cubic yards of rock was handled in this manner.

#### **System of Haul Roads**

By making suitable arrangements with the Los Angeles City Park Com-

mission, the Los Angeles County Flood Control and the U. S. Corps of Engineers, the contractor worked out a system of haul roads on park lands and in the Los Angeles River bed that permitted him to reach the job site without using city streets. Confining his operations to off-highway haul paid the contractor big dividends in time savings and in reduction of unit hauling costs.

Major structures on this contract consisted of six bridges and three pedestrian undercrossings. The total cost of bridge construction was \$1,850,000.

The Alameda Avenue Undercrossing is situated at the northerly end of the contract work in the City of Burbank. There are actually four parallel rolled beam steel girder bridges of two spans each, with reinforced concrete decks, all supported on common



abutments of reinforced concrete. The two inside decks carry the main freeway traffic and the two outer decks carry the collector road traffic.

#### Other Major Structures

Allen Avenue Undercrossing is in the City of Glendale. It is a single span, rigid frame, reinforced concrete T-beam structure built to the full width of the freeway roadway.

Western Avenue Undercrossing, in the City of Glendale, is similar to Alameda Avenue Undercrossing in layout and dimensions.

Sonora Avenue Undercrossing, in the City of Glendale, consists of two single span welded steel girder bridges to carry the main freeway traffic over this busy city street.

The Los Angeles River Bridge and Separation carries the main freeway traffic over future westbound Ventura Freeway and the Los Angeles River channel. The most northerly span will accommodate a future highway underneath. The structure cost about \$1,000,000 and consists of two parallel bridges of five welded steel girder spans with concrete decks, having a total length of 638 feet. The city limits of Los Angeles and Glendale pass through this bridge on the westerly side of the river channel.

Park Overcrossing is a three-span reinforced concrete T-beam structure

which carries traffic over the freeway to the two areas of Griffith Park on either side of the freeway.

All bridge decks carrying the main freeway traffic are 52 feet wide between curbs, and all other decks are 28 feet wide between curbs.

The three pedestrian undercrossings or "tunnels" are all in the City of Glendale and permit pedestrians to cross under the freeway. Their dimensions are eight feet wide, nine feet high, and up to 238 feet long. The interior walls were covered with white air-blown mortar to discourage writing and to improve the illumination.

#### Structural Design Features

Structural design features were dictated somewhat by the location of the freeway. The general location is along ancient silty sand deposits of the Los Angeles River. Piles were used to support all of the bridges. For the Los Angeles River Bridge, steel H-piles were used. For the other five bridges, concrete piles were used. Pile penetration varied from about 30 to 60 feet. The most effective pile-driving hammer used was a fast differential type with rated energy of 19,500 foot-pounds.

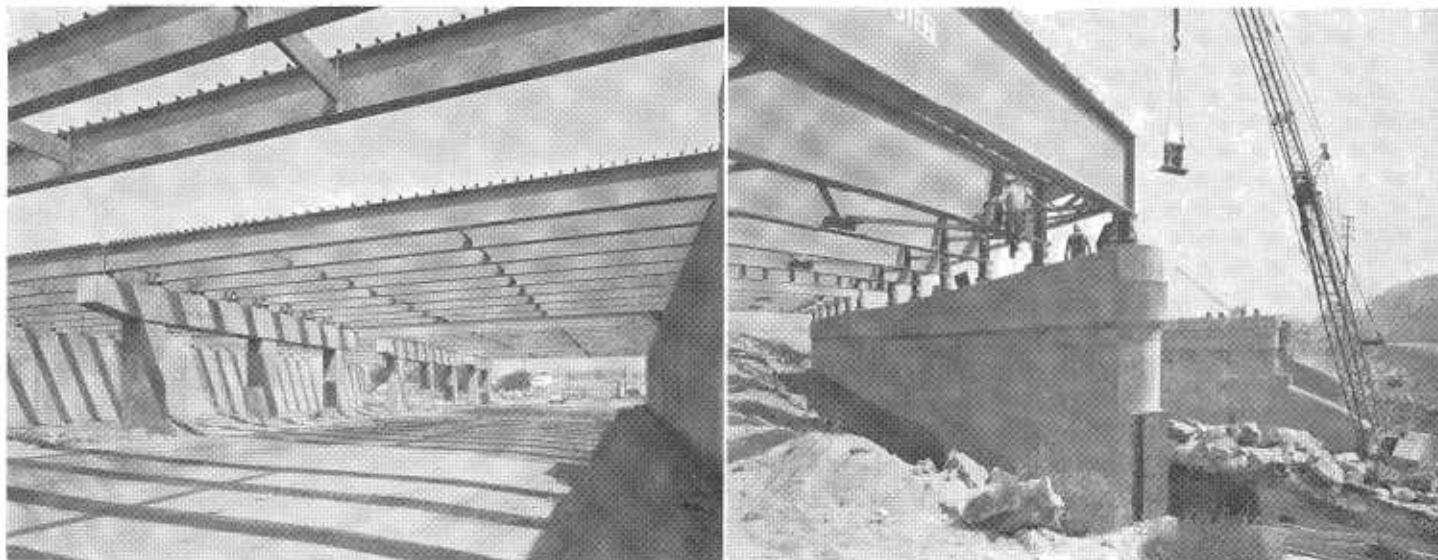
Structural steel was fabricated and erected by Vinnell Steel Company, a subsidiary of Vinnell Company, Inc. The shop fabricated girders, being a

parallel operation with construction of abutments, saves considerable time as compared with conventional concrete girders. In addition, on busy city streets, the falsework necessary for concrete girders is a hazard to traffic. There are 297 steel girders in the four bridges of that type, so that the saving in time as compared to concrete girders is obvious. At the Los Angeles River Bridge the diaphragm connections were welded in the field. At the other bridges the connections were made with high strength bolts checked with a four-foot torque wrench.

#### Erection of Steel Girders

Erection of steel girders over busy city streets presented a difficult problem. At Alameda Avenue and Western Avenue this matter was handled by detouring the traffic to the other span while each of the two spans was erected. For the single span at Sonora Avenue, the City of Glendale permitted detouring traffic to adjacent streets between the hours of 9 a.m. and 3 p.m. so that steel erection could be done. For the Los Angeles River Bridge span over Riverside Drive, there was no detour available. However, the City of Los Angeles cooperated by permitting blocking off Riverside Drive between Sonora Avenue and Los Feliz Boulevard between 11 p.m. and 5 a.m.

LEFT—Western Avenue Undercrossing in City of Glendale under construction on Golden State Freeway. RIGHT—Bridge structure under construction to carry Golden State Freeway over the Los Angeles River and over Riverside Drive.





Forms for the concrete decks of the steel girder bridges were neatly hung from the top of the girders by form ties. Decks were started at Alameda Avenue Undercrossing and as work continued southerly along the freeway on successive bridges, the efficiency of the crews increased rapidly.

#### Hazards of Construction

Some hazards of the construction required careful consideration. Near the front of the footing of the southerly abutment of the Los Angeles River Bridge, there is the old concrete outfall sewer which served the entire San Fernando Valley. Its interior condition is unknown. To drive piles beside it was risky, especially as it operated under pressure head for part of the 24 hours of the day. Attempts were made to change from driven piles to drilled and cast concrete piles, but no reasonable bid could be obtained due to the running nature of the silty sand river bed ma-

terial. Eventually, the pile driving was postponed some months until the new relief sewer upstream was put in operation, thus removing the pressure head on the old sewer. When the steel H-piles were driven, they penetrated easily for about 35 feet and then obtained the 45-ton bearing value quickly, with a minimum of vibration of the outfall sewer.

For the two piers in the river channel, the plans provided a four-foot thick tremie seal to block off the underground water in the cofferdams if necessary. However, the contractor was able to divert all of the flow, both surface and underground, and excavate and pour the pier footings "in the dry." Thus, the tremie seal was not necessary, thereby saving the State several thousands of dollars. This is a good example of the fine co-operative spirit which exists between the State Division of Highways and its contractors.

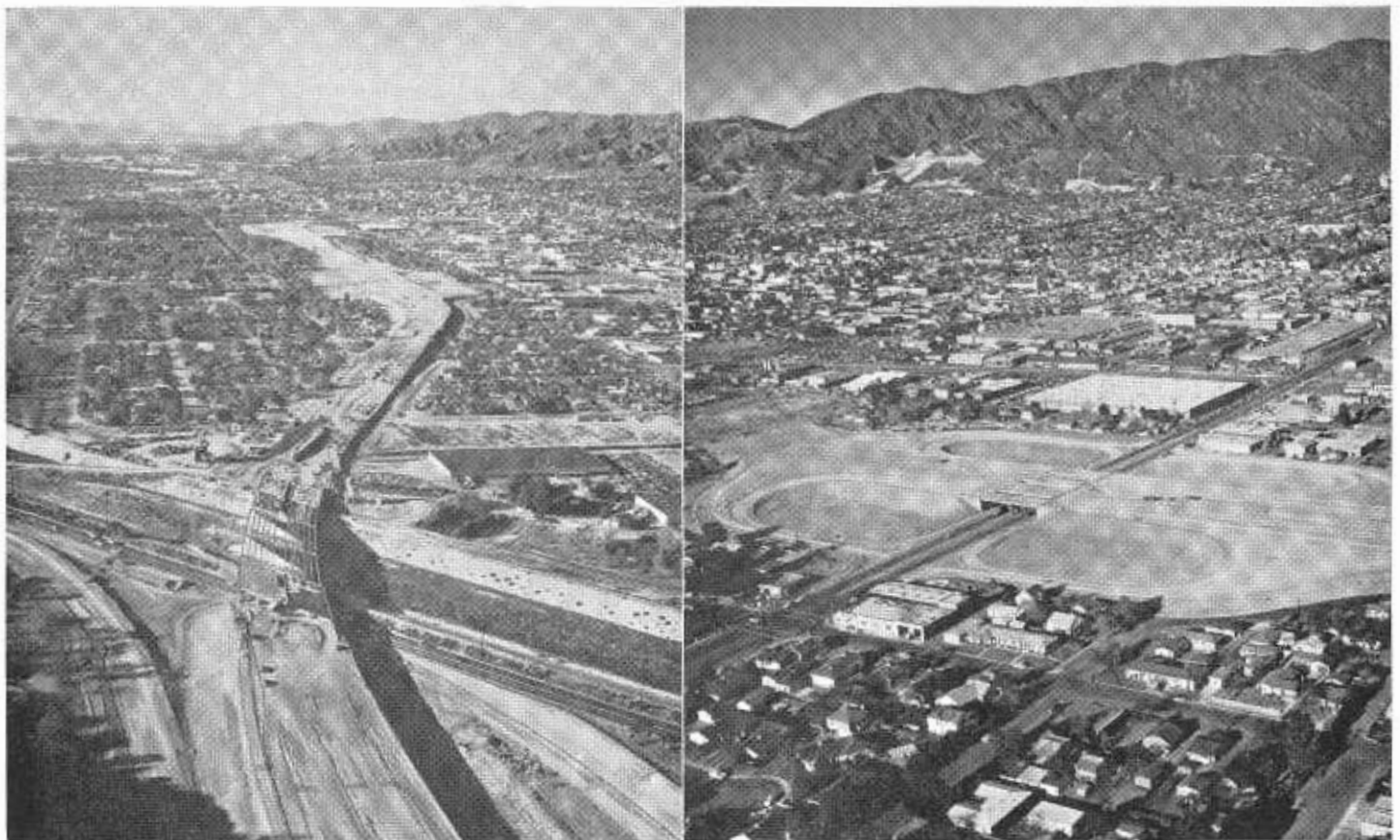
#### Contractor's Personnel

Contractor's personnel on the job were H. J. Yount, Vice President; Glen McAfee, General Superintendent; and Bob Hayden, Structure Superintendent.

The work was carried out under general supervision of District VII represented by District Engineer, L. R. Gillis; Assistant District Engineer, F. B. Cressy; and Field Supervisor, H. E. Belford. State personnel on the job were: H. B. Whitnall, Project Engineer; C. I. Palmer, Resident Engineer; and C. J. Woodbridge, Bridge Department Representative. In the latter stages of the contract, J. F. Smith succeeded Whitnall.

To the southeast of construction that was completed on September 6, 1957, a 2.6-mile length of the Golden State Freeway extending to Glendale Boulevard is now under construction also by the Vinnell Company, Inc. and Vinnell Constructors. This current

LEFT—Looking northerly along Golden State Freeway construction showing in foreground crossing over Riverside Drive and Los Angeles River. Portion of City of Glendale shown in center and City of Burbank in background. RIGHT—Looking northerly showing construction of Golden State Freeway in City of Burbank to provide cloverleaf interchange with Alameda Avenue.







LEFT—Looking northerly along Golden State Freeway showing construction nearing completion with Allen Avenue Undercrossing in foreground and Alameda Avenue Undercrossing in background. RIGHT—Looking southerly along Golden State Freeway construction nearing completion in Griffith Park with Los Angeles River and Riverside Drive Bridge in foreground. Traffic interchange facilities with future Ventura Freeway shown in center.

contract carries a construction allotment of \$5,315,000, is over 80 percent completed and the scheduled date of completion is January, 1958.

To the northwest of the recently completed section of the Golden State Freeway is a 1.6-mile unit in the City of Burbank from Alameda Avenue to Burbank Boulevard that is in the current construction budget for the 1957-1958 Fiscal Year. The budget item totals \$3,150,000. This project is now being advertised, with bids

to be opened in the Los Angeles District VII office on October 24, 1957.

Also in the current budget is an item of \$8,900,000 for constructing 3.1 miles of the Golden State Freeway in the Boyle Heights area of the City of Los Angeles from Sixth Street to Mission Road. This latter unit includes considerable reconstruction of the San Bernardino Freeway in order to develop a suitable traffic interchange system between these two great freeways. For this unit of the Golden State Freeway plans are com-

pleted, rights of way substantially all acquired, and the work is scheduled for advertising early in 1958.

While much progress has been made in design and right of way acquisition on other units of the Golden State Freeway, a construction schedule for final completion is not available at the present time because this is dependent upon availability of construction funds to be determined by the California Highway Commission in its consideration of future budgets.

## No Dearth of Road Contractors in State

As of July 1st, there were 992 contractors prequalified to submit bids on state highway projects in California, with an estimated combined bidding capacity of \$1,780,000,000, State Highway Engineer G. T. McCoy reported.

This is an increase of 180 contractors and nearly \$200,000,000 in bidding capacity over the totals for one year ago.

At the same time, McCoy reported that the average number of bidders has been on the increase. State highway projects attracted an average of 5.5 bidders each during the second

quarter of 1957, compared with 3.8 bidders per project for the same period last year.

"These figures indicate," McCoy said, "that the highway contracting industry in California is still expanding, with new firms entering the field; and that active competition for state highway contracts can be expected to continue. This means a continued favorable outlook for the public in the form of more highway improvements for their tax dollars due to this sustained competition."

The increase in highway contractors and in number of bidders also shows, McCoy pointed out, that the industry is easily capable of absorbing

even more state highway construction work than has been made available as a result of the accelerated federal highway program.

Prequalification of bidders is provided for in the State Contract Act as a means of determining a contractor's capacity to undertake work up to a given amount. The amount for which a contractor may be prequalified is based on his financial resources and experience in public works projects. Contractors are permitted to bid only on projects within their prequalification rating.

Approximately 50 contractors have prequalification ratings in excess of \$10,000,000 for state highway work.

# Long Haul

Unusual Job in  
Modoc County

**D**URING this 1957 construction season in eastern Modoc County a long haul for plant-mixed surfacing, probably without precedent in the history of highway construction in California, was employed by Clements & Company of Centerville. This firm has a paving plant erected near Hatfield on State Route 210 close to the Oregon state line. This contractor also had the contract for surfacing 7.9 miles of State Route 28 east of Alturas between the junction of this route with US 395 and Cedarville, which called for placing about nine thousand tons of plant-mix. The mix was hauled a distance of 92 miles from the Hatfield plant.

tonnage in the contract was not large and overhead costs for moving the plant in and out would have substantially increased the unit costs on such a small amount.

## Costs Reduced

By utilizing bottom dump hauling units operating in tandem hauling costs were greatly reduced. Furthermore the Dorman Construction Company of Vancouver had a contract for surfacing 7.9 miles of highway south from the Oregon state line through Tulelake, which called for eighty-seven hundred tons of plant-mix and was very close to the Hatfield plant. They made arrangements for Clem-

in California and Oregon that is within range of the Hatfield plant and Clements wanted the plant to remain in this location.

In actual operation were 15 to 17 four-axle bottom dump trailers hauling in tandem. It took the loaded units about three hours to travel the 92 miles. The plant ran from 4.30 a.m. to 2.30 p.m. Each tandem outfit hauled about 25 tons of mix and made two trips per day. This took care of a daily plant production of about 750 tons.

## Bottom Dump Units

The bottom dump units pulled in ahead of the paver and the front unit was accurately spotted over a windrow sizing box. When the gates were opened they fell into the box and engaged it so that it was pulled ahead when the vehicle moved. After the front unit was emptied the rear unit was pulled ahead and emptied in similar manner.

The paver picked up the windrow and laid it directly. No trouble was experienced in maintaining temperatures. Loads were covered, but the summer temperatures and large loads helped to retain the heat.

This contract was under the supervision of District II of the California Division of Highways at Redding. H. S. Miles is District Engineer. Ray Wilson was District Construction Engineer on this project and W. H. Bartlett was Resident Engineer. John R. Holgate was Superintendent for Clements & Company.

## SLOW DRIVING

On a warm summer day it's nice to drive along slowly on the highway and enjoy the scenery, but remember, driving too slowly is just as dangerous as speeding. Keep pace with traffic, urges the California State Automobile Association, and give the other drivers a break. If you want to loaf, pick some scenic side road that has little traffic.



There are several reasons that prompted this operation. In the first place the plant is now erected and in operation on a large and tested deposit of aggregate. Satisfactory aggregate is not available close to the Modoc County job. Then too, the

elements & Company to supply the mix for this project. As in the Clements contract, the erection of a plant for this small tonnage would greatly increase the cost of the mix.

Another factor was the fact that there is other work in prospect both



# Fast Work

Relocation of Feather River  
Highway Ahead of Schedule

By RICHARD E. STICKEL, District Construction Engineer

WITH THE summer construction season drawing to a close, the relocation of the Feather River Highway from Wicks Corner, six miles west of Oroville, to Jarbo Gap is ahead of the schedule established at the beginning of the project. The project is approximately 29 percent complete with less than 20 percent of the planned construction time elapsed.

The 13.3 miles of relocated highway will provide an expressway from Wicks Corner to the existing highway, Alternate US 40, west of Jarbo Gap. A 32-foot all-paved section which will serve as two lanes of an ultimate four-lane highway is being constructed from a point on Clark Road near Wicks Corner to the Cherokee Overhead. A 60-foot section is being graded from this point to the bridge over the West Branch of the Feather River. This section will be surfaced initially to provide 32 feet of roadway. The wider grading operation is being done at this time to avoid a costly operation in the future when it becomes necessary to convert this route to four lanes. Through this area the highway is roughly parallel to, and above, the relocated line of the Western Pacific Railroad. Four lanes will be provided initially on a 58-foot all-paved roadway from the West Branch bridge to Station 1001. The roadway through this section will have grades of up to 6 percent and the additional lanes will permit the passing of slowly moving vehicles. The new highway will then revert to two lanes from this point to where it joins the existing highway.

The bridge over the West Branch of the Feather River is not a part of this contract.

#### Contractor Gains Time

The contractor, McCammon and Wunderlich Company and Wunderlich Construction Company of Palo Alto, gained several working days on



Near future intersection of the new highway and the Pentz-Cherokee Road. Contractor's main camp is shown in center of the photo and a 15-foot concrete arch culvert in the foreground.

the contract when they elected to start clearing operations on the right of way eight days after the bid opening and before the contract had been awarded and approved. They reasoned correctly that their low bid of \$7,292,214 would be accepted for the work. The early start was prompted by the realization that burning of the cleared material would not be permitted in the critical fire season during the summer months and that this material would have to be stacked on the right of way thereby impairing work. With the clearing and burning done, the contractor was able to work his equipment without delay or interference on any portion of the right of way. Approximately 8 percent of the project

was completed before time started on the contract.

The initial phase of the construction stressed work on the development of a water supply, right of way fencing and placing of drainage facilities and erection of structures pertaining thereto. At the present time the right of way clearing and the development of water is completed.

#### Drainage Facilities

Drainage facilities for the project range from 12-inch corrugated metal pipe to a 15-foot concrete arch culvert. The types of pipe to be used are equally as varied, from the standard corrugated metal pipe through thick wall concrete, reinforced con-



LEFT—Looking east along cleared area east of the West Branch of the Feather River showing the type of terrain through which the new roadway will pass in this area. RIGHT—Cut and fill operation in the vicinity of the Yankee Hill Road showing the rough terrain in this sector.

crete, and asbestos bonded corrugated metal pipe to field assembled plate culvert. Approximately 55 percent of all pipe is now installed and it is estimated that this portion of the contract will be 90 percent complete by the end of October.

Fencing of the right of way for the highway, and the railroad in the area in which the two are contiguous, is currently about 50 percent complete. Work on the fencing subcontract was halted during the month of August when sufficient fence had been installed to prevent livestock from entering the right of way and the final right of way agreements had not been reached. The subcontractor, San Jose Fence Company, resumed fencing operations in September.

The principal contract item, 4,154,000 cubic yards of roadway excavation, is beginning to show increased production. The nature of the terrain is such that the amount of such excavation possible is determined by the placing of drainage pipes. As the pipe item approaches completion more areas are made available for grading and the contractor has been continuously moving in more earth moving equipment to speed this item. In addition, the contractor has been blocking off rocky sections of the roadway that



LEFT TO RIGHT—Floyd Helm, Project Manager for McCammon-Wunderlich, Richard E. Stickel, District Construction Engineer, and Muller Chapman, Resident Engineer, viewing plans of the project

will apparently have to be excavated by the use of shovels and trucks. These sections will be worked during the inclement weather season.

#### Four Bridges in Project

It is realized that rain in any appreciable amount will seriously hamper, if not stop completely, earth moving by the faster moving rubber tired scrapers. To date 26 percent of the earth moving has been completed. Emphasis on roadway excavation has

been primarily on the west side of the West Branch of the Feather River, although in the past few weeks work has been accelerated on the east side of the river.

Four bridges are to be constructed under this contract. Two of these cross water courses, Gold Run Creek and Flag Canyon, and two will cross the Western Pacific Railroad north of Cherokee. Work is now under way on the Gold Run Creek and Flag Canyon structures. The Gold Run Creek structure is on the present Clark Road which connects Paradise and Oroville and it has been necessary to provide a detour at this point. The detour is now in effect, the old bridge has been removed and work on the footings of new structure has started. Piling for the Flag Canyon bridge has been driven by the subcontractor, Raymond Concrete Pile Company, and work on the footings and abutments are under way.

The grading of the railroad right of way under this contract requires the relocating of the Upper Miocene Canal. This canal carries water for a Pacific Gas and Electric Company powerhouse and also provides domestic water for the Oroville area. Flow in the canal must be maintained with as little interruption as possible. The



relocation consists principally of the construction of a syphon in the vicinity of Vinton Gulch. Work on the pipe for this syphon is virtually complete and waters of the canal have been diverted around the area where the intake structure is to be constructed.

**Completion Date in 1958**

The placing of most of the imported sub-base material, cement-treated base, and surfacing is scheduled to begin early next year although sections of the roadway on the valley and foothill portion of the road will be ready for this stage this season. No difficulty is foreseen in meeting the completion date for the project which is scheduled for late in November, 1958.

To the present time the only serious construction difficulty encountered has been between Stations 481 and 508 where a water seepage problem was uncovered in a cut section. Because of the depth of the water bearing material it was decided to correct the problem by the installing of eight-inch perforated metal pipe and superimposing 2½ feet of imported material consisting mainly of coarse rock prior to the construction of the typical section.



*Cut and fill operation in the vicinity of Yankee Hill Road. The top of the fill will be near the roadway just above the earth-moving equipment to the right of the scene.*

In passing it is well to note that the new route will present probably the most striking introduction to the

Sacramento Valley of any of the routes entering the State. At a point roughly one mile west from the point where the new route leaves the existing highway near Jarbo Gap the roadway passes through a cut and suddenly the entire northern portion of the great Central Valley of California unfolds before the motorist.

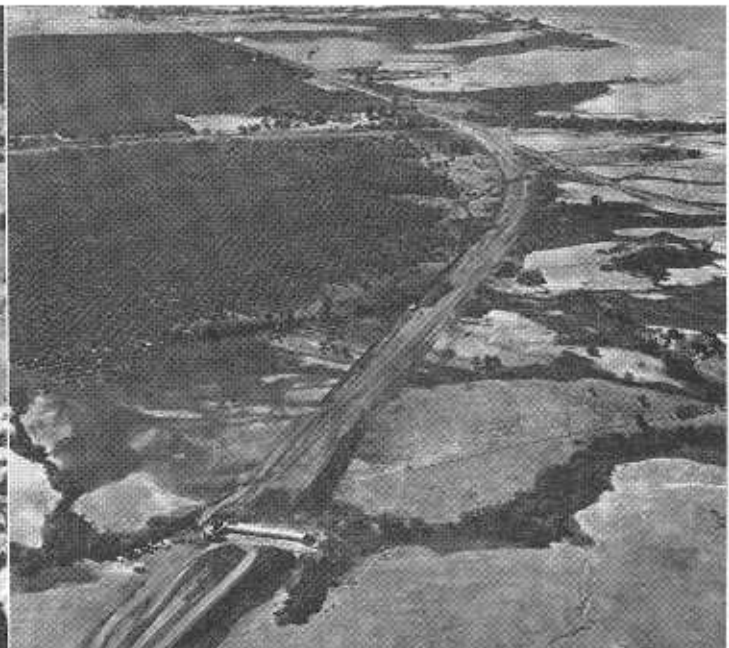
The contractor is represented by Project Manager Floyd Helm who has long and varied experience in the construction of highways. Work on the project is under the direction of Alan S. Hart, District Engineer; Muller Chapman is the Resident Engineer for this portion of the Feather River Highway relocation; and the author is the District Construction Engineer for the complete highway relocation. W. G. Ballantine is the representative of the Bridge Department.

**VIOLATIONS**

Twenty-one states report that about 3 out of 10 drivers in fatal accidents were violating a speed law, says the National Automobile Club.

If traffic volume increases by 50 percent in the next 10 years, as estimated, accidents at the present rate will take 55,000 lives a year.

*LEFT—Looking east along new alignment from the Flag Canyon Bridge site. Excavation for footing of the bridge is being made in the foreground. RIGHT—Looking west on new alignment at the intersection with Clark Road.*



# Public Relations

From the View of  
The Public Employee

By FRANK C. BALFOUR, Chief Right-of-Way Agent

IN ANALYZING and discussing public relations, one of the most difficult problems which must be faced is the matter of perspective. There has been such a wealth of literature in this field that more often than not the student is confused with broad generalizations and over-simplifications about public relations or is equally lost in professional "shop talk" concerning communications media, tools and techniques.

It will be my privilege to discuss with you ideas about public relations which may be helpful in gaining perspective. I will attempt to avoid the generalizations so often used in public relations discussions, and at the same time I will make every effort to avoid overemphasis upon the small specifics.

There is not a person in this room who does not have available to him reference material of all types, especially text books, statistical data, and public relations magazines, and I am sure more than half of the persons in this room have attended lectures on the subject of public relations as a part of your educational training and background.

To gain a true perspective and insight into the field requires a fresh look at both the definition of the term "public relations" and a careful re-evaluation of some of the history which has led to the emergence of the concept that public relations is now a "new profession."

## Perspective Important

You will note how strongly I am outlining the idea of *perspective*. Let me illustrate this factor by drawing a verbal picture:

If I were to discuss with you or with any audience in the Western United States about the extreme height of Mt. Mitchell, I am confident that you would be surprised after my description of its tremendous elevation to learn that Mt. Mitchell is only

*This is the text of an address on "The Public Employee and Public Relations" which Mr. Balfour gave before the Ninth Annual Institute on Government at San Diego earlier this year.*

6,684 feet high. Nonetheless, it is the highest mountain east of the Mississippi River, and to an eastern audience such a description of Mt. Mitchell would be appropriate. Here in the West where mountainous elevations above 10,000 feet are not unusual, such a discussion would be, so to speak, out of context; it would lack perspective.

In a similar fashion a discussion of public relations and the connection of that term with public employees must be viewed in proper perspective or the true significance of our theme will be lost.

Many of you have probably looked up the words "public," "relations," and "employee." For those who have not, I think a brief reference will be very enlightening at this point.

"Public" is derived from the Latin word *populus*, which in turn comes from the Latin word signifying "adult."

The word "relations" has two ancient stems, one of which means "to report" or "to relate," and the other of which means "to tolerate" from a Greek word "to be endured."

## Latin Derivation

Surely, for the thoughtful person, here is a great deal of the story in which underlies the significance of public relations. It has connotations of adult behavior, and of toleration, and matters to be endured.

In similar fashion the word "employee" comes from two Latin words which mean to "fold in."

I have gone to this length to discuss the word derivations because I believe that there inheres in the very language sufficient information upon which to predicate a sound program of modern public relations and the public employee.

The procedure seems to be self-evident: mix people into a situation which must be tolerated and then fold in an employee; sprinkle well with adult attitudes, and I believe you have a sound remedy for most institutions which are floundering about desperately for a true concept of the public relations approach.

I know most of you have probably anticipated the institute today by looking up a definition of public relations in Webster's Dictionary, and I do not doubt that most of you therefore have this definition more or less clearly in mind:

"Public relations—the activities of an industry, university, corporation, profession, government, or other organization in building and maintaining sound and productive relations with special publics such as customers, employees, or stockholders, and with the public at large, so as to adapt itself to its environment and interpret itself to society."

## Civil Service Data

It is undoubtedly appropriate at this time to include a brief comment upon the status of civil service employees in this Country. The Federal Government alone, with its three branches, 53 individual agencies, eight executive offices, and 14 executive departments, has approximately 2,400,000 civilian employees.

The armed forces include an approximate 3,000,000. It is estimated there are approximately 5,000,000 civil service employees in state, city, and county organizations.



All of this means, in relationship to the total working civilian population of the United States, that every seventh person you meet, on the statistical average, is a public employee in a strictly governmental sense.

To many persons these statistics are staggering, and they have the feeling that this is the first time in the history of Man that problems of such proportion have arisen involving public employees. Additionally, to many persons the idea of a public relations program is a modern concept.

Therefore, for a few minutes let's examine these two "modern" problems in the light of an interesting past history.

#### A Look at History

Throughout most of the world governments in the past, public relations have been weighed in terms of Public Opinion. Broadly speaking, scholars agree that such public opinion has been of two types: (A) static, (B) dynamic.

Static public opinion is best typified by a society which is ruled by its customs, *mores*, conventions, and traditions. (For example, agrarian and "barter" communities such as existed in medieval Greece and Rome, in Japan, West Europe, and Mexico.)

A dynamic public opinion is one which relies on a systematic publicity program based on the art of persuasion. Excellent examples would be a Greece of the time of Pericles, Rome during Caesar's administration, and the city-states in Italy during the renaissance.

Throughout history *dynamic* systems of public opinions and relations have overthrown *static* states. When sophistication and culture is introduced into a group and some type of industrialization emerges, the custom-bound state must change or fall. This was true in Sumer, in Egypt, and in Greece.

All of us are familiar with the fact that Greece gives us the word "democracy." I wonder how many of you realize that the Greeks of the Seventh Century were the first great forerunners of modern publicity measures and were most keenly aware of the complexities of public relations.

#### In Greek Theater

It was in the Seventh Century in Greece that money was first introduced in its modern concept. A type of industry appeared in the towns; there was a new wealth and slavery rose. During these times publicity methods and public relations came into the fore, especially in their military garrisons, in their market places, and, surprisingly enough, in the Grecian theater, for it was in this latter institution that public opinion was most readily influenced at that time. (Actually, I think this was the forerunner of our own response to the nightly theater which takes precedence in our own homes, that is, the TV programs.)

Those of you who are experts in such public relations media, as exemplified by the modern "inside story" of government news reports, will be interested to know that the Romans were the first to put out an official governmental news bulletin which was circulated readily among the high-placed government employees. In 59 B.C., Julius Caesar decreed that these "daily acts" of governmental news letters for public employees should be distributed to the general public.

It is very important as a matter of perspective to understand that the emergence of such a news letter was necessarily a part of the emergence of the Roman Empire, based as it was upon its amazing road system and its public relations system.

#### The Middle Ages

As we follow the development of such public relations devices as books and pamphlets, it is interesting to know that these first emerged in Europe during the reformation when controversy of a religious sort was the order of the day.

Inside information newsletters for merchantmen and businessmen first appeared in Germany in 1609, and as England became a more complex culture, public opinion forged the emergence of the first newspapers in 1622; technical professional magazines came to light about 1665 in England.

For those of you who have enjoyed Shakespeare's writings and who

are expert in them, you will recall that he placed these words in the mouth of Henry IV: "Opinion, that did help me to the crown."

I have always had a great respect for this statement written by Locke concerning *human understanding*: "The laws that men generally refer their acts to seem to me to be these three: (1) the Divine law; (2) the civil law; (3) the law of opinion or reputation, if I may so call it."

#### Three Institutions

In this matter of gaining a fresh and true perspective of the very vital role that public opinion and consequently public relations has played in the course of mankind's history, I wish at this time to briefly comment upon the *ethical* nature and significance of public relations. Without honesty, integrity, and sincerity of purpose, public relations is obviously nothing but a term.

Let's take a look at three of the greatest institutions in the history of Man and examine some of their concepts about man's relationship to man.

The first great institution, which is a religious one, has today millions of followers. One of the key terms in this great religious institution is a phrase which I think has meaning to us all: "The harvest field of merit." Surely in true merit there lies a rich harvest. This great religion stresses "mutual indebtedness" of a religious, moral, and economic nature.

The second great religious institution that I wish to refer to has this to say to its millions of followers: "Reply to injury with beneficence; evil with good." "Anyone can love his friends; try loving your enemies." "Do not vindicate your rights; if a man takes your cloak let him have your coat also." "Do not assert yourself; assert the true spirit of your principles."

I wish to tell of a third great religious institution which has millions of followers in the world today, and I think you would be interested in its founder who was a paid public school teacher working some 500 years before Christ was born. His disciples tell us that he based his philosophy upon *human relationships*.

These human relationships: father and son; man and wife; elders and young; ruler and subject.

#### **Great Teacher**

One of this great teacher's statements was to the effect that the object of government is the entire earth and all of its inhabitants; not only single, local, or national groups.

I think you would also be interested in knowing that this public school teacher, today known as Confucius, was also a member of the governmental civil service of his day, had this to say to his followers about the work of government:

Confucius opposed price raising by private or fiscal monopolies and favored government regulation of prices, loans, free granaries, aid to transportation, and state relief for orphans and the aged, in addition to private charities. He advocated that taxes were to be equal and universal; he approved income taxes and opposed customs tariffs.

#### **Sound Public Relations**

Perhaps with this brief attempt to gain an historical perspective it will be very much to the point if I illustrate the application of some of the broad principles we have just been discussing to a modern government situation.

As Chief Right-of-Way Agent of the Division of Highways, State of California, it is my privilege and responsibility to lead a staff of 429 right-of-way agents, together with an assisting staff of 787 persons who perform vital and necessary engineering, stenographic, clerical, and related functions.

For the moment let's use my staff and its developmental patterns as illustrative of my background, experience, and recommendations concerning sound public relations; for you may be sure that to the best of my ability I have endeavored to exemplify and inculcate those aspects of proper public relations which I believe must be customarily in evidence in any organization.

The net result in terms of work units is that our organization this next fiscal year will spend approximately \$150,000,000 of public funds to buy

right-of-way for the purpose of improving our 14,000-mile State Highway System in order to meet pressing traffic demands. A little extra-curricular activity during the coming fiscal year will result in our right-of-way organization acquiring for the State Department of Finance over 400 parcels of private property at a cost of 15 million dollars, which will include four new state college sites, major land expansions of four others, several office building sites and numerous sites for the State Department of Employment, Institutions, and other state agencies.

#### **Owners of Many Types**

We will acquire in the process this year some 12,400 parcels of private property which must be devoted to the public use for the common good, taking into consideration the fact that each of the 12,400 parcels will have not only a dual ownership vesting such as husband and wife, but will affect as well land holders of all types and persons who have property rights in trust deeds, mechanics' liens and a host of similar interests.

This adds up to the fact that we will affect this year directly and personally some 110,000 persons in the State of California. We will be touching their homes and pocket books, their community interests, and in truth, the very structure of their private and public lives.

At the start of negotiations practically every property owner shows maximum resistance, the property owner wants to be let alone, he wants us to buy the other fellow's property for the proposed public improvement, so here our public relations and salesmanship must be dynamic or our whole land acquisition program collapses.

If ever a department needed a sound public relations concept it is such a department as Right-of-Way of the State of California. Remember too that we are vested with the power of condemnation which issues from the government's right of eminent domain.

Not only do we have a job to do; we have what is actually the added burden of being forced to see that

the job is done even if we must force the affected property owner who is, in the final analysis, one of the persons who pays our salaries.

#### **Outstanding Phase**

Here again dynamic public relations must come to the fore. We must convince every affected property owner that it is our solemn obligation to fully protect his interest, to pay him every cent to which he is entitled. On the other hand, we must convince him that it is also our solemn duty to protect the interest of all of the other taxpayers. We cannot pay him more than the fair price to which he is entitled. At this point, we reach perhaps the most outstanding phase of our internal public relations program. Here is where the thousand of hours that we have spent training our right-of-way agent personnel, together with our indoctrination program in sound public relations, pays dividends for the affected property owner and for the taxpayers of our State.

The past record of performance of your State Highway Right-of-Way Department justifies my making the statement that we will reach negotiated settlements with 12,280 of the 12,400 property owners we will deal with, but under no circumstances will we use the threat of eminent domain, i.e., court proceedings to conclude the programmed acquisitions. We sell our organization, we sell the highway program, we sell our determination to reach fair settlements.

I have taken as my cardinal view throughout the past 25 years the attitude that basic to all of our activities must be a constant awareness of the need to "practice the Golden Rule."

#### **Not in Index**

Let me illustrate how deeply and sincerely devoted we right-of-way agents are to this single public relations concept:

I have here in my hand a copy of your State Highway Right-of-Way Manual. You may look in the index as long and as hard as you please, but you will see no separate subject matter entitled "public relations." This was done deliberately and intentionally.



When one of our young right-of-way agents asked my assistant chief, who edited the Manual, why he could not find the topic "public relations" in the index, my assistant chief replied (and I think very properly), "Everything in that Manual has to do with public relations. There is no separate topic or single program that we have for public relations. Every agent, every employee, in every act of his daily work and in his social contacts is developing public relations."

#### Code of Ethics

On the other hand, the first explanatory material in this book on page 3 is entitled "Code of Ethics of the employees of the Right-of-Way Department of the Division of Highways of the State of California."

Recognizing our responsibility to our department and to the people of the State of California, and feeling that we should encourage and foster high ethical standards in our organization, we do hereby subscribe to the following code of ethics for our contant guidance and inspiration, predicated upon the basic principles of trust, justice, and fair play.

1. To show faith in the worthiness of our profession by industry, honesty and courtesy, in order to merit a reputation for high quality of service and fair dealing.
2. To add to the knowledge of our profession by constant study and to share the lessons of our experience with our fellow employees.
3. To build an ever-increasing confidence and good will with the public, our employers, by poise, self-restraint and constructive cooperation.
4. To ascertain and weigh all of the facts relative to real properties in making an appraisal thereof, using the best and the most approved methods of determining just compensation.
5. To conduct ourselves in the most ethical and competent manner in our negotiations with affected property owners, thus meriting confidence in our knowledge and integrity.
6. To accept our full share of responsibility in constructive public service to community, State and Nation.
7. To strive to attain and to express a sincerity of character that shall enrich our human contacts, ever aiming toward that ideal—the practice of the Golden Rule."

#### Practical Aspects

Some of you may ask: "What are a few of the practical things which the Right-of-Way Department has done

as an evidence of its public relations awareness?" Let me reply by mentioning a few activities which I believe show our philosophy and attitude.

Every employee upon his entry into our department immediately participates in our continuous in-service training program, which is so oriented as to give him an introduction into his duties, responsibilities, and the proficiencies which are expected of him.

The State of California was the first (1944) in the Nation to have a continuous in-training program for its right-of-way agents. This is all the more surprising when you realize that there is no college in the country which gives a complete four-year course in right-of-way. Most of the skills in titles, negotiations, appraisals, condemnation, state and local statutes, etc., must be learned on the job.

Secondly, as a part of our practical public relations program, our organization introduced a "Streamlining Committee" in 1950 which functions both at staff and grass roots level, and which has a constant machinery in motion for the elimination of so-called "red tape."

#### Facts for the Public

Thirdly, our organization, representing the State of California, is the only one of its kind in the Country which has set up a Land Economic Studies Section. This is a continuous research program to determine the effects of highway construction upon adjacent properties and upon communities.

It is our purpose and program to get the facts on land values and land changes and to make these facts available to the public. At regular intervals our researches are printed in the official Public Works Magazine of the State of California, and they are printed in simple, concise, lay language.

It is interesting to note that these researches have received nationwide attention; they have been reprinted and quoted in such news media as *U. S. News and World Report*, and the *Wall Street Journal*, in professional publications such as *The Ap-*

*praisal Journal* and *Right of Way*, in technical monographs prepared by national organizations, e.g., the Automotive Safety Foundation, and the Chamber of Commerce of the United States, and in research papers similar to the series undertaken by Georgia State College of Business Administration and the Study prepared by the Division of Design and Construction of the State of Ohio.

#### Pamphlet Published

As another evidence of our attitude toward public relations our Right of Way Department was the first in the Nation to publish a simple brochure which is transmitted to every property owner whose lands are affected by state highway construction in California.

This little pamphlet which I am now showing you is entitled "More Than 13 Million People Want My Property." Before we appraise and negotiate for properties, we mail out this descriptive booklet to the property owner in order that he may get a first insight into the workings of our department and the manner in which our department can help him. The booklet is mailed in an envelope which has this statement printed next to the property owner's name and address:

"A message from your California State Division of Highways."

To many recipients this notation, and the friendly, helpful comments contained in the booklet, give a feeling of reassurance that personal problems affecting home and property will be treated fairly and reasonably.

Additionally, our organization encourages its membership to participate actively and fully in professional organizations representing the engineering, appraising, legal, and right of way professions. In this fashion the employees of the department can become more firmly integrated with their associates in the field and in their areas of interest.

#### Simple Approach

I have cited these brief examples of the methods and operations of our Right of Way Department in order to show that we have a simple, down-to-earth approach to public relations en-

tirely based upon a concept that the job must be done, it must be done well, and we like people to know about it.

If I were asked to summarize a bit of my philosophy concerning the force of public opinion and the inter-relationship of all of us in making this vast, intangible product known as "good public relations," here are some of the thoughts which my experience has urged upon me:

(1) There is not a single department, governmental or nongovernmental, large or small, that does not need public relations improvement.

(2) Public relations in a good sense *cannot*, and I repeat *cannot*, be generated simply by "putting someone in charge of a public relations department."

(3) Public relations is the necessary and unavoidable result of the action of every single individual in a group.

(4) Public relations, like charity, begins at home.

(5) Every effort should be made, *not* to the end that the public relations be merely *good*, but that such relations be *excellent*.

(6) There can be no distinctions between employees or employers, government or nongovernment, when it comes to public relations; our culture is too complex for anything but complete inter-relationships.

(7) A simple way to describe a grass roots public relations program is this: Establish a *policy of do good; do good; tell the world about it.*

(8) If you wish to determine what the public's attitude may be toward your own organization: Sample and examine the opinions of your own staff.

(9) The public relations concept cannot and must not be considered *static*. In this culture our public relations philosophy must be dynamic.

(10) Sometimes public relations becomes, as a program, a "canned" or artificial thing; I suspect there are too many people trying to *make friends in order to use them*. This is false and destructive. At the heart of the true public relations man is the concept of "service"—"service above self."

### Three Phases

In concluding my visit with you, I would like to leave this thought by briefly referring to three phases of public relations.

(1) Your relationship with your fellow worker in the office. Perhaps one of our greatest Americans, Henry Ford, realized the importance of our public relations with our fellow worker to the maximum extent when he said:

"Coming together is a beginning,  
Keeping together is progress,  
Working together is success."

(2) Those of us in the field should never forget that good public relations of public employees include our conduct and courtesy when we are operating vehicles with public license plates and insignia on the vehicle's door. As I said earlier, one out of every seven of the working citizens of this country are public employees. Let us carry our public relations on to the streets and highways through the courtesy and consideration we show to other drivers.

(3) I cannot too strongly impress upon every man and woman in this room that, like charity, public relations begins at home. If you do not develop public relations in your home life you will never develop good public relations in the office, on the highways and in your contacts with the public that employs you.

There is no place in a program of sound, dynamic public relations for stubbornness, domineeringness, rudeness or flippancy attitudes. The very foundation upon which good public relations must be built is patience, courtesy, consideration and integrity.

### Integrity Essential

Never forget that your personal appearance and your personal self are an all-important phase of your public relations.

One of the great leaders of one of the greatest social institutions of all time had this to say, which I think is vibrant and alive today:

"Ye shall know them by their fruits.  
"Even so every good tree bringeth forth good fruit, but a corrupt tree bringeth forth evil fruit.

## In Memoriam

### GLADYS ELIZABETH ALDRICH

The sudden death on August 31, 1957, of Gladys Elizabeth Aldrich, Highway Field Office Assistant for the Division of Highways, District VII, came as a severe shock to her many friends and coworkers.

As Gladys E. Akers she started work with the Division of Highways in May of 1944 in the Traffic Department. Mrs. Aldrich spent a number of years working in the Cost Estimate Section, from there she went to the Sign Shop; at the time of her death she was working in the Construction Department Field Office for Minor Projects.

Mrs. Aldrich was born in Indiana but has spent the major part of her life in Southern California, living in and around the City of Bell. She was a member of Bell Chapter No. 393 of the Order of the Eastern Star.

Gladys married for the second time in 1951. She is survived by her husband, Ed Aldrich; her daughter, Mrs. Wilma Miller; four grandchildren; and two brothers.

Gladys was noted for her friendliness and thoughtfulness towards all with whom she came in contact. She was a conscientious and valued worker. Her presence will be missed by all her associates who wish to extend their sincere sympathy to her family.

"Wherefore by their fruits ye shall know them."

To me, the very essence of this entire matter of public relations is in the true integrity and sincerity with which each individual faces his daily tasks.

If the individual is guided by the light of Service, and if he is truly dedicated to the welfare of his fellow human beings, he will truly be well related to the public.

"Therefore all things whatsoever ye would that men should do to you, do ye even so to them: for this is the law of the prophets."

And the Golden Rule is the law for good public relations.



# Carson Pass

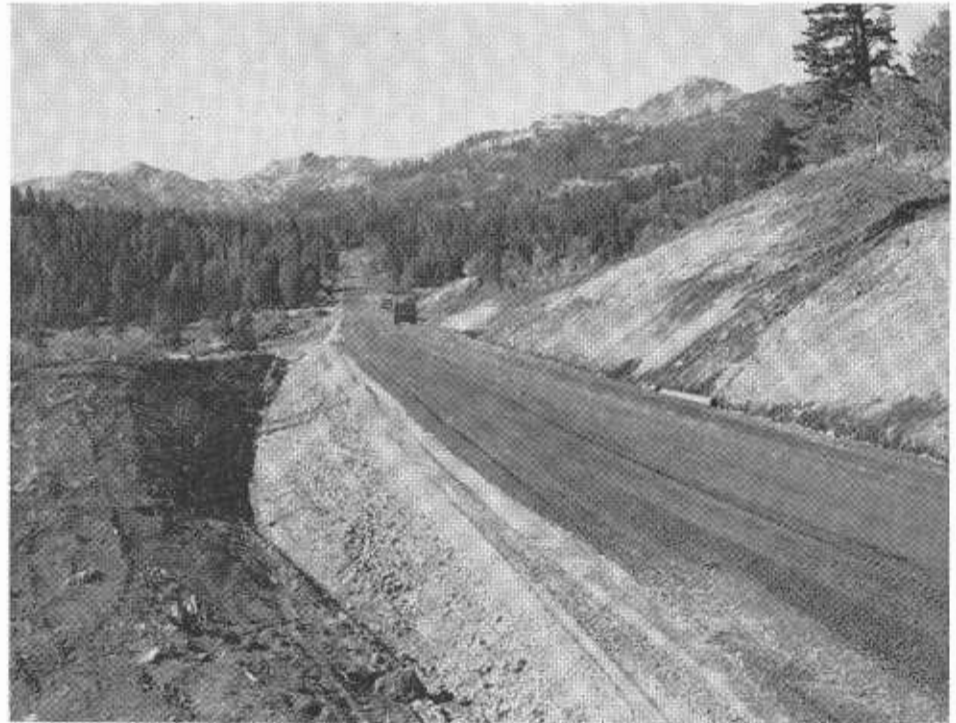
Improvements on Historic Highway in Alpine

By H. R. JANTZEN, Resident Engineer

EARLY COMPLETION of a project on State Sign Route 88 in Alpine County is another in a series of contracts designed to bring the historic Carson Pass highway up to modern standards. On January 15, 1957, a contract was awarded for the construction of 5.9 miles of new road between Red Lake and the West Fork of the Carson River.

The area traversed by this project is through Hope Valley at the eastern end of the steep approach to Carson Pass. Hope Valley has been developed as a cattle pasture by several large ranchers and is one of the more scenic valleys in the high Sierra country. The road is used primarily by vacationists bound for the high Sierra, but it is also used by logging trucks and light commercial vehicles.

Carson Pass was discovered by Kit Carson and officially reported by John C. Fremont who told of crossing the pass in 1844. After the story of the ill-fated Donner Party got out, the Carson Pass began to receive considerable travel. Eighty miles of the



Looking westerly toward Red Lake. Typical turnpike section.

old road was oiled for the first time in 1932. (See April, 1932, issue of *California Highways and Public Works*).

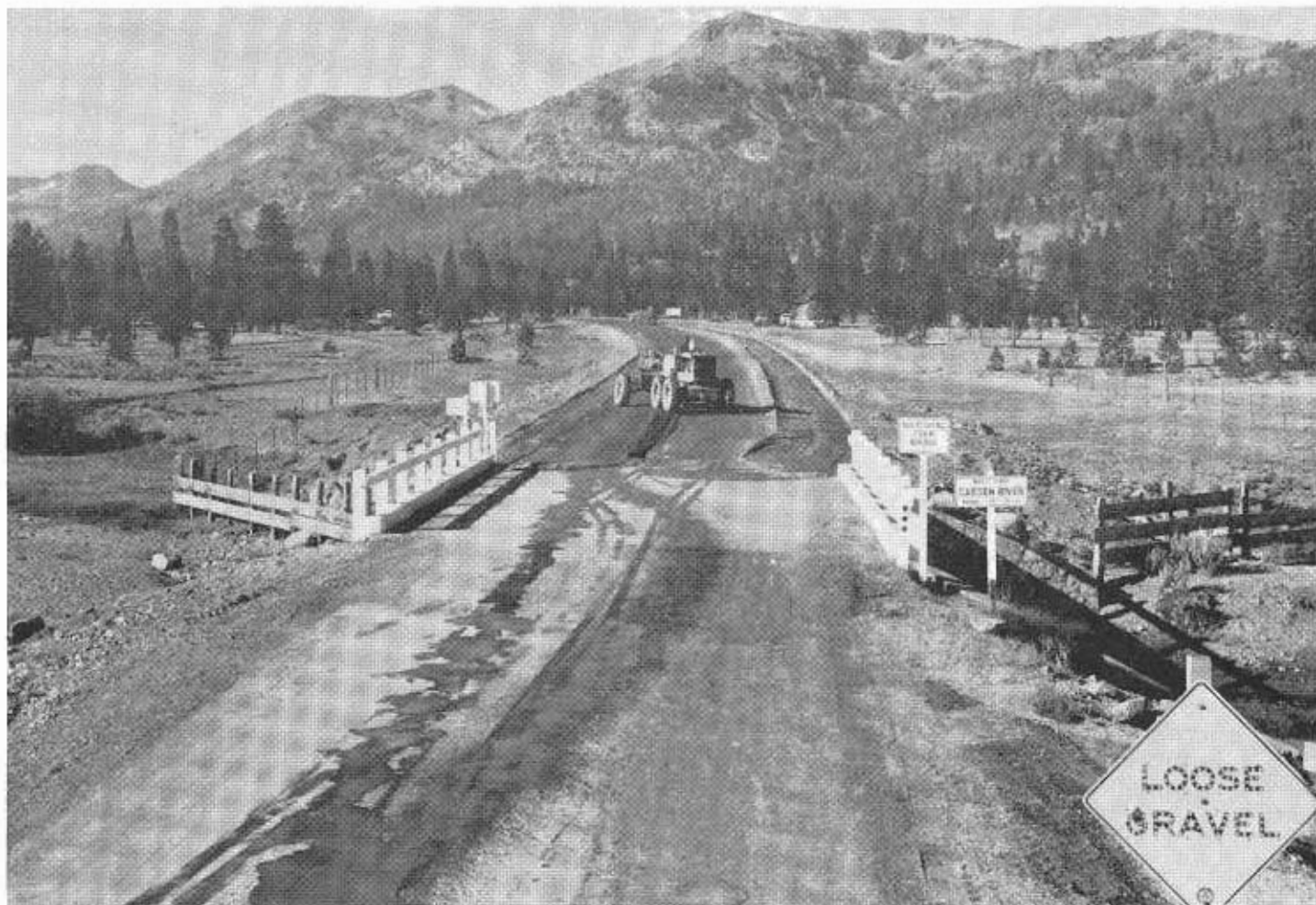
#### Old Road Narrow

The old road was exceedingly narrow and far below standards in align-

LEFT—Looking westerly near Red Lake. RIGHT—Near midpoint of project, looking westerly.







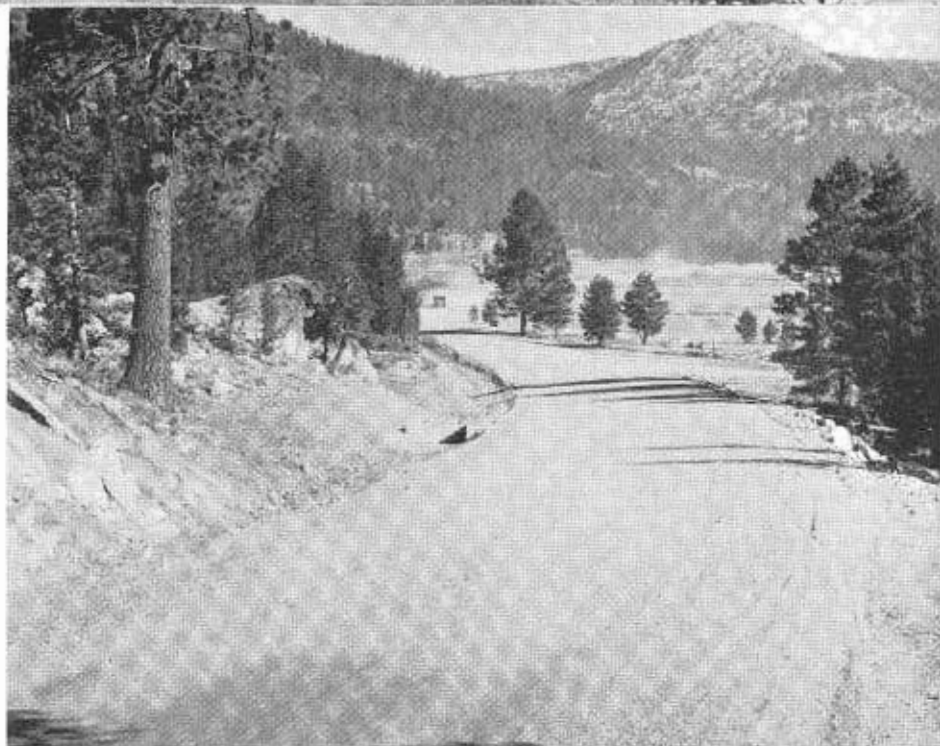
ment, grade and sight distance. The new road consists of a 28-foot all paved section of 2½ inches of plant-mix over 6 inches of base material.

About the middle of May, the contractor started work with the full intention of completing this project in one season, although the State had anticipated that two seasons would be required. The working season at the 7,000-foot elevation of the project is generally from late May through October.

The topography of the route consists of a series of meadows which are irrigated and subirrigated by water from Red Lake at the beginning of the project and Crater and Scott Lakes farther to the northeast.

#### **Drainage Problem**

From the very outset of construction the contractor had difficulty with water. In all but two of the cuts,



UPPER—Looking westerly from east end of project. LOWER—Looking northeasterly. Blue Lake Road in middle right of photo.



## MOUNT DIABLO RICH IN HISTORIC LORE

water was encountered in considerable quantity and the meadows were swampy and boggy from the snow melt and, later, irrigation.

In order to relieve the underground water condition, it was necessary to construct nearly the entire project on a "turnpike" section with a three-foot separation between side ditch and shoulder grade, raise the grade in some locations and blanket the entire section of other portions with a one-foot layer of filter material.

The contractor had up to four pieces of grading equipment occupied with correcting the drainage conditions on this project for over two months. The equipment was just able to keep the water controlled to permit the contractor to continue with the rest of his contract work.

A crawler track-mounted dragline had to work from large timber pads to keep from sinking into the marshes. Tractors frequently got stuck. At one time, two pull tractors and one tractor pushing were used to load a single scraper in the soft tundra-like material.

### Blasting of Lava

The appearance of the westerly half of the project at the start of construction gave the impression that this would be heavy grading with much blasting because of the large granite outcrops all over the area. However, as soon as the contractor's equipment had gotten under way, it became apparent that these outcrops were boulders and primarily "float" which had been left on the surface. Once these were out of the way, the balance of the grading was carried on without difficulty by power shovels. At two locations a dense lava was encountered which required considerable blasting and here also flows of water were encountered.

At the present time it appears that the contractor will accomplish his intention and complete the \$740,000 project in one working season, inasmuch as the surface course of plant-mix and the final cleanup are all that remain to be done.

The prime contractor on this project is H. Earl Parker, Incorporated, of Marysville, California, with A. C. Parker, as superintendent. Baldwin

Standing all alone in the center of a great plain, almost in the center of Contra Costa County, and raising its grand, rugged peak close to 4,000 feet into the California sky, El Monte del Diablo, or Mount Diablo as the moderns call it, is probably one of the most colorful mountains in the State today.

Even the way in which it received its name is colorful. According to a report by General Vallejo, a military expedition had been sent out from San Francisco in 1806 to wage war on a tribe of Indians that lived near and on the mountain. During the battle, when victory was beginning to go to the Indians, a large figure dressed in a strange costume and making strange dancing movements, appeared among the contestants, and shortly thereafter the victory went to the Indians. When the Spaniards learned that this figure would appear almost daily and go through this strange dance, they came to the conclusion that this was the devil of the mountain and named the mountain the Mountain of the Devil accordingly.

Since Mount Diablo occupies such a prominent position in such a large plain, it is little wonder, points out the National Automobile Club, that it has come in for considerable attention from the survey crews. Back in 1851 a government cabin and telescope were built on the summit and this summit was chosen as base point for United States surveys in California, in relation to which all the lands, with the exception of the Humboldt district and Southern California, are located.

Tourists found the mountain of interest, too. Here they could find wildflowers in abundance, majestic oaks,

Construction Company subcontracted the base material and the surfacing. The work is under the direction of J. G. Meyer, District Engineer, and W. F. Fleharty, District Construction Engineer, with the writer as resident engineer on the project.

strange natural formations, and views of the countryside that could not be surpassed. A wagon road from Concord was built, and one from Danville. Where the roads met about a mile below the summit, the last mile being too steep for the wagons, a mountain house was built and tourists came from all over the world to enjoy the hospitality here and survey the surrounding valleys.

In the 1890s the old government cabin burned down. Later the roads were abandoned and ranchers who didn't want tourists crossing their lands burned down the mountain house. On April 26, 1931, however, the magic mountain was again opened up to the passing tourist when it became a part of the California State Park System, the position of prestige it enjoys today.

### When You Walk At Night

When you step out into the glare of headlights at night, you're inclined to feel that you're in "the center of the stage." When the glare of headlights is all around you and almost blinds you, you're inclined to believe that the driver of that car must certainly see you.

The driver, however, doesn't always see you. If you're caught in the lights at night you don't always stand out clearly, especially if you're dressed in dark clothing and there is fog or rain around. Caught in the lights at night, you may often merge right into the background of shadows and be lost to view.

For this reason, points out the National Automobile Club, it's always wise to use extra caution when walking at night. If you're walking along the highway, walk on the left side facing into the oncoming traffic. Wear or carry something white, something that will reflect the light and be easily seen. And always assume that the driver just can't see you.

These are wise precautions, and they will help to keep you safe.



## J. P. MURPHY NAMED ASSISTANT STATE HIGHWAY ENGINEER

With the retirement of Richard H. Wilson, Assistant State Highway Engineer—Administration, after nearly 34 years of service (see page 47), State Highway Engineer G. T. McCoy announced the promotion of J. P. Murphy, Planning Engineer for the Division of Highways, to succeed Wilson, and made the following other appointments:

J. A. Legarra, Design Engineer, to be Planning Engineer.



JOHN P. MURPHY

George Langsner, District Engineer—Planning for District VII, with headquarters in Los Angeles, to be Design Engineer for the division, with headquarters in Sacramento.

Lyman R. Gillis, District Engineer—Operations for District VII, to be District Engineer—Planning.

Alfred L. Himelhoch, Assistant District Engineer—Traffic for District VII, promoted to District Engineer—Operations.

### War Veteran

Wilson's successor as Assistant State Highway Engineer, John Murphy, has been with the Division of Highways

since his graduation from the University of California at Berkeley in 1930 with a degree in civil engineering. Before becoming Planning Engineer for the division earlier this year, he was in charge of public relations and personnel. His earlier assignments have involved responsibility for nearly every aspect of highway planning and construction, including service in District III (Marysville) and District V (San Luis Obispo). From 1937 to 1942 Murphy worked under Wilson in Headquarters Office on federal aid projects.



LYMAN R. GILLIS, LEFT; GEORGE LANGSNER

Murphy was born in Pittsburgh, Pennsylvania, and received his early education in Bakersfield. From 1942 to 1945 he served with the U. S. Marine Corps in the Pacific Theater, including a tour of duty as Division Engineer Officer for the Second Marine Division.

Legarra, who is being transferred to the position of Planning Engineer from that of Design Engineer, will be returning to a post he previously held for more than a year beginning in November, 1955. Legarra is also a University of California civil engineering graduate (1934) who has been with the Division of Highways since 1941, serving in District VI (Fresno) and District X (Stockton) before moving to Sacramento headquarters office in 1951 as Assistant De-

sign Engineer and then Assistant Planning Engineer.

### Langsner Transfers

Langsner, who will transfer to Sacramento from the Los Angeles area to become Design Engineer for the division, is a native of Brooklyn, N. Y. He came to California in 1922 and was graduated from the California Institute of Technology in 1931 with a civil engineering degree. He has been



ALFRED L. HIMELHOCH

continuously with the Division of Highways since then, fulfilling constantly increasing responsibilities in planning, construction and design in the Los Angeles District. He was promoted to District Engineer there in 1955.

Langsner has been closely identified with the accelerated development of the Los Angeles metropolitan area freeway system, beginning as assistant resident engineer on the Pasadena Freeway in 1940. From 1947 until his promotion to District Engineer in 1955 he was assistant district engineer in charge of design, materials and sur-



veys for projects in the Los Angeles area.

Gillis, who has been District Engineer—Operations in District VII since January, 1956, will move to the District Engineer—Planning position hitherto held by Langsner.

He is a native of Walla Walla, Washington. He moved to California as a high school student and received his civil engineering degree from the University of California in 1938. He has since been with the Division of Highways, serving in District IV (San Francisco) continuously until 1956 except for military service in the Navy Civil Engineer Corps in World War II and the Korean conflict. Gillis had been Assistant District Engineer—Construction in the San Francisco District for three years prior to his promotion to District Engineer in the Los Angeles District.

Himelhoch's promotion to District Engineer—Operations is the latest advancement in an engineering career that began in 1936 on the Mono Craters Tunnel Aqueduct for the City of Los Angeles. He moved to the Division of Highways Los Angeles District later that year, and has continued there since. He is a native of Los Angeles, and an engineering graduate of the University of Southern California.

Most of Himelhoch's early activity with the Division of Highways was on survey work, but since 1945 he has had increasing responsibilities in design, hydraulics and traffic engineering in the Los Angeles District. He was promoted to Assistant District Engineer—Traffic in 1955.

## Max Gilliss Returns To Public Works Post

C. M. (Max) Gilliss resumed the position of deputy director of the State Department of Public Works September 17.

He had left the position in January, 1957, to serve Governor Goodwin J. Knight as a secretary assisting in legislative work.

Gilliss first joined the department December 1, 1952, as special representative, and became deputy director September 23, 1955.

and Public Works

## HYDRAULIC MINING IN THE OLD WEST

If you should happen to take a trip for yourself this coming fall and should end up rolling around the roads in the Mother Lode Country, the roads that run north of Sacramento through Grass Valley, Nevada City, and the like, you'll probably run across the little town of North San Juan and see nearby the great white holes that mark the spots where Columbia Hill and Badger Mountain used to stand.

To understand these great bleak holes, points out the National Automobile Club, you have to go back to the time of the Gold Rush and the strange fever that followed in its wake. When the prospectors and miners converged on California from all corners of the land, they soon discovered that the vein of gold that ran down the Sierra Nevada was one of the richest in the world. They also discovered that it could be very hard to find. Sending a shaft down here and a shaft down there, a man could spend his entire life digging holes and never coming across very much in the way of gold. The superstitious turned to divining rods and the more

practical minded turned to the knowledge of the mining engineer. Neither of these did much to take the gambling out of mining with the shovel and shaft.

In something of anger and desperation men finally turned to hydraulic mining. Diverting rivers in their courses and pumping this water through great nozzles at enormous pressures, they turned whole mountains, such as Columbia and Badger, into rivers of mud that surged down the valleys. As the mud passed, they gathered the gold.

The rivers of mud, however, soon became so great that they buried rich pasture lands and farm country under layers of ooze. At this the ranchers and farmers got up in arms, fought with the miners, and finally managed to have hydraulic mining banned in California in 1884. In recent years some hydraulic mining has been permitted in certain areas and under careful supervision.

The holes at North San Juan, however, are relics of a wilder day when wide-eyed men in search of gold could wash whole mountains right away.

### ALL IN A DAY'S WORK

TO WHOM IT MAY CONCERN:

I didn't know to whom to write this letter nor exactly know what to say. But I'm sure it'll get to the right hands.

Yesterday about 2 p.m. my mother and the five of us girls, ranging in ages from 10 to 20 years, were driving home from Inglewood after taking my father to the airport to catch a plane for Mississippi. Anyway, we were in the Santa Ana Canyon. Right in the middle of it. Imagine six women stranded in the middle of the Santa Ana Canyon with the loveliest flat tire you ever saw. A piece of rubber came off the tire and stayed on the highway. So we sat and sat. Then here comes a truck from the Department of California Highways from Santa

Ana and, as we found out later, the driver was Charlie Snider. He stopped to help us. We were on a very slight slope, which made it very hard to keep the car up on the jack, even when he used two jacks, his and ours both. The car fell off the jacks three times. But your employee, Mr. Snider, stuck to it and finished the job, too. He refused to take any payment for his work. So I (the 20-year-old) thought I would write to the department or department head to let them know the courtesy Mr. Snider showed us.

Thank you.

MISS LUCILLE MACHADO  
3744 McKenzie Street  
Arlington

P.S.: It took Mr. Snider exactly 1½ hours to fix the flat.

# Cost Index

Reaches Low Point for Year  
In Third Quarter of 1957

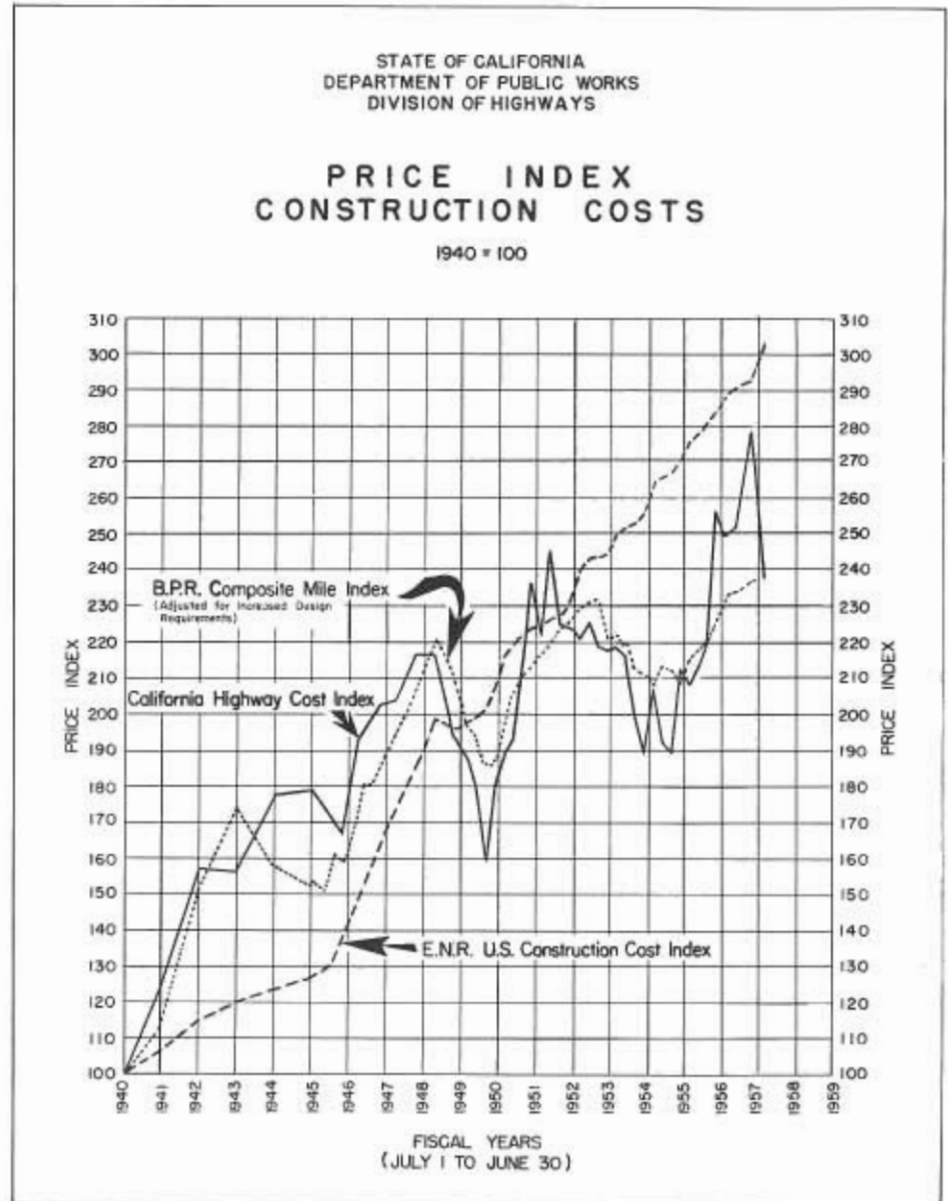
By RICHARD H. WILSON, Assistant State Highway Engineer  
H. C. McCARTY, Office Engineer  
LLOYD B. REYNOLDS, Assistant Office Engineer

THE California Highway Construction Cost Index for the third quarter of 1957 reached a low point for the year. The index now stands at 237.5 (1940 = 100), which is 29.4 index points or 11.0 percent below the second quarter. It is 11.6 points or 4.7 percent below the same quarter a year ago and 14.6 points or 5.8 percent below the fourth quarter of 1956.

The California index and the Bureau of Public Roads Composite Mile Index have followed similar patterns as the graph included with this release will show. The California index is affected by local conditions and the activities of a single state, with the result that rapid changes and decided fluctuations are found in the graph line. On the other hand, the bureau's composite mile index, which is computed from data accumulated from a much larger number of projects, national in scope, presents a smoother graph.

Past performances of these indexes show that in the instances where decided peaks and valleys have occurred in the California index with respect to the bureau's, a return to national averages, in a reasonable interval, can be expected. This situation occurred again in this quarter. The rapid move away from the bureau's index early in 1956 has been watched with speculation as to when similar levels would be reached. In view of the decided drop in California's index and the flattening of the bureau's, it remains to be seen whether a downward trend in national costs has been established. All factors being considered, it is our belief that a general upward course will be followed.

The curtailed opening of bids during August and September had a marked effect upon the index behavior during this quarter. The down-



ward direction in the period was effected by roadway excavation, asphaltic and bituminous mixes and portland cement concrete pavement, the other items remaining close to previous quarter average prices.

In the second quarter, bids were opened for about 16 large projects, the majority of which were for extensive freeway construction. Bid prices for the seven index items were widely spread, but most of the result-



ing averages were fairly in line with those determined in recent quarters. Most of these projects are located in areas subject to considerable traffic interference. It was stated in the second quarter release that cost data were well averaged by the wide distribution of the projects. A review of costs for the three items mentioned above has shown the statement to be true.

Of the 128 projects for which contracts were awarded in the third quarter, only six were major freeway projects. The large number of low-value projects with respect to the total, exerted an effect on price averages that heretofore was not appreciably felt in view of the magnitude of freeway projects with which their bid prices were averaged.

Prices furnished by three large freeway projects for the three controlling items of this period gave assistance in establishing averages below those recently experienced. In these instances low prices were reflected by freedom from traffic interference and/or accessibility of materials sources.

Average prices of \$0.63 for roadway excavation existing during the last two quarters have been considered as being at a high level, as previously bids for this item were generally hovering in the 50-cent range. The average of \$0.42 for this quarter is the lowest since the first quarter of 1956. A large-volume project with a price of \$0.32 per cubic yard combined with a number of small projects having relatively low bid prices exerted a toppling effect with respect to excavation cost averages.

Untreated rock base rose from \$2.10 to \$2.34 but, lacking support from other items, its upward force was ineffective. Limited use of the item during this period was responsible for the price increase.

Asphaltic and bituminous mixes dropped from \$6.18 to \$5.10, the lowest point reached since 1955. The previously mentioned freeway projects combined with the extensive summer resurfacing program are responsible for this marked change.

Portland cement concrete pavement dropped from \$15.59 to \$14.34, a level

#### CALIFORNIA DIVISION OF HIGHWAYS AVERAGE CONTRACT PRICES

	Roadway excavation, per cu. yd.	Untreated rock base, per ton	Plant-mixed surfacing, per ton	Asphalt concrete pavement, per ton	Asphaltic and bituminous mixes, per ton	PCC pavement, per cu. yd.	PCC structures, per cu. yd.	Bar reinforcing steel, per lb.	Structural steel, per lb.
1940.....	\$0.22	\$1.54	\$2.19	\$2.97	--	\$7.68	\$18.33	\$0.040	\$0.083
1941.....	0.26	2.31	2.84	3.18	--	7.54	23.31	0.053	0.107
1942.....	0.35	2.81	4.02	4.16	--	9.62	29.48	0.073	0.103
1943.....	0.42	2.26	3.71	4.76	--	11.48	31.76	0.069	0.080
1944.....	0.50	2.45	4.10	4.50	--	10.46	31.99	0.054	0.132
1945.....	0.51	2.42	4.20	4.88	--	10.90	37.20	0.059	0.102
1946.....	0.41	2.45	4.00	4.68	--	9.48	37.38	0.060	0.099
1947.....	0.46	2.42	4.32	5.38	--	12.38	48.44	0.080	0.138
1948.....	0.55	2.43	4.30	5.38	--	13.04	49.86	0.092	0.126
1949.....	0.49	2.67	4.67	4.64	--	12.28	48.67	0.096	0.117
1950.....	0.40	2.25	4.26	3.75	--	11.11	43.45	0.079	0.094
1951.....	0.49	2.62	4.34	5.00	--	12.21	47.22	0.102	0.159
1952.....	0.56	3.99	5.00	4.38	--	13.42	48.08	0.098	0.150
1953.....	0.51	2.14	5.31	4.88	--	12.74	50.59	0.093	0.133
1954.....	0.45	3.13	4.50	4.86	--	14.41	48.42	0.094	0.124
1955.....	0.39	2.22	4.93	--	--	13.35	45.72	0.095	0.142
1st quarter 1956.....	0.40	2.08	5.40	6.50	--	14.05	52.51	0.105	0.166
2d quarter 1956.....	0.51	2.06	6.27	--	--	14.64	67.13	0.113	0.219
3d quarter 1956.....	0.52	2.27	6.12	--	--	15.57	66.32	0.121	0.178
4th quarter 1956.....	0.52	2.21	--	--	\$5.93	14.95	59.63	0.112	0.197
1st quarter 1957.....	0.63	2.10	--	--	5.94	17.28	61.14	0.129	0.235
2d quarter 1957.....	0.63	2.10	--	--	6.18	15.59	58.61	0.119	0.204
3d quarter 1957.....	0.42	2.34	--	--	5.10	14.34	58.68	0.130	0.200

<sup>1</sup> The item of crusher run base was used before 1953.

<sup>2</sup> Asphalt concrete pavement combined with plant-mix surfacing in fourth quarter 1956 and will be identified as asphaltic and bituminous mixes in the future.

#### NUMBER AND SIZE OF PROJECTS, TOTAL BID VALUES AND AVERAGE NUMBER OF BIDDERS (July 1, 1957, to September 30, 1957)

Project volume	Up to \$50,000	\$50,000 to \$100,000	\$100,000 to \$250,000	\$250,000 to \$500,000	\$500,000 to \$1,000,000	Over \$1,000,000	All projects
<b>Road projects</b>							
No. of projects.....	56	18	18	6	2	1	101
Total value*.....	\$1,044,252	\$1,340,102	\$2,892,258	\$1,879,608	\$1,451,301	\$1,679,044	\$10,286,365
Avg. No. bidders.....	4.6	6.4	7.2	10.7	7.5	11.0	5.9
<b>Structure projects</b>							
No. of projects.....	12	1	6	1	--	2	22
Total value*.....	\$209,825	\$80,496	\$1,082,600	\$294,452	--	\$8,977,458	\$10,644,831
Avg. No. bidders.....	5.7	9.0	10.5	8.0	--	6.5	7.3
<b>Combination projects</b>							
No. of projects.....	--	--	--	--	--	5	5
Total value*.....	--	--	--	--	--	\$18,162,793	\$18,162,793
Avg. No. bidders.....	--	--	--	--	--	7.8	7.8
<b>Summary</b>							
No. of projects.....	68	19	24	7	2	8	128
Total value*.....	\$1,254,077	\$1,420,598	\$3,974,858	\$2,174,060	\$1,451,301	\$28,819,295	\$39,094,189
Avg. No. bidders.....	4.8	6.5	8.0	10.3	7.5	7.9	6.2

\* Bid items only.

#### Total Average Bidders by Months

	July	August	September	Average for three months
1957.....	6.1	6.7	5.7	6.2
1956.....	3.8	3.7	3.7	3.7

not experienced for more than a year. Two large-volume freeway projects close to material sources made the low price possible in this third quarter.

Class A portland cement concrete structures, one of the items with a

higher average price, was up to \$58.68 from the \$58.61 price in the previous quarter.

The increase in price from \$0.119 to \$0.130 for bar reinforcing steel establishes a high for the item. A re-

view of prices received during the period fails to show the reasons for the increase at this time.

The price per pound for structural steel, lower by four-tenths of a cent in this quarter, now stands at \$0.20. The change is not significant but, if a trend is being established, definite results will obtain in the fourth quarter with the resumption of freeway project bids. Recently published information on steel manufacturing shows that the industry is now recovered from strike effects of 1956 and that previously existing shortages in rolled shapes and plates are virtually cleared out.

The accompanying tabulation shows the average unit prices forming the basis for computing the cost index since 1940.

Previous releases on cost trends in California have attributed considerable of the upward direction in highway construction costs to the delays and uncertainties in steel deliveries. With the situation improved as claimed in published reports, contingencies included by contractors in bid prices for steel to protect themselves against delivery delays should not be evident in the future.

Other factors that have contributed to the rise in highway construction costs are increased labor rates and prices for materials. It is evident that shortcutting methods now being employed by many contractors, particularly on large projects, are successfully offsetting a large share of the rise in costs attributed to these price components.

Data for preparation of this quarter's index were provided by 128 projects, of which 53.1 percent were under \$50,000, 14.8 percent ranged from \$50,000 to \$100,000, 18.7 percent ranged from \$100,000 to \$250,000, 5.5 percent ranged from \$250,000 to \$500,000, 1.6 percent ranged from \$500,000 to \$1,000,000, and 6.3 percent were over \$1,000,000. The total bid value of these projects amounted to \$39,094,189, and the projects under \$50,000 accounted for 3.2 percent of the total; between \$50,000 and \$100,000 was 3.6 percent; between \$100,000 and \$250,000 was 10.2 per-

**THE CALIFORNIA HIGHWAY CONSTRUCTION COST INDEX**

Year	Cost Index
1940	100.0
1941	125.0
1942	157.5
1943	156.4
1944	177.8
1945	179.5
1946	179.7
1947	203.3
1948	216.6
1949	190.7
1950	181.2
(1st quarter 1950—160.6)	
1951	225.0
(4th quarter 1951—245.4)	
1952	225.9
1953	215.2
1954	193.5
(2d quarter 1954—189.0)	
1955 (1st quarter)	189.3
1955 (2d quarter)	212.4
1955 (3d quarter)	208.6
1955 (4th quarter)	212.6
1956 (1st quarter)	219.5
1956 (2d quarter)	255.9
1956 (3d quarter)	249.1
1956 (4th quarter)	252.1
1957 (1st quarter)	277.7
1957 (2d quarter)	266.9
1957 (3d quarter)	237.5

cent; between \$250,000 and \$500,000 was 5.6 percent; between \$500,000 and \$1,000,000 was 3.7 percent; and over \$1,000,000 was 73.7 percent.

Bidder competition has held up during this quarter, with the average bidders per contract standing at 6.2, compared with 3.7 a year ago and 5.1 for the last fiscal year. The accompanying table shows in detail the number of projects, the project values and the average number of bidders arranged by value brackets.

The California Highway Construction Cost Index, the Engineering News-Record Construction Cost Index and the United States Bureau of Public Roads Composite Mile Index, all reduced to the base 1940 = 100, are shown on the accompanying graph. The latter two indexes are based on nationwide construction costs.

The Engineering News-Record Cost Index, which now stands at 303.2, again shows a rise at a slightly

**'Twas Different Back in 700 B.C.**

Right-of-way acquisition and access control today involve negotiations which result in friendly settlements in nearly all cases. It wasn't always that way.

Seven hundred years before the birth of Christ, the king of Assyria had less democratic methods for dealing with encroachments along the Royal Road.

When he died, the king left this message on a memorial marker in the City of Nineveh: "The Royal Road. Let No Man Decrease It."

To back up this decree the monarch further ordered that any unlucky subject whose property impaired the roadway was to be impaled on a stake in front of the palace.

The record of the California Division of Highways Right of Way Department provides a sharp contrast.

During the 1956-1957 Fiscal Year, the department settled 97.16 percent of its right-of-way dealings in an amicably negotiated manner. In a total of 9,391 transactions it was necessary to complete eminent domain proceedings on only 267 parcels.

Today, property owners find that right-of-way and access problems can be resolved with state agents on a mutually beneficial basis. In the king's day, reluctant landholders had only one stake in such problems—the one in front of the palace.

higher rate of increase than in the second quarter of 1957. It is up 7.5 index points or 2.5 percent from the second quarter.

The Bureau of Public Roads Composite Mile Index for the second quarter of 1957, at the level of 237.2, which is the latest available, was up 0.2 index point or 0.08 percent over the first quarter of 1957.



# Recommendations

## Civic Groups Present Highway Priorities

THREE GROUPS presented budget recommendations to the California Highway Commission at its August meeting in Sacramento.

The San Francisco Chamber of Commerce's budget recommendations for San Francisco for the Fiscal Year 1958-59 were presented before the commissioners August 21st. Leonard S. Mosias, chairman of the San Francisco chamber's street, highway and bridge section, urged inclusion of nearly \$35,000,000 for construction and right-of-way allocations in San Francisco as follows:

- a. Routes 225 and 2, southern freeway—from Orizaba Avenue along the Southern Pacific tracks and Alemany to the James Lick Memorial (Bayshore) Freeway junction, full freeway development, 4.0 miles, \$29,000,000.
- b. Routes 2 and 56—Golden Gate Bridge approach—Route 2 from Richardson Avenue "Y" to interchange with Route 56, add two additional lanes, 1.4 miles, \$5,800,000.
- c. Route 68—James Lick Memorial (Bayshore) Freeway—South city limits to Bay Bridge, protective planting, \$100,000.

The 1958-59 recommendations of the Alameda County Highway Advisory Committee were laid before the commission on the opening day of its monthly meeting, August 20th. W. A. Sparling, secretary of the committee, headed the group making the presentation.

Projects upon which actual construction, including programed acquisition of rights-of-way, should be prosecuted the committee said, are:

### State Route 69—Eastshore Freeway

1. US 40—Complete rights-of-way acquisition and initiate construction of the Eastshore Freeway in Albany to connect with the Alameda County-Contra Costa County line.
2. In San Leandro—Early completion of First Avenue Interchange facilities. The adjacent industrial area has developed to a point where completion of the cloverleaf and provisions for four lanes of traffic on the overcrossing is necessary.
3. In San Leandro—Provide an overpass structure to carry traffic from Halcyon Drive to Farnsworth Street in San Lean-

dro. There is no crossing of the freeway between First Avenue and Washington Avenue, a distance of about one mile. The necessary rights-of-way for the approaches to the structure are vested in the City of San Leandro.

### State Route 226

1. Estuary Crossing—Complete rights-of-way acquisitions and initiate construction at an early date.
2. In Alameda—Program rights-of-way acquisition and initiate construction from the northerly end of Bay Farm Island Bridge to Fernside Boulevard.

### State Route 226 and 75—In Oakland

Portion of Sign Route 24—Complete route adoption between Alameda-Contra Costa county line and Eastshore Freeway; continue planning and surveys and formulate a program for correction of spot deficiencies. Initiate planned acquisition of rights-of-way.

### State Route 227—Mountain Boulevard Freeway

Increase program of state allocations and accelerate construction for early completion to State Route 5.

### State Route 5—Foothill Boulevard and MacArthur Boulevard

1. Sign Route 9—Expedite route studies, surveys and plans for Route 5-C from Hayward to Niles, together with correction of the three-lane portion from Sycamore Avenue to the unincorporated town of Decoto by the addition of a fourth traffic lane.
2. US 50, MacArthur Boulevard and Foothill Boulevard—Initiate construction and continue programed purchases of rights-of-way.
3. US 50—Expedite surveys and protection of rights-of-way southerly from San Leandro to connect with State Route 228, and correct spot deficiencies.
4. Sign Route 9—Expedite surveys and protection of rights-of-way for Route 5-C from Decoto to vicinity of Warm Springs, and correct spot deficiencies.

### State Route 105—In Oakland, San Leandro and Hayward

Expedite planned purchases of rights-of-way preparatory to early construction from Route 5 to Route 69 along Jackson Street in the vicinity of Hayward.

### State Route 108

1. Sign Route 21, from State Route 5 near Warm Springs to junction with State

Route 107 near Sunol—Expedite surveys, acquisition of rights-of-way, and design to take early advantage of federal highway funds as a part of the Interstate Highway System.

The regional highway committees of the California State Chamber of Commerce were heard on August 22d. They presented recommendations for highway construction projects in the 58 counties of the State in the 1958-59 Budget and in subsequent budgets.

F. W. Tarr, chairman of the State Chamber's statewide highway committee, explained to the commissioners that the projects recommended were assembled following a series of 38 meetings held in all parts of the State in June, July and August.

## ENGINEERS DO MAKE PROGRESS

Editor, *California Highways and Public Works*

1172 Seventh St., Monterey, California

DEAR SIR: I wish to thank you for sending the "California Highways and Public Works." I find it one of the most interesting and instructive publications I receive, and when I look at the photos of some of the projects it really makes me marvel. It all seems to me to be so complicated, in fact impossible, and lo and behold up comes a photo of the project all finished and in order. I have marveled at the Candlestick Point section of the Bayshore Freeway you have built just out of San Francisco. I watched it being built for about five years or more.

Yours respectively

HERBERT T. CROSS

Once there was a lion tamer who said that his father before him had also been a lion tamer.

"Did you ever put your head in a lion's mouth?" he was asked.

"Only once," said the fellow, "to look for Dad."



### CALIFORNIA CONGRATULATED

WHITMAN, REQUARDT AND ASSOCIATES  
Engineers  
Baltimore 2, Maryland

MR. GEORGE T. MCCOY  
State Highway Engineer

DEAR MR. MCCOY: Since my retirement in October, 1956, as chief engineer and advisory engineer to the State Roads Commission of Maryland I have been associated with Whitman, Requardt and Associates as highway consultant.

I continue to receive *California Highways and Public Works*, which I read religiously and always obtain some valuable information therefrom. In the March-April issue notice is given that the California Highway Department has prepared a booklet entitled "Freeway Facts." If these are available I would very much appreciate receiving two copies.

You and your associates are to be congratulated on the splendid progress you have made under the 1956 Federal Aid Highway Act, with particular reference to the interstate system, and I am happy to know that Maryland is in such fine company. This is a source of great pride to me as I had a great deal to do with the preparation and inauguration of the work under the 12-year road construction and reconstruction program.

With kindest regards and best wishes.

Sincerely yours,

W. F. CHILDS, JR.

### THANK YOU

KENNETH C. ADAMS, *Editor*

Thank you for enabling me to receive copies of your wonderful magazine. I want you to know I have thoroughly enjoyed every issue I have received. I cannot express my sincere appreciation enough for this wonder-

### LIKES OUR PHOTOGRAPHY

HAROLD D. WEBER, PUBLIC RELATIONS  
534 20th Street, Oakland 12, California

MR. KENNETH C. ADAMS, *Editor*  
*California Highways and Public Works*

DEAR MR. ADAMS: For many years I have been on the mailing list to receive *California Highways and Public Works*, a courtesy and a privilege I greatly appreciate. Because my activities are now in different fields, I no longer participate directly in the civic organization phase of highway development, as I did for more than 20 years, especially with reference to the Richmond-Oakland-San Jose East-shore Freeway, now nearing completion.

I still retain an interest in the highway program, and enjoy the opportunity of keeping posted through reading the regular issues of the magazine, which I do with interest and pleasure, and then file for reference.

The entire magazine is a splendid example of editorial and mechanical skills, but I want to compliment you particularly, and through you the men responsible, for the cover color photography, both as to subject matter and plate work. Keep up the good work!

Sincerely,

HAROLD D. WEBER

ful educational and enlightening magazine, and read it from cover to cover.

I have all copies sent me for years and often refer back to old copies. Looking forward to your next issue.

Yours very truly,

JOE DE LUCCHI  
Los Angeles

Of the 10,050 bridges on the national interstate system in rural areas, 8,187, or 81 per cent, are below standard width, according to the Automotive Safety Foundation.

## Liability of State Drivers

Do you drive a state car or other state equipment? If you do, are you always sure you are using the vehicle on actual state business, so that, should you become involved in an accident, you will not personally be held liable?

Any state employee, while using a state-owned vehicle on official business, is fully protected under insurance taken out by the State against liability for personal injury and property damage to others. There is no personal insurance on the employee himself except under the provisions of the Workmen's Compensation Act, which covers all state employees injured in the course of their employment.

### Employees' Liability

As indicated above, the key factor in determining the liability of a state employee who incurs an accident while driving a state vehicle is whether or not the employee is on official state business at the time the accident occurs. According to J. F. Brady, insurance adviser with the Department of Finance, there is a fair interpretation, based on common sense, that allows the employee to take the state vehicle when he goes out for meals or if he wishes to pick up some luggage at his home prior to a trip out of town. He cited cases, however, where employees were held personally liable as a result of becoming involved in an accident when operating a state vehicle while not in the course of their employment.

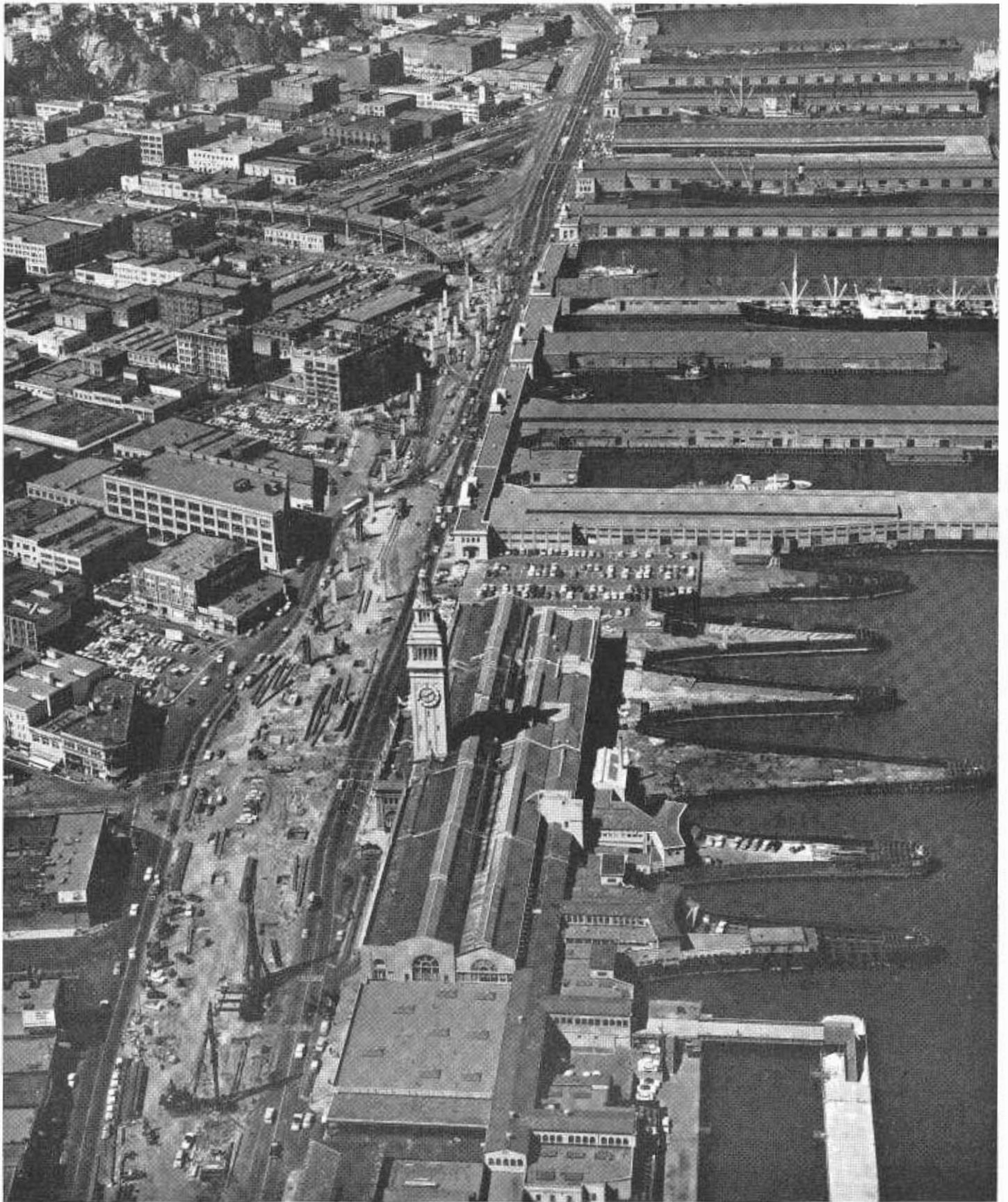
Brady pointed out there have been relatively few cases of misuse of state cars, particularly in recent years, and that many times the offender is unaware that he is doing wrong. He urged all state employees who have occasion to drive a state vehicle to exercise the utmost discretion and operate it only on official duty. Anyone who violates this provision is placing himself in an extremely delicate position, he said.

Traffic lines and pavement markings were painted on approximately 10,702 miles of rural state highways by the California Division of Highways during the 1955-56 Fiscal Year.





*View of widened section of U. S. 50 looking westerly from Bijou on Lake Tahoe*



*Recent photo of construction of Embarcadero Freeway in San Francisco. Famous Ferry Building in center foreground.*



# Hard to Replace

*Richard H. Wilson Retires  
From Highways Division*

OCTOBER 31, 1957, marks the close of the colorful and illustrious career of Richard Hagan Wilson in the field of highway engineering. Dick, as he is known to his associates with the Division of Highways, in the highway construction industry, and in private life, started his California service in 1912 with Division I, as it was known when the division office was located in Willits. His assignment as resident engineer between 1912 and 1915 resembled the life of a frontiersman as the North Coast region could boast of little more than game trails north of Willits at the time.

Other fields appeared greener, and in 1915 Wilson transferred his attentions to the Washington State Highway Department as resident engineer, serving in that capacity until 1920. His construction activities were interrupted between September, 1917, and September, 1919, by priorities of the United States Army. The two-year period with the 20th Engineers saw Wilson's rise from private to first lieutenant. At the close of the fracas in France, he returned to his former duties with the State of Washington and in 1920 was appointed district engineer with headquarters at Tacoma. At the end of a year as district engineer, he was moved to Seattle, where he carried on the administration for two districts.

#### **Returns to California**

California beckoned again, and in 1927 Wilson as district maintenance engineer returned to District I, which had in the meantime changed its headquarters location to Eureka. Over the next two years it became his responsibility to maintain many of the highways on which he had previously handled construction. Another move was soon to materialize, this time to Sacramento as office engineer and assistant district engineer with District III, where an extensive program was in the planning stage. During the following four years, as office engineer and



**RICHARD H. WILSON**

assistant district engineer, he had an active part in the design of many projects on US 40, US 50, US 99W and elsewhere in the district. His broad thinking on the subject of highway design resulted in the survival of many of these projects despite the onslaught of present-day traffic.

Being close to the seat of highway operations, his ability was not overlooked, and in 1933 C. H. Purcell, State Highway Engineer, selected Wilson as principal highway engineer, to administer office engineer functions in Headquarters Office. The Division of Highways was then undertaking an extensive program of construction. Through his leadership the program was put under way in record time. In the reorganization of the Division of Highways in 1947, he was again selected to fill an important staff position, that of Assistant State Highway Engineer—Administration, which position he held to his retirement.

Throughout Wilson's career as Headquarters Office Engineer and

later as Assistant State Highway Engineer—Administration, he has had an active and important role in the preparation and bringing to completion of hundreds of highway projects let to contract. His close contact with the various district engineers over the years was a means of expediting the flow of project plans into headquarters so that full advantage could always be taken of prevailing conditions to the end that the volume of construction was held to the highest peak commensurate with revenue available for the purpose.

His wide and intimate acquaintance with members of the contracting industry and representatives of industry connected with highway construction has developed a thorough understanding of the separate problems of these groups and of the Division of Highways. Fair treatment of individual contractors in their dealings with the division and maintenance of construction specifications on an equitable basis have been instrumental in keeping the roster of highway contractors at a high level.

#### **High Bidding Potential**

Administering the operational phase with respect to contractors' prequalification ratings has long been a function of the Assistant State Highway Engineer—Administration. His knowledge of contractor capabilities has resulted in the establishment of a high bidding potential equally satisfactory to the division and to the contracting group.

Wilson has served on the division's Contractor Claims Board with four other members from the organization. In the years he has functioned in this capacity most claims have reached an amicable settlement. Contractor relationship has been further evidenced in his negotiations with this group in the formulation of equipment rental rates affecting the Division of Highways.

... Continued on page 50

# Retirements *from* Service

## H. Clyde Amesbury

H. Clyde Amesbury, Traffic Engineer of the Division of Highways, District II, in Redding, retired on October 1st after more than 40 years of service in highway construction. Almost 25 years were spent in California state service.



H. CLYDE AMESBURY

Clyde was Traffic Engineer in District II from 1951 until his retirement, and just prior to that he was Construction Engineer in the same district for 13 years. He started

working for the State in December of 1933 as Resident Engineer and later became Assistant Maintenance Engineer of District I in Eureka.

In his capacity as Traffic Engineer, Clyde also was in charge of public relations for the district. He was very capable in this position and gained many friends for himself as well as the division.

Clyde Amesbury was born in Brooklyn, Iowa, and came to California with his wife, Helen, in 1925. They have two sons, Dr. Robert H. Amesbury, a dentist in Susanville, and Capt. Bruce Amesbury of the Air Force in Roswell, New Mexico.

After graduating from Iowa State College, Clyde spent several years in private industry as an engineer and as Field Engineer for the State of Montana. His vast experience also includes that of superintendent for the City of Alhambra, Resident Engineer for the Los Angeles County Road Department and General Foreman for the Los Angeles County Flood Control Department.

Clyde is a Mason and a member of the Redding Chamber of Commerce.

## Sam R. Leedom

Sam R. Leedom, 61, Administrative Assistant of the State Water Board, retired after 20 years of service with the State. He left on vacation September 6th, and will go on retirement at the end of his vacation period.



SAM R. LEEDOM

His friends and associates tendered him a farewell party at the University Club in Sacramento on the night of August 30th.

Leedom came into state service in 1937 as public information officer for the Water Project Authority, in which capacity he served until commissioned in 1942 as a captain in World War II. He was assigned to SHAEF in England and served there as a member of the G5 section of the Army. Leedom is also a veteran of World War I, having enlisted as a seaman in the Navy for that conflict. He claims his World War I service comprised solely of swabbing down decks of a convoy destroyer in the Atlantic.

Returning to Sacramento in 1945 he was associated with the public relations firm of Clark and Leedom for a year, during which time he also worked for the Joint Legislative Interim Committee on Water Problems.

Since 1947 Leedom has been the administrative officer of the State Water Board.

Prior to coming into state service, Leedom worked as a newspaperman. He started his career with the *Orland Register*, of which he was publisher in 1924. He worked as city editor of the *Courier-Free Press* in Redding and came to the *Sacramento Bee* in 1927 as a copyreader and shortly thereafter was appointed city editor.

... Continued on page 49

## Robert J. Carlisle

Robert J. Carlisle, Highway Equipment Superintendent I, for the Division of Highways, Shop 11 in San Diego, has retired after 30 years of state service. Carlisle was honored at a retirement party given in his behalf



ROBERT J. CARLISLE

in San Diego, which was attended by approximately 200 of his fellow workers and friends.

Carlisle started his career as an apprentice machinist with the Southern Pacific Company in Los Angeles in 1905. During 1914 and 1915, he spent 1½ years in Trinidad, British West Indies, as superintendent of automotive and marine motor equipment, for the Trinidad Lake Petroleum Company.

He entered state service with the Division of Highways on February 2, 1927, as a Senior Highway District Equipment Maintenance Superintendent at Shop 6 in Fresno. When District XI was formed in San Diego in 1933, he was transferred to Shop 11 there as the first Highway Equipment Superintendent in the newly formed district. He was instrumental in obtaining the first shop quarters there, and in the establishment of the new shop.

During his years of service in the San Diego shop, Carlisle earned an enviable reputation as maintaining one of the neatest and most efficient shops in the State. His record shows an especially fine achievement in his public relations dealings with the public and his fellow state employees. Carlisle served continuously as superintendent of equipment in San Diego until his retirement.

... Continued on page 49



## SAM R. LEEDOM

Continued from page 48 . . .

In 1933 Leedom took a trip around the world and spent several months in China and Manchuria writing articles about the industrial empire the Japanese were building in their newly militarily acquired possession of Manchuria.

For the next three years he served as a roving correspondent and special writer for the McClatchy newspapers, during which time he wrote a series of articles on virtually every hamlet in the Central Valleys area.

In 1936 Leedom went out to the Dutch East Indies to do a series of stories on the sea peoples of that then remote region. He lived with the sea peoples and sailed on their boats with them for nearly a year, covering a distance comparable to sailing from San Francisco down to New Orleans, up to New York and back to San Francisco. In doing so he covered all of the remote islands from Sumatra to Ambonia, the Moluccas and back to Borneo.

Returning, he was among the first of those to point out the weakness of United States, Dutch and English forces in the Far East against the threat of Japanese invasion and domination.

Leedom was born in Nebraska, but grew up in northern Wyoming where his father owned and published a weekly newspaper. He was graduated from the Billings, Montana, High School and is a member of the class of 1923 of the University of California.

He married Miss Ella Logan of Redding, a Berkeley schoolteacher, in 1923. For a number of years she was a teacher in the Lincoln Elementary School in Sacramento.

Upon retirement Mr. and Mrs. Leedom will move to El Granada, where they are building a new home. Leedom expects to devote his time to writing and fishing.

### CAR INCREASE

California's automobile population is increasing at the rate of about 5,500 per month, reports the California State Automobile Association.

## T. T. Buell

Co-workers and friends of T. T. "Tom" Buell celebrated his retirement Saturday evening, September 28th, with a dinner party at the Bret Harte Hotel in Grass Valley. Buell retired as highway maintenance superintendent of the area comprised of Yuba County and portions of Nevada, Sierra, Sutter and Placer Counties. He reached the compulsory retirement age of 70 on July 21st.

His nearly 25 years of service in the California Division of Highways started as a laborer in District VII, Los Angeles area, in 1932. Successive promotions saw him serving in various capacities in District VI, Fresno, District II, Redding, and District IX, Bishop. He was promoted to Highway Maintenance Superintendent in 1938 and went to the Truckee area in that capacity in 1942. He was transferred to the Grass Valley area in 1953.

Two memorable experiences occurred during his stay in District III, both while he was in charge of the Truckee area. In November, 1950, while inspecting a slide during a severe storm, a slide swept him and a highway patrolman from the roadway and carried him about 150 feet. He was seriously injured in the accident.

The winter of the "big snow," 1952, found Buell charged with the responsibility of opening Highway 40 over Donner Summit. It was during this storm that this route was closed for 28 days, and required tremendous effort to place this major transcontinental route in service even in this period of time.

Buell plans to remain in Grass Valley following his retirement.

Chairman for the retirement dinner was John L. Snider of Grass Valley, who has served under Buell for 13 years and will be his replacement.

### PATENTS

Since 1899, more than 2.25 million U. S. patents have been issued. About one out of five of these were automotive.

## A. C. Clark

Arthur C. Clark, Assistant Commissioner for Operations, Bureau of Public Roads, U. S. Department of Commerce, has retired. Following graduation from Oregon State College in 1915 as a civil engineer, Mr. Clark joined the Bureau of Public Roads and remained with the organization for 42 years.

In 1917 he enlisted in the armed forces and served for two years with the 23d Engineers. Upon his return to the Bureau of Public Roads, he was placed in charge of heavy grading, surfacing and bridge construction in the Pacific Northwestern States. From 1924 to 1937 he was responsible for all construction and maintenance operations on federal-aid and forest highway projects in Montana.

Clark organized the first federal-aid highway operation in Puerto Rico and remained in charge of the work there from 1937 to 1942. During World War II he was technical assistant and operations co-ordinator at the Washington headquarters for the construction of the Alaska Highway.

Under the organization plan of 1957, Mr. Clark was appointed Assistant Commissioner for Operations, the position he held at the time of his retirement.

## ROBERT J. CARLISLE

Continued from page 48 . . .

He is a native son of California, and was born in Tulare in December, 1888. He and his wife will continue to live in their home at 4621 Euclid Drive, San Diego, California. Their plans include trips to various points of interest throughout the United States with intervals of enjoying their home in San Diego.

### OLD AND NEW

Modern freeways are engineered so they have very few "blindspots," but older two-lane roads often were not. Don't "overdrive" when you are on narrow, two-lane roads. Be prepared to stop when rounding curves and approaching the crest of hills.

## RICHARD H. WILSON

Continued from page 47 . . .

With passage of the first federal-aid highway act in 1916, federal participation in the cost of highway construction became a reality. Administration of the act became the responsibility of the Bureau of Public Roads, which was created for the purpose. Highway construction gained in importance with the demands for better roads, and, as the federal sharing in this activity increased, the relationship between the Division of Highways and the Bureau of Public Roads became more significant.

### Co-operation With Federal Agencies

Administration of the functions involving federal aid has been the responsibility of Wilson since his attachment to the headquarters staff. Close contact with the division's programs and his awareness of federal regulations have made possible the taking of full advantage of available federal funds. Close acquaintance with bureau personnel, both at the local and national level, has been effective in expediting construction programs.

Many persons who have reached high places with the Division of Highways entered state service via the Wilson route. His subordinates have been well trained and have been given responsibility for their duties, and he has always taken part in their various social and athletic activities. He has selected well in his choice of key personnel serving under his direction.

Wilson is a member of the American Society of Civil Engineers. He has held committee membership in the American Association of State Highway Officials, and through his activities on the administration practices committee he has gained national recognition for his contributions to the organization and highway administration in general. At the same time he has been affiliated with the Western Association of State Highway Officials and the American Concrete Institute. Besides a number of lodges and service clubs, he is a member of the American Legion, the Del Paso Country Club and the Sacramento University Club.

Wilson was born in Leitchfield, Kentucky, and received his educa-

## New Truck Speed Zones Announced

Establishment of reduced downhill speed limits for trucks on eight mountain highway grades was announced by the State Department of Public Works.

The speed reductions are the first to be made under a law enacted by the 1957 Legislature in an effort to reduce the danger of run-away trucks on long downhill stretches.

Grades on US Highways 99, 101, and 40 are included in the speed zoning changes. The new truck speed limits on these sections range from 20 to 35 miles an hour, in place of the general statewide truck speed limit of 45 miles an hour.

Downhill sections affected by the reductions follow:

US 99—Shasta Springs Grade, north of Dunsmuir, Siskiyou County; Grapevine Grade, Kern County, and Three-Mile and Five-Mile Grades, both north of Castaic in Los Angeles County.

US 101—Cuesta Grade, north of San Luis Obispo, and Nojoqui Grade, north of Santa Barbara.

US 40—Glen Alder Grade, between Colfax and Gold Run, Placer County, and Donner Grade, Nevada County.

### Recommended by McCoy

The new zoning will become effective with the posting of signs. The signs will show the speed limit figure

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tion at schools in Washington, D. C., George Washington University, and the University of Michigan, where he graduated in 1912 with a bachelor of engineering degree. He was married in Idaho in 1920 to Agnes Hart of Blackfoot, Idaho. They have a son, Jack Hart Wilson, and a daughter, Betty Jo Wilson. Perhaps most important is the granddaughter Wendy, who is now five years of age.

Retirement plans are not certain beyond enjoying retirement to the fullest, which no doubt will include considerable golf and continuation of his active part with Ben Ali Shrine Chanters.

under a plate bearing the word "truck" in capital letters.

The speed limit reductions were recommended by State Highway Engineer G. T. McCoy following engineering and traffic studies by the Division of Highways.

Under a section added to the California Vehicle Code by the recent session of the Legislature the Department of Public Works may reduce truck speed limits on descending grades after studies show that "the speed of 45 miles per hour is more than is reasonable or safe \* \* \*."

The new law calls for reductions to "a speed limit of 40, 35, 30, 25, or 20 miles per hour, whichever is found most appropriate to facilitate the orderly movement of traffic \* \* \*."

### Truck Speed Zones

More detailed descriptions of the truck speed zones are listed by county below.

Los Angeles County—Five-Mile Grade (US 99), north of Castaic, 20 miles an hour southbound from the summit; and Three-Mile Grade (US 99), also north of Castaic, 35 miles an hour northbound from the summit.

Kern County—Grapevine Grade (US 99), 20 miles an hour northbound from the summit for a distance of about five and one-half miles.

Santa Barbara County—Nojoqui Grade (US 101), 25 miles an hour southbound from the summit to three-fourths of a mile north of the intersection with Sign Route 1 at Las Cruces, a distance of about one and three-fourths miles.

San Luis Obispo County—Cuesta Grade (US 101), north of San Luis Obispo, 25 miles an hour southbound from the summit for about 2.6 miles.

Siskiyou County—Shasta Springs Grade, north of Dunsmuir (US 99), 20 miles an hour southbound from the summit for approximately three miles.

Placer County—Glen Alder Grade (US 40), between Colfax and Gold Run, 20 miles an hour westbound from the summit for about three miles.

Nevada County—Donner Grade (US 40), 20 miles an hour eastbound from the summit for approximately three miles.



# HIGHWAY SUPERINTENDENT RETIRES AFTER 28 YEARS

*This article, written by Joe Paul, Jr., and published in the Ventura County "Star-Free Press," is reprinted by "California Highways and Public Works."*

Bernard M. (Ben) Gallagher, 69-year-old highway superintendent in the Ventura area for the State Division of Highways, wound up his duties September 11th and left the next day on a vacation trip prior to his retirement October 1st.

Gallagher has been superintendent here 24 years and has been with the department for 28 years. Succeeding Gallagher in the Ventura post will be Willis G. Walker, now of Santa Ana.

Following a motor trip across the United States and parts of Canada, the Gallaghers plan to return here to make their home. Plans for the future are indefinite at this time, but Gallagher said he "plans to stay in the business to a certain degree."

The retiring highway superintendent came to Ventura from Bishop in 1933. At that time, Ventura County's state routes in Gallagher's district all were two-lane, and most of the bridges were of truss-type construction.

## The Old and the New

"The roads were just as long then as they are now," Gallagher recalls, "but they have become wider." When a state route right-of-way of 60 feet was considered ample in 1933, a 250-foot right-of-way is required now for the expansive freeways, he explained.

The two greatest changes on the highways in the 24 years here, Gallagher believes, are speed and weight. Average speeds have doubled and truck weights have more than tripled.

Another great change in the department from conditions of 1933 is that of manpower.

"In the 1930's we were in a depression era, and manpower was a cheap commodity. We had hundreds of men working for the Division of Highways, largely to give them something to do," Gallagher recalls. Since that time, the crews have become smaller



BERNARD M. GALLAGHER

and smaller, until now 40 men do all the work in the district.

The district includes Highways 118 west of Chatsworth, 126 southwest of Castaic, US 101 from Oxnard to the Rincon, and the Maricopa Highway.

Greatest single problem of Gallagher's era as highway superintendent was the flood of 1938. Bridge approaches were damaged, highways flooded, culverts blocked and roadbeds destroyed. Indicating how much water came down the rivers at that time, Gallagher recalled that the high-water mark at El Rio in 1938 was only seven inches below that of the St. Francis Dam flood of 11 years previous.

## Unbelievable

"The changes which have taken place in highway traffic in the last three decades are unbelievable," Gallagher said. The number of cars on the highways has far exceeded what anyone was able to foresee, he claims.

"But the greatest changes are coming yet," Gallagher predicted. "The problem has become so large that the solution will have to be astounding in freeways and expressways. The highways of tomorrow will be beyond the imagination of the average motorist."

Two major problems plague the highway crews constantly at present, Gallagher pointed out. The No. 1 problem to the maintenance crews is trying to avoid being struck by motorists.

"All the flags, signs, barricades and warnings we can post are not enough to make it safe to get on the highway with a maintenance crew," he stated. "Workers are always in danger of being struck, and close shaves are daily occurrences. Even when the workers get off the shoulder of the highway to eat lunch, they are not safe. Motorists still try to run them down."

(While Gallagher was making this observation, one of the crew members was knocked off a bridge by a motorist in Cuyama Valley and suffered a broken leg and fractured arm.)

## Litter Is Problem

The other major current problem is litter and trash thrown from cars.

"We clean up tons and tons of it. It costs plenty to do it. Recent law changes and publicity have helped some, but so many motorists feel that the law applies to all but them that the litter problem gets bigger instead of smaller," Gallagher said.

"If we could pave highways with beer cans, we wouldn't need to buy any material," he added.

During his years in Ventura, Gallagher said he has gained many friends and has enjoyed his associations. "The people I have found to be very nice—

... Continued on page 64

# Redwood Freeway

Initial Work Marks  
Construction Firsts

By H. W. BENEDICT, Resident Engineer

THE first unit of the Redwood Freeway, a contract for which was awarded to Guy F. Atkinson Company on April 10, 1957 (see issue of *California Highways and Public Works*, dated March-April, 1957, page 54), marks several firsts for highway construction in District I.

Paramount among these is the distinction of having the highest cut in the history of roadbuilding in California included within its limits. This cut, located on the southerly end of the project, about 2½ miles north of Weott, amputates the northerly end of a high, steep, watershed ridge. The top of the cut towers 480 feet above the grade of the finished road, and the toe of the cut extends 1,300 feet along the new alignment.

Although representing only 5 percent of the total project in mileage, this cut furnishes approximately one-half, or 1,400,000 cubic yards, of the needed excavation for the 4.4-mile project.

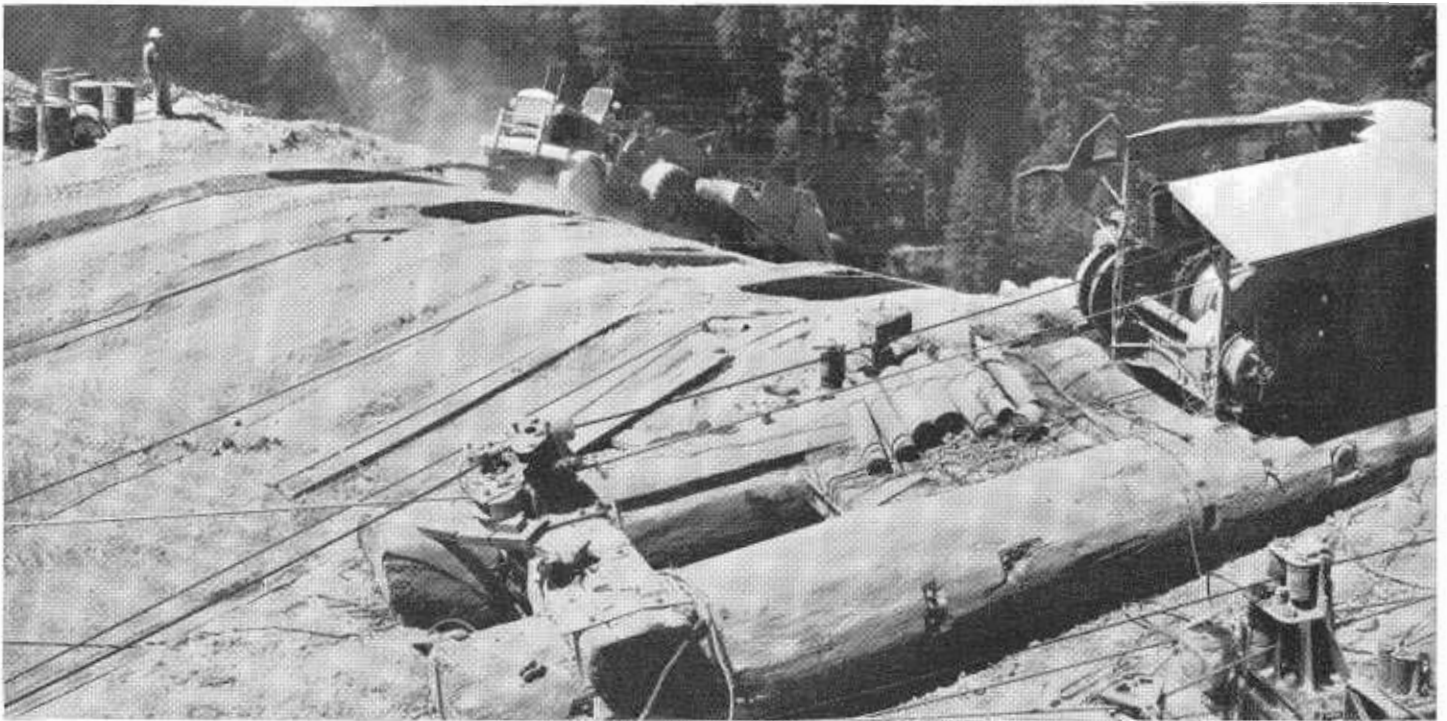


An earthmover being towed up the face of the cut. Lower earthmover is a loaded machine on the "down road."

LEFT—Bulldozers pioneering up-ramp on north end of "big cut." This ramp was 525 feet long at a grade of 62 percent. RIGHT—Detour bypassing "big cut" showing an overpass in background which was constructed by the contractor to carry 1,400,000 cubic yards of roadway excavation over the traveled detour.







To provide stability, the cut has 1:1 cut slopes with 20-foot benches spaced every 60 feet vertically. In addition, several thousand feet of 2-inch horizontal drains will be installed on various benches to insure proper drainage of waters trapped behind the cut face.

#### Two Complex Problems

The construction of this sidehill cut posed two very complex problems; namely, what to do with the highway traffic during construction, and how to move this large amount of yardage contained in the cut in the short construction season normally experienced in this area.

The first problem stemmed from the fact that the existing traveled way passed in a notch at the foot of the cut in a narrow canyon also occupied by the South Fork of Eel River. It was obvious from the outset that any attempt to pass traffic through the construction area on the narrow traveled way would result in long delays to the traveling public and would add greatly to the cost of the planned work. This problem was solved in the Design Department of District I by the rather bold design of a 2,400-foot-long all-paved detour which bypassed the construction area by swinging westerly of the existing traveled way



UPPER—One of four 400-horsepower "donkey" engines used to hoist the earthmovers up the steep up-ramp. LOWER—The earthmovers were automatically engaged to the heavy towing cable by the ingenious hook mounted on a metal sled which engaged a cable loop affixed to the tractor frame.

and dropping into the streambed of the South Fork of Eel River. Extensive lighting and signing of this de-

tour has resulted in three months of accident-free use of the facility.

... Continued on page 58

# Street Widening

Oakland City Job  
Jointly Financed

By JAMES E. McCARTY, City of Oakland  
Supervising Civil Engineer in Charge of Construction

MAJOR street widenings have long plagued city engineers, utility companies, property owners, contractors, and, particularly, the traveling public. Rarely initiated until the original street has reached maximum capacity, they present difficult problems to the contractor who must not only rebuild the streets to modern standards but, also, provide for heavy traffic movements and access to private property during construction.

The City of Oakland recently completed such a project along West Street at a contract cost of \$253,000. The new improvement provides approximately 1.6 miles of widened street capable of carrying four lanes of modern traffic, including mass transit vehicles, as well as providing for two parallel parking lanes. The basic improvement involved setting back curbs eight feet to provide a 60-foot pavement width and two 10-foot-wide sidewalk areas. The widened areas were paved with four inches of asphaltic concrete surfacing on 12 inches of crusher run base. The gutters are six feet wide and were constructed of concrete eight inches in thickness on eight inches of crusher run base.

Plans were based on accurate field surveys in order that a grade be established which would provide a minimum gutter flow of 0.33 percent and, at the same time, meet existing sidewalk and driveway grades so as to avoid expensive new sidewalk and driveway construction. Water pockets, either in the gutter or in the private property behind the sidewalks, had to be avoided. This presented an interesting problem of adjustments and balances in order to insure maximum benefits at minimum costs. Profiles were taken of each driveway to insure that the driveway could be used by modern vehicles.



Channelization at San Pablo Avenue and West Street, looking northerly up West Street

## Property Owners' Option

Many meetings with property owners were necessary in order to secure their co-operation in replacing wornout driveways and sidewalks at their expense and to secure public acceptance of the project. Defective sidewalks were posted under provisions of the State Improvement Acts, and property owners were notified to make the necessary repairs. The property owners were given the option to have the sidewalk repaired by the general contractor at the time of the improvement or have the sidewalk repaired by others either during or after the improvement. Of the 43,000 square feet of sidewalk and driveway that was reconstructed, 26,000 square feet was at city expense, 6,000 square feet by the utility companies, and 11,000 square feet by private owners. Careful

co-ordination between the inspectors, the contractors, the utility companies and the owners was necessary, and accurate records had to be kept in order that the charges for this work could be properly apportioned. The entire project was thoroughly covered by photographs before the work was started. These photographs proved to be an invaluable aid and are strongly recommended for work of this kind.

Much time and effort was expended in order to insure proper public relations and a complete understanding of the responsibility of each affected party. Utility companies had to be notified at least a year in advance of actual construction in order to provide them opportunity to examine their facilities and, in many cases, finance and reconstruct new lines. Most of the utility work and sanitary



sewer repair was done well in advance of the main contract in order to avoid extensive traffic delays.

**Work Jointly Financed**

The project on West Street involved channelization and signalization at important intersections. A total of 8,055 tons of asphaltic concrete surfacing was used. It was found advisable in many cases to use asphalt concrete for leveling courses rather than

rials laboratory of the City of Oakland:

Passing	¼-inch dense graded	½-inch dense graded	¾-inch open graded
¾-inch sieve	100.0%	100.0%	100.0%
½-inch sieve	78.9	99.5	99.8
¼-inch sieve	50.2	81.3	61.7
No. 4 sieve	36.7	49.6	23.5
No. 8 sieve	32.4	38.9	15.6
No. 28 sieve	18.0	19.6	9.1
No. 100 sieve	7.2	8.6	4.7
No. 200 sieve	3.7	4.8	2.7
Percent asphalt	4.6	5.1	4.5



Channelization at West Street and Grove Street looking northerly

crusher run or treated base in order to provide continuous uninterrupted flow of traffic during peak hours.

City crews expended \$12,000 to repair base failures in the existing pavement before the contract was awarded. Asphaltic concrete mixes having three-fourth-inch maximum size aggregate and one-half maximum size aggregate were used for the base and leveling courses. A finish course 1½ inches in thickness of open graded asphaltic concrete was used to complete the project. All asphalt used was 60-70 penetration. The following is a typical analysis of the asphaltic concrete mixes used as determined by the mate-

To provide proper drainage it was necessary to install 3,630 linear feet of drainpipe, together with 22 storm water inlets and 14 manholes.

The work was financed jointly with five-eighths-cent gasoline tax funds and city funds. Plans and specifications for the project were prepared in the city engineer's office and approved by the California Division of Highways. The resultant project has caused much favorable comment from the traveling public and property owners alike, and the improved street now conforms to modern standards as an important arterial between residential and business centers.

**NEW LAW GOVERNING AGE OF TEEN-AGE DRIVING INSTRUCTOR**

Teenagers under 18 years old are not allowed under the new law to instruct other teenagers how to drive, says the California State Automobile Association.

The AAA motorists' organization points out that a driver accompanying or supervising the driving of the holder of an instruction permit must be 18 years old or over and must have a valid operator's license.

Prior to this change, which became effective September 11, the driver accompanying the holder of an instruction permit merely had to be licensed. This often resulted in 16-year-olds "teaching" 16-year-olds to drive, a condition which created many problems in enforcement and accident investigation work that now can be more effectively controlled.

124 Ward End Park Rd.  
Birmingham 8, England

KENNETH C. ADAMS, *Editor*

DEAR SIR: I would like to thank you for sending me California Highways and Public Works, which I always look forward to receiving. I thought perhaps you, and also your readers, may be interested in the enclosed print of one of our main trunk roads, which is greatly in contrast to yours. It is known over here as the Great North Road. The caption accompanied this picture as published here.

I should also like to pay tribute to the printers, etc., for turning out such a clean and smart-looking job.

Thanking you again for your magazine, which I pass on to other people, I remain

Yours sincerely,

EARNEST V. BEAVIS

**AUTO VACATIONS**

Americans spend more than \$9,000,000,000 a year on auto vacations, according to the National Automobile Club. This includes all such expenses as gas, oil, motels, hotels, and meals.

## Merit Award Board Winners

Employees of the Department of Public Works who received merit award recognition during the month of August, 1957, are:

*Keith E. McKean*, Los Angeles, proposed a method for estimating earthwork quantities for preliminary planning, for use primarily on flat terrain. In May, 1956, he was awarded \$50 for the adoption of his suggestion in District VII, Division of Highways. After a year of actual use, it now appears that \$50 additional is warranted, making a total award of \$100.

*D. Angus Vogt*, Sacramento, received a \$15 award for an improved procedure. Vogt recommended a change in the construction of the Hveem stabilometer. The modification is being used in the headquarters and in all district laboratories of the Division of Highways.

*Herbert Shipley*, San Luis Obispo, \$50 additional award for suggestion recommending a combination of grade and grid sheets. An award for \$50 was made in March, 1956, and the savings, after one year's experience, have warranted this additional award.

*Mrs. Gloria M. Anthony*, San Francisco, \$30 for suggestion recommending the use of pounce on vellum and ozalid paper before using six different rubber stamps on appraisal maps.

*Miss Mabel Graham*, Los Angeles, \$100 for suggestion recommending use of a statement form return envelope for the active rental accounts of highways. The envelope is prepared on the addressograph and stuffed in a window envelope.

*Wallace R. Turpen*, Sacramento, \$50 for suggestion recommending a snap-out carbon letter form to be used in the Advanced Planning Section of the Bridge Department, where a large volume of routine letters, requiring numerous carbon copies, are prepared.

*Oliver Dowd, Jr.*, Stockton, \$42 for suggestion recommending the elimination of freehand lettering on culvert lists and construction note sheets and instead using the typing and photographic process in preparing contract plan tracings with tabular data.

*William W. Wallace*, Oakland, \$45 for suggestion in which he designed and built a simple tool for use as a roller chain pulling tool. It is used when two ends of a roller chain must be pulled together and properly aligned to insert the connecting link.

*Mrs. Adel R. Leitch*, San Francisco, certificate of commendation for suggestion recommending that instead of using two stamps to record the date scheduled and the schedule number on receiving records, posting pages and transfer records, one combination stamp be procured as both operations could be done at the same time.

## LIFE, ASSOCIATED PRESS LAUD STATE SYSTEM

*Life Magazine* and the Associated Press, reporters of international news to millions of readers, agreed on the superiority of California's Highway System and administration in articles published in August.

After a critical analysis of the highway program throughout the United States, *Life* concluded in an editorial in its August 5th issue that:

"The best highway department of them all" is California's.

The Associated Press studied California's highway program in a report long enough to fill a full newspaper page, but printed in five parts in many California newspapers. The news agency found that:

"In general, California today has what probably is, across the board, the best road system in the Country. \* \* \*

The editors of *Life* devoted the full editorial page to an analysis of highway developments and highway problems in many of the states and under the Federal Government. The editorial's last two paragraphs were about California and read as follows:

"It has its own sources of income and methods of expenditure, prescribed by the Constitution and statutes, virtually beyond any legislative meddling. Its highly professional staff

*Lloyd R. Brush*, Sacramento, certificate of commendation for suggestion recommending that the bolt fastening the tire rack under light trucks be wrapped with friction tape to protect it from dirt and facilitate its removal.

*James H. Hirotsu*, Sacramento, certificate of commendation for suggestion recommending that when there are no construction changes on the plans of highway contracts, a short letter advising there have been no changes be forwarded to the headquarters office in lieu of sending final plans.

*Paul H. Henley*, Division of Architecture, Sacramento, received a certificate of commendation for his proposal that the related financial statement be identified on tracings for projects handled by direct construction.

Following employees received merit award recognition during the month of September, 1957:

is protected by civil service, and its unpaid commissioners are picked by the Governor 'with just as much care,' says the director of the Northern California A. A. A., 'as a regent of the university. He can't afford to mix politics with highways, because every motorist in California watches him like a hawk.' The land acquisition program, wholly separate from maintenance and construction, is run according to a long-range plan which the Legislature adopted in 1953 after eight years of study and hearings. Contractors are kept up to taw by their own organization, by state records of past performance called 'the integrity file,' by the A. A. A. and by other private groups. Behind all this is a public attitude that stems from the fact that California grew to political maturity in the automobile era. Everybody depends on the highways, from farmers to weekend skiers, and everybody is his own watchdog. Says one State Senator, 'It would be easier and safer to tamper with the water supply than the highway program. \* \* \* This is a highway State.'

"The other 47 are, or soon will be, 'highway states' too. The vast new road program will be cleaner, cheaper and better if all of us copy our best models."

*Eloise D. Carson*, Sacramento, recommended that in writing specifications for highway contracts, the specification writer eliminate a pencil copy of the engineer's estimate and bid proposal items. The Merit Award Board had previously granted Mrs. Carson a \$100 check subject to a review to determine the actual savings involved. As a result of the study made by the department, it has been determined the elimination of writing bid proposal items results in a yearly savings of approximately \$1,500. A \$50 additional award has now been granted.

*Ray V. Alfsen*, Los Angeles, proposed the use of a transparent template coordinate and topographic plotter for plotting of calculated center lines or proposed design features whose coordinates are known or calculated. A \$25 award was made.

*Orville G. Goodrich*, Marysville, received \$10 for designing a plastic triangle with various common side slopes at each corner and various super elevation rates inscribed

... Continued on page 58



# Ground Breaking

Officials Start  
S. F. Building

A ground-breaking ceremony led by Governor Goodwin J. Knight marked the start of work August 26th on a \$6,500,000 addition to the State Office Building in San Francisco.

The Governor, State Director of Public Works Frank B. Durkee and other state and city officials joined in the occasion at the building site in San Francisco's Civic Center on Golden Gate Avenue between Larkin and Polk Streets.

Governor Knight pointed out that the structure is one of many state buildings recently built or planned to take care of growth occasioned by the expanding population in California.

"Since my administration began four years ago," Governor Knight said, "we have completed 17 major office buildings. They provide needed space for our Departments of Public Health, Highways, Employment, Motor Vehicles, Finance, Agriculture, Veterans Affairs, and Forestry. The total cost of these 17 buildings has been nearly \$24,000,000.

"But here's another interesting fact about the buildings. They are located in a dozen different communities reaching from Eureka to San Bernardino. I know of no other state which has managed to place its state buildings in so many diverse areas. We think it is sound practice, since it makes government not a centralized, far-removed thing which is remote and inconvenient to the populace. We try to keep government convenient to those who support it and who need it.

## 280 Major Projects

"In addition to these major expansions, in the last four years, we have completed 280 other major projects including such things as hospitals and University of California buildings. When I say major projects I mean that each one involved a cost of more than \$100,000. The total cost of these additions came to \$180,000,000.

"Now just a word about the future. Long before the building which



Scene at ground breaking. Left to right—Governor Goodwin J. Knight, Contractor J. F. Barrett, and Director of Public Works Frank B. Durkee.

we get under way today is completed, we will have started work on the Oakland State Office Building. And to solve the office space problems in Los Angeles, we will have under way a great new state office building there. \* \* \*

"In the past few months I have been traveling up and down our State talking about our budget, our plans and our accomplishments. I have often mentioned the size of our budget of this year—over two billion dollars. I have mentioned that that is more money than Teddy Roosevelt spent to run the entire Nation in 1904. Have people been impressed? Yes, I think they have. Have they been shocked? I don't believe so. And the reason they haven't been shocked has surely been because they can see what we are doing with the money here in California—and they approve of what they see."

The Governor explained that the new San Francisco building will be used by personnel of many state agencies: Mental Hygiene, Industrial Relations, Professional and Vocational Standards, Public Utilities, Youth Authority, and Social Welfare. It is being built for the Department of Finance.

## Four Contracting Firms

Contracts for construction of the building were awarded by Director of Public Works Durkee August 7th, on recommendation of the Division of Architecture, which is in charge of the project. The contracts went to four Bay area firms which were low bidders.

The building will rise seven stories high over a full basement and will have a penthouse for mechanical equipment. Its main mass will be 118 feet by 379 feet, entirely of reinforced concrete construction, and it will pro-

vide a gross area of 401,000 square feet. The exterior of the building will be faced with ceramic veneer.

The appearance of the building will harmonize with the architecture of the San Francisco Civic Center.

Contractors and the amount of their contracts are: General work, Barrett Construction Company of San Francisco, \$3,817,000; electrical work, Patterson-Emerson-Comstock, Inc., of Oakland, \$787,878; mechanical work, Anderson & Rowe, Inc., of San Francisco, \$1,592,937; and elevators, Pacific Elevator & Equipment Company of San Francisco, \$297,322.

#### Around Central Core

Main entrance lobby of the new building will be on Golden Gate Avenue and will connect directly with the 35-year-old state building facing on McAllister Street. Other entrances will be provided on Larkin and Polk Streets.

Office space in the structure will be located around a central core of utilities and service functions. The arrangement is flexible and designed to facilitate future expansion and reassignment of areas to departments.

The new building will be connected with the old across Redwood Street, which the City of San Francisco will close between Larkin and Polk Streets. Three areaways will connect all floors and permit the two buildings to function as one unit.

Design of the building was by Alfred Eichler, a supervising architect in the Division of Architecture of the Department of Public Works, and L. W. Richert and Stanley Collins, associated architects, under the general supervision of Arthur F. Dudman, principal architect. P. T. Poage is Assistant State Architect in charge of planning and design. Anson Boyd is State Architect.

#### PARTY BOAT FISHING

Anglers participating in party boat fishing off the coast of California in 1955 caught more than six fish per angler, according to the National Automobile Club. Leading species taken were rockfish, kelp bass, barracuda, Pacific mackerel, and salmon.

#### GIRL WITH MONEY

Mrs. Ann Dreman, accountant-auditor in the City and Co-operative Department of the Division of Highways, is holding \$8,909,597 in warrants to be paid to 206 incorporated cities in California.



MRS. ANN DREMAN

This represents the July, 1957, quarterly payment of the five-eighth-cent gas tax fund to cities and is the second largest payment since the enactment of Section 2107 of the Streets and Highways Code providing for the five-eighth-cent gas tax allocation. This payment was exceeded only by the October, 1956, payment, which amounted to \$9,723,141.

Mrs. Dreman is also holding a copy of an explanatory letter sent to each city with the payment.

#### MERIT AWARD WINNERS

Continued from page 56 . . .

adjacent to the two sides. This tool will be used to plot cross sections.

Thomas G. Ingram, Sacramento, was presented a certificate of commendation for proposing that the freeway project office in Sacramento join the Sacramento Multiple Listing Bureau to obtain daily bulletins and quarterly reports regarding real property values in the Sacramento metropolitan area.

George S. Maxey, Redding, proposed the combination of two reports in order to save time and expensive printing material, the Weekly Equipment Report (Form S-20) showing what days an alternator is used and the weekly mileage report on the vehicle in which the alternator is installed. A \$10 award was granted.

#### REDWOOD FREEWAY

Continued from page 53 . . .

The solution of the removal of the large amount of material from the cut in a short construction season was left to the ingenuity of the contractor. This problem was complicated by the fact that no access roads to the top of the slope could be constructed outside of slope lines, since the contract forbade any encroachment into adjacent state redwood parks.

#### Donkey Engines Used

The native slope of the original material within the slope lines was steep and broken and precluded all but the most tortuous, steep and frequently switchbacked pioneer road to the top of the cut. To use such a road for the passage of modern earthmoving equipment would have been slow, costly and exceedingly dangerous.

To gain access to the top of the cut with enough equipment to put the operation on a high production basis, without resorting to the use of such a pioneer road was a problem the contractor ingeniously solved by an original and unique method. Near the north end of the cut he constructed an up ramp 525 feet long on a 62 percent grade. At the top of this ramp were placed four 400-horsepower logging donkey engines. By a system of blocks, continuous cables, and buried rollers, these powerful engines pulled the rubber-tired dirtmovers up the face of the cut. From the top of the ramp access was easily obtained to the top of the cut by a pioneer road. The loaded earthmovers proceeded from the cut area under their own power over a "down road" constructed on an approximate 45 percent grade.

After about six weeks of operation, the cut was brought down to such an elevation that the earthmovers could gain access to the excavation area under their own power, and use of the donkey engines was discontinued. As testimony that this innovation was a success is the fact that the contractor averaged better than 10,000 cubic yards of excavation each shift and was, on September 1st, ahead of schedule in removing the "big cut."



# Hoopla Bridge

*New Span Replaces Structure  
Destroyed on Trinity River*

By RUSSELL O. LIGHTCAP, Resident Engineer

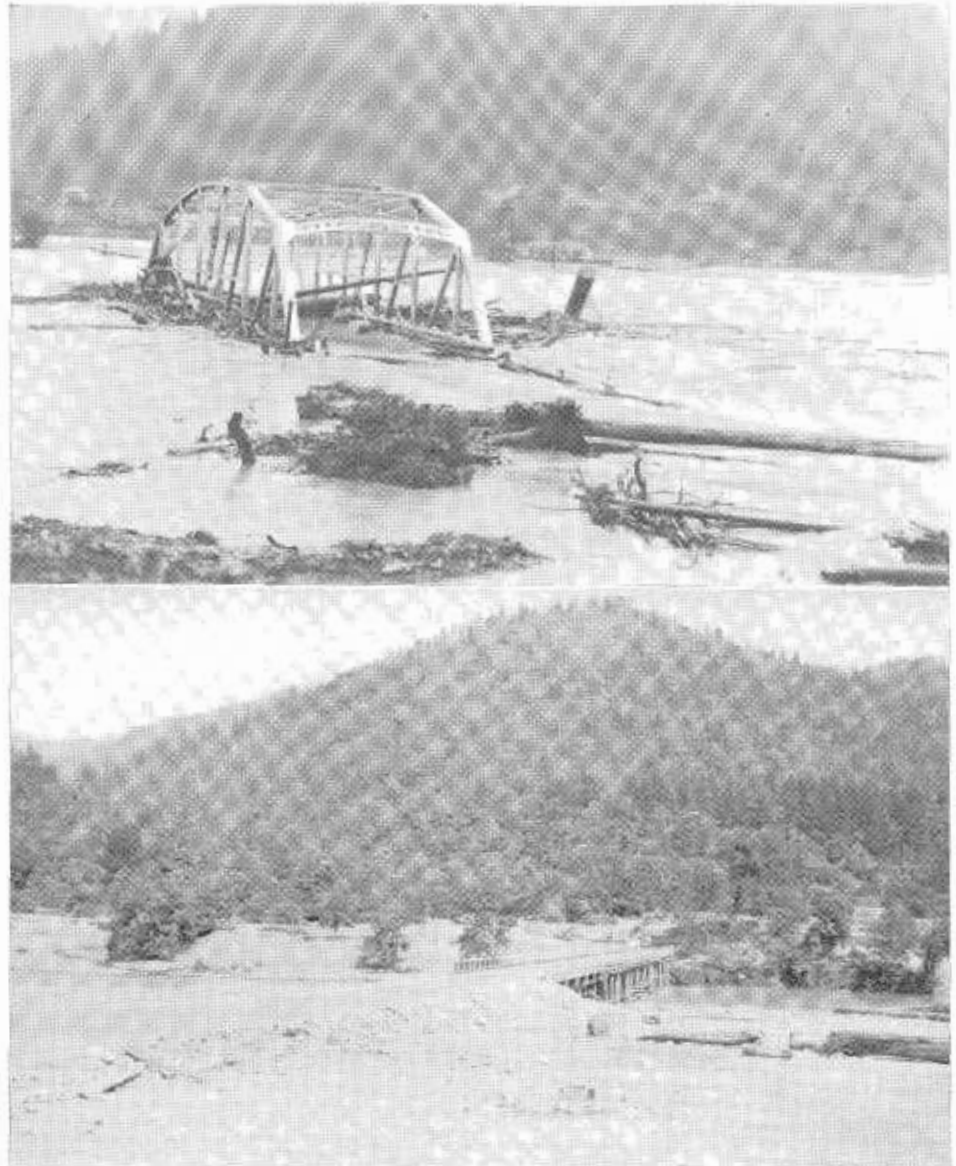
**H**OOPLA VALLEY, home and reservation of the Hoopa Tribe of the Klamath River Indian nation, was badly hit by floodwaters during the state-wide storm of December, 1955.

The Trinity River, fed by the many storms, filled to overflowing and encroached upon the sacred tribal grounds of the Indians. The raging waters destroyed the sacred Indian church and sweathouse, which according to legend would remain untouched until the ways of the Indians had vanished. The sweathouse for centuries was the meeting place for the medicine men before they started the most sacred of all Indian rituals, the white deerskin dance. Never before, according to the Indian legend and in the memory of even the oldest tribesman had the waters been so high.

The state highway bridge, located on Route 84, about one mile upstream from the sacred Indian grounds, was also a victim of the raging waters. Floating logs and debris were hurled against the bridge and the incessant pounding finally destroyed it, carrying a 132-ton truss span 1,000 yards downstream. Another truss was carried downstream and ripped into fragments by the power of the floodwaters, leaving pieces scattered for miles down the river.

## Emergency Transportation

Destruction of the bridge left the community on the north side of the river completely isolated. Emergency transportation across the river was provided by small boats and a cable ferry. Since the health and safety of the tribal community required immediate steps to construct a new bridge, an emergency contract was negotiated with Ben C. Gerwick, Inc., to construct a low-level temporary bridge across the river. Within seven weeks this bridge was completed, but again high water came and a major



UPPER—View of small truss before it was washed away. Larger truss already gone. LOWER—Temporary low-level bridge constructed about one mile downstream from bridge site.

portion of the temporary bridge was washed away. Another emergency contract was made with the same contractor and in another two weeks the low-level bridge was again open to traffic.

The expense and danger involved in keeping the low-level bridge in op-

eration during winter months made a new permanent high-level structure necessary before the following winter. Accordingly, right-of-way negotiations and work on plans and specifications were immediately begun. The co-operation of the Hoopa Indian Council and the local office of the

Bureau of Indian Affairs greatly assisted the District I right-of-way department in acquiring the necessary property. The mutual efforts of District I and the Bridge Department resulted in a rapid completion of plans and specifications for a complete project with the roadwork and structure work in one contract. A contract was prepared with the requirement that a new bridge be completed before the anticipated high water during the following winter.

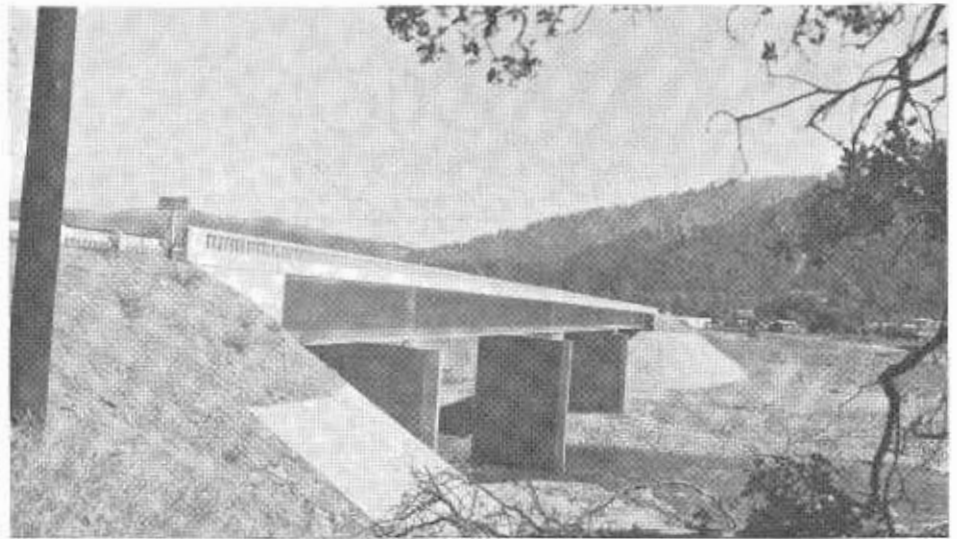
#### **Urgency Project**

In April, 1955, the contract was awarded to Peter Kiewit Sons' Company. From the beginning, the contractor realized the urgency of the construction and expedited the work. Superintendent John Carroll kept his work on schedule, working as many shifts as necessary to assure that the various stages of work would be completed on time. In many cases this meant working two 10-hour shifts and in some instances 24 hours a day.

According to the work schedules submitted by the contractor, the structural steel girders were to arrive on September 1st and the steel work was to be finished by October 1st. A steel strike prevented the American Bridge Company, the steel subcontractor, from delivering the structural steel and starting erection until October 9th. This was a dangerously late date for work in this area, because of the likelihood of high water.

#### **Steel Erection Problem**

The erection of the structural steel was well under way when the rains began. On October 30th some of the falsework was washed out, leaving girders isolated on piers and inundating girders that were waiting to be placed. The American Bridge Company, realizing the necessity of completing the work, began preparing to erect steel from the top instead of from the riverbed as it had been doing. While the proper equipment for erecting the steel from the top was being located, the water went down. By changing the river channel and building dikes the contractor was able to continue steel erection from the riverbed. High water caused no fur-



UPPER—Side view of the new bridge. LOWER—Road view of approach to new bridge.

ther trouble and the structural steel was finished by December 6th.

Superintendent Carroll then made a concerted effort to complete the bridge so traffic could use it as soon as possible. Enough lumber was obtained to form the entire length of the concrete deck all at one time and the work was continued in spite of the rain and snow. Within less than three weeks after the structural steel was completed, the concrete had been placed for the entire bridge deck and traffic was crossing it. It took about a month to complete the other miscellaneous items of work and to remove the temporary detour bridge. Since winter weather prevented structural steel painting, that work was deferred and was completed this spring.

One year and two days after the old bridge was destroyed, traffic was using the new bridge—a longer, higher structure that will be well above any future high water, on improved alignment with new approaches. Replacement of the bridge in such record time is evidence of the co-operation of the many agencies and organizations involved; namely the Hoopa Indian Council, the Bureau of Indian Affairs, Contractor Peter Kiewit Sons' Company, District I, Division of Highways, and the Bridge Department.

The contract was administered by the Bridge Department, and the roadwork was under the direction of Donald W. McDonell, District Representative.



## Bear Flag Flies In the Antarctic

This picture of the Bear Flag shows it in climatic conditions far removed from sunny California.

The flag was carried south by H. W. Bachtold, C.E. 1, of the U. S. Seabees



This is a photo of the California Bear Flag flying at the South Pole

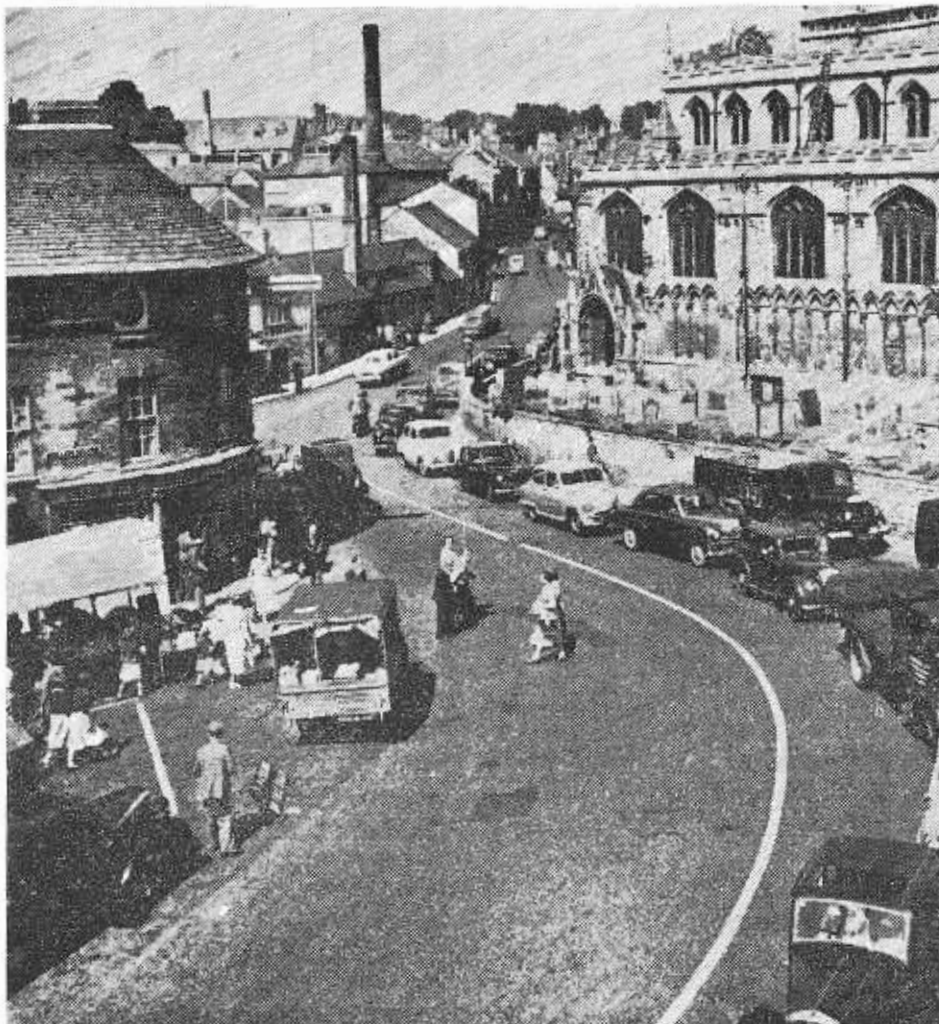
on the Antarctic expedition Deep-freeze. The picture was sent to his father, H. J. Bachtold, Assistant Highway Engineer with the Division of Highways in Redding.

Wes Bachtold, as he is generally known, joined the Seabees in 1953. He served in Alaska, Korea and Japan.

In 1955 he was among the volunteers who were accepted to join the Antarctic expedition. Prior to leaving he was given an intense course of training in operations and survival under conditions that would be encountered under subzero temperatures. This included six weeks' training with dog teams in Vermont.

Wes completed his Antarctic hitch in April, 1957. After a few days at home in Redding he reported to his unit and was sent to North Ireland, where he is now stationed.

## THIS IS BRITAIN'S A-1 TRUNK ROAD



Believe it or not, this winding thoroughfare with a street market on the left is the Great North Road at Stamford, Lines. It is an eloquent testimony to the inadequacy of Britain's roads when a major trunk route still follows the twisting streets of an ancient town.

### YOU SHOULD KNOW

EDWARD R. BACON COMPANY OF HAWAII  
San Francisco 4, California

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: The following statement is quoted from an article on highway departments in the August 5th issue of *Life* magazine—"as is evidenced by the best highway department of them all, California's."

From the inception of highway construction in the State of California when my company, Edward R. Bacon Company, furnished to Contractor F. R. Ritchie the concrete paving mixer that he used on Contract No. 1

for the construction of 5.4 miles of highways in San Mateo County in 1912, I have done business with the California Division of Highways, and my dealings fully confirm the opinion expressed in the article in *Life* magazine.

Yours very truly,

EDWARD R. BACON

### LICENSED DRIVERS

The number of licensed drivers, according to the National Automobile Club, leaped from 54.5 million to a current 77 million during the past decade.

# Vallejo Project

Portion of Interstate Highway  
to Become Full Freeway

By J. E. WILSON, Resident Engineer

CONSTRUCTION of the Vallejo Freeway is now in full progress, and local residents and daily commuters along Highway US 40 are eagerly looking forward to the time when this facility will be widened to six lanes and the existing five sets of traffic signals are replaced by modern interchanges and overcrossing structures.

This, indeed, is what will take place in the fall of 1958 when the six-lane, full freeway from the Vallejo Wye to 0.4 mile north of Redwood Street is completed and placed in operation.

It is expected that this vital link will stimulate the growth of Solano County and the City of Vallejo, particularly the area east of US 40, which is developing into a major residential district. The difficulty experienced in crossing Highway US 40 under present and past conditions in going to and from work at the Mare Island Navy Yard and other industrial and commercial establishments which are concentrated on the west side of the highway had until recently held back the development of this area for residential purposes.

#### Present Deficiencies

Inadequacies of the present facility are being clearly demonstrated twice daily and on weekends when peak-hour traffic has to wait through several signal changes to cross Highway US 40. For the motorist traveling to the mountains or valley area from the Bay area, there is the usual wait through several signal changes at the Benicia Road intersection, the first set of lights after crossing the Carquinez Bridge since the Magazine Street interchange has been completed.

This same motorist will be delayed again on his way home, except that the Sunday evening bottleneck is on the north end of Vallejo at the Tennessee Street intersection.

#### Traffic

With US 40 traffic averaging 25,000 cars daily during 1956 and cross traffic at several signals running from four to five thousand cars daily, the need for a full freeway is obvious.

Several detours are scheduled for construction. The first, a four-lane detour around the site of the Benicia Freeway structure, is already in operation. Other detours are planned for both main-line and cross traffic, but four lanes will be left open along the existing main line except in the immediate areas of widening or where other operations make it unsafe for the motorist. Four lanes will always be in use at night and on weekends and holidays.

#### Interchanges and Structures

Eight overcrossing structures are being provided, with the Magazine Street structure already completed and placed in operation in the fall of 1956.

A full four-quadrant cloverleaf interchange is under construction at the intersection of the proposed Benicia Freeway and Highway US 40 near Reis Avenue. The Benicia Freeway has been planned for an ultimate six lanes with four lanes to be constructed in the near future. Benicia Road, the present state highway, will cross over US 40 near its present grade crossing.

Overcrossing structures with full traffic interchanges are under construction at Georgia Street, Springs Road, Tennessee Street and Redwood Street.

Four lanes for cross traffic have been provided on the Georgia Street, Springs Road and Tennessee Street structures. As this area is a well-built-up urban area, all overcrossing structures have been provided with concrete sidewalks on both sides and on the approach ramps where their use is warranted.

Local traffic near the Benicia Freeway and east of US 40 will have available the Laurel Street overcrossing, providing freedom of movement without having to enter either freeway.

The Redwood Street interchange will make available direct access from both the north and south to the rapidly expanding north Vallejo area, previously accessible only through a circuitous route through various city streets.

#### Financing

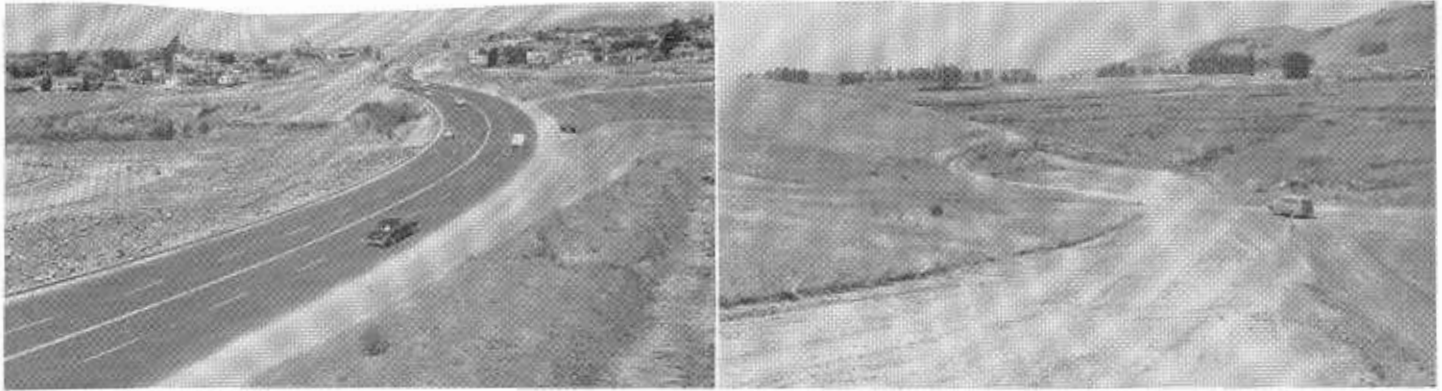
This project, while on the Federal Interstate System, is also considered a part of the approaches to the new Carquinez Bridge. This is the first project in District X to be financed under this nationwide federal interstate highway program. The completion of the freeway project is planned to approximately coincide with the completion of the new Carquinez Bridge.

#### Construction Features

The use of precast and prestressed concrete beams throughout the seven major structures is another first for District X. Two hundred twenty-seven are being used which range in length from 43 to 83 feet and have constant depths of three feet. The use of high-strength concrete and special cable reinforcing enabled the designers to use the three-foot overall depth, even on the longer spans.

Another unusual feature is the construction of an access road across Lake Chabot, a City of Vallejo storage reservoir. Soundings indicated approximately three feet of mud would have to be removed before placing embankment. To permit removal of this mud, the level of the water was lowered approximately 10 feet by gravity flow and a high capacity centrifugal pump. Mud stripping can now be completed above the water level.





LEFT—Looking southerly along U. S. 40 from the recently constructed detour at the U. S. 40-State Route 74 interchange. Note the completed overcrossing at Magazine Street in the background, which was completed on another contract in November, 1956. RIGHT—Looking northerly across Lake Chabot. Frontage road to be constructed across this area requiring the removal of 25,000 cubic yards of unsuitable material.

The construction of this access road will enable the State to close two county roads presently connected to the existing facility. It will also connect to a future interchange on Sears Point Road, Sign Route 48, at Chabot Road.

The usual number of construction problems that arise whenever an improvement of this nature takes place in an urban area, are being encountered. Underground utilities often interfere with the location of the storm drain flowlines, which are carefully worked out in design, and many adjustments have to be made.

The Vallejo Sanitation and Flood Control District relocated its sanitary and storm drain facilities, and the City of Vallejo relocated its 20-inch water mains under separate contracts prior to the highway contract. The cooperation and co-ordination of the City of Vallejo, Vallejo Sanitation District, Pacific Gas and Electric

Company and the Pacific Telephone and Telegraph Company in removing and relocating their existing facilities has materially aided the construction of this freeway project.

Fill struts will be used to control settlement on the west side of the Benicia Freeway interchange. The southwest quadrant of this interchange will be constructed over a marshy area where two feet of subsidence is expected. The fill struts placed next to the regular embankment are expected to control this settlement and stabilize the fill so that construction can proceed without delay.

#### Progress Good

Bids on this project were received on April 17, 1957, and the award was made to the firm of Harms Bros., C. M. Syar, Erickson, Phillips and Weisberg of Sacramento, Vallejo and Concord on a bid of \$4,118,053.90.

Construction work was started almost immediately.

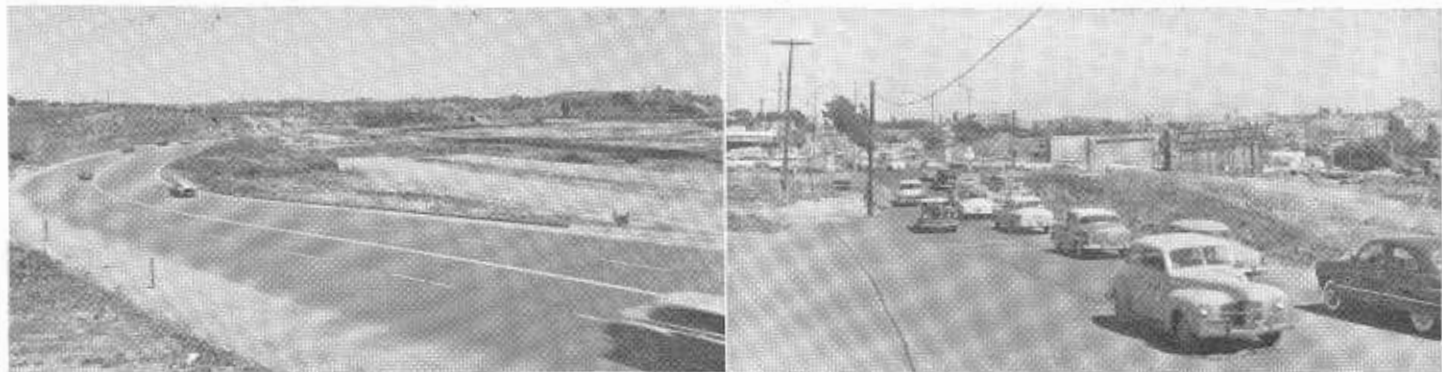
The major structures are being constructed by Erickson, Phillips and Weisberg with Ross Phillips as superintendent. All other work is being handled by Harms Bros. and C. M. Syar, with H. W. Keeler and Hermon Cecil as superintendents.

For the Division of Highways the work is under the general direction of J. G. Meyer, District Engineer, and K. N. Hatch, District Construction Engineer in Solano County for District X.

The author was the squad design engineer on the project and is at the present time assigned as resident engineer during construction.

Studies prove that 7 out of 10 motor vehicle deaths, and more than one-half of all traffic injuries, occur on free and open roads in rural areas.

LEFT—Looking northerly along U. S. 40 across recently constructed detour which was required in order to construct the U. S. 40-State Route 74 interchange at left of the detour. RIGHT—Looking easterly on State Route 74 at intersection of U. S. 40. This signalized intersection will be eliminated by the overcrossing shown on the right.



## CASE HISTORY

Continued from page 13 . . .

out showing conclusively a reduction in total number of accidents.

Type of accident	Five months before improvement	Five months after improvement
Personal injury	17	10
Fatal	4	0
Total, all types	54	51

Accident records available at this time are not complete. The local authorities have indicated, however, that the left-turning type of accident off Sepulveda Boulevard has virtually disappeared. It should be noted also that the improvement in the accident picture has taken place in the face of considerably increased traffic volumes.

Although the system is handling an extremely heavy load of traffic, there may be the need in the near future for still more capacity. The equivalent of a full additional traffic lane can be obtained for each direction on Sepulveda Boulevard by the peak-hour prohibition of parking. All of the cross streets except the east legs of Marine Avenue and Gould Lane and the west leg of Manhattan Beach Boulevard are two-lane streets. All of the major cross streets can be widened. Providing additional lanes on the side streets would allow the allotment of more green time to Sepulveda Boulevard and still handle side-street traffic. The peak direction lane capacities being handled by this system approach those normally associated with freeways. This results from the minor cross-street traffic and the extreme directional pattern which makes it possible to assign maximum green time to the heavy move without unduly penalizing the cross-street traffic.

The outstanding achievement of the installation is the fact that proper channelization, coupled with an advance type of electronic traffic control, has accomplished the equivalent traffic service of constructing an additional lane of pavement each direction over a two-mile section of highly developed highway, and done so at a fraction of the cost.

### ACKNOWLEDGMENTS

The project was conceived and completed by State of California, Department of Public Works, Division of Highways; George T. McCoy, State Highway Engi-

## GALLAGHER RETIRES

Continued from page 51 . . .

when they are not driving cars. The motoring public seems to be made up mostly of maniacs," he said.

Gallagher was born in Green Bay, Wisconsin, and plans to visit his old hometown on his vacation trip.

He was able to obtain only one year of formal education but obtained an engineering background in home education and "practical application."

### Served in Army

In 1912-14 he was district engineer for the state highway department in St. Paul, Minnesota. Then he went into the Army Engineers and came out a first lieutenant. He was construction engineer for the state highway department in Arizona. In 1921, he came to California and was employed by engineering firms until 1929 when he took a position with the State Highway Department.

In 1937, Gallagher helped organize the 144th Field Artillery of the National Guard in Ventura and served as its first commanding officer.

His son, Richard, is Director of Public Works for the City of San Diego.

Gallagher feels that it is symbolic that his retirement should come while the last steel truss bridge (on Route 150 near Sulphur Mountain) in Ventura County's state system is being removed.

"It's the end of an era," he said.

### HIGHWAY ACCIDENTS

A recent survey shows that 80 percent of the deaths and injuries on highways occurred as a direct result of driver error, reports the National Automobile Club.

ner, Chief of Division; George M. Webb, State Traffic Engineer. In District VII design and construction were under the direction of Assistant State Highway Engineer Edward T. Telford, with design engineering under the supervision of Robert W. Van Stan, District Traffic Engineer; Project Engineer was Bert H. Clark; Design Engineer Ted L. Morehead also completed the adjustments and testing operations.

## In Memoriam

### HARRY A. HOPKINS

Harry A. Hopkins, 75, a member of the California Highway Commission from 1931 to 1937 and Assistant State Director of Public Works in 1937-38, met a tragic death by drowning in the Colorado River on April 12, 1957. It was reported that he was alone in a boat on the lake behind Parker Dam in Arizona when the craft capsized.

Mr. Hopkins' body was not recovered until late last August.

Hopkins first went to Kern County in 1904. He was one of the small delegation of men that named town of Taft after President William Howard Taft, and he served on that city's first council. He was the third mayor of Taft and city's first postmaster.

He engaged in various business and civic activities in Taft for many years. He helped organize the Taft Rotary Club and was its first secretary and president. He was also past president of the West Side Businessmen's Club. He was prominent as a scout leader and was president of the Kern County Council of Boy Scouts for two terms. During World War I he had charge of civilian relief for the West Side Oilfield Chapter of the American Red Cross.

Hopkins was one of the most hard-working men ever to serve the Highway Commission. From the time he left state service until his death he gave much of his time and energy to highway matters.

Hopkins was a member of the Scottish Rite and York Rite Masons; of Al Malakiah Shrine, Los Angeles; of Taft Elks Lodge, Taft Chamber of Commerce and Rotary Club.

Hopkins had been retired for the last five years and made his home in Bakersfield since 1939 when he founded the Kern County Economic Council.

He is survived by a son, Harry A. Hopkins, Jr., a daughter, Mrs. W. Carl Rose, and his widow, all of Bakersfield.



**GOODWIN J. KNIGHT**  
Governor of California

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