

# District VII

Accomplishments During 1956  
and Outlook for Future

By EDWARD T. TELFORD  
Assistant State Highway Engineer

## Freeways Report

WHEN THE freeways of District VII in Los Angeles, Orange, and Ventura Counties are considered, we can say that the year 1956 has been one of significant accomplishment in many ways. Important freeway units totaling over 20 miles in length were completed and made available for public traffic. Construction by contract has been started on 11 large freeway sections that have a total length of 41 miles. The California Highway Commission has adopted four vital freeway routings in widely separated locations in the district. Additional federal aid moneys have been made available for expediting freeway construction.

The Highway Commission on October 18, 1956, adopted a record State Highway Budget for the 1957-58 Fiscal Year allocating to District VII for rights of way and construction a total of \$115,500,000. This large budget and the augmented one of 1956-57 were made possible because of the additional federal aid money coming to California as a result of the passage by Congress of the legislation known as "The Federal Highway Act of 1956."

### New Federal Highway Act

In answering questions that had arisen as to the effect of this new federal aid on state-wide progress of freeways, J. W. Vickrey, Deputy State Highway Engineer, recently said:

"The effect of the Federal Highway Act of 1956 on California's highway development is that we now can expect to have within four or five years the freeways we previously unt on for 8 or 10 years. Of ll relatively simple, straight-statements regarding any



EDWARD T. TELFORD

kind of governmental function require some qualification.

"We will attain the anticipated speedup in our freeway construction if the Congress in future years carries out the intent of the 1956 Federal Highway Act as to the apportionment formula for Interstate Highway funds; and if there is no major change in California's own highway financing picture.

"Things have happened fast this year in the highway field. Last year, 1955, was a year of preparation. As Mr. G. T. McCoy, State Highway Engineer, expressed it at a nationwide gathering of state highway officials last December: 'In the annals of American transportation, the year 1955 will probably prove to have seen more constructive talk and less

constructive action than any comparable period in our modern highway history.'

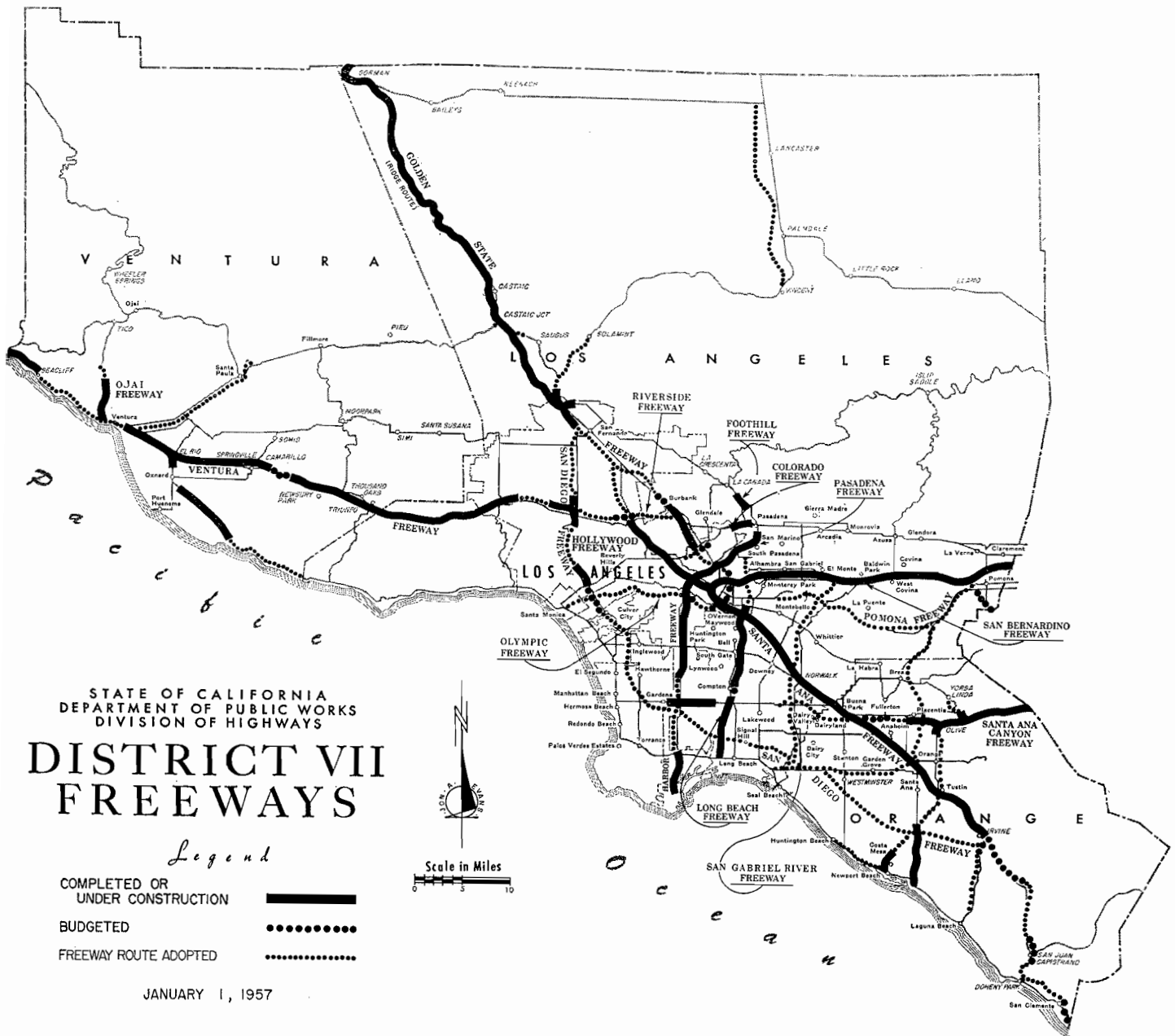
"The 'constructive talk' referred to by Mr. McCoy included the Clay Committee report on a national highway program; many volumes of testimony before the Congress as to the need for an immediate attack on the nationwide twin plagues of traffic congestion and needless death and injury on the highways; and countless columns of discussion in the Nation's press. Proposed national highway legislation bogged down in 1955, but not because there was any question of need; the fatal argument was over details of financing.

"In 1956, by contrast, we got the national highway legislation with a minimum of dispute about financing. The major dispute was over apportionment of the interstate system funds among the several states. On the basis of need, California would have received about 10 percent of the federal funds for interstate highways. On the basis of the traditional federal allocation formula based on population, area, and mileage of post roads, California receives only about 5 percent."

### Big Increase in Budget

If there is no major change in California's program of financing highways, and if the Congress of the United States continues with the program as presently outlined in the 1956 Federal Highway Act, then it is reasonable to expect that in approximately three years from now the right of way and construction budget for District VII will be in excess of 160 million dollars annually.

To understand the value of this financial program and the highway development it makes possible, it is



necessary that we briefly consider the problem and our approach to its solution. District VII consists of three counties of Los Angeles, Orange, and Ventura. The traffic problems in this district fall into two general categories—that of the highly urbanized Los Angeles Basin area, which includes a large part of Orange County; and the less populous areas of Ventura County, northern Los Angeles County, and eastern Orange County. Common to the entire area is the north-west, south-east traffic movement, generally parallel to the coast, which extends between the coastal

areas of San Diego County to the south and the northern parts of the State, both coastal and San Joaquin Valley. The other long distance movement is, of course, the east-west movement generally described as the Los Angeles-San Bernardino movement. Superimposed on this pattern of movement is, in the metropolitan area, the demand for movement between centers of population and industry within the metropolitan area. This is essentially a grid pattern of movement desire. These traffic movements are modified by the geographical features of the mountains and valleys

within and adjacent to the area. These geographical factors have had their effective not only directly upon the movement of traffic, but upon population trends, which of course are the ultimate basis for the development of traffic demand.

### Population Growth

The factor of population growth in the Los Angeles area and the actual distribution of that growth points strongly to the need for consideration of the growth trend rather than present-day traffic pattern as being the proper consideration for long-

range planning. The Los Angeles County Regional Planning Commission publishes from time to time a report of its Population Research Section, which is an extremely valuable indicator of population trends. Report No. 53, dated July of 1956, furnishes a comprehensive breakdown of the comparative population of April, 1950, and July, 1956. I wish to point out a few of the comparisons which I feel are pertinent to this discussion.

For example, the central area of Los Angeles has decreased in population from 129,578 to 106,396; whereas, the Chatsworth area increased from 17,583 to 50,291. The Encino area increased from 118,000 to 243,798. The San Fernando area increased from 53,557 to 119,064. The citrus area; that is, the area including Covina, West Covina, Glendora and other San Gabriel Valley areas, increased from 46,276 to 141,307, with the City of West Covina increasing from 4,499 to 36,615. The Whittier area increased from 68,368 to 144,451. The Norwalk area increased from 109,659 to 222,459, and the explosive growth of Orange County, southeast of the Norwalk area, followed the same general pattern. The Long Beach area increased from 286,505 to 377,372, with one city, the City of Lakewood, coming into existence during that period and having a present estimated population of 59,302.

This strong growth pattern was shown throughout the San Pedro and Palos Verdes area, the South Coast beach cities, and the Santa Monica-Venice area. This entire growth pattern simply points out the trend away from the heart of the built-up metropolitan areas, so far as residential population is concerned. This results in an increased demand for movement of persons and goods between these rapidly growing communities themselves, and between these communities and the heart of the metropolitan area to which they actually belong.

#### Traffic Counts

G. T. McCoy, State Highway Engineer, recently made public release of the 1956 state-wide traffic count figures. As Mr. McCoy says, on a

state-wide basis the traffic volumes during the year 1956 have increased 7.71 percent over the 1955 figures. In District VII this percentage figure has been exceeded on many of the important state highway routes but in the case of the freeways in and near the City of Los Angeles the rate of increase, generally speaking, has been considerably less. Under the circumstances this is no more than was to be expected.

The average daily traffic volume on the freeways of this area for the past years is shown by the following:

Location	1954	1955	1956
Hollywood Freeway (4-level—westerly)	168,000	180,000	185,000
Pasadena Freeway (Elysian Park)	110,000	112,000	114,000
Santa Ana Freeway (Soto Street)	90,000	113,000	145,000
San Bernardino Freeway (Soto Street)	80,000	88,000	96,000
Harbor Freeway (4-level—southerly)	125,000	160,000	175,000
Colorado Freeway (Linda Vista)	30,000	27,000	29,000
Long Beach Freeway (Pacific Coast Highway)	10,000	31,000	37,000
Using 4-level interchange	242,000	280,000	300,000

Even in 1954 we considered that these freeways were carrying traffic loads far in excess of the design capacity, and the wonder is that further increases in volume have actually been recorded. This can partially be explained from the fact that there has developed an increased use of the freeway during the off-peak hours. Another conclusion that has been advanced to explain this is that the motorists in this area who are daily using the freeways have become very skillful in their driving. Incidentally, it has been extensively observed that motorists are becoming more safety conscious on freeways. Even of greater importance, perhaps, is the growing conviction that motorists, as a class, are now much less selfish and much more courteous than formerly. Motorists on the freeways are now willing and ready to give a little to let the other fellow do what he needs to do to get safely to his destination. Very seldom does one see a hoggish motorist close the gap ahead of him when he sees

his neighboring motorist trying to slip into it to make a lane change. This commendable attitude on the part of motorists as a whole and the growing consciousness that safety for others is as important as safety for oneself must be the explanation of the successful operation of freeways in the Los Angeles area under the present overcrowded conditions.

#### Interstate Highways

The general location of the National System of Interstate Highways was designated in September, 1955, by the Bureau of Public Roads of the U. S. Department of Commerce.

Included in this national system are seven important state highway routes in District VII. These freeways constitute an important part of the District VII network of freeways. The Golden State Freeway, the Olympic Freeway, the San Diego Freeway, the Santa Ana Freeway, the San Gabriel River Freeway, the San Bernardino Freeway, and the Foothill Freeway are on this interstate system.

The only interstate route for which the Highway Commission has not yet made an actual route adoption and freeway declaration is that of the Foothill Freeway. This route has been described in general terms as a part of the interstate system, but final determination of its location must await completion of studies now under way. One of these interstate routes, the San Bernardino Freeway, has been financed from regular state highway funds, and construction is practically complete—in fact, will be completed within the next few months.

It is interesting to note that in this district, for the 1956-57 Fiscal Year and the 1957-58 Fiscal Year we have budgets for right of way and construction which total approximately 235 million dollars, of which approximately 132 million dollars are assigned to the interstate system. In the 1955-56 Fiscal Year we purchased in excess of 60 million dollars' worth of right of way. This was a continuation of a policy of planning for an increased highway program. It was this expansion of planning, design and right-of-way acquisition which, carried out in an orderly manner, has enabled us to

move into this greatly expanded program in an effective and efficient manner.

**Freeway Routes Adopted**

The California Highway Commission during the year 1956 adopted four very important freeway routings. On February 15, 1956, the US 101-Route 19 Freeway in Orange County, that is locally called the "Brea Canyon Freeway," was adopted, extending from the Santa Ana Freeway in Santa Ana northerly through the Cities of Orange, Placentia, and Fullerton to Pomona.

The commission on March 21, 1956, adopted the Route 23 Freeway in the Antelope Valley section of Los Angeles County from one-half mile north of junction with Angeles Forest Highway near the Southern Pacific Railroad Vincent Y to Neenach Road, that is locally called the "Palmdale-Lancaster Freeway."

On April 19, 1956, the commission adopted the Route 79 Freeway in Ventura County from US 101 south of the City of Ventura northeasterly to the City of Santa Paula, which is locally referred to as the "Santa Paula Freeway."

Then on November 15, 1956, the commission adopted the freeway route for the Olympic Freeway (State Highway Route 173) from La Cienega Boulevard in the City of Los Angeles to Lincoln Boulevard (State Highway Route 60) in the City of Santa Monica, a length of 6.6 miles. This action was taken after the commission had held a public hearing at Patriotic Hall on September 14, 1956, and an earlier public hearing in the State Building, Los Angeles, September 29, 1955. Public meetings called by the Division of Highways regarding this routing had also been held on April 11 and July 16, 1956.

**East-West Freeway**

In adopting this freeway location that is so very important to the people of this area, the commission in part said:

"The recommended line conforms to a well-planned and orderly development of a complete system of freeways for the Los Angeles metropolitan area and will best serve the West Los Angeles and Santa Monica Bay area.

"In view of the over-all state-wide highway program and the availability of funds to complete the system, one east-west freeway will have to serve the West Los Angeles area for many years. The one freeway selected, therefore, must provide the maximum traffic service. The line recommended by the State Highway Engineer will provide the best over-all traffic service. It is the most direct, feasible, and practicable route that can be obtained. It will serve the largest volume of 'through' as well as local traffic, and will cause the least disturbance to existing improvements.

"We recognize that this may not be a satisfactory or comforting answer to those whose properties are affected, but we believe it is obvious to all that any freeway through this heavily built-up area will require the acquisition of considerable private property from numerous owners. This cannot be avoided if the commission is to carry out its duty and legal obligation to fix and determine a location for the state highway route under consideration."

The location for the section of the Olympic Freeway from La Cienega Boulevard easterly to the Santa Ana Freeway (State Highway Route 2) near Soto Street was previously adopted and declared a freeway by the commission in May, 1954.

**Olympic Freeway Progress**

Good progress is being made by the District VII right-of-way staff in right-of-way acquisition for the easterly portion of the Olympic Freeway between junction with the Santa Ana Freeway and crossing with the Harbor Freeway and to a lesser degree, westerly toward La Cienega Boulevard. To date over \$16,000,000 has been expended for rights of way on the Olympic Freeway, and it is expected by the end of the current fiscal year that the amount will be increased to over \$20,000,000. The 1957-58 Fiscal Year budget as adopted by the California Highway Commission on October 18, 1956, contains an item of \$12,000,000 for continuing right-of-way acquisition on the Olympic Freeway. This budget also contains two items totaling \$8,400,000 for construc-

tion of bridge structures to provide interchange facilities for Olympic Freeway with the Harbor Freeway and to provide crossings over the Los Angeles River and the Santa Fe Railroad yard. Work on these structures is scheduled to start early in the summer of 1957. This will be the initial construction on the 4.2-mile unit of the Olympic Freeway between Hoover Street and the Santa Ana Freeway that involves long lengths of viaduct to carry the Olympic Freeway over the southeast business and industrial section of the City of Los Angeles for which the estimated total cost of right of way and construction is approximately \$66,000,000.

**Freeways Completed During 1956**

Important sections of freeway completed and opened to public traffic during 1956 are as follows:

	Miles
<b>Harbor Freeway</b>	
From 23rd Street to 42d Street, City of Los Angeles .....	1.4
From Pacific Coast Highway in Wilmington to Battery Street in San Pedro.....	2.8
<b>Long Beach Freeway</b>	
Sheila Street to Verona Street, including Santa Ana Freeway interchange.....	0.9
<b>Ojai Freeway</b>	
In Ventura County from Ventura Boulevard to Mills School .....	4.1
<b>San Bernardino Freeway</b>	
Durfee Street to Puente Avenue, West City Limits of West Covina.....	3.3
<b>San Bernardino Freeway</b>	
Rosemead Boulevard to San Gabriel River through City of El Monte.....	3.9
<b>San Bernardino Freeway</b>	
West City Limits of West Covina to Citrus Avenue .....	4.2
Total .....	20.6

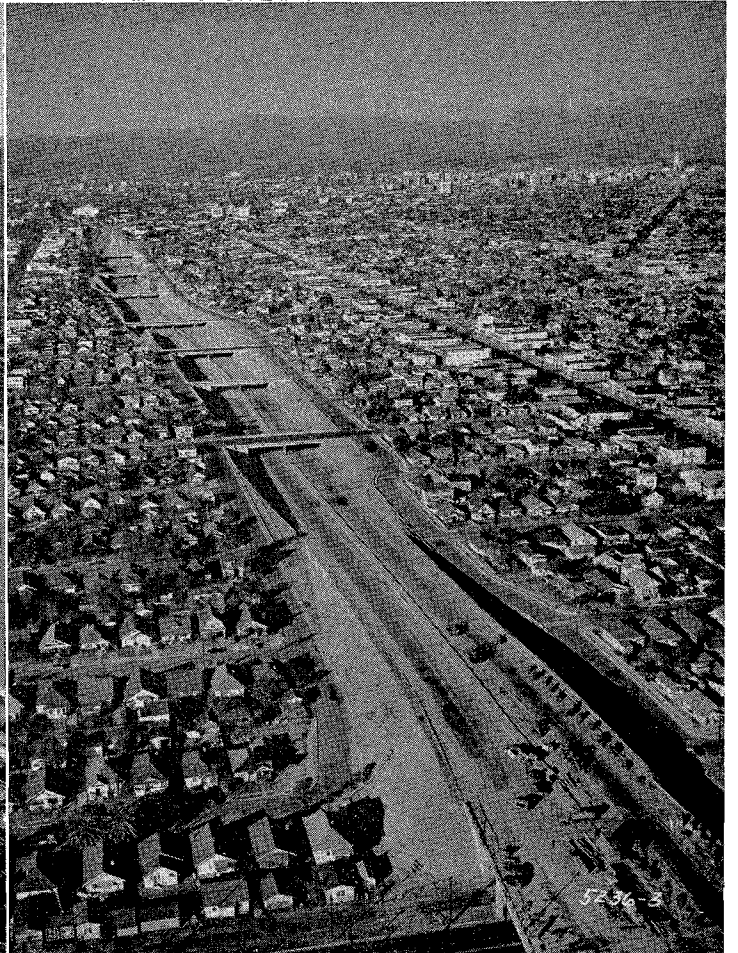
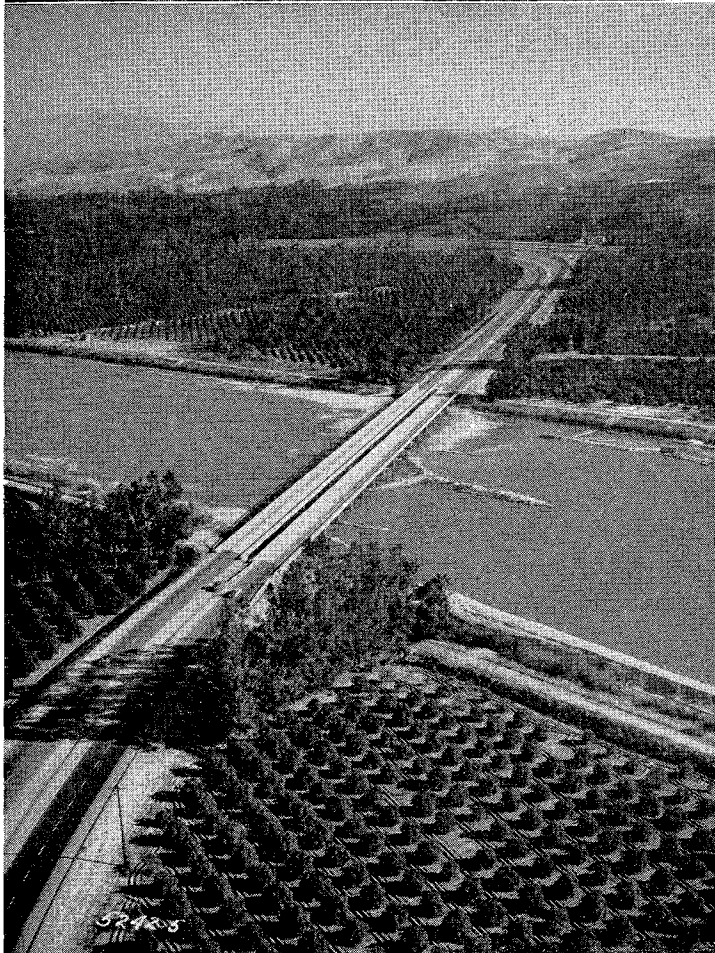
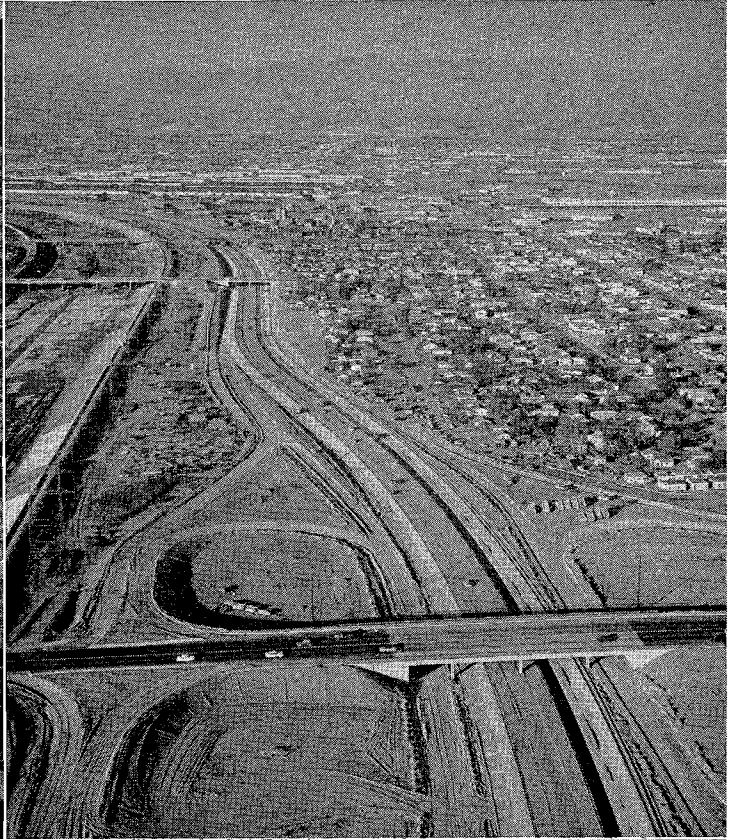
**Construction Contracts Awarded in 1956**

The past year has been one of significant accomplishment from the standpoint of freeway construction

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UPPER LEFT—Looking southeasterly along Golden State Freeway construction in Burbank showing in foreground interchange with Alameda Avenue. UPPER RIGHT—Looking northerly along Long Beach Freeway construction at interchange with Florence Avenue in East Los Angeles area. In background, left, is Cheli Air Force Depot. LOWER LEFT—Looking easterly along completed Route 175 (Houston) Freeway, showing in foreground bridges across Santa Ana River and in background connection with Santa Ana Canyon Freeway. LOWER RIGHT—Looking northerly along Harbor Freeway construction with Slauson Avenue crossing in foreground. Los Angeles Civic Center background right.





contracts that have been advertised and awarded in District VII. These contracts are as follows:

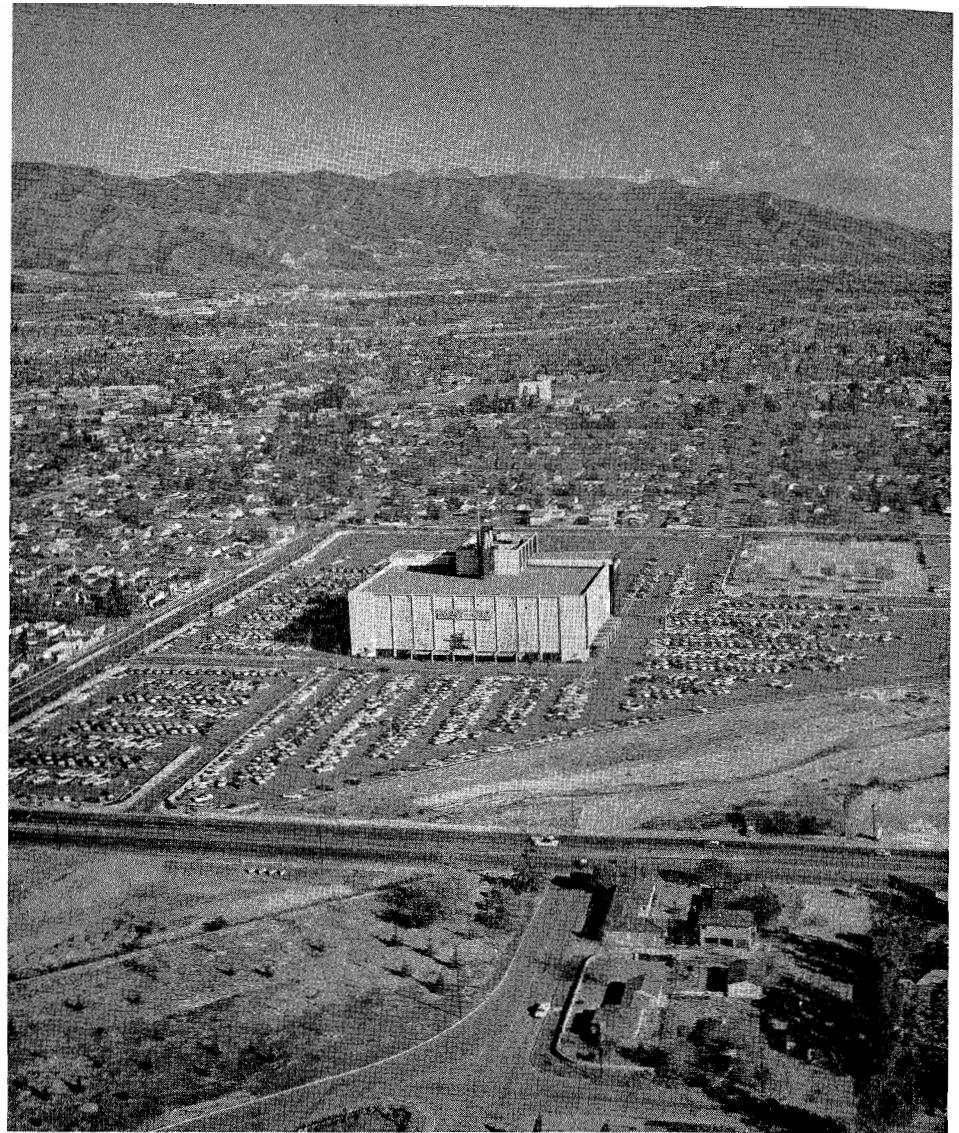
	<i>Miles</i>
<i>Golden State Freeway</i>	
Glendale Boulevard to Los Angeles River in Griffith Park section of Los Angeles .....	2.6
<i>Harbor Freeway</i>	
88th Street to 124th Street .....	2.6
<i>Hollywood Freeway Extension</i>	
East of Lankershim Boulevard to Moorpark Street in City of Los Angeles .....	1.1
<i>Long Beach Freeway</i>	
From Imperial Highway to Dozier Street .....	3.8
From Rosecrans Avenue to Imperial Highway .....	1.9
<i>Pacific Coast Freeway</i>	
From Date Street, Oxnard, to Calleguas Creek .....	7.2
<i>Santa Ana Freeway</i>	
From Laguna Canyon Road to Browning Avenue .....	5.7
From Coyote Creek to Ball Road, Orange County .....	6.5
<i>San Diego Freeway</i>	
From Ohio Avenue to Waterford Avenue .....	1.1
<i>Ventura Freeway</i>	
From Kelvin to Calabasas .....	4.0
<i>Ventura-San Diego Freeway</i>	
From Sepulveda Boulevard to Encino Avenue on Ventura Freeway .....	3.1
From Valley View to Burbank Boulevard on San Diego Freeway .....	1.6
Total .....	41.2

**Pasadena Freeway**

This freeway, formerly called the Arroyo Seco Freeway, is 8.2 miles in length, extending from the four-level structure near the Los Angeles City College to Glenarm Street in Pasadena. The last unit of construction on this freeway was completed and opened to traffic on September 22, 1953. The total cost was \$11,443,300. The Elysian Park section of this freeway is now carrying 114,000 vehicles per day, and the estimated daily traffic utilizing the four-level interchange structure at the south end of this freeway is 300,000 vehicles per day.

**Hollywood Freeway**

On the 10-mile length of the completed Hollywood Freeway from the Los Angeles Civic Center to Vineland Avenue in the San Fernando Valley the last unit of construction was completed and opened to public traffic August 5, 1954. The total cost of this



Looking easterly from above North Hollywood showing in foreground right of way for Hollywood Freeway Extension along Big Tujunga Wash adjacent to new shopping development. Street in foreground is Laurel Canyon Boulevard.

unit was \$55,000,000. On the basis of 1956 traffic counts the average daily vehicular traffic on the Hollywood Freeway westerly of the 4-level structure is 185,000 vehicles per day.

The Hollywood Freeway Extension joins the main Hollywood Freeway near the intersection with Lankershim Boulevard and extends northerly therefrom 6.8 miles to the proposed Golden State Freeway near Wentworth Avenue. On January 20, 1956, a contract was awarded to Oberg Construction Company for building two bridges on the Hollywood Freeway Extension, one across the Los Angeles River and the other at Vine-

land Avenue. The construction allotment is \$1,250,000.

On August 16, 1956, contract was awarded to Griffith Company for constructing 1.1 miles of the Hollywood Freeway Extension from Lankershim Boulevard to Moorpark Street. The contract allotment is \$2,324,800, and the estimated date of completion is November 21, 1957.

District VII right-of-way forces are now acquiring rights of way for the Hollywood Freeway Extension northerly of Moorpark Street. The 1957-58 Fiscal Year budget as adopted by the California Highway Commission has an item of \$3,000,000 for right of way



acquisition on the Hollywood Freeway Extension.

#### **Santa Ana Freeway**

This freeway extends from the easterly terminus of the Hollywood Freeway at Spring Street in the Los Angeles Civic Center in a generally southeasterly direction for a total length of 42.8 miles through the Cities of Buena Park, Anaheim, Santa Ana, and Tustin to a junction with the San Diego Freeway near the town of El Toro. This freeway, following as it does a northwesterly-southeasterly direction generally paralleling the Pacific Ocean coastline, makes it of great strategic value because so many of the other important traffic arteries in this part of the State have been established in a generally northerly-southerly or easterly-westerly direction.

The entire 42.8 miles of this freeway are now either fully completed,

under construction or financed. By the end of 1958 it will be entirely completed to full freeway standards. Three contracts, totaling \$13,757,900 and embracing 14.6 miles are now in progress. The last remaining link in Orange County extending from Laguna Canyon Road to El Toro-Niguel Road will be advertised for construction early in 1957. Completion of the Santa Ana Freeway throughout its entire length will be achieved by the end of 1958.

#### **San Bernardino Freeway**

As reported by District Engineer Lyman R. Gillis in his story published in *California Highways and Public Works*, July-August, 1956, the year 1956 has been a most significant one in the history of the District VII part of the San Bernardino Freeway.

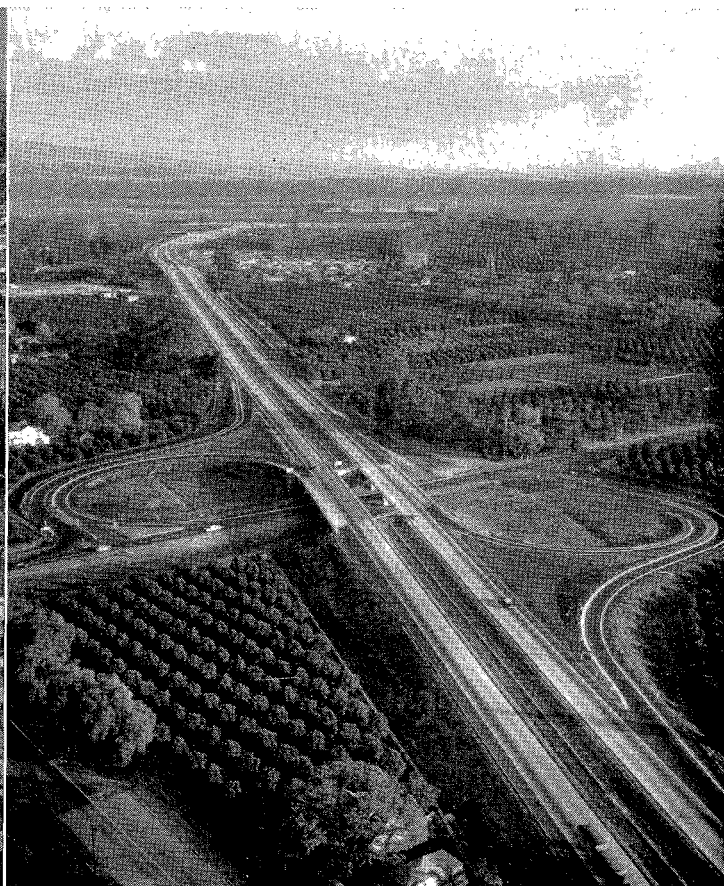
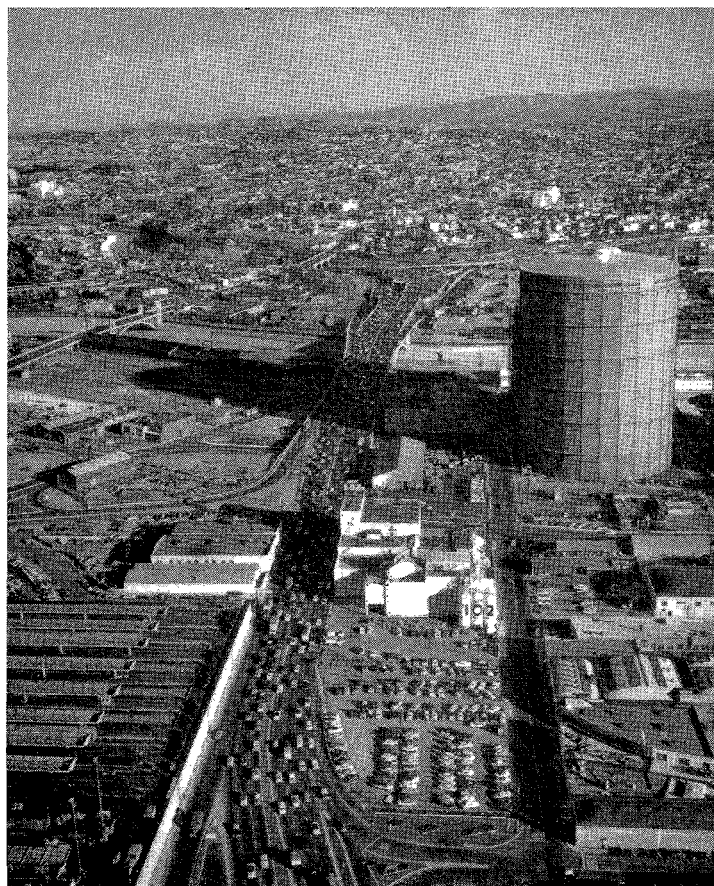
There now remains on this freeway only one construction contract to be completed. This is the section 5.2

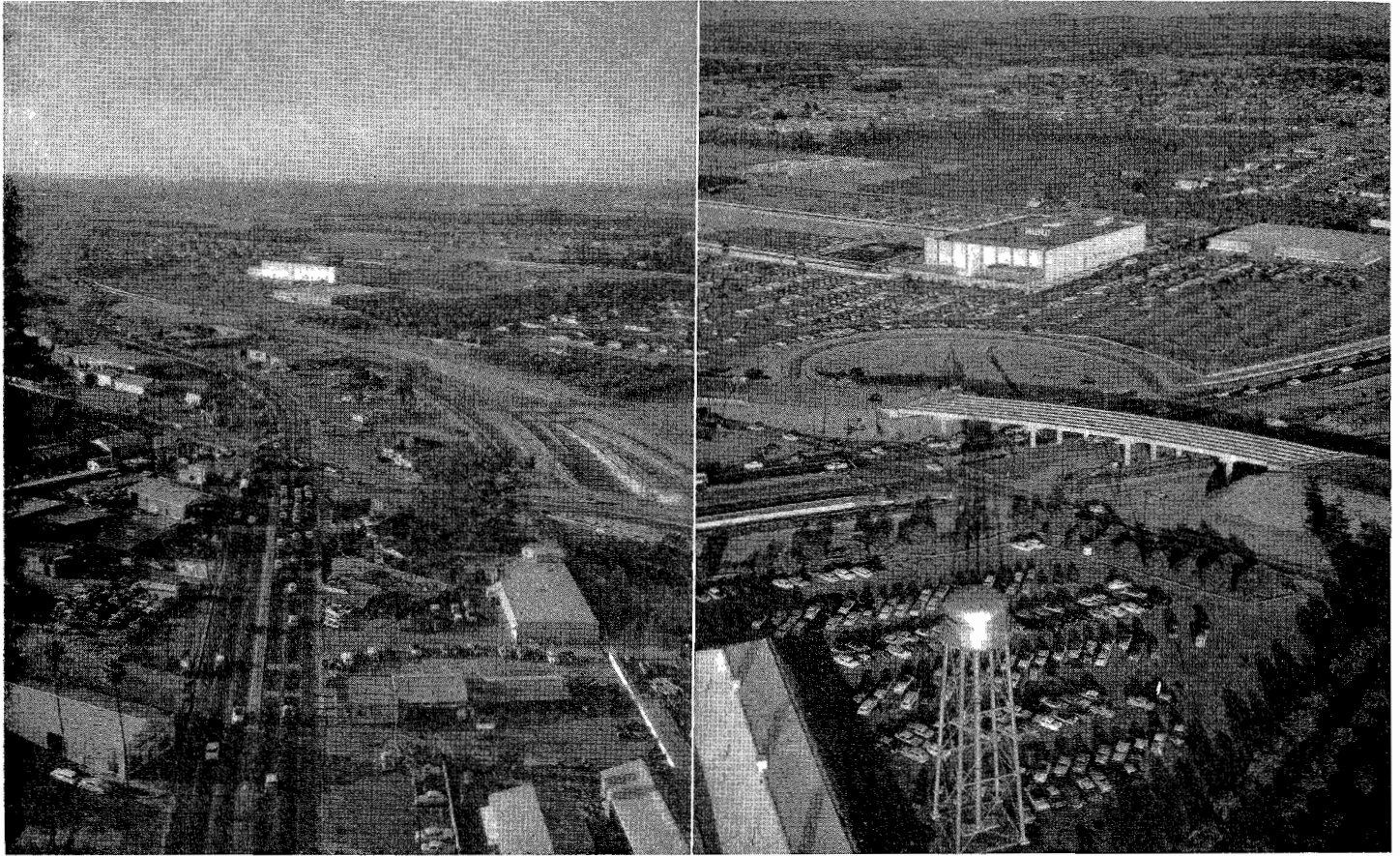
miles in length, between Citrus Avenue in West Covina and Ganesha Boulevard in Pomona, which is scheduled for completion in April, 1957. This 30.7 miles of full freeway in District VII extending from the Santa Ana Freeway near the Los Angeles River to San Bernardino County line at Claremont, has to date cost a total of close to \$52,000,000.

#### **Harbor Freeway**

The Harbor Freeway extends for 22.4 miles from junction with Hollywood Freeway at the four-level traffic interchange structure southerly to Battery Street in the San Pedro district of Los Angeles Harbor area. Two important sections of this freeway have been completed and opened to public traffic. At the northerly end 4.3 miles are now open from the four-level structure near the Los Angeles Civic Center to 42d Street. At the southerly end 2.8 miles from Pacific

LEFT—Looking easterly along Santa Ana Freeway from above Los Angeles Civic Center showing northerly end this freeway under full afternoon traffic load. In background is junction with San Bernardino Freeway to left where Santa Ana Freeway turns to right just beyond the Los Angeles River. RIGHT—Looking southeasterly along recently completed section of Santa Ana Freeway through Tustin showing in foreground interchange with Tustin Avenue and in background present end of completed construction at Browning Avenue.





LEFT—Looking northwesterly showing construction on Santa Ana Freeway through City of Anaheim. Bridge construction at right is to carry Lincoln Avenue, State Highway Route 78, over the freeway. RIGHT—Looking northeasterly showing in center bridge construction to carry Euclid Avenue over Santa Ana Freeway. In center is new shopping development for City of Anaheim.

Coast Highway in the Wilmington area to Battery Street in the San Pedro-Los Angeles Harbor area were opened to public traffic July 1, 1956.

Three major construction contracts are now under way for 6.8 miles from 42d Street to 124th Street, having an estimated value of \$15,687,000. The two northerly units of this construction are scheduled for completion in the summer of 1957 and the most southerly unit, in late 1958.

Right of way acquisition operations are now nearing completion with nearly all the parcels having been acquired that are necessary to complete this freeway. Other units of construction can be placed under contract as the California Highway Commission is able to provide for financing in subsequent budgets.

#### Long Beach Freeway

The Long Beach Freeway is one of the newer freeway developments.

Ground-breaking ceremonies at the southerly terminus of this freeway at Pacific Coast Highway in the City of Long Beach were held on June 27, 1951. However, since that time there has been steady progress in constructing this important freeway in the East Los Angeles area.

The total length of the Long Beach Freeway from Pacific Coast Highway (Route 60) in Long Beach to Huntington Drive in East Los Angeles approaching the City of Alhambra is 21.5 miles. As of the present time eight miles of the Long Beach Freeway at the south end have been completed from Pacific Coast Highway northerly to the crossing with Atlantic Boulevard east of the City of Compton, and at the northerly end one mile extending from Verona Street to Washington Boulevard, including the interchange structures and connecting ramps at junction with the Santa Ana Freeway.

Currently under construction are four contracts extending from Washington Boulevard southerly to Rosecrans Avenue east of Compton that total 7.1 miles in length and carry allotments aggregating \$12,724,000.

The Highway Commission on October 18, 1956, adopted the 1957-58 Fiscal Year budget that included an item of \$1,750,000 for 1.1-mile length of the Long Beach Freeway from Rosecrans Avenue southerly to Atlantic Boulevard east of Compton. This action provided the necessary financing for the last link necessary to complete the Long Beach Freeway throughout the entire 16-mile length between Santa Ana Freeway and Pacific Coast Highway in Long Beach.

The Los Angeles County Road Department is now engaged in completing plans for the extension of Olive Street in Compton easterly across the Long Beach Freeway and

the Los Angeles River. The State Division of Highways has agreed to contribute to the Los Angeles County project the actual cost of the structure and westerly approaches for the Olive Street crossing over the Long Beach Freeway. The construction of the Olive Street extension by Los Angeles County will, of necessity, have to be carried out simultaneously with the State's adjoining construction on the Long Beach Freeway. Therefore, the time for advertising the State's contract and the Los Angeles County contract will have to be worked out so that the two can proceed simultaneously. This construction is scheduled for advertising early in the spring of 1957.

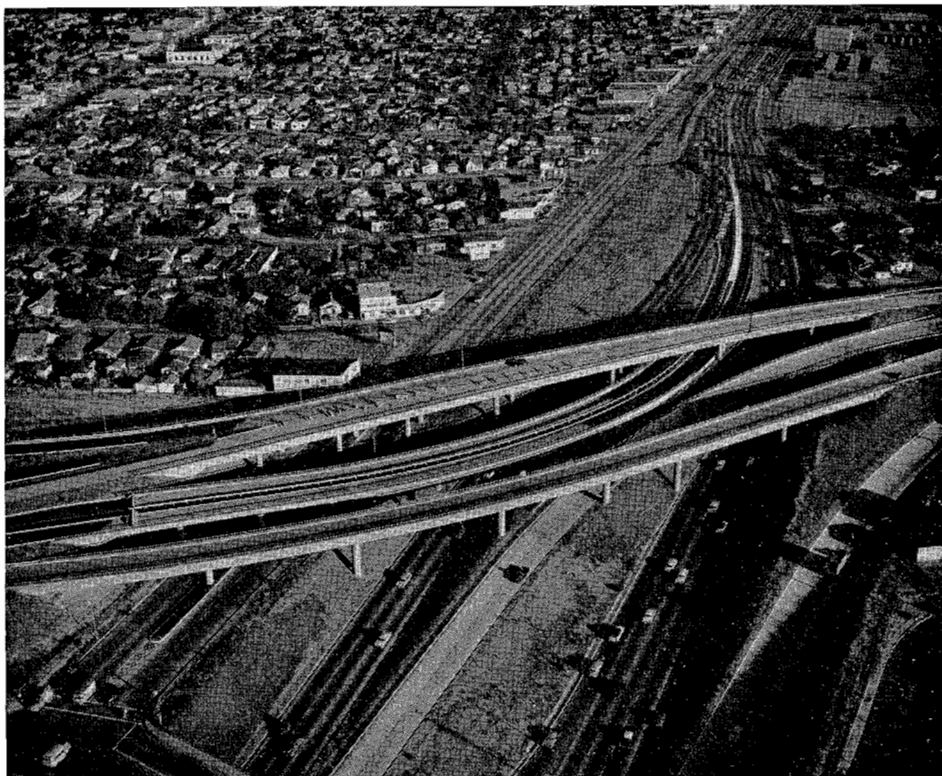
Therefore, we can say that by the end of 1958 the Long Beach Freeway from the Santa Ana Freeway southerly should be completed and opened to public traffic.

#### **Golden State Freeway**

This freeway extends 72.7 miles from the southerly terminus at the junction with the Olympic and Santa Ana Freeways near Soto Street in Los Angeles to Kern county line.

The portion of the Golden State Freeway, U. S. Highway 99, locally known as the "Ridge Route" between Tunnel Station and the Kern County line, 45.2 miles in District VII, has been converted to a four-lane expressway. The total cost of this reconstruction, completed February, 1953, was \$13,500,000. Southerly from Tunnel Station for 27.5 miles the Golden State Freeway is to be carried out to full freeway standards to its southerly terminus at junction with the Santa Ana Freeway. Of this portion the northerly three miles from Tunnel Station southerly to Sepulveda Boulevard was completed as a four-lane expressway at a cost of \$3,200,000 on August 25, 1955.

Two very important contracts on the Golden State Freeway are now in progress. The contractor on this five miles of construction, extending from Glendale Boulevard in the City of Los Angeles to Ash Street in the City of Burbank, is Vinnell Co., Inc., and Vinnell Constructors. The sum of the two contract allotments is



*Looking easterly showing recently completed structures comprising interchange between Long Beach Freeway and Santa Ana Freeway*

\$9,779,000. The estimated date of completion is October, 1957.

Right-of-way acquisition is under way for acquiring all rights of way needed for the Golden State Freeway throughout its entire length. The budget for the 1957-58 Fiscal Year, as adopted by the California Highway Commission on October 18, 1956, contains \$12,000,000 for right-of-way acquisition on the Golden State Freeway. It also contains a construction item of \$3,150,000 for 1.3 miles of the Golden State Freeway between Alameda Avenue and Burbank Boulevard in the City of Burbank and an item of \$8,900,000 for 3.1 miles of this freeway from Sixth Street to Mission Road in the City of Los Angeles. This latter project is 3.1 miles in length and includes the traffic interchange facilities with the San Bernardino Freeway.

The last unit of the Golden State Freeway from the north city limits of Burbank to junction with San Fernando Road near intersection with Sepulveda Boulevard has been approved by the Los Angeles City Board of Public Works, and the free-

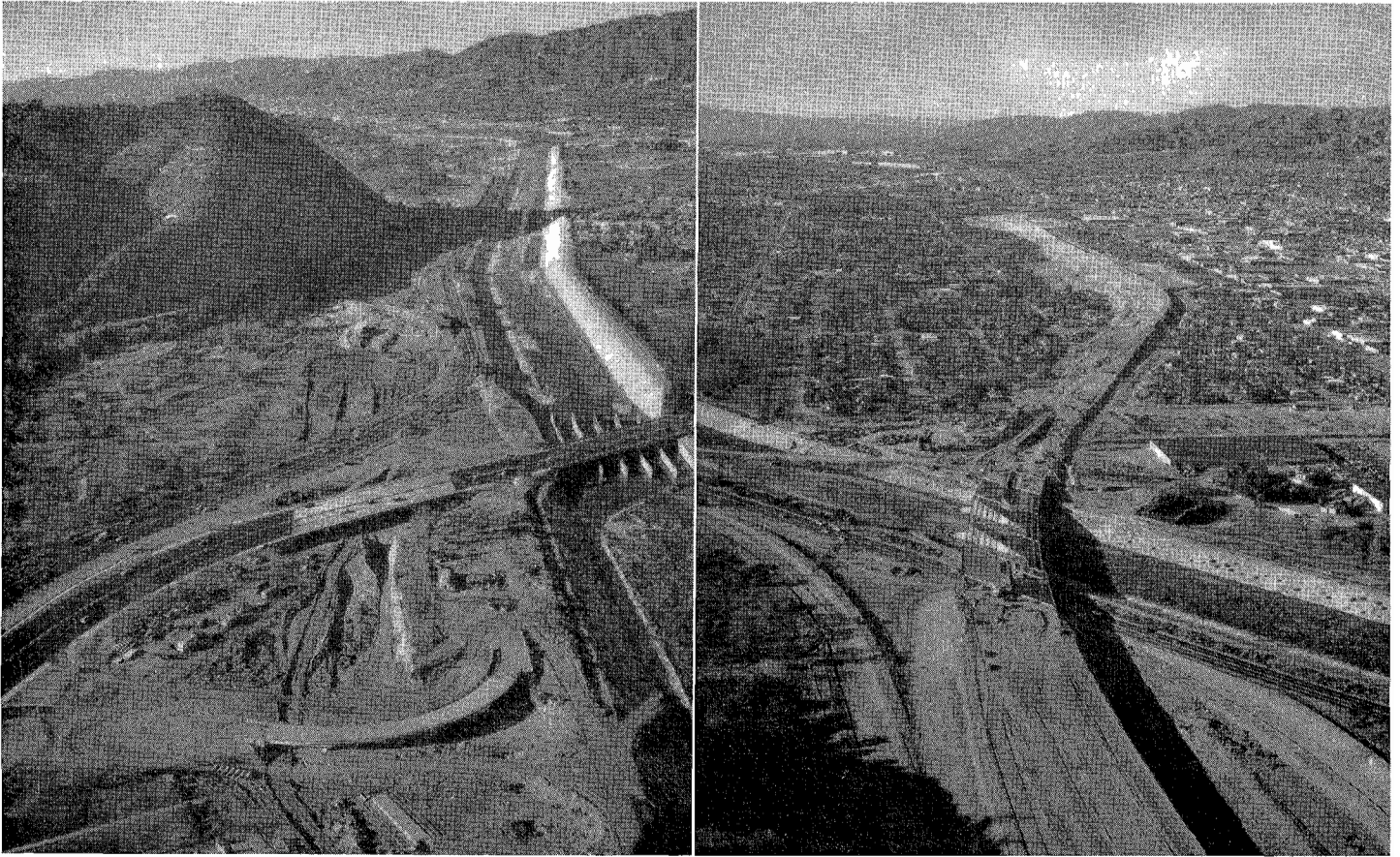
way agreement is now before the city council for consideration. This covers an 11.8-mile length of freeway and is the longest continuous stretch of freeway that has yet been presented to the city council for freeway agreement.

Completion of the Golden State Freeway through the City of Los Angeles, connecting it with the Santa Ana Freeway, the San Bernardino Freeway and the Pasadena Freeway, is of vital importance in clearing up traffic congestion on present freeways serving the Los Angeles Civic Center and business district.

#### **Ventura Freeway**

The Ventura Freeway extends from the Hollywood Freeway Extension near Vineland Avenue in the San Fernando Valley to the Santa Barbara county line, a distance of 65.1 miles. Of this mileage 40.6 miles have been completed at a construction cost of \$13,454,000 to provide four-lane divided highway or expressway standards. This completed construction is all westerly of the west city limits of Los Angeles at Calabasas.





*LEFT—Looking northwesterly along construction in progress on Golden State Freeway in Griffith Park area showing in foreground completed structures at Los Feliz Boulevard. Storm drain channel at right is Los Angeles River. RIGHT—Looking northwesterly along Golden State Freeway construction from above Griffith Park showing crossing with Riverside Drive and Los Angeles River in foreground and City of Burbank in background.*

The Highway Commission on May 18, 1955, adopted a freeway routing to carry the Coast Highway (U. S. Highway 101) through the City of Ventura. Plans are now in progress so that construction can go forward whenever financing can be arranged for this entire 5.5 miles through the City of Ventura.

The budget for the 1957-58 Fiscal Year as adopted by the Highway Commission October 16, 1956, contains an item of \$3,400,000 to convert to full freeway status the existing two- and three-lane undivided section over the Conejo Grade. This is 4.8 miles in length, extending from Conejo Grade Summit to Fifth Street in Camarillo. This is the last section of the existing two- and three-lane pavement on Route 2 between Los Angeles and Santa Barbara county line to make this route a four-lane divided highway throughout its length in District VII. Designs are under way

on the Ventura Freeway in new location through the City of Ventura, and some money is available in the 1956-57 Fiscal Year budget for right-of-way acquisition in the City of Ventura. Additional funds in the amount of \$3,000,000 are now available in the 1957-58 Fiscal Year budget to continue with right-of-way acquisition in expectation of starting construction at a later date when funds are available.

Studies are under way to convert existing sections of four-lane divided expressway from the north city limits of Los Angeles at Calabasas to the Santa Barbara county line to full freeway status.

Within the City of Los Angeles two major freeway construction contracts are now in progress on sections of the Ventura Freeway. These extend from Sepulveda Boulevard to Encino Avenue, a length of 3.5 miles, and from Kelvin Avenue to Calabasas, a

length of four miles. The value of this current construction is \$9,779,000.

District right-of-way agents are now actively engaged in acquiring rights of way for the remaining units of the Ventura Freeway so that these can be placed under construction when funds are provided by the California Highway Commission in subsequent budgets.

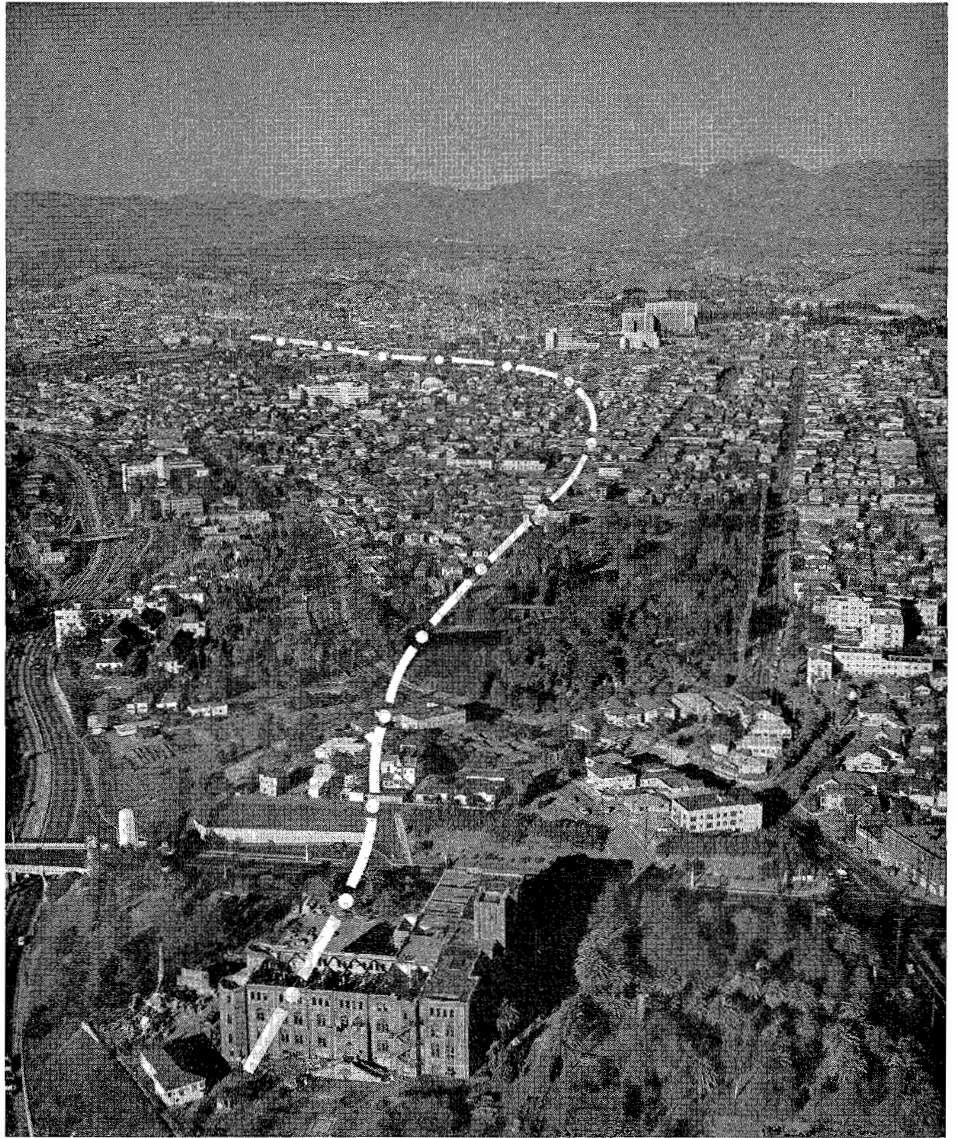
#### **San Diego Freeway**

This freeway is 93.7 miles in length. It extends southerly from junction with the Golden State Freeway near the City of San Fernando in close vicinity to existing Sepulveda Boulevard over the Santa Monica Mountains through the West Los Angeles area and along the easterly side of the Los Angeles International Airport. Then it swings easterly, passing to the south of the Long Beach Municipal Airport and then southeasterly into Orange County, to a junction

with the Santa Ana Freeway at El Toro. Then it proceeds in close vicinity to existing US 101 through San Juan Capistrano and San Clemente to the Orange-San Diego county line. In the West Los Angeles area, work on the Sunset Boulevard Overcrossing and three other nearby bridges costing \$723,000 was completed in February of this year. In this same area, construction under two contracts with the Thompson Construction Company is now in progress to complete 2.3 miles of the San Diego Freeway between Ohio Avenue and Casiano Drive. The construction allotments total \$4,000,000. The estimated date of completion is April, 1957. The construction includes seven reinforced concrete bridges and the extensive traffic interchange system at Wilshire Boulevard.

Over the entire length of this freeway at various locations, planning, designing, and right-of-way acquisition is in progress as well as the construction that has been described. In many locations, advance right-of-way acquisition funds, frequently called "Chapter 20 money," have been utilized in the purchase of vacant lands to forestall construction of private improvements which, if allowed to proceed, would have made future right-of-way cost many times greater. On the San Diego Freeway, \$5,000,000 has been expended from Chapter 20 money. The total expenditures to date for right-of-way acquisition and construction on this freeway is close to \$35,000,000. The 1956-57 Fiscal Year budget contains an allotment for right-of-way acquisition on the San Diego Freeway of \$2,740,000. The 1957-58 Fiscal Year budget, as adopted by the California Highway Commission October 18, 1956, contains an item of \$9,000,000 for continuing right-of-way acquisition on the San Diego Freeway.

The San Diego Freeway is a traffic facility badly needed by the San Fernando Valley motorists, being valuable because it will take through traffic around the built-up and heavily congested Los Angeles business and industrial areas. When completed, a large portion of the through traffic now using the Hollywood and Santa Ana Freeways can to great advantage



Looking northerly along location for Golden State Freeway showing right of way clearing operations in progress. Hollenbeck Park lake in center; Santa Ana Freeway, left, and Sixth Street, Los Angeles, in foreground. The center line of freeway is shown by dash-dot line.

utilize the San Diego Freeway as a bypass route. It will be of further value when the future Olympic Freeway has been constructed for traffic destined for Los Angeles, because then another alternate route supplementing the Hollywood Freeway will be available.

#### Colorado Freeway

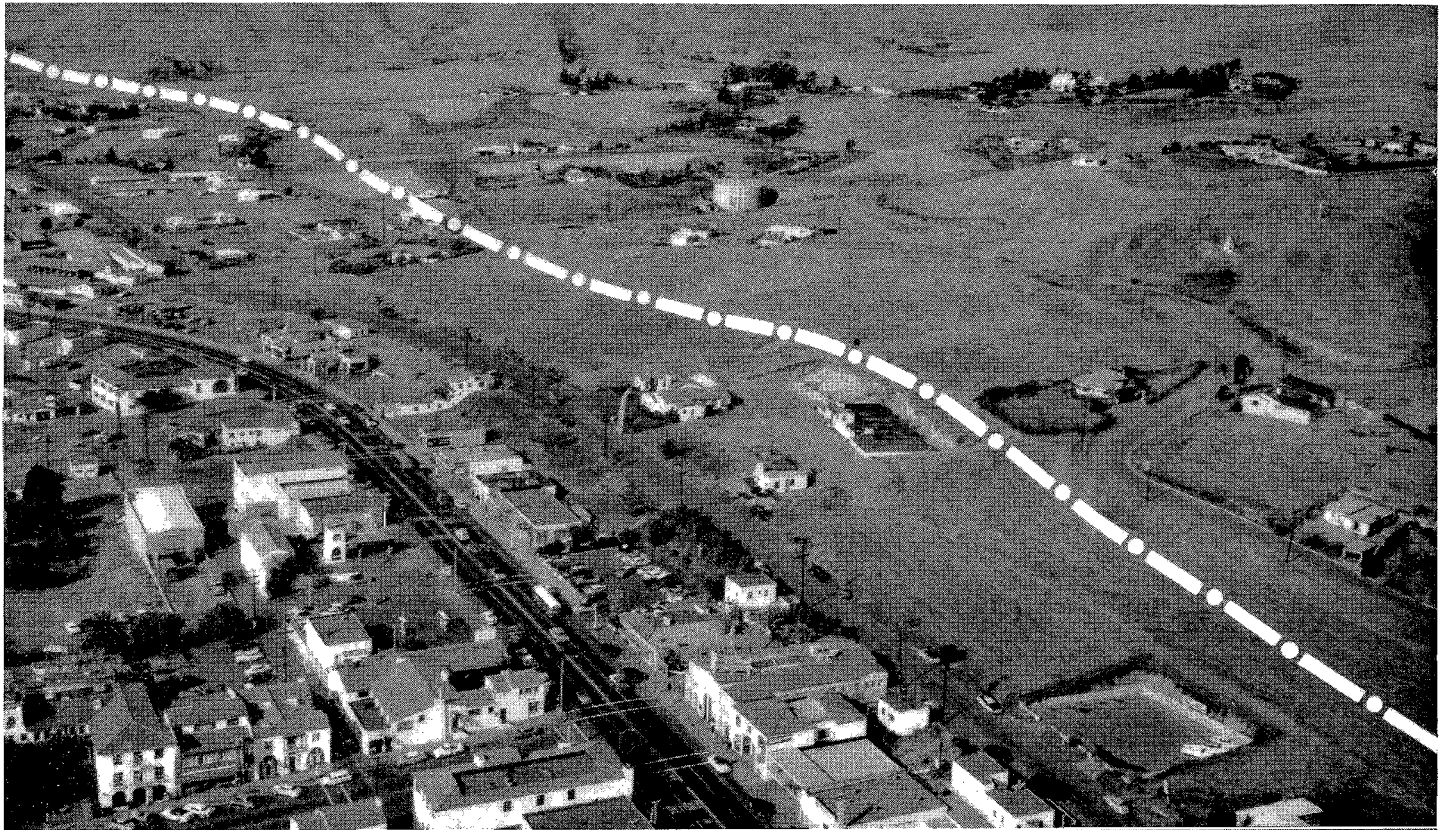
The unit of the Colorado Freeway, extending for 2.2 miles from Eagle Vista Drive in Eagle Rock to Holly Street in Pasadena, being entirely completed with the new Pasadena Pioneer's Bridge over the Arroyo Seco, is of vital importance to the people

of Pasadena and this area. The last unit of construction on the Colorado Freeway from Eagle Vista Drive to Avenue 64 was completed July 28, 1955. The total of expenditures on this freeway to date is \$8,500,000.

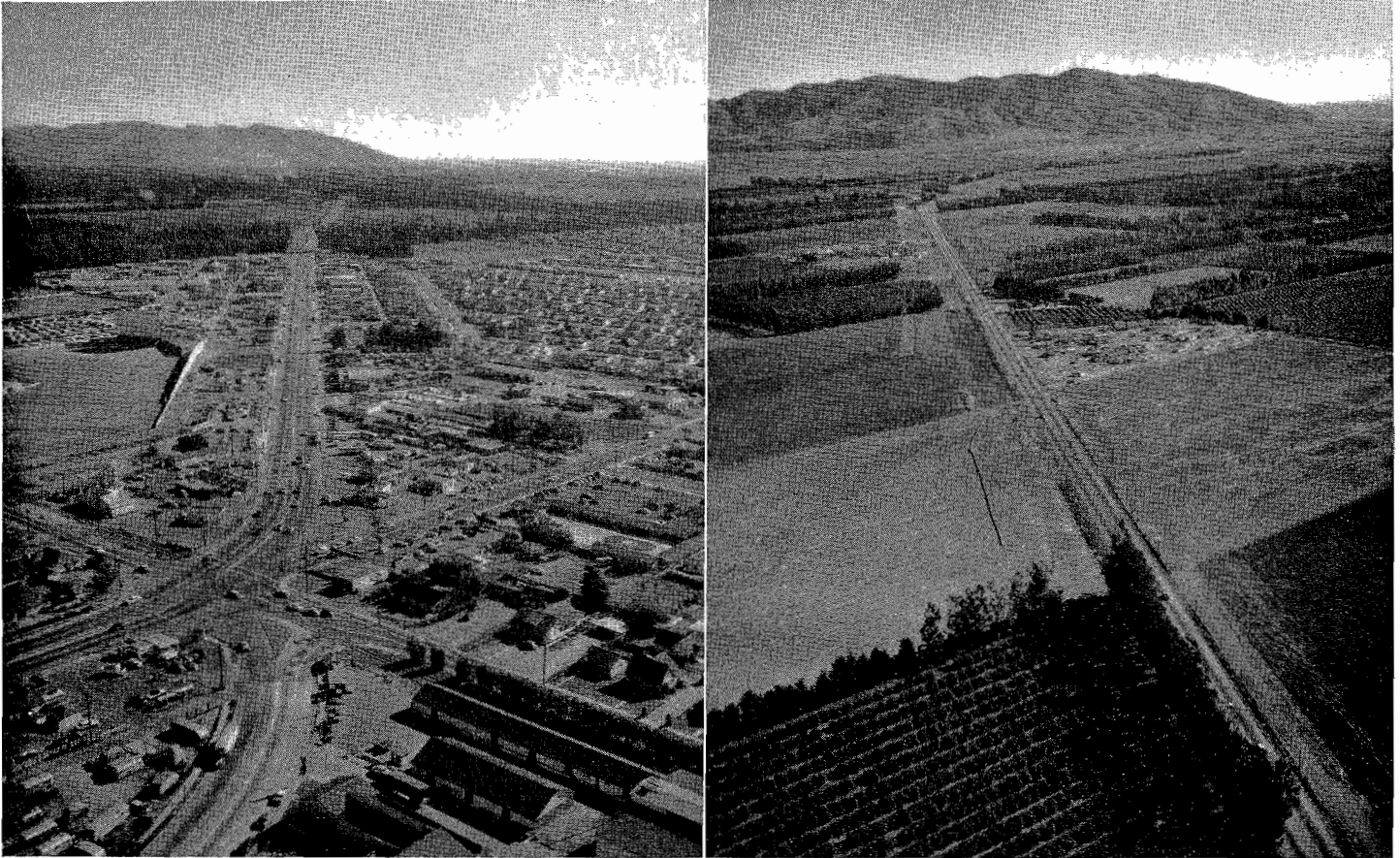
#### Foothill Freeway

The portion of the Foothill Freeway from Hampton Road to Montana Street in the Flintridge area, 1.8 miles in length, was reported in detail by Resident Engineer C. J. Verner in the September-October, 1955, issue of *California Highways and Public Works*. This important project, completed October 28, 1955, was enthu-





*UPPER—Looking northwesterly along State Highway Route 2 (US 101) through City of San Clemente, with dash-dot line showing location of San Diego Freeway.  
LOWER—Looking easterly toward Capistrano Mission with State Highway Route 2 (US 101) in foreground. The San Diego Freeway will pass through location as indicated by dash-dot line.*



LEFT—Looking southeasterly along State Highway Route 60 (US 101 Alternate) showing in foreground portion of City of Oxnard and intersection with Route 153 leading to Port Hueneme. The freeway construction recently started begins at the line of trees just beyond houses and extends toward foot of hills in background. RIGHT—Looking southeasterly along US 101 Alternate showing right of way clearing in progress for freeway construction recently started in Ventura County from Oxnard to Calleguas Creek which is located along base of hills shown in background.

siastically welcomed by the people of Pasadena, Flintridge, and Altadena because it corrected an exasperating traffic congestion problem at Devil's Gate Dam. The total cost was \$2,675,000.

The only interstate route in District VII for which the California Highway Commission has not as yet passed a resolution adopting a freeway route for the entire length, is the Foothill Freeway. We are now engaged in preliminary engineering studies and are conferring with engineering departments and planning commissions of Los Angeles County and the various cities that will be passed through by this freeway in order to obtain the most economical route to provide the greatest possible traffic service.

#### **Glendale Freeway**

On the Glendale Freeway for the 1.6-mile section between the Los An-

geles River and Avenue 36 near Eagle Rock Boulevard, plans are now completed and construction funds are available in the 1956-57 Fiscal Year budget in the amount of \$3,270,000. This includes the grade separation bridge over Taylor Yard tracks of the Southern Pacific Railroad. Advertising of this contract is expected in early 1957. The 1.5-mile section of this freeway from the Los Angeles River extending it southerly to Glendale Boulevard was adopted by the Highway Commission on December 14, 1955. The budget for the 1957-58 Fiscal Year contains an allocation of \$3,500,000 for continuing right-of-way acquisition on the Glendale Freeway.

#### **Ojai Freeway**

A contract was awarded June 29, 1955, for 4.1 miles of the Ojai Freeway in Ventura County, extending from the junction with West Main

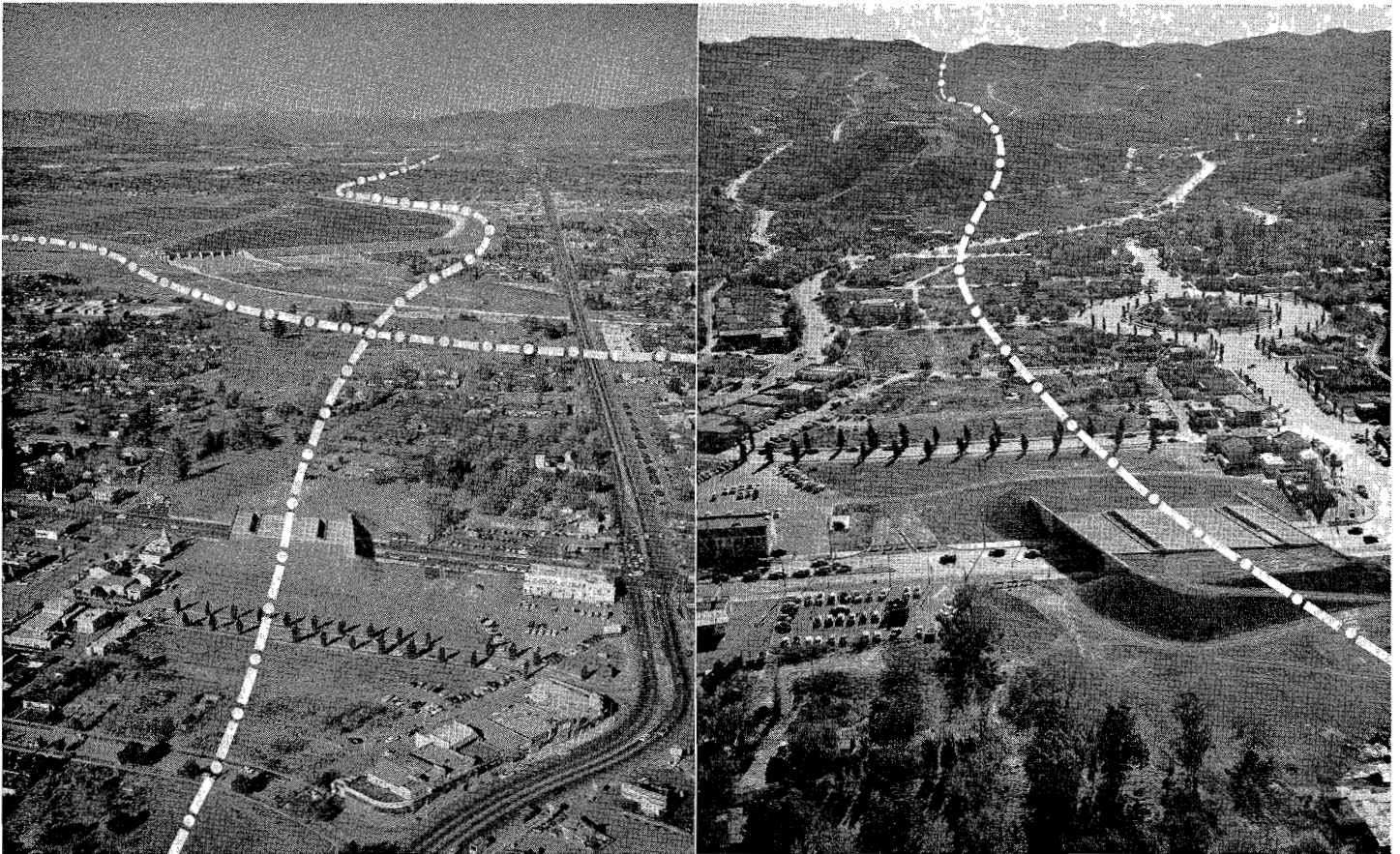
Street in the City of Ventura north-erly to Mills Schools. This contract was completed and opened to public traffic on December 3, 1956. It was accepted by Director of Public Works Frank B. Durkee on December 6, 1956.

It is anticipated that early this year action will be taken by the California Highway Commission in connection with a routing from the Ojai Freeway, extending it southerly from a point north of the crossing with West Main Street, to a junction with the new Ventura Freeway along the ocean front.

#### **Artesia Freeway**

This freeway takes its name locally from Artesia Street along which it follows for a considerable distance in Los Angeles County. It is a part of State Highway Legislative Route 175, that has a total length of 34 miles extending from Coast





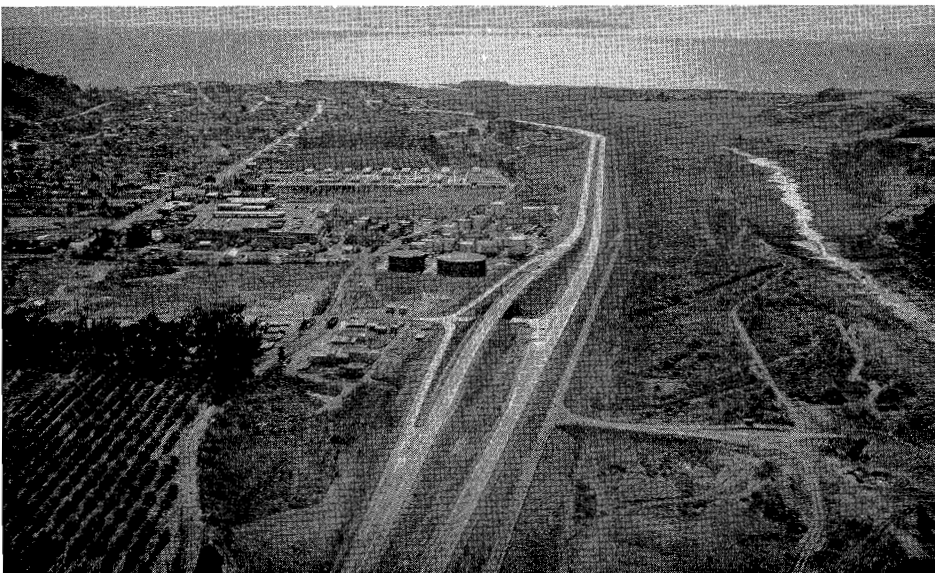
*LEFT—Looking northerly along San Diego Freeway location showing in foreground recently completed bridge over Ventura Boulevard in Sherman Oaks area of the San Fernando Valley. In center is shown intersection with Ventura Freeway. Traffic artery to right is Sepulveda Boulevard, State Highway Route 158. RIGHT—Looking southerly along San Diego Freeway location showing in foreground recently completed bridge over Ventura Boulevard.*

Highway, Route 60 in Redondo Beach to a junction with the Santa Ana Canyon Freeway in Orange

County near Olive. The California Highway Commission has adopted two portions of this route in the

amount of 21.7 miles for freeway routing. These two sections of freeway routing in Los Angeles County extend from Normandie to Santa Fe Avenue and in Orange County from Palo Verde Avenue to Santa Ana Canyon Freeway. In Orange County this freeway is locally referred to as the Houston Freeway, taking its name from proximity to Houston Avenue. Sections of this freeway have been developed as a four-lane divided highway, two of which were completed and opened to traffic during 1956.

*Looking southerly along recently completed Ojai Freeway with City of Ventura to left and Ventura River at right. Santa Barbara channel islands in background.*



On April 20, 1956, 2.2 miles of expressway were completed in Los Angeles County from Central Avenue to Alameda Street. The total cost of this construction was \$1,783,500. In Orange County four miles of expressway were completed April 26, 1956, from Cypress Avenue to junction with the Santa Ana Canyon Freeway near Olive. The total cost of this con-



*Looking easterly along Ventura Freeway construction through Woodland Hills area showing in foreground recently completed bridge over Ventura Boulevard*

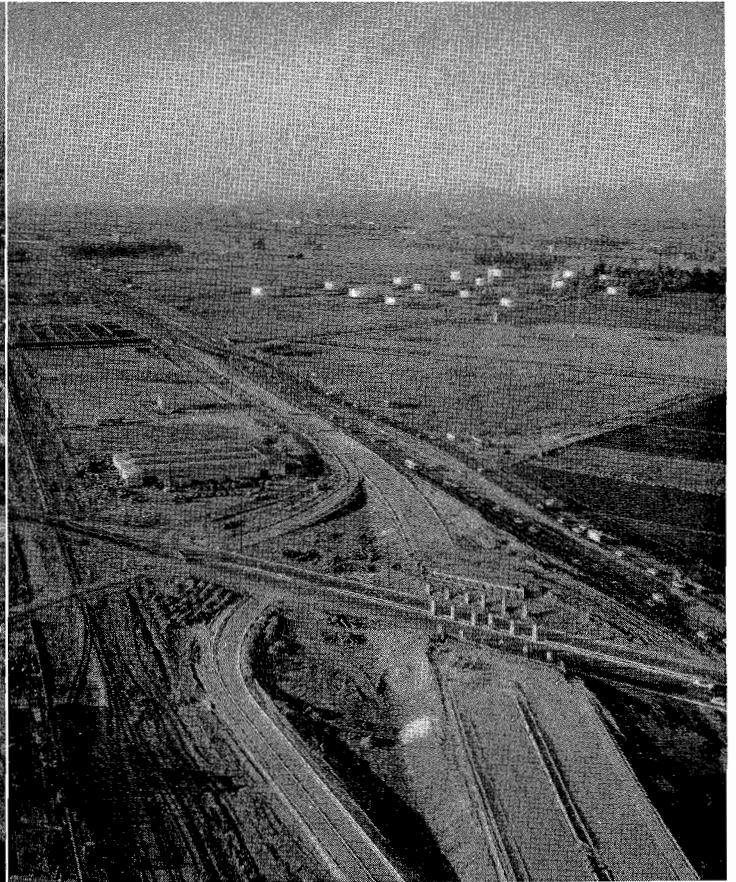
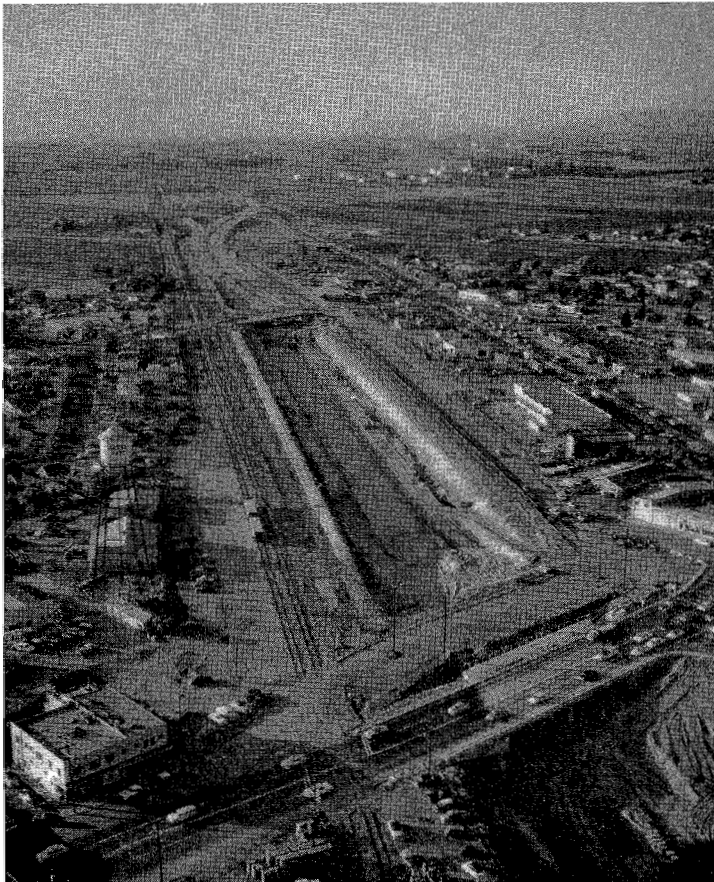
struction was \$1,259,100. Combining these two projects with previously completed construction a total of 9.6 miles of four-lane expressway has been completed at a total cost of \$7,841,000.

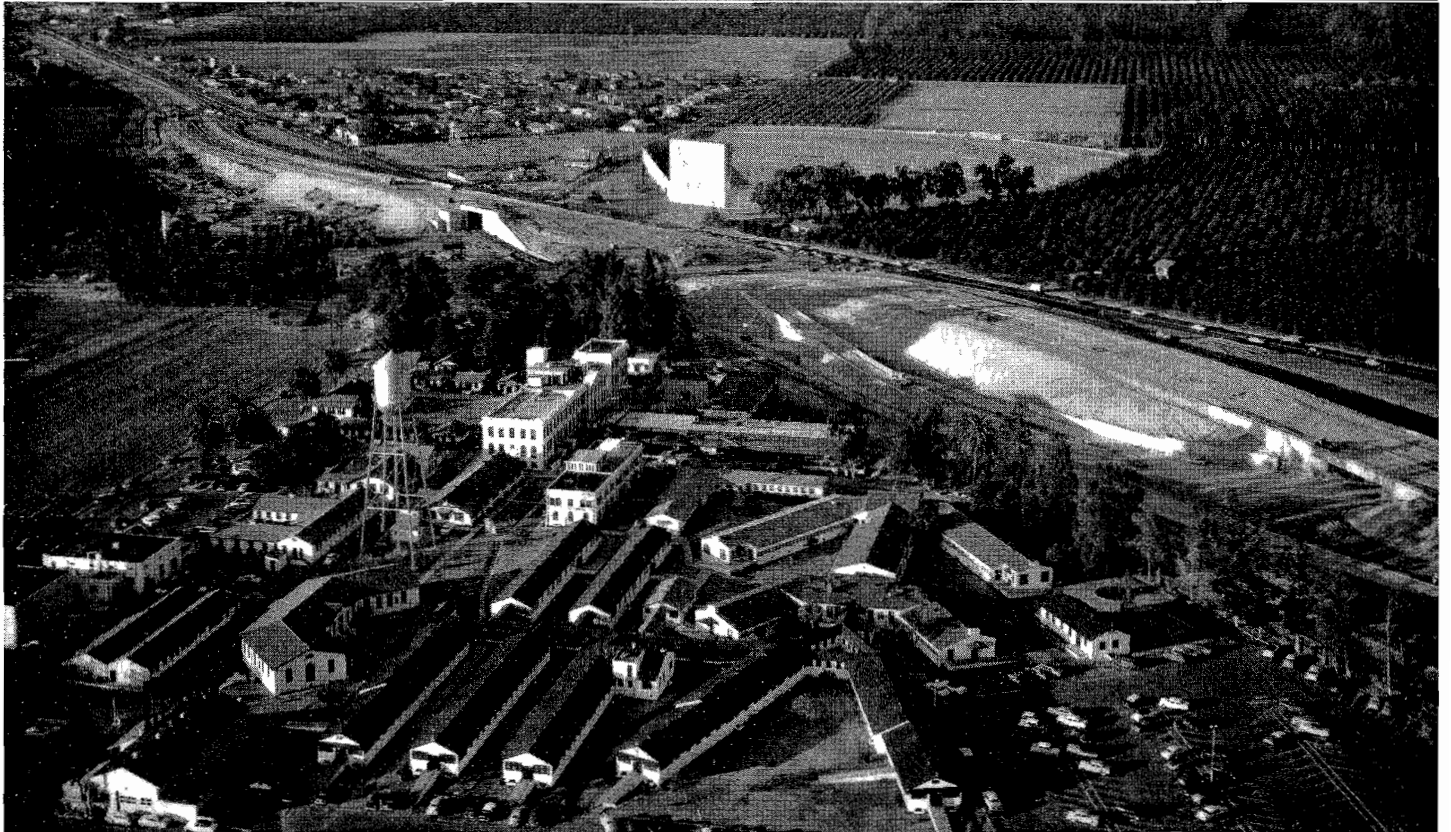
**Santa Ana Canyon Freeway**

This freeway is a development of State Highway Route 43 extending 27.4 miles from Newport Beach to Riverside County line. It takes its local name from the fact that the northeasterly portion lies in Santa Ana Canyon. This is a four-lane divided highway where improvement has been carried out over 2.0 miles at the south-westerly end through Costa Mesa and over 10.7 miles at the northeasterly



*LEFT—Looking northwesterly along Santa Ana Freeway construction in City of Buena Park showing in foreground, right, bridge construction for Grand Avenue, Route 171. RIGHT—Looking northwesterly along Santa Ana Freeway construction in City of Buena Park showing in foreground crossing of Artesia Avenue, State Highway Route 175.*





UPPER—Looking northerly along Harbor Boulevard, a county road, showing at right interchange with Santa Ana Freeway and with Disneyland at left. LOWER—Looking northerly showing constructoin in progress on Santa Ana Freeway between Broadway and Lewis Street with Orange County General Hospital in foreground. Note recently completed grade separation bridge for Southern Pacific Railroad, center left, near drive-in theater screen.



end through Santa Ana Canyon. The total cost to date has been \$5,607,000.

#### Other Freeways

The Olympic Freeway has been discussed previously in this story under the heading freeway route adoptions by the California Highway Commission.

In addition to the above described freeways, the California Highway Commission has adopted other freeway routings for 150 miles of additional freeways upon which as yet no construction has been started.

Designing of these freeways is being pushed as fast as other com-

mitments will permit, and good use of advance right-of-way funds is being made whenever critical situations arise where action must be taken now to protect future rights of way from impending private developments which if permitted to go forward would cause great increase in future costs of rights of way.

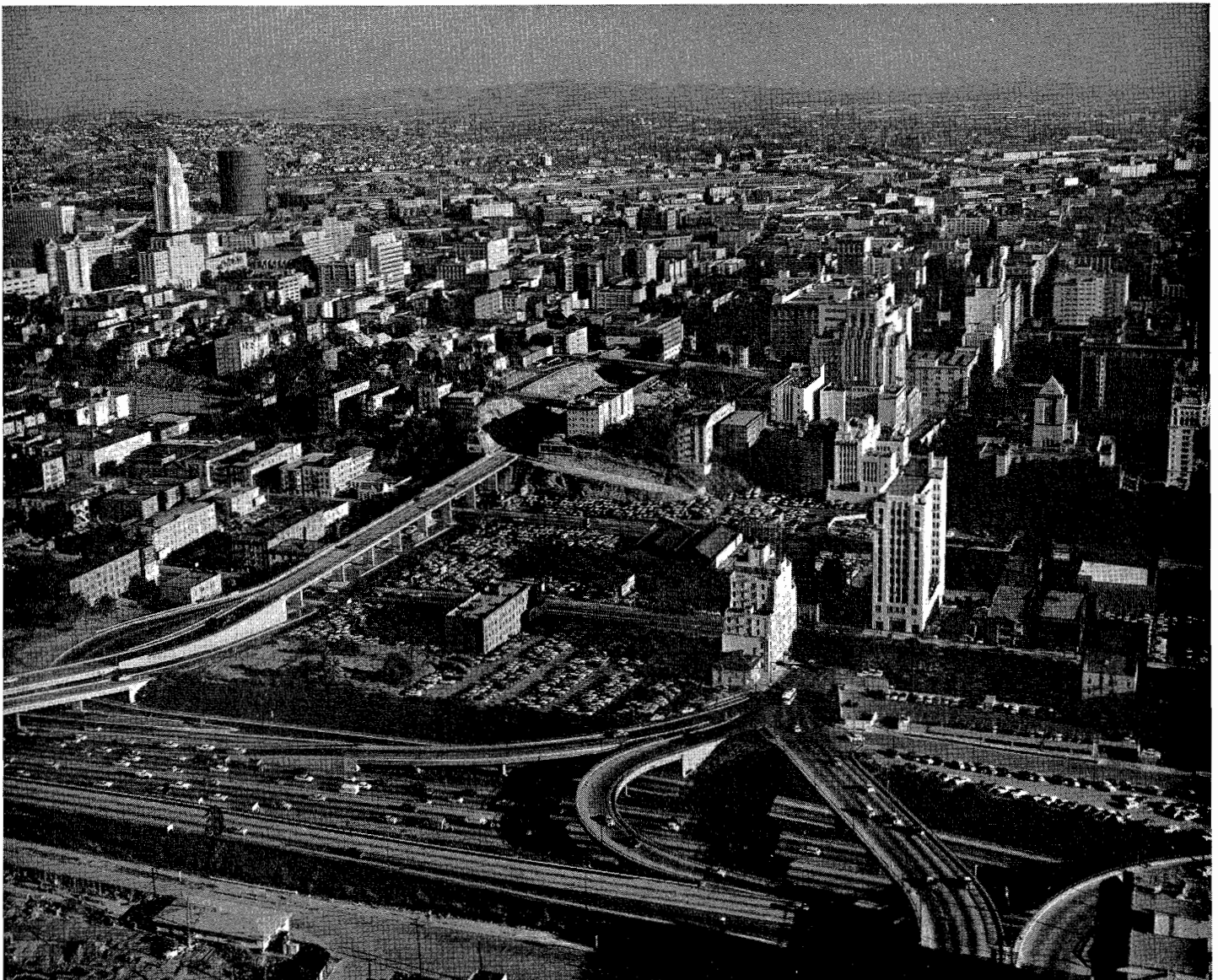
The Highway Commission on November 18, 1954, adopted a freeway resolution covering 10.9 miles extending from junction with the Golden State Freeway, US 4, in Griffith Park westerly to Sepulveda Boulevard, State Route 158. This adoption included the then last remaining section of Ven-

tura Freeway that had not previously been adopted as a freeway, and 5.2 miles of the Riverside Freeway.

The commission adopted the route for the San Gabriel River Freeway on December 15, 1954. This freeway extends from the junction with the Garden Grove Freeway near Long Beach to a junction with the San Bernardino Freeway near El Monte, a distance of 23 miles. Design is now under way in order to acquire vacant property subject to industrial and residential development under the advance right-of-way acquisition program.

The portion of the Pomona Freeway between Potrero Grande Drive

*Looking easterly toward downtown Los Angeles showing Harbor Freeway in foreground, Fifth and Sixth Street bridges, right, recently completed Fourth Street bridges, left.*



**STATUS OF DISTRICT VII FREEWAY PROJECTS—JANUARY 1, 1957**

Freeway name	Total miles	Completed projects		Under construction		Right of way costs	Total obligated costs to date
		Miles	Construction costs	Miles	Estimated construction cost		
Pasadena Freeway 4-Level Structure to Glenarm St., Pasadena.....	8.2	8.2	\$10,434,200			\$1,009,100	\$11,443,300
Hollywood Freeway Spring St. via Cahuenga Pass to Junction Golden State Freeway near Wentworth St.....	16.8	10.0	29,007,500	1.8	\$3,502,500	31,809,000	64,319,000
Santa Ana Freeway Spring St. (Los Angeles) to Junction of San Diego Freeway near El Toro.....	42.8	28.2	39,893,930	14.6	13,757,900	17,983,500	71,635,330
San Bernardino Freeway Santa Ana Freeway near Los Angeles River to San Bernardino County Line in Claremont.....	30.7	22.6	29,331,000	8.1	5,579,200	16,518,000	51,428,200
Harbor Freeway 4-Level Structure to San Pedro.....	22.4	7.1	19,345,945	6.8	15,686,928	50,292,000	85,324,873
Long Beach Freeway Pacific Coast Highway in Long Beach to Huntington Dr. in South Pasadena.....	21.5	9.8	14,414,140	7.1	12,724,300	19,860,000	46,998,440
Golden Gate Freeway Junction of Olympic and Santa Ana Freeways near Soto St. to Kern County line.....	72.7	47.2	15,746,026	5.1	10,350,200	37,035,000	63,131,226
Ventura Freeway Hollywood Freeway extension to Santa Barbara County line.....	68.7	40.6	13,453,659	7.5	9,779,000	19,637,000	42,869,659
San Diego Freeway Golden State Freeway near San Fernando Reservoir to San Diego County line.....	93.7	0.3	2,192,900	3.8	6,692,500	25,811,000	34,696,400
Colorado Freeway Eagle Vista Dr. in Eagle Rock to Holly St. in Pasadena.....	2.2	2.2	6,204,815			2,295,000	8,499,815
Foothill Freeway Hampton Rd. to Montana St. in Flintridge.....	2.0	1.8	2,051,100			624,000	2,675,100
Glendale Freeway Los Angeles River to Avenue 36, near Eagle Rock Blvd.....	2.5					3,102,000	3,102,000
Artesia Freeway Normandie Ave. to Santa Fe Ave. and Palo Verde Ave. to Santa Ana Canyon Freeway.....	21.7	9.6	4,176,800			3,664,000	7,840,800
Santa Ana Canyon Freeway Newport Beach to Riverside County line.....	27.4	12.7	2,990,600		482,000	2,134,500	5,607,100
Ojai Freeway West Main St. in Ventura to 0.4 mi. north of Foster Park.....	5.7	4.1	2,075,000			1,130,000	3,205,000
Olympic Freeway Santa Ana Freeway near Soto St. to Lincoln Blvd. in Santa Monica.....	16.6					16,488,000	16,488,000
Pacific Coast Freeway Oxnard to Los Angeles County line and Huntington Beach to Newport Beach.....	23.0			7.2	2,519,000	1,144,000	3,663,000
Other Freeways Covered by Resolution of Adoption by Highway Commission.....	149.4					8,286,900	8,286,900
<b>Total.....</b>	<b>628.0</b>	<b>204.4</b>	<b>\$191,317,615</b>	<b>62.2</b>	<b>\$81,073,528</b>	<b>\$258,823,000</b>	<b>\$531,214,143</b>

and the junction of Route 19, a length of 18 miles, was adopted by the Highway Commission on April 2, 1954. Notwithstanding the intense subdivision activity in the Puente area, right-of-way needs for the freeway have been established ahead of the numerous subdivisions, and acquisition of property is under way.

**Route Adoptions**

On June 21, 1955, the Highway Commission declared that portion of

existing Route 23 (US 6) between Route 4 (US 99) and Solamint, a distance of seven miles, to be a freeway. The commission, on March 21, 1956, adopted freeway route in the Antelope Valley portion of Route 23 from one-half mile north of junction with Los Angeles Forest Highway near Southern Pacific Railroad Vincent Y to Neenach Road, that is locally called the "Palmdale-Lancaster Freeway."

The California Highway Commission on October 20, 1954, adopted

the westerly portion, and on May 18, 1955, adopted the easterly portion of Route 179 as a freeway. This generally speaking, follows along Garden Grove Boulevard or fairly close thereto, and is locally being called the "Garden Grove Freeway." It extends from the City of Long Beach easterly to the Santa Ana Freeway in the City of Santa Ana. The design of this project is now under way and some Chapter 20 advance right-of-

... Continued on page 30

# Coast Highway

Improvements in Santa Barbara  
and San Luis Obispo Counties

By A. M. NASH, District Engineer

THE MAIN traffic artery through the historic California coastal Counties of Santa Barbara and San Luis Obispo has been known by many names—El Camino Real for its Spanish ancestry; the Coast Highway, for its many miles of ocean vistas; and the Trail of the Missions, due to the five early-day missions it passes by or near.

Most commonly, however, it is known by its federal designation, US 101, one of the two most heavily traveled routes between Los Angeles and San Francisco. In its scenic run through Santa Barbara and San Luis Obispo Counties this highway has undergone, chiefly in the past eight years, an unprecedented number of face-liftings and concrete-and-asphalt surgery, in the meantime carrying an ever-increasing volume of through and local traffic. Today virtually all its 182 miles through the two counties are multilaned or rapidly being prepared for conversion, and a study of this highway, taken contiguously section by section from south to north, indicates the many separate construction projects involved.

## In Santa Barbara County

Beginning in the southeast corner of Santa Barbara County, US 101 is a four-lane divided expressway to Carpinteria, a section completed in December, 1950. No freeway agreement with the county was entered into, as no county roads were affected.

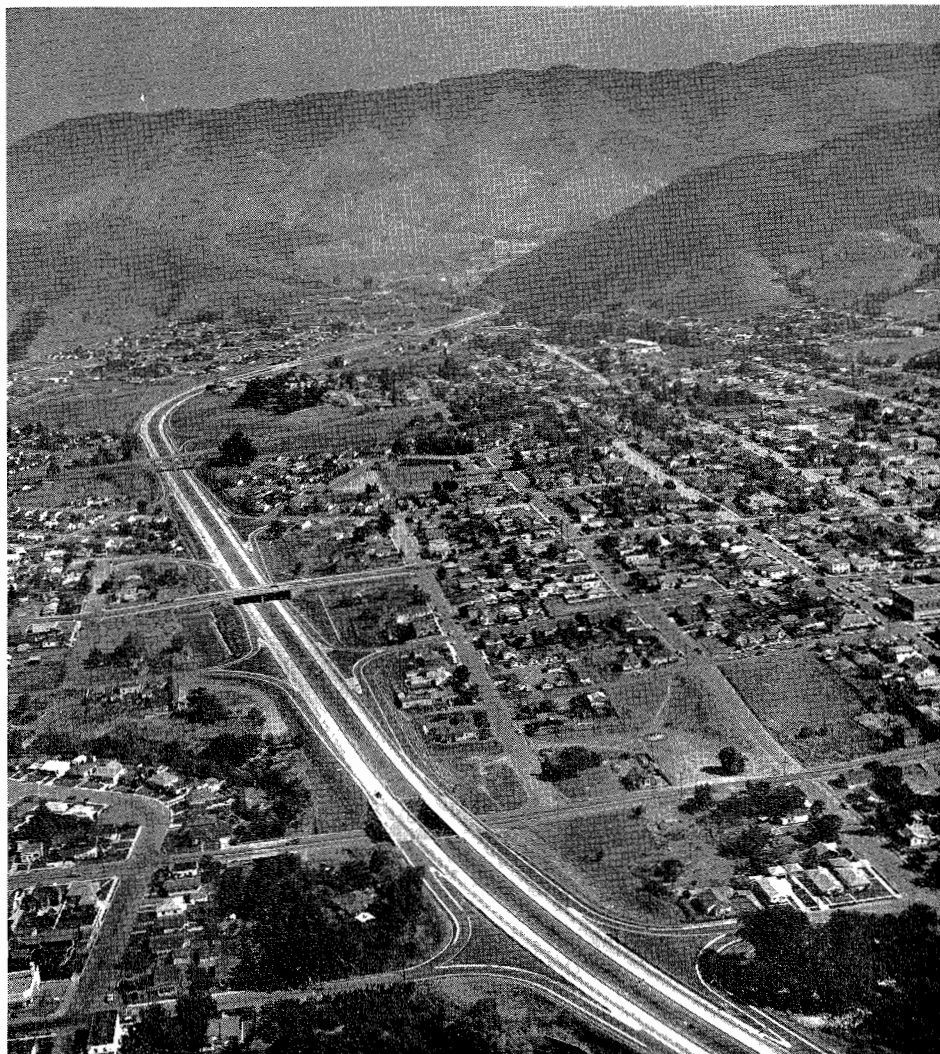
The next section, through Carpinteria to Arroyo Parida, is developed to freeway standards and was completed in January, 1955. Westerly from Arroyo Parida, through Summerland, to Ortega Hill at the edge of Montecito, is four-lane divided expressway completed in May, 1953. At Ortega Hill there is a very short section of four-lane undivided highway, but this is under freeway resolution and will be included in a full freeway project in the next few years.

## Ortega Hill Section

From Ortega Hill to San Ysidro Road the next contiguous section is four-lane divided highway but, strictly speaking, is not expressway or freeway. Actually, however, it is to all appearances an expressway and was completed in February, 1948, under a "parkway agreement" with the county. This section, together with the Ortega Hill portion, is under freeway resolution and will be developed

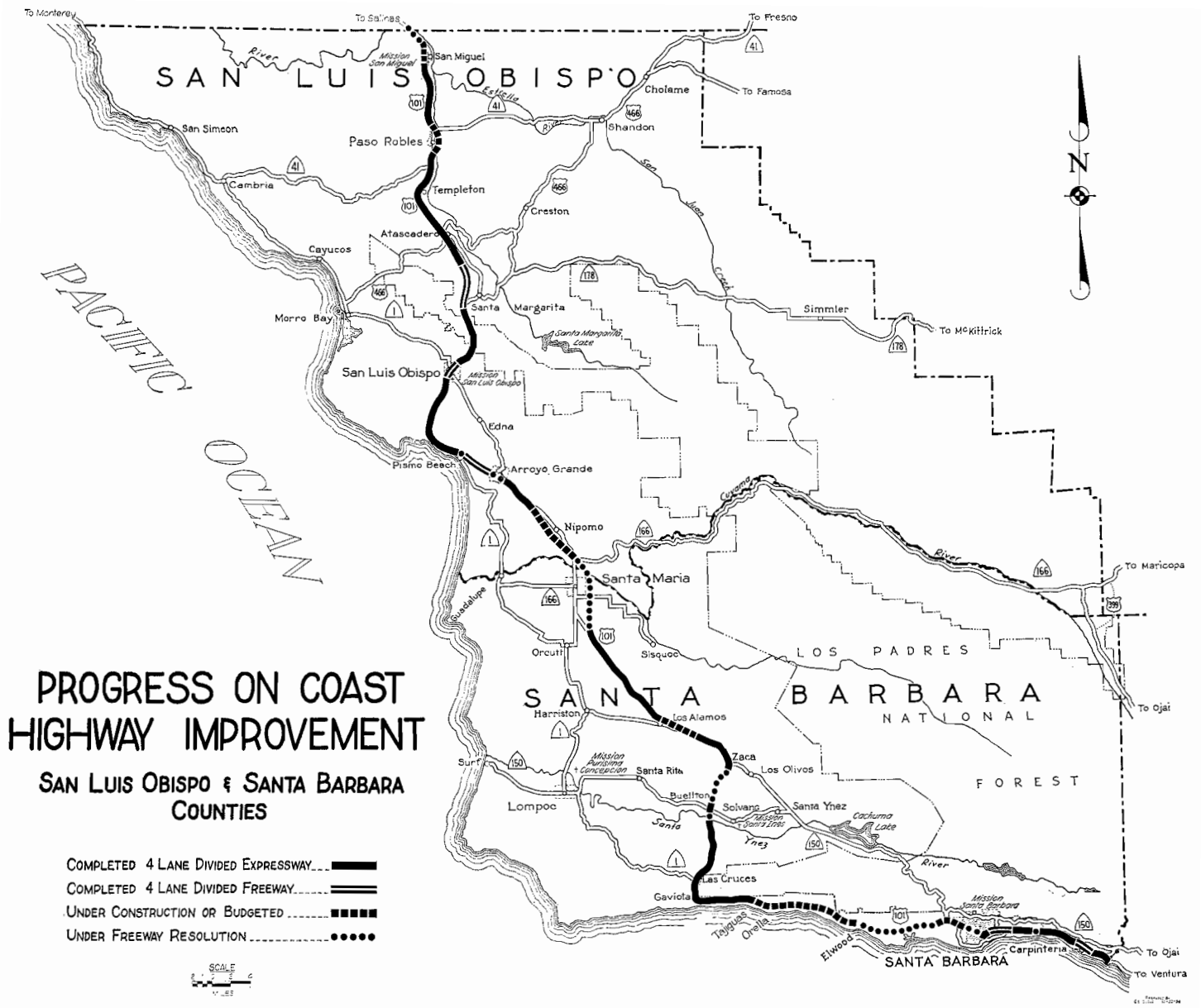
to full freeway standards in another few years.

Over most of the sections so far discussed, the average motorist, of course, rolls merrily on with little regard as to whether he is on a parkway, freeway, or expressway. However, from San Ysidro Road westerly into Santa Barbara only the most unobservant would fail to note the modern, full freeway development through Montecito. This section, completed in Au-



Twin structures carry freeway over Southern Pacific Railroad south of Pismo Beach. Acquisition for freeway through Pismo Beach will begin shortly.





gust, 1956, was one of the most expensive in the district, due not only to necessary construction costs but to high real estate values in this exclusive community. This project terminates at Park Place, opposite the Bird Refuge, in Santa Barbara and is contiguous to the first expressway project in Santa Barbara County, completed in August of 1948 on new alignment from Park Place to Bath Street. Although in use less than 10 years, it has long been foreseen that this attractively-landscaped section of four-lane divided expressway eventually must be developed to a full freeway in order to serve both through and local traffic properly.

**Expressway Project**

From Bath Street, along Hollister Avenue, to the city limits at Los Positas Road is an expressway project that was a casualty of World War II, necessitating complete redesign and renewed freeway agreement negotiations. At present, traffic is served by a multilane, undivided highway, but right-of-way acquisition has been resumed and the project is being redesigned on a full freeway basis. It is obvious that the end product will be far superior to the proposed improvement shelved by the war.

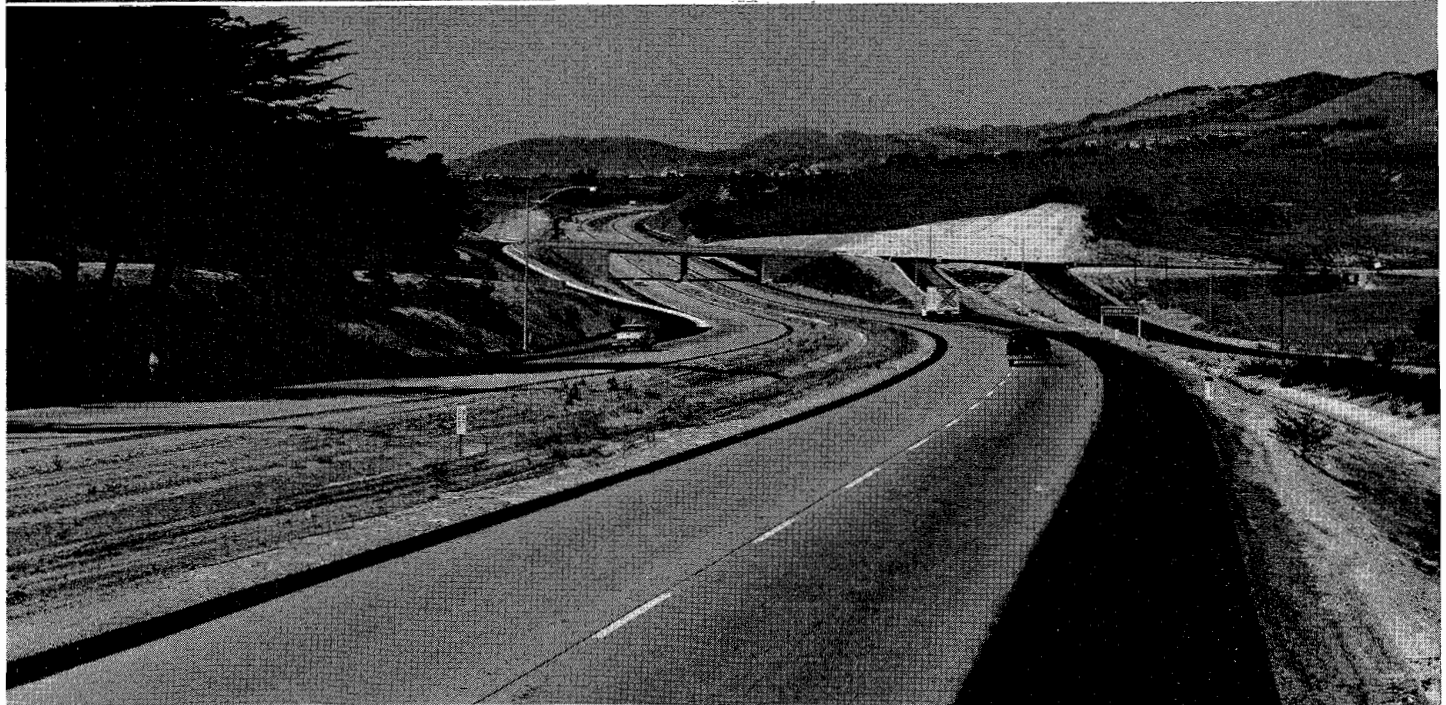
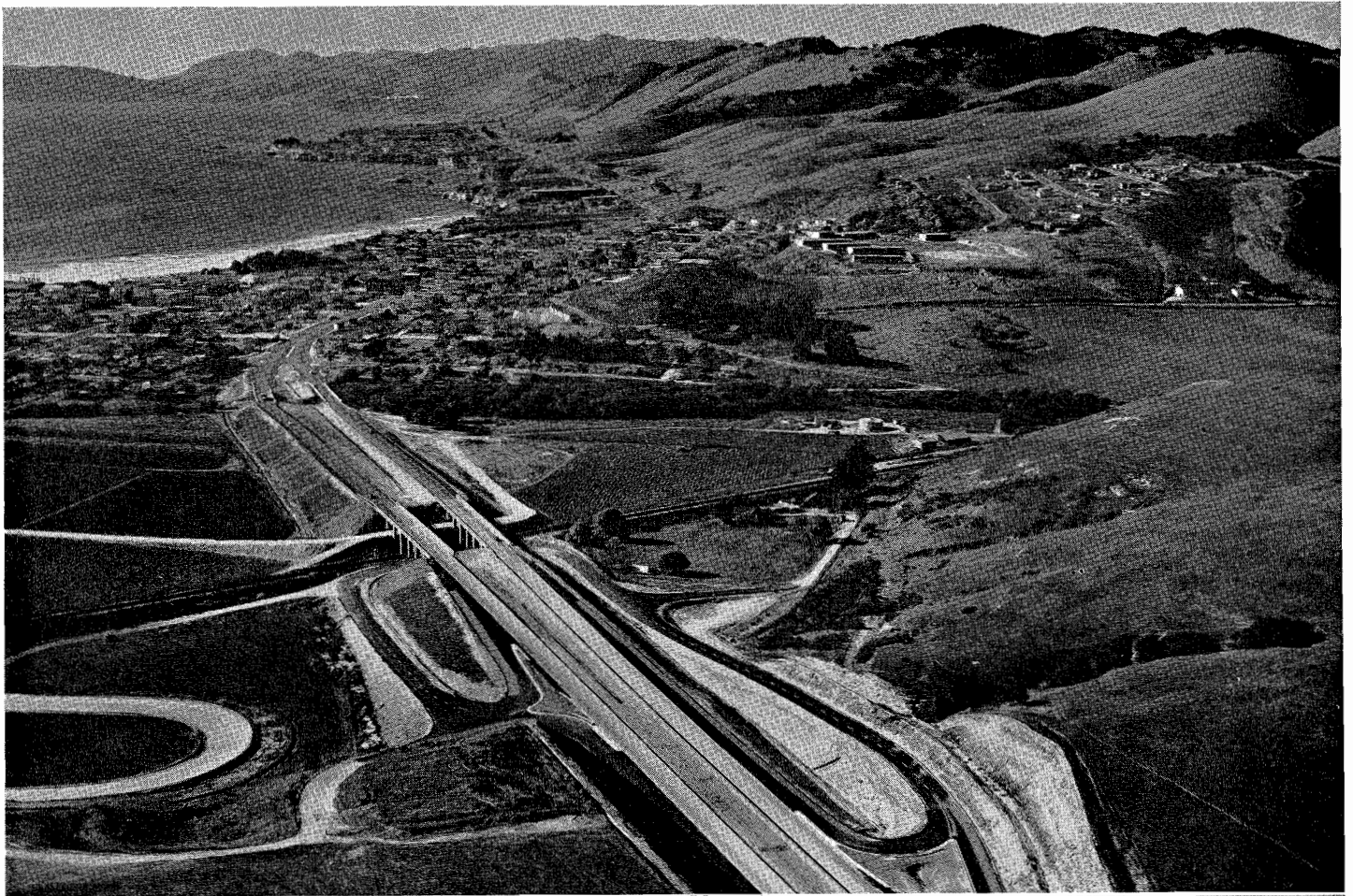
Continuing westerly, there is now under construction a full freeway section from the Santa Barbara city

limits to El Sueno Road, with an elaborate interchange structure being built at the Hollister Wye.

Westerly from El Sueno Road the existing highway as far as Ellwood is under freeway resolution of the California Highway Commission upon the basis of an expressway. Negotiations are in progress with Santa Barbara County officials which will provide for conversion of this section to full freeway standards within the foreseeable future.

**Projects Completed**

From Ellwood westerly to the area known as Orella, an expressway project is about to go under contract. Be-



UPPER—Full freeway development carries US 101 through City of San Luis Obispo. Off-ramp at lower right leads to historic mission three blocks east. LOWER—Newly opened section of full freeway between Arroyo Grande and Pismo Beach will soon be landscaped. Interchange serves Grover City to west, rural area to east.

tween Orella and a point 0.5 mile west of Refugio Beach State Park there is an existing multilane section, but this is under freeway resolution for eventual conversion to full freeway. From here westerly to the vicinity of Arroyo Quemada an expressway section is planned for construction in the next few years, with provision for ultimate expansion to full freeway standards. This will tie into existing expressway running west then north as far as the Santa Ynez River. These sections were completed as follows: Arroyo Quemada to Arroyo Hondo, February, 1950; Arroyo Hondo to Gaviota, July, 1956; Gaviota Gorge to Las Cruces, August, 1952; Gaviota Gorge Tunnel and approaches, May, 1953; Las Cruces to Summit, November, 1951; and Summit to Santa Ynez River, February, 1956.

#### **Gaviota Gorge**

Of special interest is the expressway section through Gaviota Gorge. This reportedly is one of the few points, if not the only point, in the United States, where an historical marker commemorates an event that never took place. This refers to the proposed ambush, by Spanish rancheros and soldiers, of Lt. Col. John C. Frémont and his southbound battalion in 1846. Forewarned, Frémont detoured over San Marcos Pass to the east and captured Santa Barbara, while nothing happened at Gaviota. At this same site, latter-day history records that highway engineers solved the problem of squeezing a modern expressway through this narrow gorge by boring a curving, fluorescent-lit, tunnel to carry the north-bound expressway lanes. Just how much of this was sentiment and how much was practical engineering is a matter for future historians to ponder.

At the Santa Ynez River is a short span of conventional highway that will be converted to freeway on a future project, and from there northerly through Buellton is existing expressway, completed in May, 1949. From Buellton to Zaca is a planned expressway, to be advertised for construction in the near future, which will connect with existing expressway completed in May, 1955, between Zaca and a point known as Wigmore. Between Wigmore and 1.5 miles north

of Los Alamos an expressway project on which bids were opened January 30, 1957, will connect with an expressway just completed to within four miles of Santa Maria. All of these expressway sections either are now planned or in the future will be planned for eventual full freeway. In the meantime, between this latter point and the San Luis Obispo county line, rights of way are being acquired for a freeway route by-passing the City of Santa Maria.

#### **Nipomo-Mesa Freeway**

This project will in turn connect with the so-called Nipomo Mesa Freeway in San Luis Obispo County, which is now under construction northerly to Russell Turn. The next section, Russell Turn to Arroyo Grande, is expressway completed in July, 1956. Multilane highway exists through the City of Arroyo Grande but will be superseded in a few years by a freeway project for which rights of way already have been purchased and cleared.

Continuing north, a freeway between Arroyo Grande and Pismo Beach was finished September, 1956. For a freeway through the City of Pismo Beach, a freeway agreement has been executed, rights of way are now being appraised, and acquisition will begin shortly.

Northerly of Pismo Beach, existing expressway to Miles Station, was completed in July, 1949, and between Miles Station and San Luis Obispo in December, 1948. Full freeway through San Luis Obispo was finished in December, 1953. Expressway north to the foot of Cuesta grade previously had been completed in August, 1948, the first limited-access project in San Luis Obispo County. Over the 7 percent Cuesta grade are several miles of four-lane highway, completed on existing alignment in November, 1938, but improved many times since. At most points along this section, access is so physically difficult, if not impossible, that there has been no urgency to acquire access rights. This will be done at some future date but in the meantime this section functions as an expressway even without being so designated, and blends inconspicuously into the next expressway project to

the north. This runs from Cuesta siding to 1.0 mile south of Santa Margarita and was completed in June, 1950.

#### **New Alignment on US 101**

At this point a new interchange sorts out traffic to and from by-passed Santa Margarita, and US 101 itself heads out across 9.3 miles of new freeway alignment, tying into previously built expressway at the north end of Atascadero. A bumper crop of deer paid the price of progress along this new section after it was opened to traffic in November, 1956, as many miles are through scenic back-country not previously traversed by a north-south road. In the meantime warning signs have been placed and it is expected that natural deer runs soon may be defined and posted.

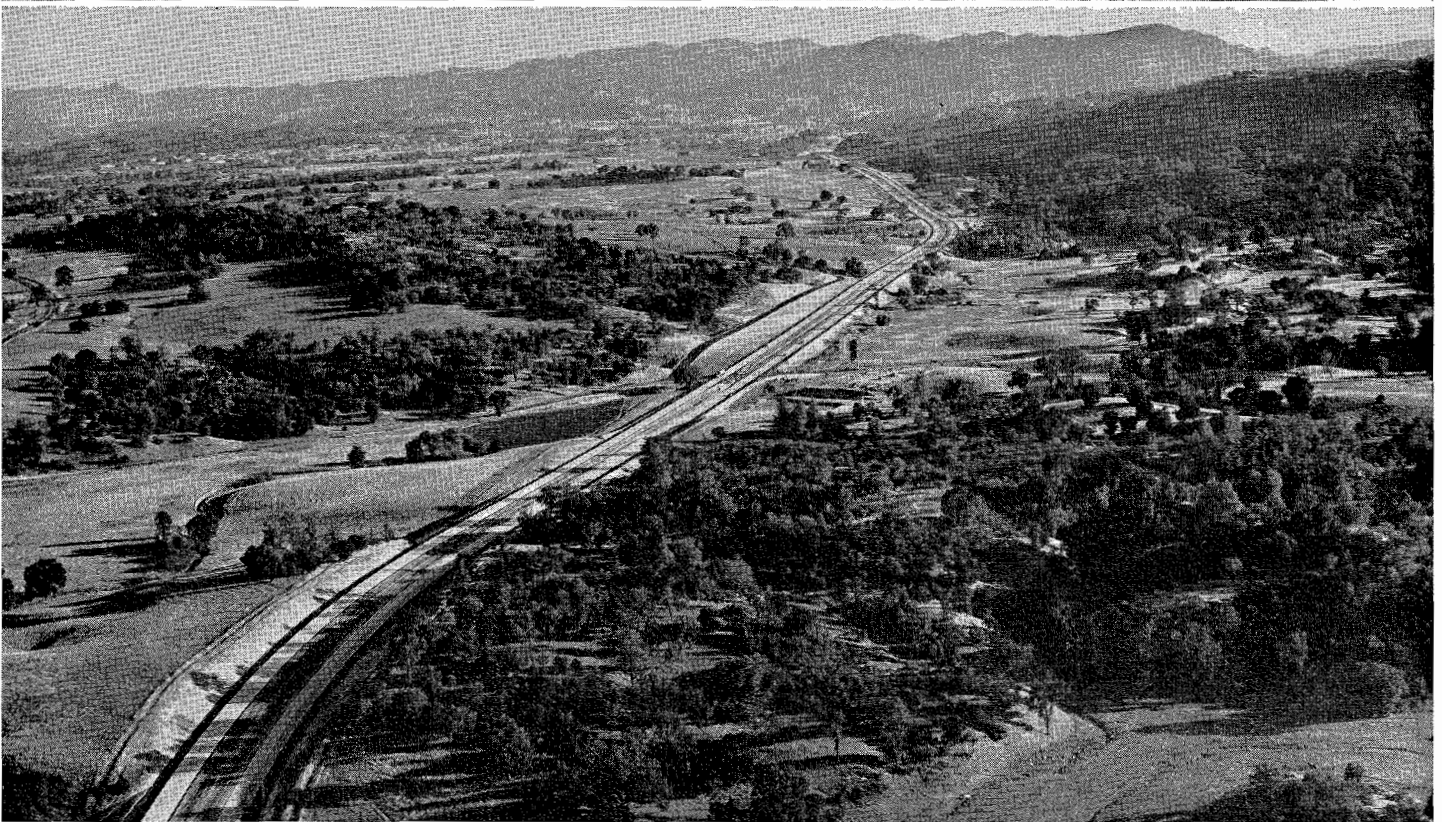
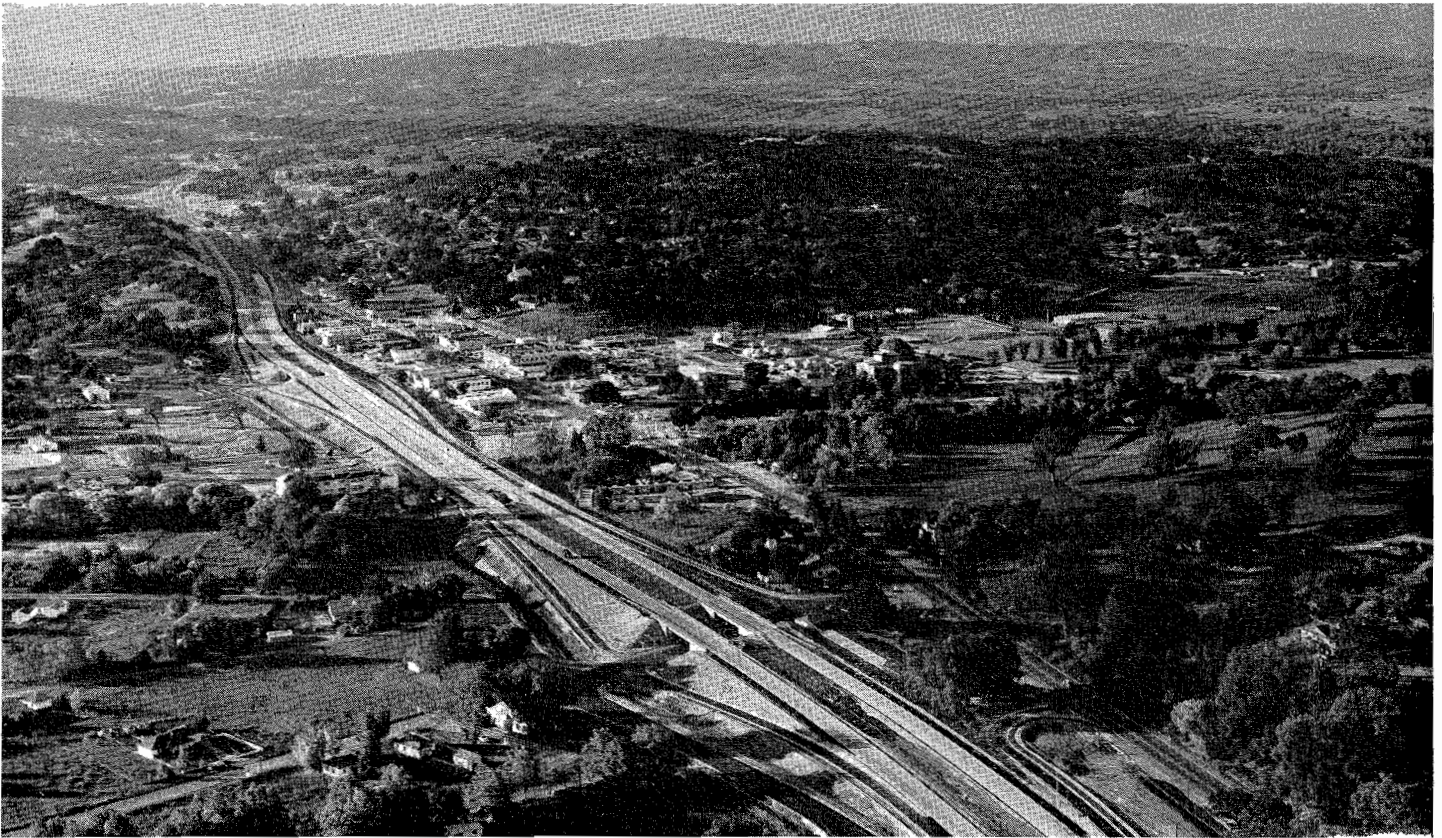
Between Atascadero and Graves Creek the expressway construction was completed in July, 1951. From Graves Creek, by-passing Templeton, to the south end of Paso Robles, the expressway was finished in January, 1953. Freeway through Paso Robles is now under construction as one of the district's larger projects. This involves structures over Southern Pacific Railroad at each end of the city, and an interchange and bridge over the Salinas River to handle Sign Route 41 traffic to and from points east. The combined project is scheduled for completion in the spring of 1958.

#### **North of Paso Robles**

North of Paso Robles the expressway to San Miguel was completed in January, 1955, and a new freeway section from there to the south boundary of Camp Roberts is now under construction. From this point, a short distance south of the Monterey county line, the existing highway to the north is being actively planned for improvement to expressway or freeway standards as rapidly as funds may be made available.

In conclusion it is interesting to note that all completed expressway and freeway sections discussed above were constructed in the past eight years, during which time average daily traffic increased 112 percent at Hollister Wye, 25 percent at Santa Maria, 29 percent at San Luis Obispo, and 82 percent at Paso Robles.





*UPPER—Full freeway through Atascadero lies immediately west of old highway. Interchange in foreground serves local traffic and US 466 to Morro Bay. LOWER—Most recently completed freeway section of Coast Highway runs 9.3 miles, from one mile south of Santa Margarita to Atascadero. View looking south shows entirely new alignment through scenic countryside, portion of superseded highway at left center.*

# SIX MILES OF FREEWAY IN SACRAMENTO RIVER CANYON COMPLETED

By W. H. JACOBSEN, District Surveys Engineer

Six miles of the Sacramento Canyon Freeway on US 99, State Route 3, in Shasta County, were completed in December, 1956. With the opening of the freeway, 25 percent of the bottleneck between Crespo's and Duns-muir has been eliminated and travel time through the area has been reduced by approximately 10 minutes.

US 99 follows the Sacramento River Canyon from Crespo's to Duns-muir, a distance of 25 miles. Due to the poor horizontal and vertical alignment on this 25 miles, vehicle passing has been limited in the past to special passing lanes provided at varying intervals. The average vehicle speed through the area has been 30 miles per hour due to the restrictions on passing and the large percentage of trucks using the route.

Although the new road has been constructed to freeway standards, none of the beauty of the area has been destroyed. In fact, with the better sight distances, it is felt that the touring public will be able to see more of the area than it could on the old road.

## Story in Pictures

The complete story is told in various photographs.

Photo No. 1 shows the old Dog Creek Bridge with its poor approach alignment.

Photo No. 2 shows the new Dog Creek Bridge with the approaches under construction, which are now complete. This photo gives a good view of the surrounding area.

Photo No. 3 of the old highway north of Vollmers showing poor alignment and sight distance.

Photo No. 4 shows a section of the new freeway taken directly west of Photo No. 3. The site distance is unrestricted. The beauty of the area has been enhanced and maintained. The traveling public is able to look at the country rather than having to maintain a constant vigil on the road.

During the construction part of the old toll house for the stage road to Trinity Center was removed. This toll house was constructed during the



1890's and later added onto and converted into a dwelling house on what is known as Vollmers Ranch.

Many early travelers will remember the Vollmers Ranch Hotel for the fine dinners served.

## Three Separate Contracts

State engineers stayed at this ranch while on location and construction of

the original state highway through the canyon and again in the late twenties when the old highway shown in the photos was constructed.

The present freeway was constructed under three separate contracts and all finished within three months of one another. The contracts are as follows:



Dog Creek Bridge by Ukropina, Polich and Kral of Los Angeles.

Four miles of grading, surfacing and a bridge across Slate Creek by Piombo Construction Company of San Carlos.

Two miles of grading, surfacing and Sacramento River channel change by the Guy F. Atkinson Company of South San Francisco.

The grading on this six miles is some of the heaviest that will be encountered on this route. With the cuts and fills being some 200 feet in height, it is little wonder that the yardage

moved ran approximately 500,000 cubic yards per mile.

The three contracts have a total value of approximately \$5,000,000.

The road contracts were designed from aerial photo maps and were constructed under the direction of H. S. Miles, District Engineer, and Geo. R. Barry, Construction Engineer, with the writer as resident engineer on the projects.

At the present time, a contract for an addition 6.8 miles immediately north of the Piombo contract has been awarded to Reid and Gibbons of Salt Lake City.

## PRAISE FOR CALIFORNIA

DEPARTMENT OF COMMERCE  
BUREAU OF PUBLIC ROADS  
Washington

January 17, 1957

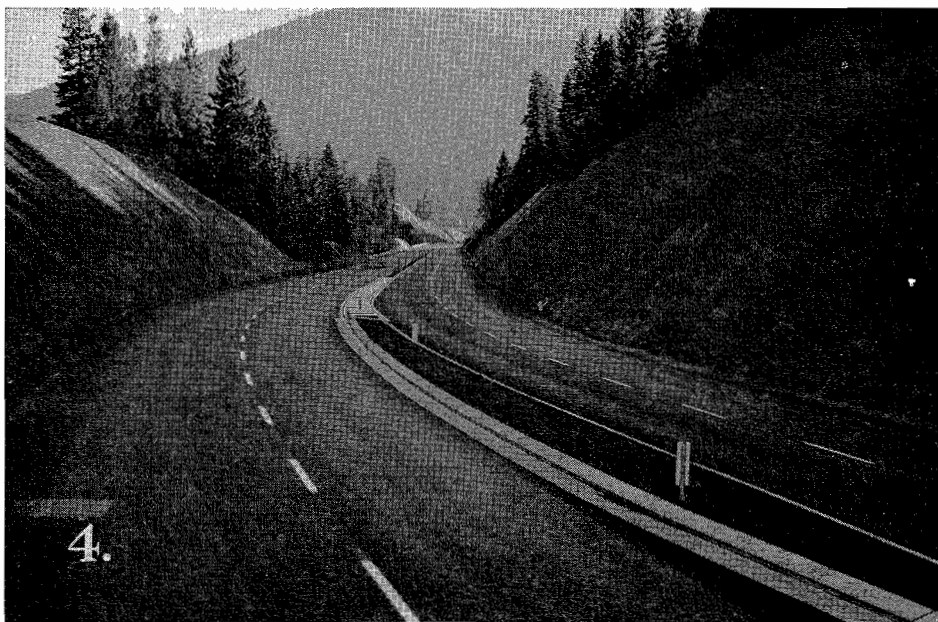
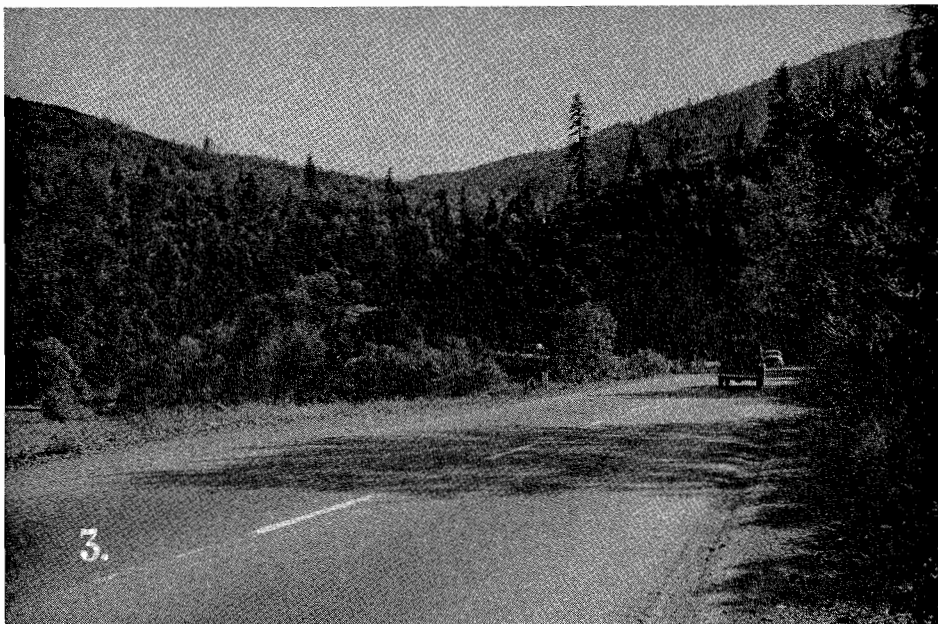
MR. G. T. MCCOY  
*State Highway Engineer  
Department of Public Works  
Sacramento 7, California*

DEAR SIR: As of January 1st California was one of six states which had already advanced all of their 1957 interstate funds to the plans-approved stage and had begun working on 1958 funds. California's percentage rate is exceeded only by Maryland.

It is a pleasure to call your attention to such a favorable record, and I hope that you will pass on to your staff my personal feeling of appreciation for this accomplishment. California's standing in this regard was read into the Senate hearing record last week.

Sincerely yours,

JOHN A. VOLPE  
Federal Highway  
Administrator



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Commenting on California's good showing, State Director of Public Works Frank B. Durkee pointed out that this State has enjoyed for years a favorable budgetary procedure in highway matters which makes it possible for the Division of Highways to do advance planning effectively. At the same time, he said, California has been able to provide the matching funds for Federal Aid highway programs without difficulty, thanks to the State's highway revenue setup.

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### THE CROSSROADS

All too many motorists are inclined to trust more to luck than to skill when they come to the crossroads. Approaching a busy intersection they know that dangers are involved but they just keep rolling and trust to luck to get them through. Cruising along at a brisk clip they let the other drivers jam on their brakes and swerve wildly to avoid an accident. The careless drivers manage to get by this way until they come to an intersection where the other driver is a "luck truster" too, and then comes collision.

# King City Bridge

*New Span Will Relieve  
Heavy Traffic Congestion*

By FRED H. YOSHINO, Resident Engineer, and  
R. S. SCAMARA, District V Representative

A PORTION of the first section of four-lane divided highway was recently opened to traffic in SOMOCO. SOMOCO is what the residents of southern Monterey County like to call this particular section of California. This section of highway consists of a new bridge across the Salinas River and about two miles of divided expressway, beginning at Canal Street in King City and extending 1.8 miles north of the Salinas River crossing, on US 101. The completion of this project eliminated a very hazardous stretch of road and bridge which had a very bad accident record. Also, the completion of the new bridge will allow freer movement of the very large farm machinery that is common to this section of California, known as the "Salad Bowl of the Nation."

The traffic on this section of US 101 is both local and through. King City is located about 150 miles south of San Francisco and about 240 miles north of Los Angeles. The through traffic is fairly highspeed.

#### **Traffic Increase Steady**

Study of traffic counts over the years indicates a steady increase. Some indication of the growth is shown in the comparison of 16-hour July traffic counts for 1946, 1950 and 1956 taken at the junction of US 101 and the county road to Jolon west of the bridge. These counts were 4,387, 7,014, and 8,161 motor vehicles.

The normal traffic growth plus increased agricultural activities and greater use of Hunter-Liggett Military Reservation by the Army has greatly overtaxed the existing highway facility and made it imperative that steps be taken to increase traffic capacity of this section of US 101. This project was placed under contract to take care of the worst section.

The construction of the new bridge provides for one-way northbound traffic with one-way traffic southbound on the existing bridge. As the existing bridge was only 21 feet 6 inches between curbs, with no sidewalk, and with both approaches on substandard curves for the highspeed traffic, it had been the scene of many serious accidents. This existing structure was constructed in 1919 and consisted of 41 30-foot concrete girders and 14 100-foot steel pony truss spans. The total length was 2,655 feet.

Included in the new construction were certain modifications and revisions in this old bridge as hereinafter described.

#### **No Traffic Delays**

Revamping of the existing bridge to one-way traffic has resulted in several improvements. It will be no longer necessary to tie up traffic for as long as 30 minutes at a time while a ponderous, slow-moving machine uses the existing bridge. This tieup has at times caused traffic to be backed up completely through the main street of King City and beyond the opposite city limits. Another dividend is that it will no longer be necessary to detail a Highway Patrol officer to stop traffic for machinery movements, thereby keeping the officer from performing his primary duty of patrolling the highways. The farm operators will also derive a benefit of not having to wait until a patrolman is available to stop traffic. This waiting has at times amounted to half a day when traffic conditions elsewhere prevented detailing of an officer to the bridge.

#### **Jolon Road Intersection**

The completed contract consisted of construction of a new 1,806-foot deck plate girder bridge, about two miles of expressway, removal of 600

feet of concrete approach spans on the existing bridge, and revamping of the intersection of US 101 and Jolon Road by the construction of a series of on and off ramps. The reconstruction and improvement of the Jolon Road intersection should greatly expedite military traffic that uses this road to reach Hunter Liggett Military Reservation.

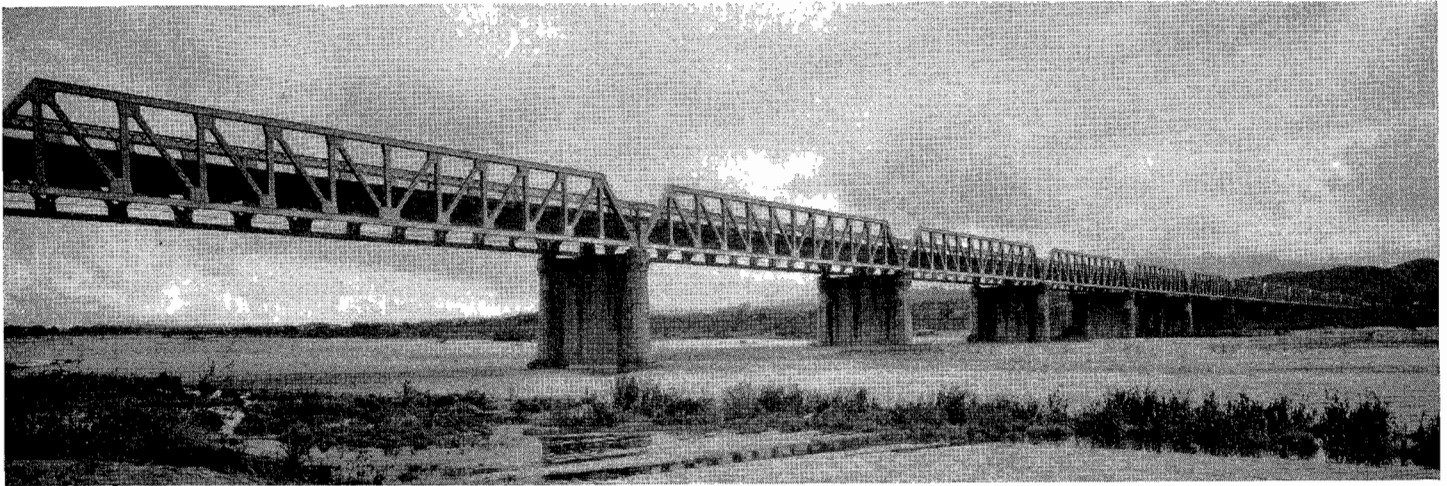
The new bridge consists of one 65<sup>2</sup>-foot, 15 107-foot 5-inch and one 127-foot span. The distance between paving notches is 1,806 feet. All spans are of welded plate girders with concrete deck slab. Composite girder design was used to arrive at a balance between span length and pier cost. Four girders are used in Span 1 (65 feet) and in Span 2 (107 feet 6 inches) because of the extreme skew at these locations. The balance of the structure has three girders per span. The depth of the girders is 7 feet 6 inches.

The bridge rests on concrete piers and abutments which were built in a conventional manner. Cast-in-place concrete piling is used to furnish support.

#### **Design of Span**

Piers were constructed by first driving sheet piling and then excavating to Elevation 265. After excavating, concrete pile shells were driven to Elevation 230. Before cutting off the pile cans to grade, tremie concrete was placed to seal the cofferdam. After dewatering, concrete for the cast-in-place piling was placed, and the footing and piers were constructed in the usual manner. Ground water surface during pile driving and pier construction was about Elevation 275.

The placing of sheet piling and bearing piles and the removal of the sheet piling was done by Raymond Concrete Pile Company for the general contractor, C. K. Moseman.



*This photo shows pier and superstructure design of King City Bridge*

Deep piling was used to furnish support for the bridge due to the fluctuation of the river from its very dry summer condition to extremely high velocity flow during the winter season, therefore, it was felt that a more than ordinary effort be made to secure stable bearing. In order to do this, it was necessary to drive piling to Elevation 230, with no jetting allowed below Elevation 250. Borings indicated that the Salinas River had scoured down to Elevation 250 during some period in the past. This limitation on jetting created an additional burden in reaching the specified tip elevation. The sandy uniform appearance of the river bed at about Elevation 285 belies the fact that substructure conditions varied greatly from pier to pier and from pile to pile in any one pier location. It is to the credit of the pile company that out of the total of 12,400 lineal feet of piling in the original estimate of quantity, the final quantity underran by only 146 feet.

#### **Salinas River Unique**

The flow in the Salinas River during flood stage is extremely turbulent. However, this river is considered to have its major volume of flow underground. In fact, it is considered the largest river in the United States from the standpoint of underground flow.

While the pile driving and pier construction were underway at the site, Independent Iron Works, Oakland, was fabricating the girders out of

plates. All fabrication was done by the submerged arc method in the shop. Inspection of this phase of the work was done by the Materials and Research Department, Berkeley office. After three girders for a span were fabricated, the steel was shipped by rail to King City by flat car, using two cars as idler. Upon reaching King City, girders were loaded onto truck and trailer and hauled to the site and erected. No trouble was encountered in erecting the steel at the site other than the normal 20- to 40-mile an hour winds that blow through the Salinas Valley almost every day during the summer.

After landing the girders on the piers and bracing them temporarily, diagonal bracing and diaphragms were welded in place using the shield arc method. All field erecting and welding was done by Independent Iron Works field erection crew.

#### **Huge Amount of Steel**

The total amount of steel used was 1,816,000 pounds at a lump sum bid price of \$230,800.

Deck concrete forming and placing started as soon as the first girder was erected. The concrete deck construction was started at Abutment 1 and continued until the deck was completed at Abutment 18.

Upon completion of the deck and curb, Todd and Cantrell, bridge rail subcontractor, placed the bridge railing.

Painting of the structural steel was done by John P. McGuire of San Jose, immediately after the deck was placed. All structural steel was sand-blasted and painted with red lead and a finish coat of aluminum.

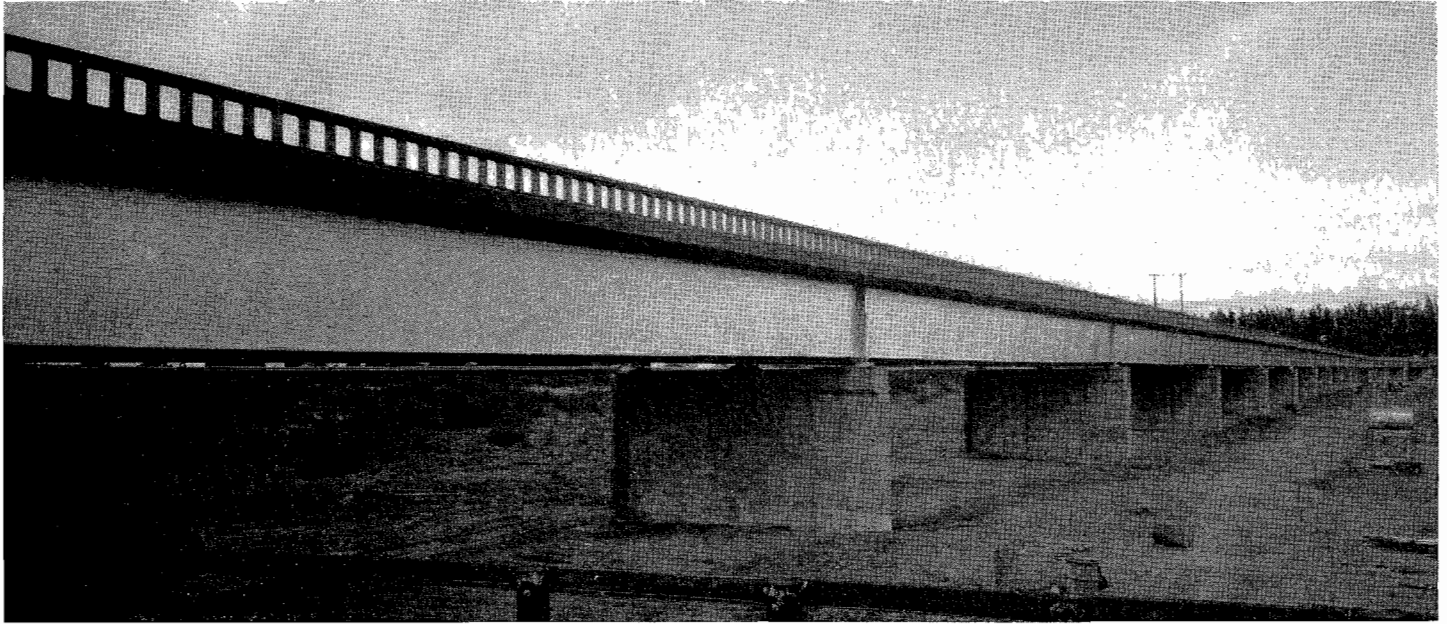
In the meantime, Los Gatos Construction Company and Volpa Brothers, roadway excavation and paving subcontractors, respectively, had completed the southbound lanes north of the old bridge, and after traffic was routed thereon, the old existing lanes were removed and construction of the northbound lanes was begun. Upon completion of the paving, the new bridge was opened to two-way traffic on October 3, 1956.

#### **Part of Old Bridge Removed**

As soon as the traffic was routed over the new bridge, removal of 600 feet of the southerly end of the existing bridge was started. This portion of the bridge consisted of 20 30-foot concrete spans. The bridge was removed by knocking it down with a 4,000 pound "headache" ball swung by a three-eighths cubic yard crane. Fill construction was underway as soon as this portion of the bridge was sufficiently demolished to allow removal of the rubble. A new bridge abutment was constructed and the roadway constructed to a higher standard of curvature and grade to allow use of the remaining portion of the old bridge.

Other work on the existing bridge consists of placing new metal plate





*Close-up view of King City Bridge, which will relieve traffic congestion at this point on US 101*

bridge railing from the end of the truss spans to the new abutment at Bent 18, and improvement of the curve and approach at the King City end. Upon completion, the existing bridge will be one-way for south-bound traffic.

The metal plate bridge railing on the remaining concrete approach

spans was placed by Wulfert Company of San Leandro.

Except from Canal Street to the approach to the bridges, the road will consist of two 12-foot lanes with a 10-foot outer shoulder and a 5-foot inner shoulder, with a 46-foot minimum division strip. The project included the construction of

two ramps in a 35-foot cut connecting the right and left lanes to the county road leading to Hunter Liggett Military Reservation and Jolon Valley.

#### **Highway Construction**

A 2,000-foot revetment with a 30-foot pile training fence was constructed along the west bank of the

*Traffic begins using new span across Salinas River*



Salinas River in order to allow for shortening the bridges and to improve the alignment to the west approaches.

A highway lighting system was installed at two locations on the Jolon Road connection ramps, consisting of eight luminaires, each on a 30-foot standard.

Over 350,000 cubic yards of roadway excavation was used to construct the embankments, all coming out of the roadway prism and a local borrow area located between the old and new bridges in the Salinas River. The roadway excavation and 3,000,000 station yards overhaul were performed with scrapers. Compaction was obtained by sheepsfoot rollers.

A light silty clay material found in the excavation gave considerable trouble. That portion used in embankments had to be mixed with other material to get compaction, and that close to subgrade had to be removed and replaced with select material. Two locations required a change order amounting to \$18,000 to excavate 12 inches below subgrade and 18 inches below subgrade, replacing the clay with select material, and installing 4,200 feet of 8-inch perforated metal pipe.

An existing 10-foot x 10-foot reinforced concrete box was extended at each end with 66-inch reinforced concrete pipe, with special designed connections. This culvert is located in a 45-foot gulch that was filled, eliminating a sharp dip that resulted in poor sight distance on the old existing two-way road. Approximately 1,700 lineal feet of other culverts were also placed.

#### Subcontracts

Some 20,000 tons of Type B plant-mixed surfacing and 45,000 tons of Type C cement treated base were placed on the main line and ramps.

The prime contractor, C. K. Moseman of Redwood City, who is primarily a bridge contractor, had subcontracted all other work to nine subcontractors; Todd & Cantrell of Sacramento, Progress Electric Co. of Palo Alto, Raymond Concrete Pile Co. of Oakland, Steelfab Inc. of Castroville, Independent Iron Works Inc. of Oakland, Los Gatos Construction Co. of Los Gatos, Volpa Bros. of

Fresno, Wulfert Co. of San Leandro and John P. McGuire of San Jose. The authorized subcontracting amounted to only 47 percent due to nine specialty items in this contract.

Exceptionally good weather experienced during the 1956 winter aided the contractor in finishing the project in January, 1957, without the usual winter shutdown. The hard winter of 1955-56 caused the normal winter shutdown, and roadwork was not started again until March of 1956. Very little winter damage resulted, and construction on the new bridge was not affected.

The bridge work amounted to about \$680,500 and the roadwork portion of the contract was about \$423,129.

#### Two Additional Contracts

Two more contracts to continue four-lane divided highway construction north to Salinas, approximately 40 miles north of King City, are ready to start. At the completion of construction of projects on the 1957-58 budget, four-laning to Salinas from King City will be complete except for approximately 15 miles.

The contract for this project was awarded to C. K. Moseman, Redwood City, on April 1, 1955, by the Director of Public Works. The contract was approved by the Attorney General April 28, 1955, and work started May 5, 1955. A total of 325 working days were allotted to complete the project, with the original completion date set as August 16, 1956. The final date of completion is estimated to be about January 15, 1957. The bid price for this contract was \$1,103,629. The work was under the direction of F. W. Panhorst, Assistant State Highway Engineer-Bridges; A. M. Nash, District Engineer and the authors. R. N. Moseman was the general superintendent for the contractor.

#### MORE CARS ENTER CALIFORNIA

Nearly 14,000 more cars entered California during October, 1956, than did during October, 1955, reports the National Automobile Club. The total number of cars that entered during October of this year was 317,083.

## In Memoriam

### RICHARD JONES

Richard Jones, retired assistant highway engineer, passed away on October 31, 1956, greatly to the regret of his fellow workers in District VII.

Dick, who was born in 1894, first came to work for the California Division of Highways in District III from the Kentucky Highway Commission in 1929. After attending the Polytechnic College of Engineering and the University of California Dick came to District VII in 1932.

As an assistant highway engineer, he spent most of his career in the construction department, working as assistant resident on such projects as the Hollywood Freeway, Harbor Freeway, Long Beach Freeway, and many other major construction jobs.

Dick retired early in 1956 after a leave of absence for reasons of health. He leaves a widow, Mrs. Jean Jones, to whom we extend our deepest sympathy.

### BERT STEWART NEW GENERAL MANAGER NATIONAL AUTO CLUB

Bert Stewart of San Francisco is the new secretary and general manager of the National Automobile Club. He succeeds Herbert E. Manners, retired.

Born and raised in Berkeley, Stewart went through the public schools there and attended Armstrong College and the University of California.

After a brief period in which he worked on newspapers and the insurance trade press around San Francisco, he joined the staff of National Automobile Club as associate director of public relations in January of 1938. He then served as editor of *National Motorist*, became director of public relations in 1941 and field secretary in 1947. So successfully did he carry out his duties as field secretary that in January of 1956 the board of directors appointed him assistant general manager of the club, which position he held until his present appointment.

## Motorists Benefit By Increase in Freeway Building

Earlier use by California motorists of new freeways and other modern highways is one of the most gratifying effects of the increase of California state highway funds, State Engineer G. T. McCoy points out in a report submitted by the Department of Public Works to Governor Goodwin J. Knight.

"The increased cost of highway construction has absorbed a part of this revenue," McCoy continues, "but the additional amount now available is making possible the consolidation of projects that in former years were undertaken by stage construction. The program as now functioning is advancing completion of these improved facilities for early use by the traveling public."

The additional funds referred to by McCoy were the highway users taxes enacted by the State Legislature in 1953 and retained in 1955, exclusive of the augmented federal highway funds the State is now receiving as a result of the Federal Highway Act of 1956.

### Huge Construction Program

The State Highway Engineer's report covers the 1955-56 Fiscal Year which ended June 30, 1956, and is the Tenth Annual Report of the Division of Highways since the Collier-Burns Highway Act of 1947.

The report states that bids were opened by the Division of Highways for 669 projects with a construction value of \$233,183,200 for construction and engineering but excluding right-of-way expenses.

During the year 551 contracts with a value of \$219,965,700 were awarded and 65 informal contracts for storm damage repair amounting to \$1,664,800 were approved. Eleven contracts totaling \$6,803,300 were also awarded during this fiscal year for projects on which bids had been received in the previous fiscal year. Expenditures for right-of-way acquisition and utility relocation exclusive of land clearance overhead and acquisition for other

## DISTRICT VII REPORT

*Continued from page 18 . . .*

way acquisition funds have been expended in the protection of this routing.

The Highway Commission has adopted as freeway, two sections of Route 60, Pacific Coast Highway; one at Ventura County and one in Orange County. The portion in Ventura County, 17.4 miles long, extends from Ventura Freeway to the Los Angeles county line and of this, 7.2 miles from Date Street, Oxnard, to Calleguas Creek, is now under a construction contract that is 15 percent completed. The contract allotment is \$2,519,000. The other portion of this freeway in Orange County that is locally referred to as the Pacific Coast Freeway, is 5.6 miles in length, one section 4.6 miles long, extending from Huntington Beach to Newport Beach, and the other section, one mile long, in the San Juan Creek area. Design studies for this project are now under way. Due to the popularity of the Huntington Beach State Park it is anticipated that improvement on this section may be required in the near future.

### Outlook for Future

Within the next few years, if the present financing program is maintained, we expect to complete to freeway standards US 101 from the San

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agencies totaled \$109,150,400 for the year.

The increased number of multilaned projects that were placed under contract during the fiscal year accounted for a higher money value of construction compared to previous years without showing a corresponding increase in construction mileage. Construction of 334 bridges and grade crossings were contracted for during the year.

The various functions of the Division of Highways are outlined in the report, including operations, administration, planning, bridges, rights of way, public relations and personnel, legal, and accounting.

Illustrations in the report cover some of the major construction projects under way or completed.

Diego-Orange County line to a point west of Ventura. Within the central area of metropolitan Los Angeles we plan early completion of a loop consisting of the Olympic Freeway from its interchange with the Santa Ana and Golden State Freeways westerly to and beyond the Harbor Freeway; the Golden State Freeway northwesterly to a point north of Burbank; and the Ventura Freeway westerly from its junction with the Golden State through the San Fernando Valley. The Ventura Freeway is of course in part included in US 101, mentioned above.

Also, subject to financing considerations, the next few years should see the completion of the Harbor Freeway, the Long Beach Freeway as far north as the San Bernardino Freeway; the San Diego Freeway from Burbank Boulevard southerly to Florence Avenue, and from the Harbor Freeway southeasterly to Huntington Beach Boulevard in Orange County. Plans and right-of-way acquisition are being carried forward on other important parts of the freeway system in order that construction may be carried on as rapidly as funds become available.

Our present position in this freeway program may be summed up in this way: We have for the first time a financial program which begins to recognize the size and complexity of the program required to build a freeway system in a metropolitan area. It is essential that we project our planning into the future in order that an orderly development of a reasonable freeway network may be possible.

### RAILROAD CROSSINGS

You don't have to be reckless to get yourself killed at a railroad crossing.

While many of these accidents do happen to the reckless drivers, those who insist on racing the train to the crossing or pay no attention to the warning signs and signals, a good number of these accidents happen to drivers who just don't use all the care that is necessary.

Traffic accident deaths to date are twice the total of battle deaths in all wars in United States history.



# Something New

*Double-deck Freeway Viaducts  
In San Francisco and Oakland*

By W. TRAVIS, District Construction Engineer

**F**REEWAY construction in industrial and commercial areas of San Francisco and Oakland is progressing rapidly under five concurrent construction contracts totaling some 24 millions of dollars in value. These portions of the metropolitan freeway system are designed as double-decked concrete viaducts which will provide four lanes of traffic in each direction at separate levels. The entire freeway is elevated and separated from all city street traffic. These will be the first double-deck freeway facilities in California.

The design of a freeway facility which must pass through long established industrial and commercial properties presents problems which are not encountered in either rural areas or in areas where the freeway planning can be correlated with the development of the surrounding lands. In general, the existing surface street pattern, having been established for a century, cannot be altered and all streets must remain in service, making a viaduct construction the only practical design.

#### **High Property Values**

Consideration of high property values and the necessity of holding the disruption of established businesses to an absolute minimum require that the design make maximum use of existing streets for the freeway right-of-way. The double-decked viaduct design fulfills these criteria in that all surface streets may remain in service and the two levels of structure occupy half the right-of-way width required for a single level structure of equivalent capacity. The double-deck design also simplifies connections to the freeway in that ramps may be brought in to either side of either deck. The direct connections permit compact ramp designs with a resultant large saving in right of way requirements.



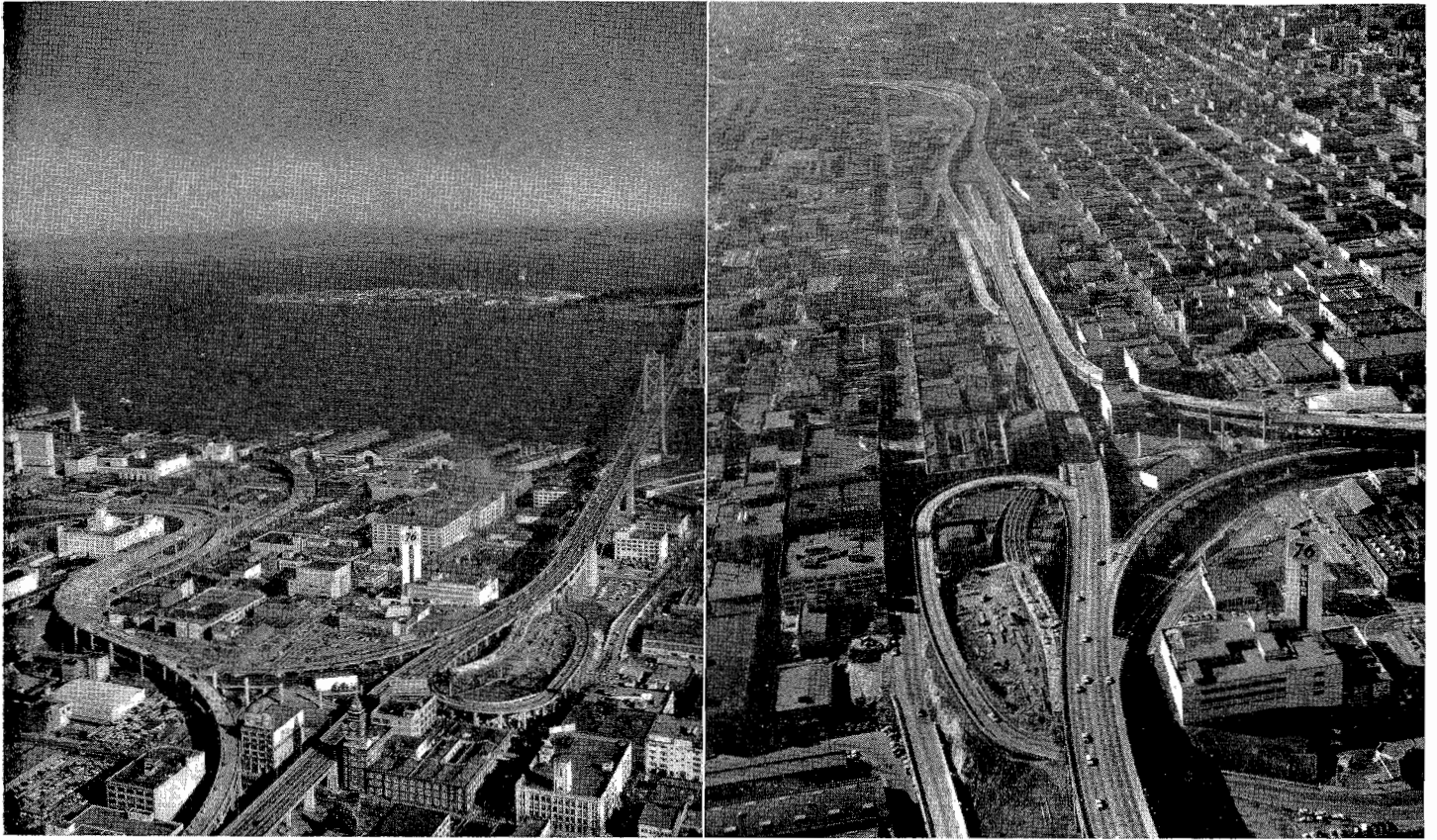
*Looking south along Cypress Street, showing heavy traffic prior to construction of new facilities*

The current construction requires approximately 8,000 foundation piles totaling 400,000 lineal feet, 200,000 cubic yards of structure concrete, 60 million pounds of reinforcing steel and 100,000 lineal feet of bridge railing.

#### **Embarcadero Freeway**

The first section of double-deck freeway in San Francisco which will connect with the James Lick (Bayshore) Freeway at Fourth Street, pro-

vides a transition from single to double-deck construction and is the first unit of Route 224 which will be known as the Embarcadero Freeway. The contract provides entrance and exit ramps to the city street system at Beale Street and Main Street at Mission Street together with additional connections to the San Francisco-Oakland Bay Bridge. Completion of this project will therefore extend the freeway system and the Bay Bridge



*UPPER LEFT—Looking northeast at Embarcadero Freeway construction. Ramp connection over existing Bay Bridge approach for eastbound traffic now taking shape. UPPER RIGHT—Looking west from Bay Bridge approach, showing Embarcadero Freeway connection to the right, existing First Street ramp in foreground, Fifth Street ramp in center. LOWER—Embarcadero Freeway looking west, Main and Beale Streets ramps to the left, also Key System track. Extension to Embarcadero ahead.*

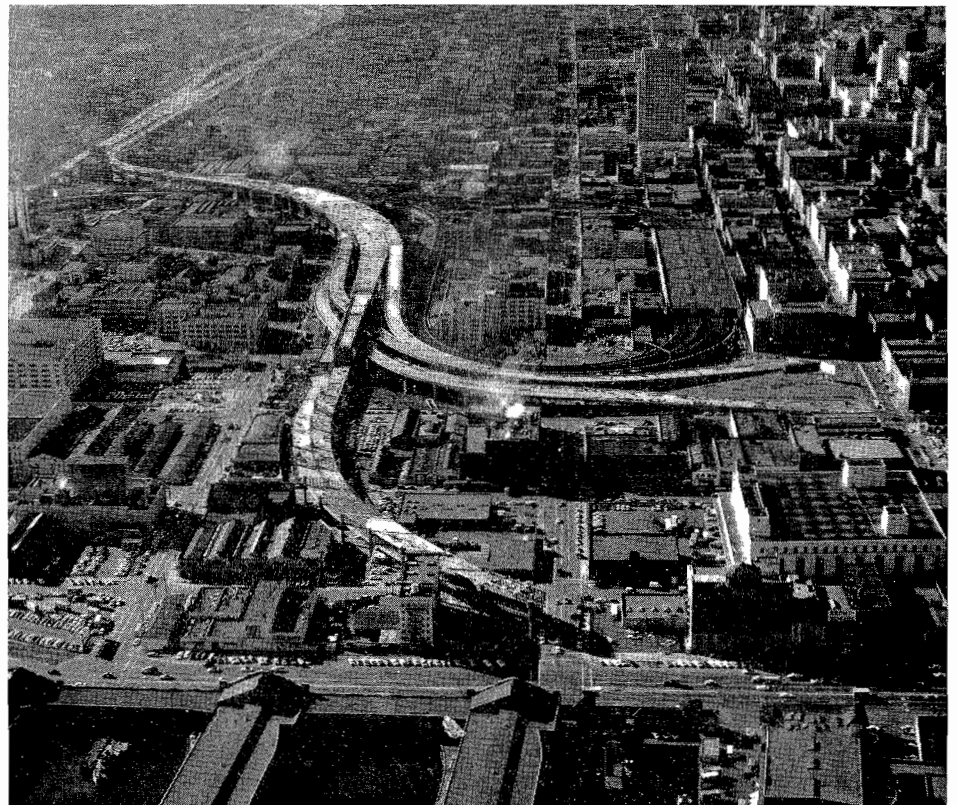
approaches to the southern extremity of San Francisco's financial district. Work on this section was started in May of 1955 and is expected to be opened to traffic in March of this year. The contract, which will approximate \$5,700,000, is held by MacDonald, Young & Nelson Inc., and Morrison-Knudsen Co., Inc.

Two additional contracts have been awarded totaling \$9,500,000, to Charles L. Harney, Inc., which will extend the Embarcadero Freeway past San Francisco's famous Ferry Building to Broadway. The contracts include over a mile of double-deck construction and also provide a double-deck ramp for on and off connections to Sansome Street and to Battery Street at Broadway. Completion of this contract will extend the freeway system to the north end of San Francisco's financial district.

Work was started on the first of these contracts in March of 1956 and the entire project is scheduled for completion in the summer of 1959.

**Basic Design**

The basic design of the freeway is a continuous reinforced concrete box







Looking west at Embarcadero Freeway construction. Foreground shows progress toward Embarcadero with Main and Beale ramps in center.

girder viaduct, of repeating 80-foot span, supported by reinforced concrete bents on steel piles. A 52-foot clear roadway is provided on each level to accommodate four lanes of traffic. Southbound traffic will occupy the upper deck and northbound traffic the lower deck of the viaduct. Surface traffic will be carried on either side of the completed structure. The State Belt Railroad, which extends the length of the Embarcadero, will be relocated to a position beneath the

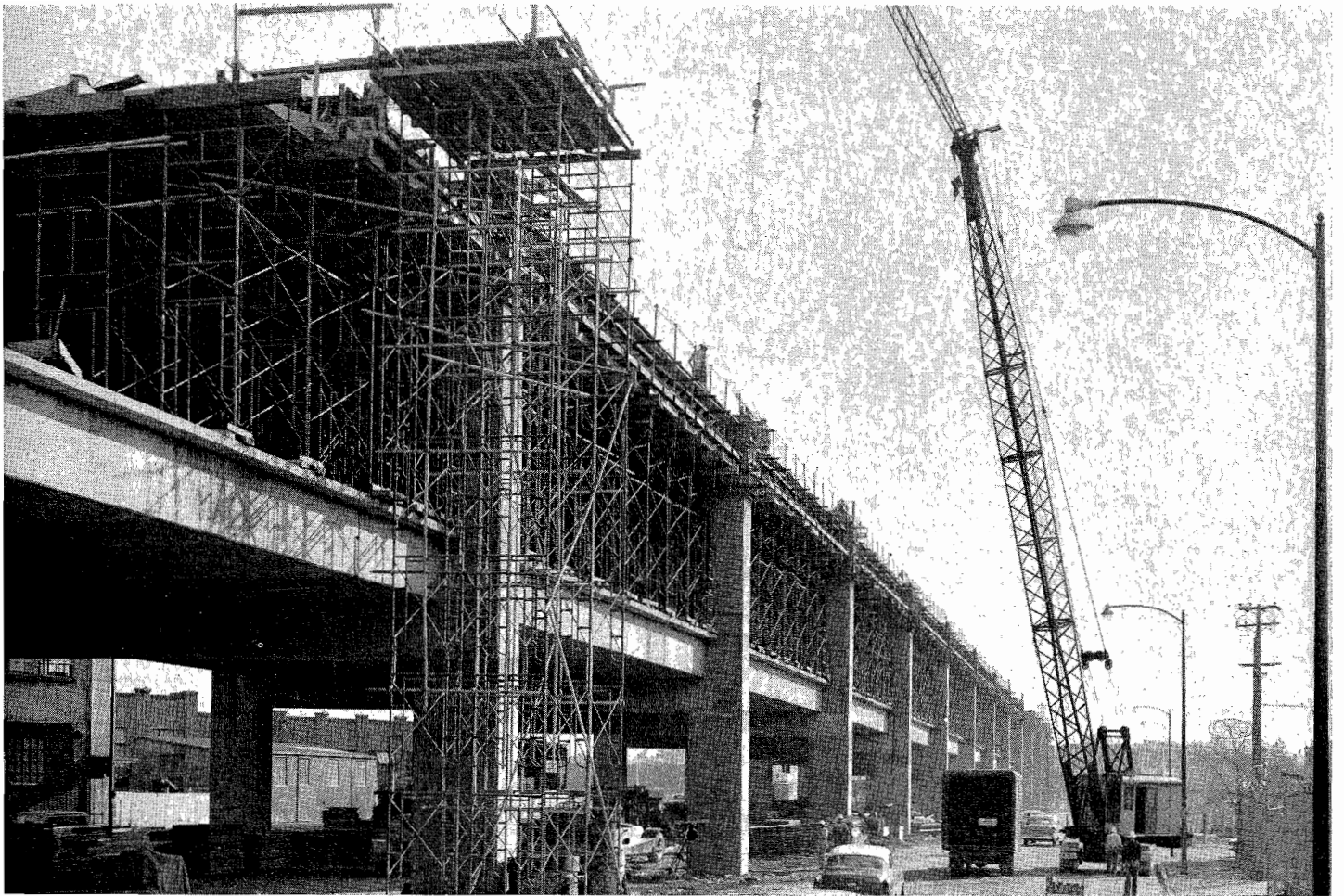
viaduct clear of automotive traffic. Consequently, the completed project will not only lift the through traffic from the Embarcadero but will provide far better service for surface traffic than now exists.

The design includes provisions for possible extension southerly to approaches of the proposed southern crossing of San Francisco Bay and will be continued northerly under future contracts to eventual connection with the approaches of the Golden Gate Bridge.

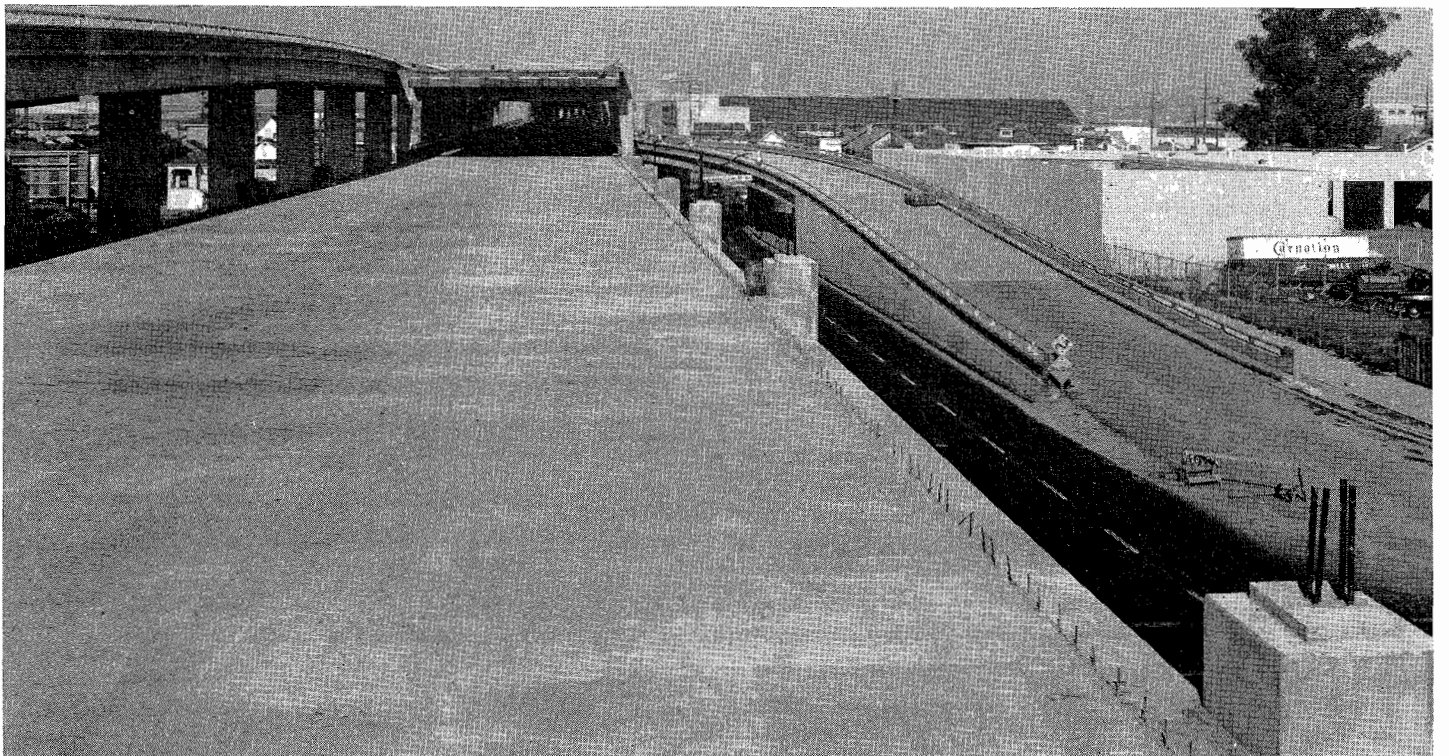
#### **Cypress Street Viaduct**

In Oakland viaduct construction is in progress along existing Route 69 (Cypress Street) between the newly reconstructed distribution structure at the east end of the San Francisco-Oakland Bay Bridge and the completed portion of the Eastshore Freeway at Magnolia Street. The project consists of a mile and three-quarters of double-deck viaduct structure with necessary ramp connections to city streets. The basic design of the Cypress Street Viaduct is similar to that





*UPPER—Double deck along Cypress Street. Note usage of prefabricated metal tubular staging. LOWER—Double-deck construction along Cypress Street showing on-ramp at 14th Street, off-ramp at high level, left.*



under construction in San Francisco. Again a 52-foot clear roadway is provided on the upper deck for four lanes of southbound traffic and a like roadway will be provided on the lower deck for northbound traffic.

Utilization of the existing highway right-of-way for the viaduct construction necessitates carrying highway traffic through the entire length of the project continuously during construction. To provide this service new roadways on either side of the proposed structure were first constructed and traffic routed thereon to clear the viaduct area. These roadways will serve permanently as surface streets after completion of the freeway.

The Cypress Street Viaduct is being constructed under two contracts totaling \$8,500,000, both of which were awarded to Grove, Sheperd, Wilson & Kruge of California, Inc. Work was started in August of 1955 and the project is expected to be opened to traffic in July of this year.

The only portion of the Eastshore Freeway in Oakland not now completed or under construction is the one-mile unit from Fallon Street to Market Street. Plans have been completed for this work and \$6,400,000 has been budgeted for its construction. The project will be advertised immediately and construction will be under way this spring. When this final unit is opened to traffic, scheduled for the spring of 1959, the entire Eastshore Freeway will be completed from the San Francisco-Oakland Bay Bridge to San Jose.

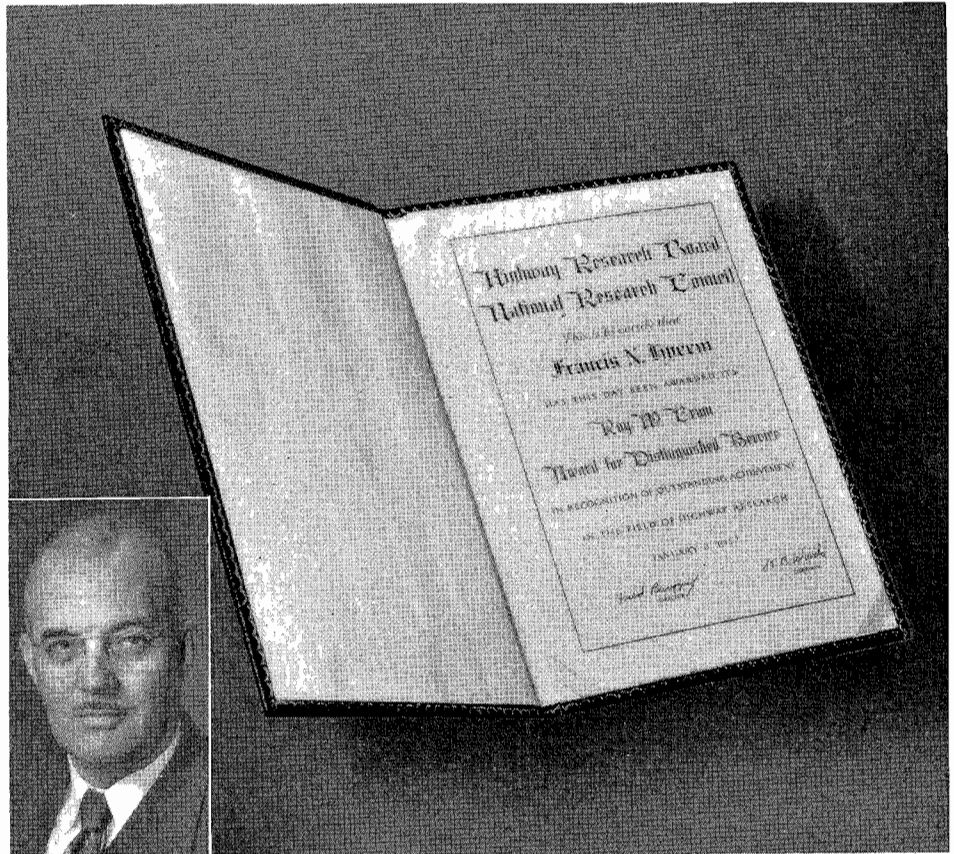
#### FRED OEHLER IS HONORED

Fred J. Oehler, San Jose banker and civic leader, is the new president of the California State Automobile Association. He was elected January 17th, in San Francisco.

Oehler is Vice President and General Manager of the San Jose Office of the American Trust Company and district manager for the bank. He has served the association as vice president two years and as treasurer for three.

Of the 5,421 bridges in the state highway system, only 13 are now posted for reduced loads and 57 for restricted speed.

## Francis N. Hveem Receives High Award



Certificate of Roy W. Crum Award for Distinguished Service. Inset photo of Francis N. Hveem.

Francis N. Hveem, Materials and Research Engineer for the State Division of Highways, has been chosen by the Highway Research Board to receive its highest award for 1956, the Roy W. Crum Award for Distinguished Service.

The award, made annually for outstanding achievement in the field of highway research, was presented to Hveem on January 8th, in Washington, D. C., during the national meeting of the board, by G. Donald Kennedy, Past President of the Automotive Safety Foundation.

In accepting the award Hveem said:

"I consider that this award really belongs to the entire Materials and Research Department as it will be obvious to all that the accomplishments for which the award is made represent the contributions of everyone in the department. While directed to an

individual, this award is a tribute to the teamwork that makes outstanding achievements possible."

#### Pioneer in Research

One of the pioneers in highway research methods, Hveem has earned a national reputation for his numerous original contributions. Testing equipment and testing methods which have been developed under his supervision are now in extensive use throughout the United States and foreign countries. A list of some of the better known devices and test methods he has developed include the stabilometer, the cohesiometer, the kneading compactor and sand equivalent apparatus, investigation of joint distress in concrete pavement, development of welding inspection techniques for structural steel, design formula for estimating thickness of pavement required, and a study of automobile col-

lisions with highway bridge railing. The application of a surface area formula in bituminous mix design, also developed by Hveem, is another recognized outstanding contribution to the highway science field.

#### Enters State Service in 1917

A native of Lamoine in Shasta County, Hveem began his career with the State in 1917 when he went to work for the California Division of Highways as a draftsman for District II at Redding. He became an assistant resident engineer in 1918 and a resident engineer in 1924. In 1929 he joined the Materials and Research Department, having attracted the attention of its chief, Thomas E. Stanton, by his independent field research in design and control of bituminous mixtures for highway surfacing.

During the ensuing years Hveem established a national reputation, both as a specialist in bituminous mixes and in the general field of highway research and testing. He was appointed construction engineer for the division in 1950 with responsibility for supervision of highway construction throughout the State. In 1951, on the retirement of Mr. Stanton, Hveem returned to the testing laboratory as its chief. The laboratory is responsible for testing all materials used in the construction of state highways and bridges.

He took a leading role in the planning and operation of test tracks in Idaho and Illinois. The purpose of these test roads, which are cooperative projects of state highway departments, federal agencies and private industry, is to analyze the effects of loads of varying weights on highways of different types of construction.

Hveem was also the recipient of the Highway Research Board Award for 1948, along with R. M. Carmany, for their paper on "The Factors Underlying the Rational Design of Pavements."

Hveem is also a member of the American Society of Civil Engineers, the American Concrete Institute, the American Society for Testing Materials and the Association of Asphalt Paving Technologists.

## Philippine Contractors Tour Southern Freeways

MR. B. N. FRYKLAND  
District Construction Engineer  
Division of Highways  
State of California

Dear MR. FRYKLAND: First allow me to express to you my apologies for not writing you immediately. The team has just arrived after our three-month tour in Japan, United States and Europe.

In behalf of the Philippine Building Contractors Productivity Team, allow me to thank you for the very kind hospitality you gave us during our visit at your office. We enjoyed it immensely and we hope that the ideas we gathered during our visit at your office will be used to a great advantage in the Philippine construction industry.

Please feel free to write me or any member of the team if there is anything we can do in our humble way to help you.

Again, thank you for your hospitality.

Very truly yours,

DOMINGO V. POBLETE  
Team Leader, Philippine Building Contractors Productivity Team

The foregoing letter has been received by District Construction Engineer Frykland of District VII, Los Angeles, who recently conducted a group of Philippine contractors on a tour of highway construction projects and completed freeways in Southern California. Senor Poblete, in addition to his Philippine connections, is also President of the East Asian General Contractors Association, which includes all of the Philippines, Japan, Indonesia, and parts of Northern Australia.

The group making the inspection trip consisted of the following:

Christine Concepcion, President, Fortunato Concepcion, Inc.—Union Engineering Corp.—Pan Philippine Commercial Corp., Director, Philippine Contractors Association; Director, Philippine Association of Civil Engineers.

Rodolfo M. Cuenca, General Contractor. General construction, operating cranes, bulldozer, pile driving, etc. Member of Philippine Contractors Association.

Bienvenido Dimson, Vice President and Treasurer, Maximo Dimson Construction, Dimson Construction Corporation. General construction, roads, irrigation, piers, portworks, etc. Member of Manila Junior Cham-

ber of Commerce and Philippine Contractors Association.

Honrado R. Lopez, President and General Manager, H. R. Lopez Co., Inc. Quezon City General Contractor. Vice President, Philippine Contractors Association, Philippine Society of Civil Engineers and Philippine Association of Civil Engineers.

Domingo V. Poblete, President and General Manager, Poblete Construction Co., Makati, Risal. Member of Manila Lions Club, International Chamber of Commerce, Philippine Association of Civil Engineers and Philippine Contractors Association.

Placido O. Urbanes, Jr., General Manager, Paencor, Inc., a corporation dealing with publication of technical magazine devoted to architecture, engineering construction and lumbering. Member of Philippine Contractors Association and Philippine Association of Civil Engineers.

Also on the trip were A. E. Laurencelle of Industrial Training Division, International Cooperation Administration, Washington, D. C., and H. A. Alderton, Principal Highway Engineer of U. S. Bureau of Public Roads, who were in charge of making general arrangements for the distinguished group of foreign visitors.

Frykland particularly enjoyed conducting this group because they were interested in so many of the construction details that were his particular interest and also because of his having served during World War II with U. S. Army Engineers in the Philippines, during which tour of duty he visited islands of Leyte, Luzon, Palawan, Mindanao, Samar, and Mindoro.

### THE BETTER LAWYER

In Southern California two legal beagles were arrested at almost the same time for almost the same infringement of the speed law. Being a cooperative pair, they decided to defend each other in court. Each man pleaded for the other and when the words and the warblings had settled down, one lawyer found that he was acquitted and the other found that he had to pay a \$10 fine. What he lost in money he gained in professional satisfaction on reflecting upon the fact that his colleague just must have had a better lawyer.



# Now Read This

Carquinez Bridge Project Tests  
Ingenuity of Engineers

By LEONARD C. HOLLISTER, Projects Engineer, Carquinez \*

\* This is the first of two articles on Carquinez Bridge Project by Mr. Hollister—Ed.

SINCE THE good old horse and buggy days, the Carquinez Strait has presented many problems to the highway engineer. It lies directly in the path of the natural highway location connecting the San Francisco Bay area with the Sacramento Valley.

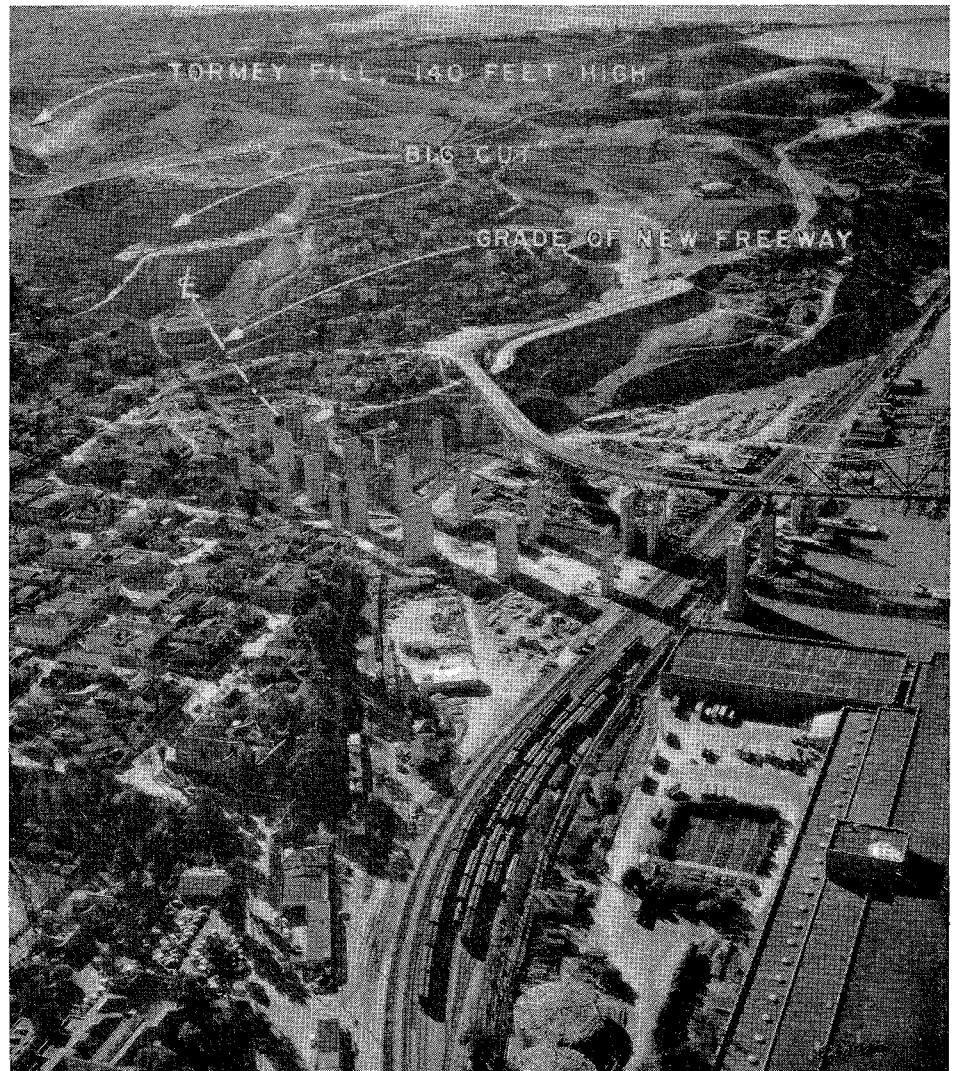
US 40 is the most direct and widely used highway connecting the San Francisco Bay area with the eastern states and carries an unusually high percentage of truck traffic indicating its great strategic and commercial importance as a transportation facility.

This east-west interstate highway route crosses the Carquinez Strait about halfway between the great industrial area of San Francisco Bay and the fertile inland valley of the Sacramento River.

The Carquinez Strait is a navigable body of water approximately 3,000 to 5,000 feet wide with velocities varying from 5 to 10 feet per second; and since the early gold rush days of California has been a formidable barrier to the development of land transportation.

#### Early Ferry Service

The first attempt to overcome this barrier was in 1850 when a ferry was established to cross Carquinez Strait between Benicia and Martinez. Twenty-nine years later in 1879 the Central Pacific Railway now the Southern Pacific Company succeeded in establishing railroad transportation across the Carquinez Strait by building two large ferries, the *Solano and Contra Costa*, for the transportation of trains across the strait. Ferry service thus remained the only facility for land transportation until the 1920's when the American Toll Bridge Company started construction of two highway bridges, one known as the Carquinez Bridge located at Crockett and the other located about 15 miles upstream called the Antioch Bridge. At about the same time the Southern Pacific



Picture showing the new piers of the Crockett Interchange. The outline of the "big cut" is beginning to take shape and the bottom of cut or grade is indicated by the lower bench which is slightly above the elevation of the tops of piers. Piers will extend back to this lower bench where the abutment or beginning of the structure will be located.

Company started construction of a railroad bridge across the strait between Benicia and Martinez about six miles upstream from the Carquinez Bridge. These three bridges have, therefore, been the sole means of land transportation across the Carquinez Strait for the past 30 years.

#### Carquinez Bridge Traffic

In spite of the tremendous increase in highway traffic over the past 30 years, no increase in highway trans-

portation facilities have been made. In the five years following the close of World War II, highway traffic across the Carquinez Bridge more than doubled until it reached an annual traffic count of over 10,000,000 cars per year. The three-lane roadway of the existing bridge, therefore, became a very serious bottleneck to the natural development and free flow of highway transportation between San Francisco and the Sacramento Valley.



Excavation material from the "big cut" is being placed in a fill which will be 140 feet high when completed. To date approximately 5,000,000 cubic yards of earth have been excavated from the "big cut" and rolled and compacted in the fill which should be to grade in February, 1957.

Since the close of World War II it became very apparent that some means of financing additional highway facilities across the strait would have to be found. Because of the large amount of funds involved and because it would require a large concentration of gas tax expenditures in two relatively small counties over a short period of time, this type of financing seemed impracticable.

#### **Two New Bridges**

Realizing this situation the California Legislature in the summer of 1955 passed legislation making it possible

for the California Toll Bridge Authority to build two new bridges across Carquinez Strait to be financed by the sale of revenue bonds not to exceed \$80,000,000.

The two bridges to be built are, a new bridge parallel to and about 200 feet upstream from the existing Carquinez Bridge on US Highway 40, and the other a new bridge about six miles upstream between the cities of Benicia and Martinez on State Route 75.

Since plans for the new parallel Carquinez Bridge had already been prepared it was possible to advertise

for bids on this portion of the project in October, 1955. Bonds in the amount of \$46,000,000 were sold in December and construction officially started the last part of December, 1955.

Plans for the bridge at Benicia-Martinez are underway and advertisement for this work will not be made until sometime in 1957.

#### **Major Contracts**

The major contracts on the new parallel Carquinez Bridge now underway are as follows:

1. Two and nine-tenths miles of approach freeway work to the south of the

bridge which was awarded to Ferry and Crow for about \$7,200,000.

2. The Crockett interchange structure joining the main bridge and the freeway contract which was awarded to Peter Kiewit Sons Company for \$4,700,000.

3. The foundation work for the main bridge awarded to Mason and Hangar, Silas Mason, Inc., and F. S. Rolandi, Jr., Inc., for about \$5,500,000.

4. The superstructure of the main bridge awarded to the United States Steel Corporation, American Bridge Division for about \$9,500,000.

5. One and two-tenths miles of freeway work at the north end of the bridge awarded to Fredrickson and Watson Construction Company-Ransome Company for approximately \$1,800,000.

6. Construction of the Administration Building and Toll Plaza awarded to W. J. Kubon Company for about \$500,000.

There are three other small contracts with an aggregate cost of approximately \$1,000,000.

**The Big Cut**

The \$7,200,000 freeway contract to the south of the bridge contains one

of the largest cuts in the history of highway building in California and possibly in the United States.

This cut which has been nicknamed the "Big Cut" has a width across the top of 1,370 feet and varies from 245 feet deep at the centerline to 350 feet deep when measured from the highest point to the south side of the cut. It contains 9,500,000 cubic yards which makes up a large percent of the total 11,200,000 cubic yards in the contract.

This cut was decided on after considerable study of other possible lines and after consideration of a tunnel design. Considering first cost, maintenance, right of way, highway user costs, convenience, safety and disturbance to existing property, the line chosen appeared to have the advantage over other lines.

Comparing the cut section to the tunnel there were two factors that made the cut a preponderately more satisfactory solution. They were first

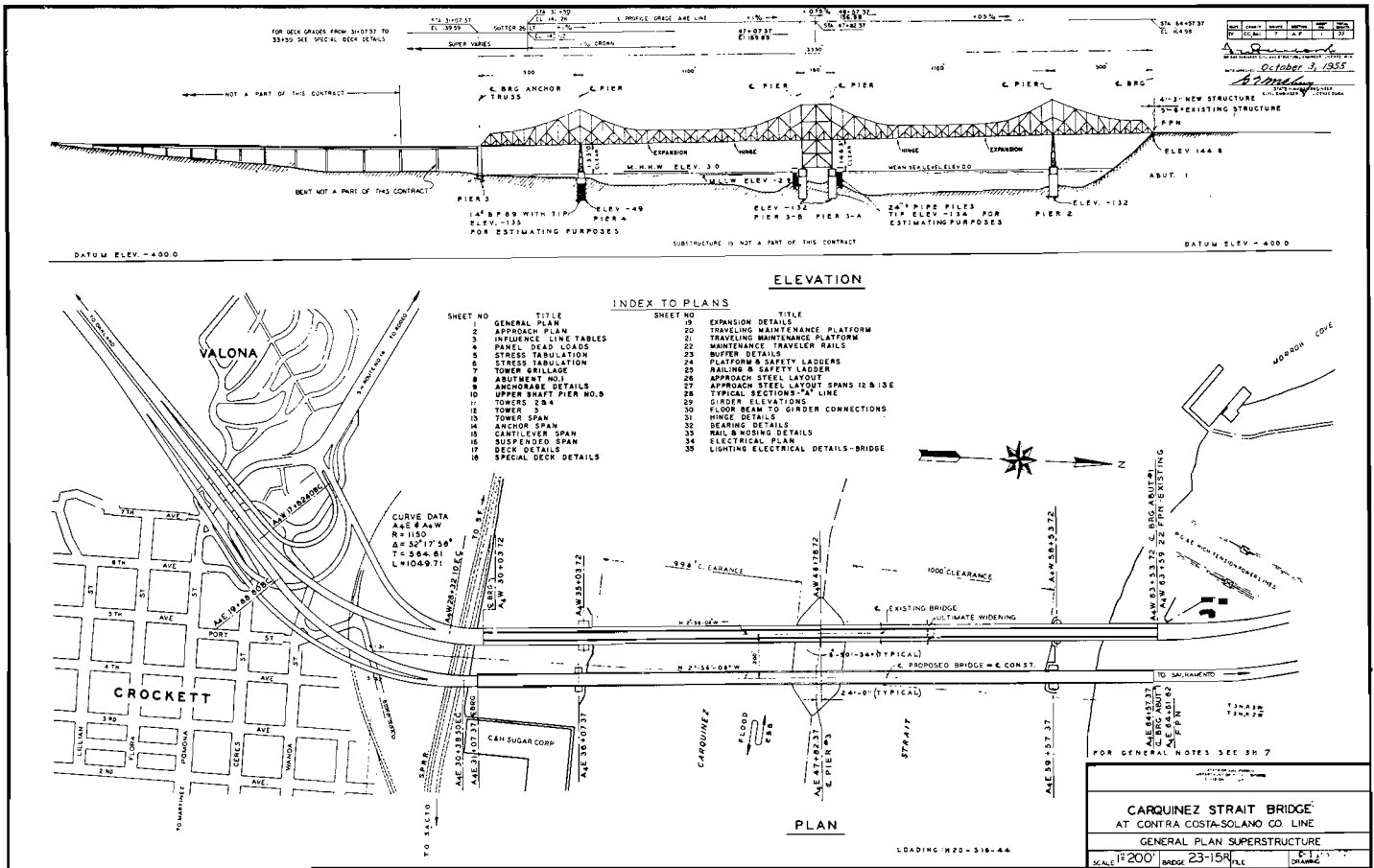
cost and safety from earthquakes, since the line passes through a faulted unstable area tunnel lining would be heavy and costly to construct and subject to considerable danger throughout its life.

**Earthquake Faults**

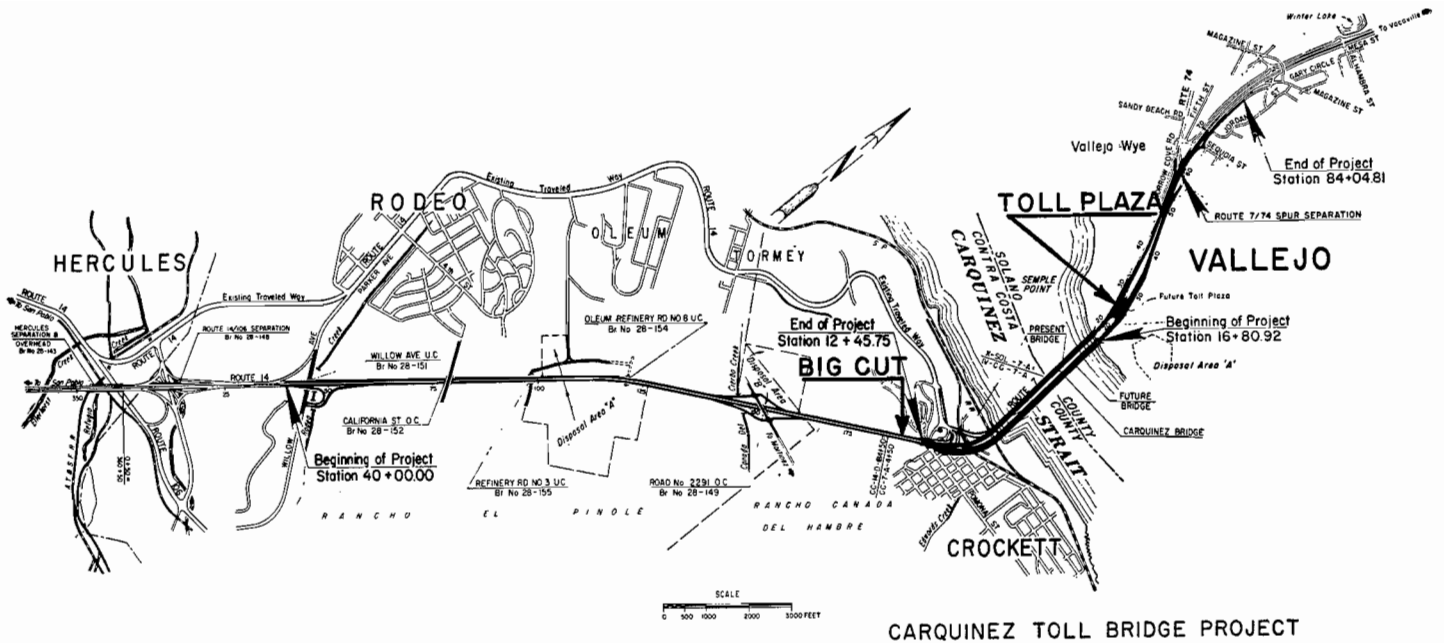
Preliminary borings indicated an older Cretaceous sandstone and sandy shale thrust over younger Eocene shale, intermixed with a steeply up-turned Miocene strata consisting of interbedded shale and hard sandstone. Water was also found in sufficient quantities to make drainage an important problem in the design of the cut.

Based on the findings and studies of the borings, general terrain, and earthquake conditions the following design for the cut section was decided on: Slopes were set at 2:1 with 30-foot benches ever 60 feet in elevation. The cut at grade provides for two 36-foot paved roadways with width for two additional 12-foot lanes, with

Sketch showing plan and profile of the main bridge. In plan the lower layout is the new parallel bridge and the upper the existing bridge. Northbound traffic will use the new bridge and southbound traffic the existing bridge. The old sharply curved approach alignment of the existing bridge will become an off-ramp leading into Crockett.







CARQUINEZ TOLL BRIDGE PROJECT

Layout showing the limits and extent of the Carquinez toll bridge projects under contract

9½-foot outer shoulders and 2-foot shoulders adjacent to the 4-foot raised median strip, plus a debris trough on each side. This makes the cut 200 feet wide at the bottom.

For proper drainage of trapped underground water 2-inch horizontal perforated drain casings are to be drilled laterally into the cut slopes at locations and frequencies to be decided by the engineer as excavation advances. It is anticipated that at least 24,000 linear feet of these drains will be required to adequately provide for the structural stability of the cut section. The 30-foot benches will also have collection ditches to collect surface water and seepage from the horizontal drains. In addition the benches will provide access for maintenance equipment.

**Big Excavation Job**

From the "big cut" there are about 2,400,000 cubic yards of material that is not needed for roadway fills. This material is being placed at disposal area "A" shown in sketch and will be used to improve Union Oil Company property in return for right of way required from it for freeway construction.

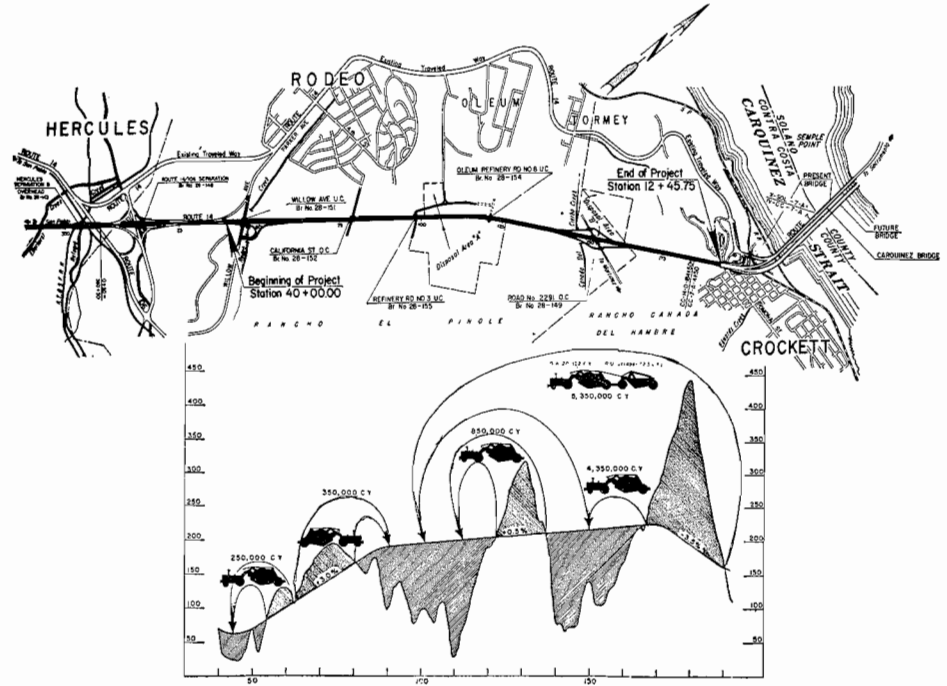
The shale and sandstone encountered during excavation by the contractor varies in hardness. It has been found possible to excavate by ripping

at all locations except the cut at about station 130 which is the first cut to the south of the "big cut." Here it is necessary to shoot and excavate with a 2½-cubic yard shovel and use 8-cubic yard dump trucks for disposal.

As can be seen from the sketch, there is a 7,000- to 8,000-foot haul for about 5,350,000 cubic yards of the

"big cut." For this operation the contractor proposes to use 23-cubic yard scrapers in tandem with 22-cubic yard DW 20's.

Maximum daily yardage moved by the contractor to date is about 32,000 cubic yards. Bid price for the 11,200,000 cubic yards is 25.6 cents per cubic yard.



Sketch showing plan and profile of the freeway contract in Contra Costa County which contains the "big cut." Profile shows contractor's proposed dirt-moving operations with the R. U. scrapers and D. W. 20's hooked up in tandem for the long haul from the "big cut."



Work is in progress on the Vallejo side of Carquinez Strait in this picture. Contractor's derricks and barges can be seen at each of the main channel piers. The Crockett Interchange piers are being constructed in this picture. These interchange piers will be completed in January and steel erection will start in February, 1957.

#### **Crockett Interchange**

The Crockett Interchange serves as a connecting viaduct between the "big cut" and the south end of the main bridge. It also acts as an interchange structure providing on and off ramps for the town of Crockett.

This interchange structure is of conventional steel girder design, varying in span lengths from 120 feet to 180 feet. Girders are supported on 47 reinforced concrete piers. These piers vary in plan from 6 feet x 22 feet solid

shaft to 20 feet x 76 feet boxed section shaft, and in height from 20 feet to 123.5 feet, with the average height about 70 feet.

The piers were all designed without batter or offsets so that slip-form construction could be used by the contractor if desired.

The contractor, Peter Kiewit Sons Company, investigated this method of construction for the piers and decided to proceed with slip-forms developed by B. M. Heede Inc., an international

organization with headquarters in Sweden.

Slip-forms have been used before in the United States but they have been of the manually operated screw jack type. These have been cumbersome to keep level and troublesome to keep moving at a constant rate at all points.

The development of an automatic controller for operating the hydraulic ratchet jacks has greatly simplified this procedure.

### Hydraulic Ratchet Jacks

These hydraulic ratchet jacks are supported about 7-foot centers by 1-inch diameter high strength steel rods. Each rod has a 3-foot section of metal sleeve which protects the rod from bonding with the green concrete making it possible to salvage them after the last pour on the pier has been made.

At the start of each pier after forms have been carefully set on pier footings, the 4-foot deep forms are filled in layers of about 8 inches. As soon as concrete in bottom has set sufficiently, which may be in about three hours, the jacking operations are started. Once the jacking operations are underway the forms are slipped up at the rate of 5 to 14 inches per hour with the average being about 10 inches per hour. Rate of slipping is dependent on rate of curing which changes with the ambient temperature and wind velocity. An experienced operator determines the pace at which forms are slipped by pushing a thin steel rod down into the concrete.

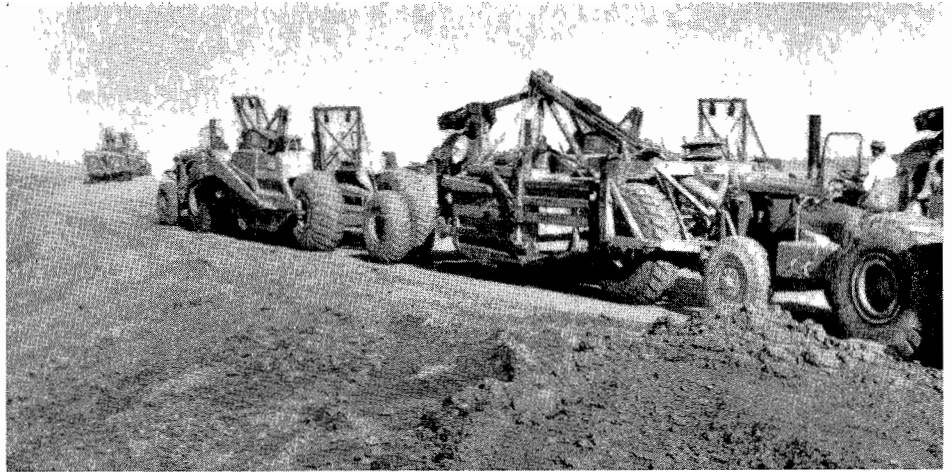
The forms are constructed so that the outside form of the wall is vertical, while the inside form is battered about three-eighths inch in the 4 feet. This makes the form three-sixteenths narrower at top and three-sixteenths larger at bottom than the nominal thickness of wall.

### Surface Finishing

When the concrete becomes exposed as the forms are slipped up it is necessary to finish the surface by trowling. This is done quickly and easily. It is necessary occasionally to grout and finish small pockets caused by rocks gouging the sides during slipping. To facilitate finishing a finisher's platform is hung on the outside below the forms and moves up automatically as the forms are slipped.

For curing a water pipe rigged up with fog nozzles is hung below the finishers platform. This keeps the exposed concrete surface constantly moist and provides excellent curing conditions even during hot windy weather.

Pouring operations are maintained 24 hours per day which, at the average



UPPER—Picture showing "tandem" hookup consisting of one tractor and one operator hauling two scrapers. This picture shows equipment ascending top of "big cut" preparing to be loaded. LOWER—Picture shows "tandem" scrapers being loaded. Rear scraper is loaded first with the assistance of a powerful pusher in the rear. After rear scraper is completely loaded, the front scraper is loaded. After both are loaded, the single operator and tractor take off down the hill to dispose of the material on the fill. East slope of the "big cut" can be seen in the background.

rate of 10 inches per hour, provides for about 20 feet per day. Since some of the piers are over 100 feet high they cannot be completed in a five-day week. On these piers the operations are shut down over the week end and an operator left in charge to keep the forms slipping a very small amount sufficient to prevent bond until the slip forms come to within 6 to 12 inches of the top of concrete.

### Keep Piers Plumb

In order to keep the piers plumb a constant check must be made during pouring operations. To check for verticality three targets are placed on each end and at the center of one side. One target is placed near the bottom of pier, one on the slip form, and one on the reinforcing steel template above the forms.

Water columns placed in transparent plastic tubes and located at strategic points on the forms are also used to check for possible listing. As soon as a small deviation from verticality is noted corrective measures are started by hand jacking the low points. Corrections must be made gradually however.

Comparative costs between slip forms and conventional forms are not available; however, on a job with a reasonable number of piers 40 feet and over in height there appears to be an excellent opportunity for economy. Other advantages are safety and speed of operation. Therefore, where time is of importance there is considerable advantage. Their simplicity and safety also appear to give them an advantage over the conventional methods on high piers.

*To Be Continued.*



## REAPPOINTMENTS

Chester H. Warlow, retired Fresno attorney and banker, and James A. Guthrie, President and Editor of the Sun Company, publisher of the *San Bernardino Daily Sun and Evening Telegraph*, have been reappointed by Governor Goodwin J. Knight to the California Highway Commission. Both were originally appointed to the commission by Governor Earl Warren when the commission was reorganized under an act of the Legislature in September, 1943, and this is their fourth reappointment.

Warlow, ex vice chairman of the commission, has been interested in highway building and improvement since 1927 when he first was named to a central valley highway committee. He was instrumental in promoting the Kings Canyon Highway, the Generals Highway, and the Yosemite-Fresno Highway.

Guthrie also has been interested in highways for many years; his paper had leadership in the original good roads program in San Bernardino County in advance of state highway construction. He has been associated with the Automobile Club of Southern California and is a member of San Bernardino City Traffic and Safety Commission.

On January 24th Guthrie was elected vice chairman of the commission for the second time. Guthrie and Warlow were administered their oaths of office by Secretary of State Frank M. Jordan on January 24th.

## WHO WAS DRIVING?

There were approximately 4,800 women drivers and 41,500 men drivers involved in fatal accidents during 1955. Drivers in all accidents—fatal, injury, and property damage—were divided: 2,500,000 women; 14,500,000 men. These national estimates are based on the reports of traffic authorities in 34 states.



Secretary of State Frank M. Jordan administers oath of office to Highway Commissioners Chester H. Warlow (on his left) and James A. Guthrie

## James A. Guthrie Honored By His City

James A. Guthrie, Editor and President of the *San Bernardino Sun-Telegram*, and Vice Chairman of the California Highway Commission, on January 23d was named recipient of the 1956 Red Feather Community Award "for contributing greatly to the building of a better San Bernardino."

The award, fifth in a series of annual presentations begun in 1952, was the first made via long distance telephone. Guthrie was in Sacramento attending a Highway Commission meeting, and telephone contact was used to bridge the gap between the veteran journalist and the Community Chest dinner meeting in San Bernardino.

"This is the first time I have attempted to make a public address while staring at the bare walls of a hotel room," Guthrie said over the telephone hookup.

"I feel highly honored at this tribute," Guthrie told the 250 com-

munity leaders and chest workers gathered at the annual meeting in the Fellowship Hall of the First Presbyterian Church.

Surprise announcement of Guthrie for the 1956 award was made by George Hellyer, first chest president in San Bernardino in the year of its inception, 1923.

"One man left his name with history in trying to stop the sun," Hellyer said. "James Guthrie will leave his name with efforts in getting out the *Sun*."

The Red Feather citation concluded with the words, "His sterling character has been impressed upon and has molded the community which hereby acknowledges its great debt."

Accepting the award medallion in behalf of her father at the dinner meeting was Mrs. Kathleen Lonergan, secretary-treasurer of the Sun Co.

Guthrie also was named as the first recipient of the "Citizen of the Year"

... Continued on page 45

# Speed Survey

State-wide Check Shows Motorists Are Driving Much Faster

By GEORGE M. WEBB, Traffic Engineer

VEHICULAR speeds are a vital factor which must be taken into consideration in the development and establishment of modern highway design standards. Consequently, in the interests of ever-improving highway operation, the Traffic Department of the Division of Highways periodically conducts a state-wide speed survey on state highways, the latest of which was undertaken during the month of October, 1956.

The data obtained during this recent study are shown on the accompanying charts, which represent the results of 35,439 individual observations of vehicular speeds under free-flowing traffic conditions. The speed checks were made during off-peak hours at selected rural locations on straight alignment in areas out of the influence of speed zones, roadside business, and other physical controls which might affect the speed of traffic.

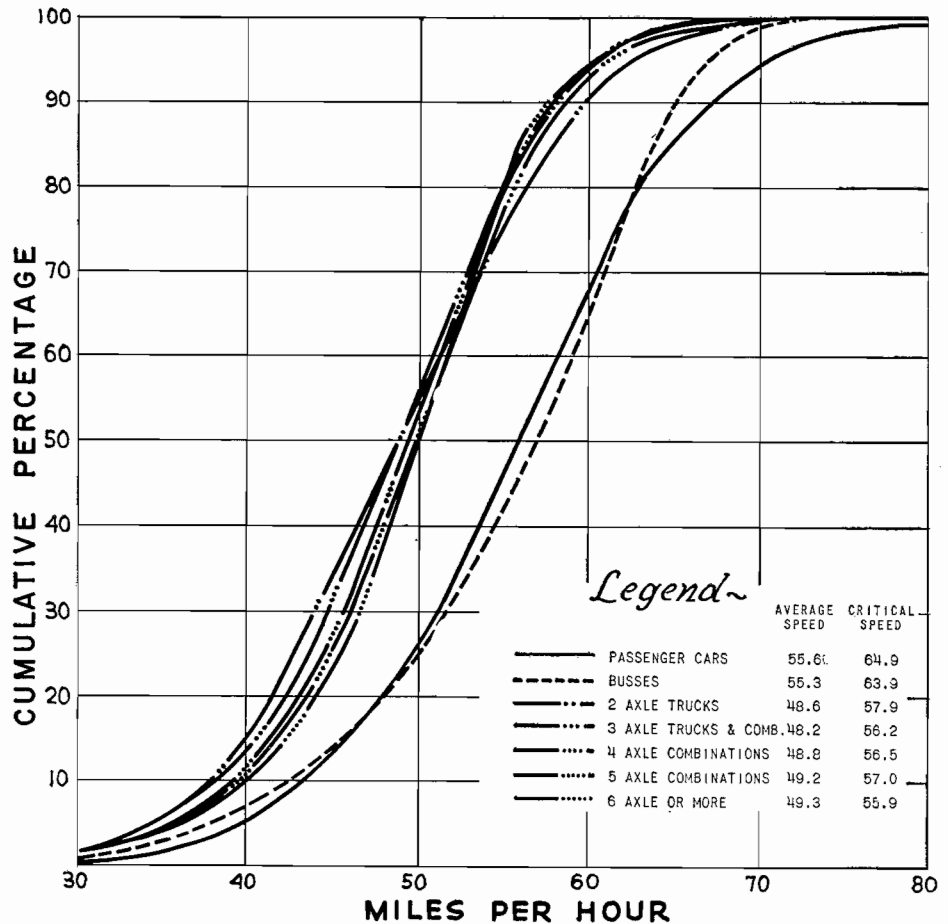
### 108 Observation Stations

A total of 108 observation stations was used. These may be classified according to roadway type, as follows:

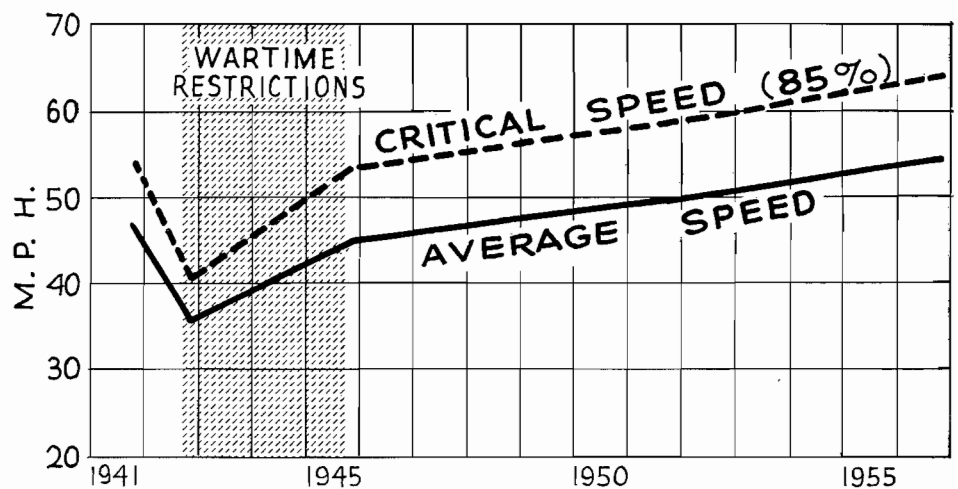
Number of stations	Type of roadway
47	2 Lanes
1	3 Lanes
2	4 Lanes undivided
5	4 Lanes divided
27	4 Lanes divided expressway
15	4 Lanes divided freeway
1	6 Lanes undivided
5	6 Lanes divided freeway
5	8 Lanes divided freeway

### Speed Has Increased

It may be interesting to note that the 1956 survey showed that the average speeds of all vehicles were 4.3 miles per hour greater than those observed in 1951. The critical speeds during this period increased by 5.2 miles per hour. (The critical speed is defined as the speed at or below which 85 percent of the traffic is moving.)

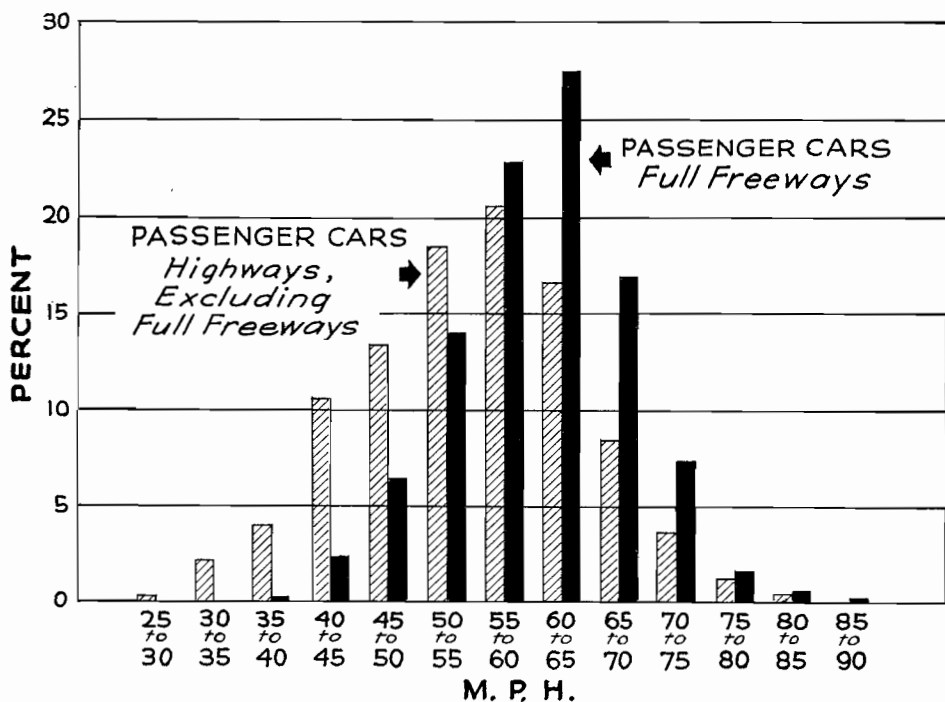


The speeds of vehicles by type, as found in the October, 1956, survey, are represented by the curves in the above drawing. Note that the speeds of passenger cars and buses are quite similar, while the curves for the various types of trucks fall into a lower speed group.



Since the end of the World War II restrictions there has been a gradual increase in vehicular speeds. This is illustrated in the above chart of average and critical speeds of all vehicles by years.

## STATE-WIDE AVERAGE ON RURAL HIGHWAYS



The survey showed that passenger cars generally travel faster on rural freeways than on other types of rural highways

It might also be noted that the rate of increase per year compares quite closely with the rates of increase found on the previous surveys of 1945, 1948, and 1951.

### Truck Speeds Lower

The chart showing the speeds of vehicles by type also illustrates some features worth mentioning. A comparison of the curves shown on this chart reveals that the speeds of the various types of trucks are grouped rather closely and fall approximately seven miles per hour below those of passenger cars in the higher ranges. However, it may be seen that there is very little difference between the speeds of passenger cars and those of buses in the range below 60 miles per hour. It was also found from the study that the average speed of both buses and trucks had increased approximately three miles per hour since 1951.

The speeds of passenger cars, as may be expected, were found to average higher on rural freeways than on other types of rural highways. However, the differences were not as high as some might have imagined. The

survey showed that passenger cars average 60.5 miles per hour on rural freeways, as compared to an average speed of 54.7 miles per hour for all other rural locations. Comparable critical speeds were 68.5 miles per hour and 64.7 miles per hour, respectively.

## JAMES GUTHRIE HONORED

Continued from page 43 . . .

award presented by the San Bernardino Real Estate Board.

Presentation took place at Norton Air Force Base Officers Club as part of a banquet program for installation of 1957 board officers headed by Thomas S. Madison.

Guthrie was given a watch as the "Frank L. Whitelock award," donated by a past president of the real estate board.

The presentation was made by Ken W. Dyal, board secretary, who cited the invaluable publicity the editor had given nationwide for "his beloved city and beloved valley," and the highways, steel plant, Air Force Base, and other industries he had helped bring to the San Bernardino area.

## Freeways Get New Names

The California Highway Commission has assigned names for three sections of freeway routes in Southern California.

The names and sections are as follows:

**Riverside Freeway**—State Highway Route 43, from Santa Ana Freeway in Santa Ana to the San Bernardino Freeway near Colton.

**Santa Monica Freeway**—The route hitherto unofficially referred to as the "Olympic Freeway," between the Harbor Freeway in Los Angeles and Santa Monica.

**Escondido Freeway**—US 395 between San Diego and Riverside.

**Ventura Freeway**—The freeway now being developed between U. S. Highway 99 in the vicinity of Glendale and U. S. Highway 101 in the City of Ventura. Although most of this freeway has been locally known as the Ventura Freeway, the easternmost section, 5.3 miles in length, from the Golden State Freeway in Griffith Park to the Hollywood Freeway extension in North Hollywood has previously been referred to locally as the Riverside Freeway, taking this name from its proximity to the Los Angeles River and Riverside Drive.

## Max Gilliss Is Drafted to New Job by Governor

C. M. (Max) Gilliss, Deputy Director of the State Department of Public Works, was drafted in January by Governor Goodwin J. Knight to serve as a secretary assigned to the Governor's legislative office.

Gilliss in his new position will assist Paul Mason, the Governor's Legislative Secretary and Director of Motor Vehicles.

He was appointed special representative of the Department of Public Works in 1952, was named Assistant Deputy Director in 1953, and was promoted to Deputy Director September 23, 1955.



## Employees Receive Twenty-five-year Awards

Employees of the Division of Highways who became eligible for 25-year awards October 31 to December 31, 1956, are:

Name	Total service Yrs. Mos. Days	Name	Total service Yrs. Mos. Days
<b>District II</b>		<b>District VIII</b>	
Azbill, Irven E.....	25 0 6	Anthony, Frank A.....	25 0 19
<b>District III</b>		Lauterborn, Randall A.....	25 0 28
Hebasque, Charles E.....	25 0 00	Lawrence, David.....	25 0 18
<b>District IV</b>		<b>District X</b>	
Cobb, William R.....	25 0 01	Meyer, Kenneth E.....	25 0 10
Clough, Herbert W.....	25 0 15	<b>District XI</b>	
Cumberpatch, Stanley C.....	25 0 12	Thomson, George A.....	25 0 3
Cyorgy, Frank A.....	25 0 27	<b>Central Office</b>	
Urzi, Sebastian A.....	25 0 15	Lunetta, George J.....	25 0 2
<b>District V</b>		Miller, Carl D.....	25 0 00
Hudson, Guy G.....	25 0 15	<b>Bridge Department</b>	
Jones, Bernarr M.....	25 0 10	Plows, Jason.....	25 0 22
Stokes, C. Eric.....	25 0 19	<b>Bay Bridge</b>	
Meehan, James C.....	25 0 28	Webb, Alice K.....	25 0 14
<b>District VII</b>			
Bachand, Myrtle F.....	25 0 18		
Miller, Carl D.....	25 0 00		
Rittmaster, Oscar.....	25 0 9		
Telford, Edward T.....	25 0 16		

## MERIT AWARD BOARD WINNERS

*Michael Valentine*, Highways, Sacramento, Assistant Bridge Engineer (TAU), received \$80 for recommending the design and detail of reinforced concrete pile footings be standardized and quantities of reinforcing steel and concrete used in the footings, be tabulated. The suggested tabular form for standard column footings will save considerable time for many younger designers. The suggestion is now in use and will save at least one hour of designer time on about 200 separate occasions per year. Estimated annual savings at least \$800.

*George E. Gray*, Highways, Bishop, Assistant Highway Engineer, and *David A. Crane*, Highways, Bishop, Assistant Highway Engineer, will divide \$40 for their recommendation that the quantities now shown on Division of Highways Standard Structure Sheet, A-50, be revised to include the concrete and steel quantities for L walls. The employees proposed that varying the lengths from two feet to six feet in one-half foot intervals would be adequate. The division was not able to adopt this suggestion until a revision of Structure Sheet A-59 had been completed. The idea has been placed into effect with an annual savings of approximately \$400.

*Robert L. Woolf*, Highways, Sacramento, Assistant Shop Foreman, and *Daryl Smith*, Highways, Sacramento, Automotive Mechanic, will share \$30 for designing and using a special tool while servicing Lipe Rollway clutch pressure plates. This tool is used to compress the coil spring under the clutch plate, releasing the tension on the

snap ring on the top of the plate so that it and the ball retainer may be removed, allowing the balls and vanes to be removed, cleaned, relubricated and reassembled. This plate may be left in position during the servicing of the clutch. The division estimates a net annual savings of \$150 will be realized and recommend that an award of \$30 be divided equally. As the units involved require clutch repairs in periods of from one to three years the Merit Award Board concluded the use of a one-year period as the basis for estimating savings was not completely equitable so savings were estimated for the first two years.

*Robert L. Woolf*, Highways, Sacramento, Assistant Shop Foreman, and *Ray Sandour*, Highways, Sacramento, Heavy Equipment Mechanic, will share \$15 for designing and developing a special tool to remove the climax engine clutch housing assemblies from their mountings. The use of this tool is limited to those shops where snow removal equipment is required.

*Tom C. Kinard*, Highways, Escondido, Highway Field Office Assistant, will receive \$10 for recommending the revision of Highway Form M-32, Foreman's Daily Labor and Equipment Report. This suggestion is to omit the padding and to make the colors uniform instead of two separate colors. Accounting Department reports the suggestion was placed into effect on October 16th with annual savings of at least \$100.

*Josephine M. Norton*, Highways, Sacramento, intermediate stenographer-clerk, received a certificate of commendation for her

## In Memoriam

### HARRY F. CARTER

Harry F. Carter, retired Bridge Department Resident Engineer, died in Oakland November 15, 1956.

Harry was born in Belfast, Maine, on February 25, 1882. In his youth he joined the gold rush to Alaska and prospected both in the Nome area and Yukon Territory. After returning to the United States, he joined with his father in silver mining in Nevada and Western Utah. He then joined the Oregon-Eastern Railroad, later a part of the Union Pacific Railroad, as a civil engineer.

Harry started work with the California Division of Highways on June 16, 1914, as an instrument man. He was one of the original "Four Horsemen," resident engineers on bridge construction at the time the Bridge Department was organized in 1924. During the construction of the San Francisco-Oakland Bay Bridge he performed outstanding liaison work between the State and the Navy. Two of the last structures on which Harry served as Resident Engineer were the bridge across the Feather River at Marysville and the Noyo River Bridge near Fort Bragg.

Harry retired on March 10, 1950, after 36 years of outstanding work in state service. He was a member of the American Society of Civil Engineers and of Elks Lodges in Idaho and Montana. He is survived by one son, Robert S. Carter, of San Mateo and one sister, Mrs. Emma Leggett of Hollywood.

suggestion regarding a modification to the Encroachment Permit Form, P-202. Previously, there were several titles of identification used; Mrs. Norton's suggestion proposed the uniform use of "grantor" and "permittee" in place of the varying titles formerly used. This change in wording makes for easier understanding of the conditions of the documents.

*Donald A. Hankins* and *Robert R. Wirts*, Highways, San Bernardino, \$100 to be divided equally and certificates of award for suggestion recommending the elimination of cleaning of salvaged Ottawa sand in standard compaction tests, and the purchase of clean sand instead.

*John A. Kerr*, Architecture, Los Angeles, \$15 and a certificate of award for sugges-

... Continued on page 60

## PROMOTIONS ARE ANNOUNCED BY McCoy

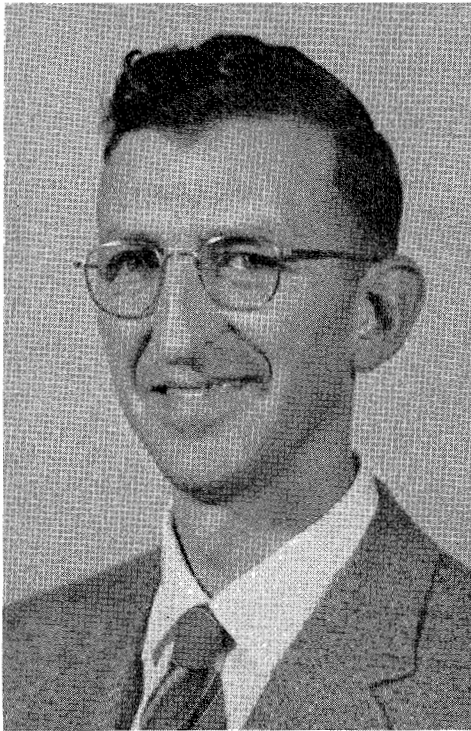
State Highway Engineer Geo. T. McCoy has announced the following promotions of Division of Highways personnel:

R. A. Hayler, for eight years Assistant District Engineer-Planning, for District XI in San Diego, to be a Dis-

trict Engineer in District IV with headquarters in San Francisco. graduation in 1932, from the University of California (Berkeley) in civil engineering. He is a native of San Diego and attended San Diego schools and San Diego State College before going to the University of California. He is married and has five children.

Counties of Sonoma, Marin, Napa, Santa Clara and Santa Cruz, together with supervision of other district-wide functions.

Jorgensen worked for the Division of Highways between semesters while attending the University of California



**R. A. HAYLER**



**J. FRANK JORGENSEN**



**G. L. RICHARDSON**

trict Engineer in District IV with headquarters in San Francisco.

J. Frank Jorgensen, Assistant District Engineer-Operations, District XI, to replace Hayler.

G. L. Richardson, Maintenance Engineer of District XI, to Assistant District Engineering-Operations, replacing Jorgensen.

McCoy said that the greatly increased funds to become available under the federal highway program, and the consequent stepped-up schedule of important highway route determinations and planning in District IV, have required establishment of an additional position at the district engineer level.

Hayler has had broad experience in metropolitan and other major highway planning. He has been with the division for 24 years, following his

Assistant State Highway Engineer B. W. Booker, in charge of District IV, who is recuperating from a heart ailment, expects to return to work in the near future. Until Booker's return, J. P. Sinclair will continue as acting assistant state highway engineer. After Booker returns, Sinclair will resume his district engineer functions with responsibility for general district-wide planning and with specific design responsibility for the state highways in Contra Costa, Alameda, San Francisco and San Mateo Counties.

District Engineer L. A. Weymouth will continue as District Engineer-Operations involving supervision of construction, maintenance, administration and cooperative project.

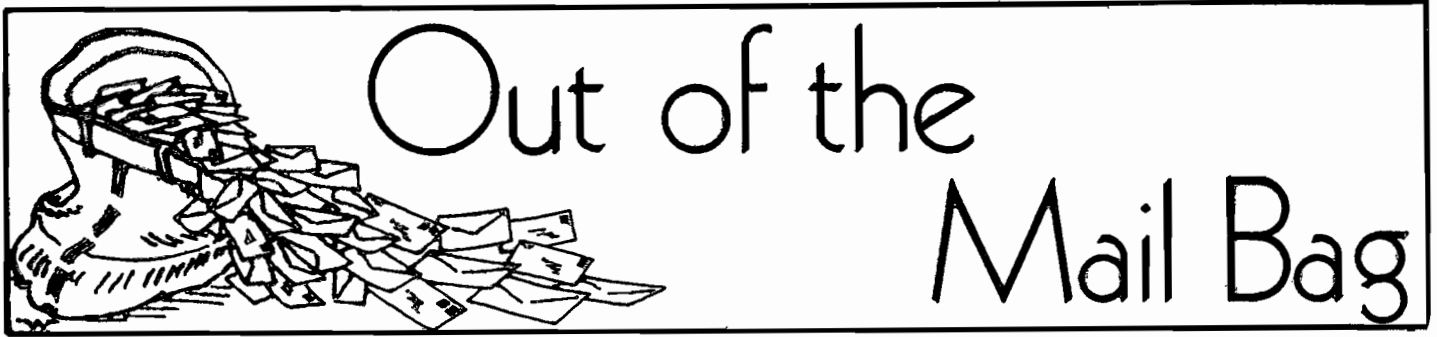
Hayler will be responsible for design of state highway projects in the

at Berkeley and became a full-time employee in 1931 after his graduation. He has been an assistant district engineer in District XI since 1950. A native of Arizona, he came to California as a child and attended schools in San Diego.

He is married and has two children. His residence is in San Diego.

Richardson is a native of Maine who came to California in 1935. He was educated in Maine schools and attended the University of California at Berkeley and first came to work for the Division of Highways in 1937. He is married and has four children. The Richardsons maintain their home in El Cajon.

Seventy percent of American families own a car.



**THANK YOU, MR. BACON**

EDWARD R. BACON COMPANY OF HAWAII  
San Francisco, California

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: *California Highways and Public Works* is by long odds the finest publication of its kind that I have seen during my many years of association with the construction industry.

It is most interesting and informative to note the remarkable advances in design and construction of highways and the development of equipment to meet the requirements of superhighway construction. A far advance since the equipment that my company furnished for the construction of the first state highways in 1912.

Kindly accept my heartiest congratulations.

Yours sincerely,

EDWARD R. BACON

**MAKE GOOD USE OF MAGAZINE**

OXNARD CHAMBER OF COMMERCE, INC.  
Oxnard, California

KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: *California Highways and Public Works* is thoroughly enjoyed by the staff here and each copy is passed around to members of our Highway and Safety Committee. We look forward to each issue not only for personal enjoyment but as a source of up-to-date information to pass on to our members and the public.

Congratulations on the fine job you are doing.

Cordially yours,

R. E. TREMAINE, Manager

**ACCEPT OUR CONGRATULATIONS**

CONSTRUCTION OFFICE  
TAIPEI TAMSHUI RIVER BRIDGE  
26, Kongting Road, Taipei, Taiwan

DEAR MR. ADAMS: Thank you very much for giving me the enjoyment of reading your fine magazine for many years. All the papers in your magazine are valuable, practicable, and up-to-date information to highway engineers. It is a great help to me in my bridge design work.

More than two years ago I had a chance to learn your technical know-how in your Bridge Department. The research spirit and the high quality of your bridge engineers impressed me very much. Now I am the project engineer supervising the 3,460-foot long precast prestressed concrete bridge, which will be the longest one of its kind in the Far East. Let me express my hearty appreciation for the kind help you have given to me.

Let me say thank you again, with my best regards.

Sincerely yours,

WEN-TAO CHANG  
Project Engineer  
Taipei Tamshui River Bridge

**MOUTHS WATER**

BRITISH ROAD FEDERATION  
26 Manchester Square  
Briroadfed Wesdo, London, England

*Editor:*

DEAR SIR: We are very pleased to receive from you copies of your excellent publication. I can assure you that the descriptions and illustrations of the work being carried out in your State make our mouths water.

Thank you again for your courtesy in this matter.

Yours faithfully,

C. D. MORGAN, *Secretary*

**FROM DENMARK**

COUNTY HIGHWAY DEPARTMENT  
Holbaek, Denmark

EDITOR: Since my visit in California in 1949 as participant in the course for foreign engineers arranged by the U. S. Bureau of Public Roads, I have had the pleasure of receiving your very fine journal. I want to express my high gratitude for the forwarding and to assure you that the journal is of very much interest to me.

We, here in Denmark, admire the development in the highway field in the United States and are learning very much from your experiences. Particularly, it is important for us to know something about the progress in California, which state I regard as the most advanced in the highway field in the world.

Very truly yours,

KNUD P. DANO  
Chief Highway Engineer

**WE THINK SO, TOO**

Monrovia, California

MR. KENNETH C. ADAMS, *Editor*

I would like at this time to thank you and your staff for your fine publication of *California Highways and Public Works*. The many articles and illustrations are interesting and helpful.

After reading these articles, I am sure that more people will realize the advantages of having the freeways around, rather than through the towns, as business has been helped more than hindered.

Again thank you.

Sincerely,

J. ARLEIGH LEE



## LIKE MAGAZINE

STATE OF ILLINOIS  
DIVISION OF HIGHWAYS  
Dixon, Illinois

MR. KENNETH C. ADAMS, *Editor*

We appreciate very much receiving the *California Highways and Public Works* publication and find the articles well prepared, interesting and educational. The highway work carried on by California is a credit to the engineers of your State.

We look forward to receiving each copy which is made available to our entire staff in our district library.

Very truly yours,

M. M. MEMLER  
District Engineer

## ANOTHER ILLINOIS LETTER

STATE OF ILLINOIS  
DIVISION OF HIGHWAYS  
Ottawa

MR. KENNETH C. ADAMS, *Editor*

I wish to take this opportunity to thank you for sending the magazine, *California Highways and Public Works*. This magazine is undoubtedly the finest of its type in the Nation. You and your staff are to be congratulated on the able presentation of the California problems to the public and to engineers in other states, who look to California for new ideas and methods.

Yours very truly,

CHARLES E. CULLEN  
District Engineer of Materials

## GLAD TO OBLIGE

TURKISH REPUBLIC  
MINISTRY OF PUBLIC WORKS  
General Directorate of Highways  
Istanbul, Turkey

*California Highways and  
Public Works*

GENTLEMEN: From time to time we have the opportunity of reading your fine magazine, *California Highways and Public Works*. We have the idea that your periodical is one of the best in its field. For that reason we read it regularly. We will appreciate your kindness, if you can include our address in your regular mailing list.

Very truly yours,

FIKRET ERKIVANC  
Traffic Engineer

## WELCOME PRAISE

MR. KENNETH C. ADAMS, *Editor*

I have enjoyed your magazine for a good many years and hope to have the privilege to do so in the future also. You and your staff have to be complimented on the excellence of this publication, which, in my opinion, is unequaled the world over.

True, there is in the road construction field many a grandiose sight in your wonderful State and credit must be given to the foresight of your Division of Highways and the know-how of your technical personnel, too. In fact, every issue confronts us with vistas that make us Europeans turn green with envy.

Yet, we are happy to know that somewhere on this earth standards in road construction are set that are leading the field and are showing all of us which way to go.

Again congratulations for your splendid work and best wishes for your continued success, along with my sincere thanks for having me on your mailing list.

Sincerely,

PETER MERKER  
Im Walder 22, Zollikon  
ZH Switzerland

## BURMA HIGHWAYS

55, Fytche Road, Rangoon, Burma

*California Highways and  
Public Works*

GENTLEMEN: I am very proud of myself being one in my country receiving your most interesting and valuable magazine. I sincerely believe that your publications will help us in our promotion of better development of highways in Burma.

Extending my best wishes to you all.

Very truly yours,

Ko Ko Gyi  
Highway Engineer  
Department of Highways

## KNOWS ANGELES CREST

ALHAMBRA, CALIFORNIA

KENNETH C. ADAMS, *Editor*

DEAR EDITOR: I was particularly interested in the story of the building of the Angeles Crest Highway in your last number.

I had hiked and camped along its entire route, or very close to it, before the start of construction, and had supported it against active opposition in lectures and in print. I have led hiking parties through the mountains of Southern California for the past 50 years; was president of the San Antonio Hiking Club for 34 years and personally led most of their one- to three-day trips. Headed the Division of Mountain Information-Education with the County Department of Recreation as long as there was such and was Editor of *Trails Magazine* until discontinued by the County of Los Angeles.

Have, in *Trails Magazine* and *Historical Society of Southern California Quarterly*, 27 historical stories of my own writing and several others which I have had written by those who helped make this mountain history in the California History Department of the Huntington Memorial Library.

Sincerely yours,

WILL H. THRALL

## MAGAZINE USED IN CLASSES

UNIVERSITY OF CALIFORNIA

MR. KENNETH C. ADAMS, *Editor*

I wish to express to you my appreciation for receiving *California Highways and Public Works*. It is a most interesting and informative publication. In fact, I use the publication in teaching courses in geological engineering here in the engineering department of the university. Please keep me on the list of subscribers.

Sincerely yours,

PARKER D. TRASK  
Professor of Geological  
Engineering

## WARNING OF FAILING BATTERY

Lights that seem to be dimmer than usual generally are an advance warning that the battery needs attention.

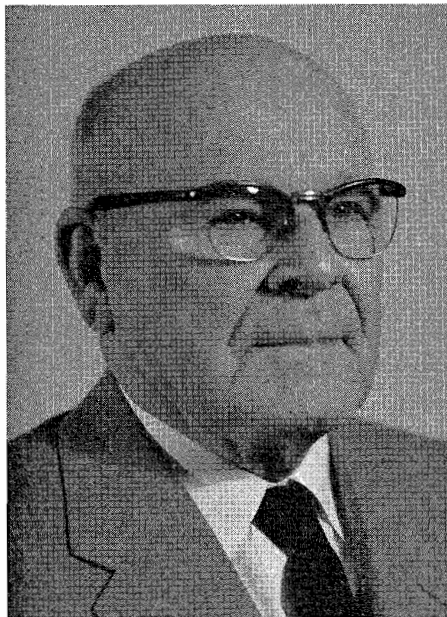
Many motorists are inclined to think in terms of the lights themselves when they get below standard. Suspicion should be directed first to the battery. If the lights flicker when the engine is being started or burn more brightly when the engine is running at high speed, it is likely that the battery needs recharging.

# Retirements *from* Service

## Herbert A. Waterman

Herbert A. Waterman, Assistant Construction Engineer for the California Division of Highways, is retiring after 38 years with the State.

Waterman has been in charge of reviewing and recommending acceptance of all construction contracts



HERBERT A. WATERMAN

awarded by the division for its vast road building program throughout the State, totaling more than \$160,000,000 for the current fiscal year. He also handled much of the work involving special agreements with outside agencies and has written and edited most of the manuals and annual reports prepared by the division's Construction Department during the past 30 years.

Long before the term "In-Service Training" had been coined, Waterman conducted training courses for construction personnel in proper record keeping. District personnel were sent to Sacramento to train under him.

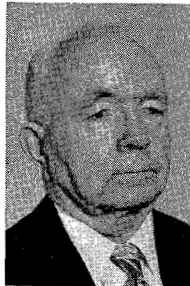
He was delegated by Construction Engineer Charles Stockton Pope to as-

... Continued on page 51

## Richard W. Robinson

Richard White Robinson, Structural Engineering Associate, with the Division of Highways, Bridge Department, retired on December 31, 1956, after 33 years with the State.

A luncheon on December 27th was attended by his family and many friends and associates.



RICHARD W. ROBINSON

Robinson was born in Salt Lake City, Utah, on June 3, 1889, and was educated there, receiving a bachelor of science degree from the University of Utah in 1913. He taught school three years and served for two years as a missionary for his church.

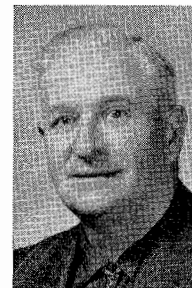
Early jobs were with the Utah-Idaho Sugar Company, the Amalgamated Sugar Company, the Utah Power and Light Company and the Southern Pacific Railroad in Utah and Sacramento on field and office work.

He entered state service in January, 1924, as a draftsman with Division of Highways at Dunsmuir and transferred to the Bridge Department in February of that year. For many years Robbie prepared specifications for contracts and in 1942 became associated with the design section where he remained except for two intervals of field construction assignments. At the time of his retirement Robbie was a designer on many important structures.

Robinson married Ethel Varley in 1919 and they have four married daughters. Mr. and Mrs. Robinson will continue to reside in Sacramento where they will be active in their church, but with more opportunity to travel and visit friends.

## Frank V. Weaver

Frank V. Weaver, Highway Maintenance, District VIII, San Bernardino, retired December 31, 1956, after 25 years' service with the State. Prior to his employment with the State, he was employed by the Santa Fe Railroad as a railroad telegrapher being stationed at Needles, California, for 10 years, and was later transferred to San Bernardino as a train dispatcher, where he worked for two more years.



FRANK V. WEAVER

In May of 1920 he resigned from the railroad service and purchased an orange grove at Highland, California, where he and his wife, Marion, have lived for many years. He started to be a rancher and grew citrus fruits, oranges, lemons, grapefruit and olives. In 1931 there was practically no market for citrus fruits and he secured employment with the Division of Highways at San Bernardino on October 19, 1931.

Frank's hobbies are ranching and after a trip to the Hawaiian Islands, he and his wife, Marion, expect to settle down upon their ranch. He is a World War I veteran, Past Commander, Chapter No. 12, Disabled American War Veterans, and a charter member of the American Legion Post No. 14, San Bernardino.

He is a Master Mason, member of Blue Lodge, Eastern Star and Knights Templar.

### RETAIL SALES

Retail sales of motor vehicle dealers, parts and accessories stores, and gasoline service stations amounted to 374 billion dollars during the past 10 years, according to the National Automobile Club.

## Clement F. Waite

Clement F. Waite, Assistant District Engineer-Administration, of the California Division of Highways, District VI office in Fresno, retired on December 11th after 28 years of state service.

Waite has held the post he gave up for the past eight years. District VI, with headquarters in Fresno, includes Tulare, Kings, Fresno, Madera Counties and most of Kern County.

Waite came to work for the division in 1928 as a resident engineer. He was promoted to office engineer of the Fresno district in 1933. He became district survey and planning engineer in 1946 and was appointed assistant district engineer in 1948.

Waite is a veteran of both world wars, serving as a captain in the U. S. Army Engineers from 1917 to 1919 and as a lieutenant colonel in charge of construction work along a section of the Alcan Highway during World War II. He was promoted to colonel in the U. S. Army Reserve in 1946.

Waite's early career included survey and construction work on highway and bridge projects in the northwest and Alaska. He was Assistant City Engineer of Vancouver, Washington, from 1912 to 1915.

He was born in Arcadia, Nebraska, and obtained his B.S. degree in civil engineering from the University of Washington. Waite and his wife live at 1538 Poplar Avenue in Fresno. They have two daughters, Mrs. Patricia Helen Alsen of Fresno and Mrs. Marilyn Harriet Jernigan of Modesto.

Waite is a Mason and a member of the Fresno Engineers Club.

### INSURANCE

Ninety-two percent of the cars bought new in the United States are covered by fire and theft insurance, according to the National Automobile Club.

## L. L. Funk Named Photogrammetric Engineer by McCoy

Promotion of L. L. Funk to the newly established position of Photogrammetric Engineer for the California Division of Highways was announced by State Highway Engineer G. T. McCoy.

Funk will head a new department within the Division of Highways which will have responsibility for development and application of the latest photogrammetric techniques in the production of highway plans.

### HERBERT A. WATERMAN

*Continued from page 50 . . .*

semble this material in written form for the guidance of construction supervisors. The first instruction manual ever to be issued by the Division of Highways was written by Waterman in 1924 and published in March, 1925, under the title of "Manual of Instructions, Construction Department."

Another "first" for Waterman was the assembling and editing of the first Standard Specifications of the Division, published in July of 1925.

Herb came to work for the division on a permanent basis in 1921 as a resident engineer. He subsequently served as Office Engineer of District III, with headquarters at that time in Sacramento, and became one of the original members of the headquarters Construction Department.

Waterman's early career before he entered state service included engineering assignments on various irrigation projects and resident engineer in charge of construction for Sacramento County. During World War I he served overseas as a 2d Lieutenant with the 115th Engineers.

Born in Riverside, California, Herb attended elementary and secondary schools in San Juan Bautista and San Jose. He received his degree in engineering from Stanford in 1912.

Waterman and his wife reside at 1112 38th Street. He is a Mason and a member of the American Society of Civil Engineers.

## William A. Bugge New President of Highway Officials

W. A. Bugge, Director of Highways for the Washington State Highway Commission, on November 30th, was elected president of the American Association of State Highway Officials at the group's annual convention in Atlantic City, New Jersey.



WILLIAM A. BUGGE

His election provides another climax in a career highlighted by public service and richly varied in experience in the field of engineering.

He has served as president of the Washington State Association of County Engineers and as commander of the American Legion Post at Port Townsend. He was a civil defense coordinator for both Port Townsend and Jefferson County during World War II.

He has also served as president of the Western Association of State Highway Officials and at the present time is secretary of the Washington State Council for Highway Research. He has been a member of the Interstate Committee on Highway Policy Problems and is chairman of the Committee on Design Policies of the American Association of State Highway Officials, which formulated design policies for the 41,000-mile interstate and defense highway system. During the past year he served as First Vice President of the American Association of State Highway Officials. He is a director of the Highway Research Board of the National Academy of Sciences.

During the convention six members of the California delegation were presented with 25-year membership awards. Their certificates read:

"Appreciative of the benefits accruing to the public from the accumulated and continuous experience of those who make the public service their life work, and desirous of recording its appreciation of such long and faithful service by its members, American Association of State Highway Officials

*. . . Continued on page 60*



# Cost Index

Makes Slight Rise During  
Fourth Quarter of 1956

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

THE California Highway Construction Cost Index for the fourth quarter of 1956 resumed its upward course after a slight drop in the third quarter. The index stands at 252.2 (1940 = 100) which is 3.1 index points or 1.2 percent above the third quarter, but it is still 3.7 points or 1.4 percent below the all-time high of 255.9 established in the second quarter of 1956.

The high point in the second quarter reflected the uncertainty due to the steel strike and pending wage renegotiations, the index then went through a leveling off process during the remainder of the year. In relation to the index for the same period last year which stood at 212.6, the present index reflects an 18.6 percent rise in construction costs during the year. Construction costs at the fourth quarter of 1955 were 10.6 percent above the fourth quarter of 1954.

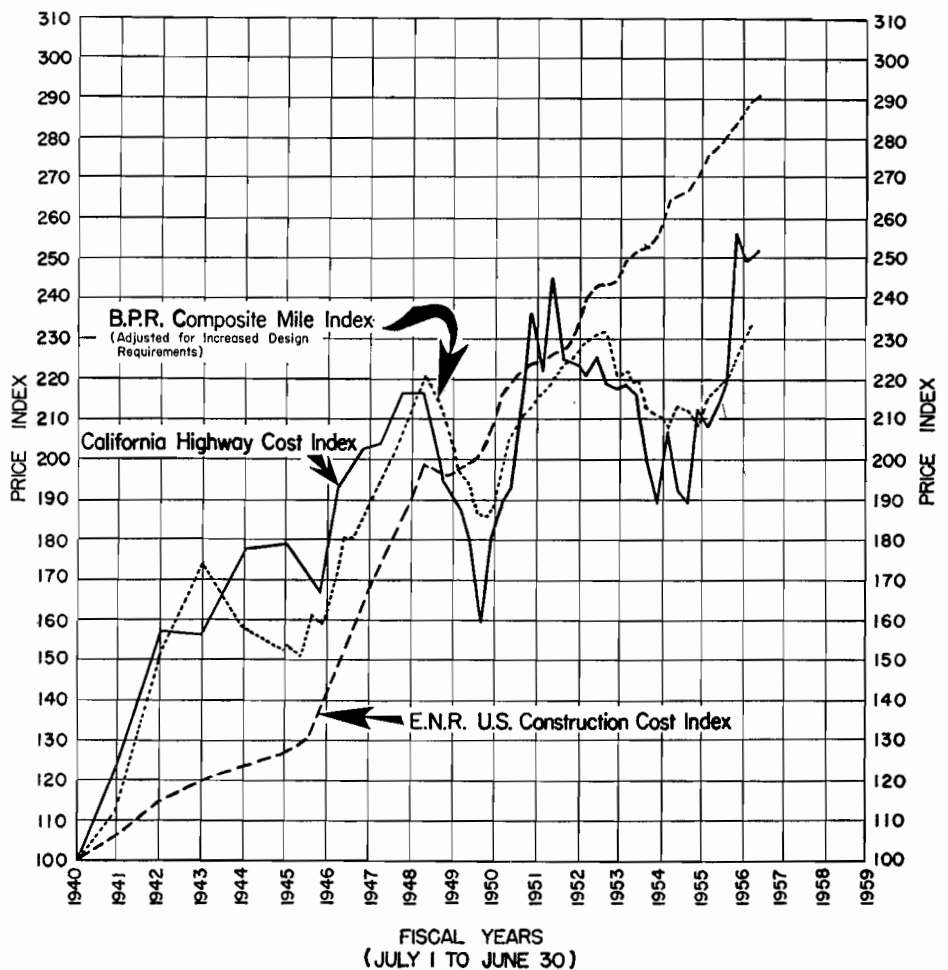
It is believed that the general rise in construction costs established during 1956 will continue during 1957 but at a slower rate. This conclusion is based upon labor contracts which were renegotiated during 1956 for periods in excess of one year as previously had been the case. Many of these contracts of longer duration are in fields most vitally affecting the highway construction industry. Contractors are now in a position to bid highway contracts with fair knowledge of future labor and materials costs.

A factor which occurred during this quarter tending to level out construction costs is the increase in bidder competition. The average number of bidders per contract rose from a low of 3.7 in the third quarter to 5.1 in the fourth quarter of 1956. Much of this increase has occurred in high bid value projects that generally include all of the construction items on which the cost index is based.

STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS  
DIVISION OF HIGHWAYS

## PRICE INDEX CONSTRUCTION COSTS

1940 = 100



The California 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 nation-wide construction costs.

The *Engineering News-Record* Cost Index again shows a rise but the rate of increase is lower than that of the

third quarter. It is up 2.5 index points or 0.87 percent from the previous quarter.

The Bureau of Public Roads Composite Mile Index for the third quarter of 1956, which is the latest available, was up 8.5 index points or 3.8 percent over the second quarter. The upward direction of the Bureau of Public Roads Index shows that the decline in the California index in the third quarter reflected strictly local conditions.

#### 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	176.7
(1st Quarter 1950-160.6)	
1951	210.8
(4th Quarter 1951-245.4)	
1952	224.5
1953	216.2
1954 (1st Quarter)	199.4
1954 (2d Quarter)	189.0
1954 (3d Quarter)	207.8
1954 (4th Quarter)	192.2
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

It appears that the construction cost index will continue its general rise during 1957, due to wage increases, probable higher costs of materials and the increased cost of borrowing working capital.

The recent cost issue of *Engineering News-Record* indicated that nationwide, highway bid prices during the year had increased about 8.6 percent on the average. These costs reflected increases in prices for equipment, steel, other materials and labor, ranging from 4 percent to 8.5 percent. Other factors influencing contractors'

#### NUMBER AND SIZE OF PROJECTS, TOTAL BID VALUES AND AVERAGE NUMBER OF BIDDERS

(July 1, 1956, to December 31, 1956)

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	207	41	34	19	12	5	318
Total value*	\$3,181,904	\$2,908,682	\$5,520,618	\$6,562,205	\$8,833,811	\$9,524,621	\$36,531,841
Avg. No. bidders	3.7	3.8	5.9	4.9	5.3	7.8	4.1
<b>Structure Projects</b>							
No. of projects	22	2	14	2	1	4	45
Total value*	\$448,257	\$140,900	\$2,388,970	\$766,923	\$502,887	\$11,152,915	\$15,400,852
Avg. No. bidders	4.4	2.5	5.6	2.5	5.0	5.0	4.6
<b>Combination</b>							
No. of projects					2	24	26
Total value*					\$1,341,234	\$76,777,869	\$78,119,103
Avg. No. bidders					3.0	5.5	5.3
<b>Summary</b>							
No. of projects	229	43	48	21	15	33	389
Total value*	\$3,630,161	\$3,049,582	\$7,909,588	\$7,329,128	\$10,677,932	\$97,455,405	\$130,051,796
Avg. No. bidders	3.7	3.8	5.8	4.7	4.9	5.8	4.3

\* Bid items only.

#### Total Average Bidders by Months

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg. for six months
1956	3.8	3.7	3.7	4.2	5.3	6.1	4.3
1955	4.9	4.2	4.4	5.4	6.2	5.4	5.0

#### CALIFORNIA DIVISION OF HIGHWAYS AVERAGE CONTRACT PRICES

	Roadway excavation, per cu. yd.	Untreated rock base, per ton	Asphaltic and bituminous mixes, per ton	Asphalt concrete pavement, 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	0.059	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	2.99	5.00	4.38	13.42	48.08	0.098	0.150
1953	0.51	2.14	5.31	4.58	12.74	50.59	0.093	0.133
1st Quarter 1954	0.45	2.28	4.23	4.78	14.89	47.52	0.092	0.126
2d Quarter 1954	0.38	2.09	4.29	5.18	14.28	47.12	0.093	0.114
3d Quarter 1954	0.43	1.85	4.68	7.00	12.63	49.59	0.095	0.162
4th Quarter 1954	0.35	1.78	4.83	--	13.13	46.08	0.094	0.135
1st Quarter 1955	0.39	1.69	4.55	--	13.44	40.66	0.095	0.140
2d Quarter 1955	0.42	1.99	5.39	--	14.46	51.36	0.098	0.136
3d Quarter 1955	0.41	2.33	5.43	5.70	13.46	49.64	0.093	0.132
4th Quarter 1955	0.37	2.00	5.52	4.00	15.05	52.72	0.099	0.144
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	57.13	0.113	0.219
3d Quarter 1956	0.52	2.27	6.12	--	15.57	56.32	0.121	0.178
4th Quarter 1956	0.52	2.21	5.93	--	14.95	59.63	0.112	0.197

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

<sup>2</sup> The item of plant mix surfacing was used before 4th Quarter of 1956.

<sup>3</sup> Asphalt concrete pavement combined with plant mix surfacing in 4th Quarter 1956, and will be identified as asphaltic and bituminous mixes in the future.

bids are higher interest rates on borrowed money, acute steel shortages, and delays in construction steel deliveries.

It will be noted that the number of individual items on which the cost index is based has been reduced from

... Continued on page 60

# Highway Review

*Past Achievements and  
Outlook for the Future*

By CHESTER H. WARLOW, Member California Highway Commission

LET us briefly review some of the many things which have taken place in California since the fifteenth day of September, 1943, when the statute (Streets and Highways Code, paragraphs 70, 70.1, 70.2) creating the present organization of the California Highway Commission went into effect.

Then World War II was in full swing. California had a population of approximately 9,000,000, now, 13,600,000. Then 3,000,000 registered vehicles, now nearly 7,000,000. Trucks constituted 250,000 of the vehicles then registered, now we have approximately 800,000 registered trucks with the average weight and size of the trucks greatly increased.

#### **Contrasting Budget Figures**

The first budget passed by this new commission was the biennial one for 1944-46. For comparative purposes it is of little value for it was prepared under war conditions when new construction not connected with war activity was held up. The actual expenditures charged against the fiscal year of 1944-45 are more satisfactory for use in making the comparisons I have in mind. The record shows a gross income of \$39,114,969 for that fiscal year from all sources for all purposes. Expenditures for rights of way, construction engineering, and construction on state highways totaled \$24,743,770. Of this amount \$4,693,307.39 represents the total federal funds ultimately received.

Contrast these figures with those estimated for the Fiscal Year 1957-58. Income from all sources for this period is set at the sum of \$464,247,288. This item includes moneys allotted for federal-aid secondary highways, for state matching money on such projects, also for allocations to cities for major city streets and a few other minor items, leaving a net amount for state highway purposes of \$421,062,057. This 1957-58 budget

assigns \$354,812,051 for major construction and improvements, minor improvements and betterments, contingencies and rights of way. This figure is to be contrasted with the actual expenditure of \$24,743,770 for these purposes in the 1944-45 Fiscal Year.

#### **Increasing Income**

During this 13-year period, California increased its gas and fuel taxes to 6 cents and 7 cents, respectively. In 1939 the Federal Government levied a gas and fuel tax which the 1956 Highway Act raised to 3 cents a gallon. This act also imposed additional excise taxes on motor vehicles and accessories and allotted all these revenues exclusively to highway purposes, with most of the funds being assigned for the construction of the interstate highway system.

By 1954-55 the allowance to California for federal highway aid had grown to the sum of \$38,132,110. The year before Congress had made the first specific allotment for interstate highways and the gross appropriation for all federal aid was stepped up. California received in that year for its part of the interstate system \$515,659. Under the new schedule of taxes and allotments made by the 1956 act, California received for the 1956-57 Fiscal Year a supplemental apportionment of \$57,028,146, making a total of \$66,820,982 for its interstate highways for that year and later had assigned to it for those interstate highways for the 1957-58 period the sum of \$96,947,850.

#### **Federal Aid Funds**

The total federal aid allotment to California for 1957-58 for all federal aid highways in the State is the sum of \$142,656,288, of which \$9,051,859 goes to federal-aid secondary highways.

Under the present California law 87½ percent of this \$9,000,000 goes

to the counties for such work, 12½ percent being retained by the State.

This additional highway financing, has all been reflected in actual on the ground construction. To me it would appear that the general motoring public has accepted these increase in taxes with good grace—and here in California with some satisfaction—because of the construction programs they have engendered. Personally, I believe the fact that there is in this State a constitutional limitation prohibiting diversion of these funds to other than highway purposes, and that there has been a sincere and reasonable attempt to allot these available funds to projects on the basis of actual need, has had something to do with this public acceptance and satisfaction.

In 1945 the members of the California Highway Commission were traveling over the State in an endeavor to acquaint themselves with the State Highway System and the local problems in relation thereto. I recall that we had been warned in advance that the citizens of one county were preparing to give the commission a bad time at one of the local meetings for not doing some substantial construction work in their territory. Fortunately we had the opportunity of talking finances to them before they presented their intended claims. The net result was that they agreed to settle for white lines down the state highways in their county.

Despite all the nine-place figures that I have been citing, and the fact that the state highway mileage has remained very close to our 1943 total of 14,000 miles, the situation financially, in my humble opinion, is not greatly different from what it was prior to the passage of the first Collier-Burns Highway Act in 1947.

#### **Increased Construction Costs**

Increasing unit costs of construction, increasing vehicle registration,



increasing annual travel per car, the continuing influx of population into California, and the higher driving speeds, have created financial as well as traffic problems and structural requirements far beyond what was visualized 20 years ago. What we are trying to do today is to analyze the future on the basis of these factors and to design and construct to meet the requirements 20 years hence; and at the same time, where engineeringly proper, leave room for further lane expansions upon presently purchased rights of way. By this we hope to avoid, as much as possible, future disturbing displacements. At the present moment the reappraised total cost of bringing the entire State Highway System to such a standard has not been completed, but from what we have at hand it is now very evident that even under the augmented income, above indicated, we will require a period of 10 to 13 years before accomplishing that purpose on the present State Highway System.

These recent federal allotments apparently have created the impression in the minds of some of our citizens that we are over-endowed, when the facts are otherwise. Some very influential groups are talking about immediately adding hundreds of miles to the state system, a mileage which will cost an additional billion dollars and more to construct. Some minor additional subventions to local governmental agencies for highway purposes may perhaps be justified, but even here some very important groups are urging substantial increases in the percentages of gas tax funds to be allotted to cities and counties at the expense of state highway requirements.

Under these conditions I do urge forbearance and moderation.

#### **Beautification of Freeways**

There is one other matter which should be touched upon. Individually the members of the California Highway Commission have indicated their willingness to consider beautification in some areas on our major freeways providing a suitable program can be worked out within reasonable financial limits. Immediately we find enthusiasts

talking about roadside garden areas and the placing of rock facades on all our structures, all at the expense of the motoring public.

I fear that such individuals are going to be met with the provisions of Article XXVI of the California Constitution which provides that motor vehicle fuel tax funds "shall be used exclusively and directly for highway purposes."

Even reasonable plantings for erosion control, screening and beautification will require the expenditure of very substantial sums.

Ground cover, trees, shrubs and water systems have an initial cost of \$7,500 per acre with planted areas on freeways running around 15 acres per mile. Maintenance costs are in the neighborhood of \$900 per acre per year. For the present program of erosion control, headlight-screening and a very meager amount of beautification, the Division of Highways spent last year \$2,781,139. Personally I am hoping that this amount can be substantially increased under present financing. I believe that a reasonably augmented and continuing beautification program will meet with the approval of the general public, but I suggest that there is a limit as to what we should do under present conditions and what the Constitution and the motor vehicle taxpayers will permit us to do.

#### **Record 1957-58 Budget**

In the 1957-58 budget, \$340,220,000 has been allotted to specific projects for immediate construction and for right-of-way purchases in preparation for future construction. The allotment in this budget to noninterstate highways has been increased by \$12,000,000 over the 1955-56 figure. The outlook is that percentage-wise this relative increase will be even greater in future budgets. Incidentally, this is the first budget in which every county in the State is included for a substantial undertaking.

#### **District VII**

Looking at District VII we find that Cahuenga Pass as a joint city-state and WPA project, and the Pasadena Freeway as a state project

had been completed and were in operation at the time the commission as presently organized went into office. Since that time, and in accordance with a priority system informally worked out jointly with the City of Los Angeles and numerous quasi-public organizations of that county, funds were first concentrated on the Hollywood Freeway, with the Santa Ana and San Bernardino Freeways next being started and extended. As of this date the Hollywood has been completed almost to the junctions of the Ventura Freeway with the Riverside Freeway. The 1957-58 budget provides for substantial work at that junction and also for construction across the intersection of the Ventura Freeway with the San Diego Freeway.

The Santa Ana Freeway in the past 13 years has been completed to a point south of Tustin, with construction about to be carried to El Toro Road, approximately 11 miles south of Tustin.

The San Bernardino Freeway has been completed to the eastern boundary of the district, and in District VIII this freeway has been extended, under construction, or budgeted to Colton. It has an extension completed, or under construction, or budgeted on US 91 northward through San Bernardino to Barstow, and an extension eastward which, with exceptions of the section between Colton and Redlands and two pieces in the vicinity of Beaumont, has been carried into the Coachella Valley near Indio.

#### **Long Beach Freeway**

The Long Beach Freeway will be completed by the 1957-58 allotment, while the Harbor Freeway will have been completed to 124th Street, with an additional 2.8 miles completed at the San Pedro end, leaving a gap of nine miles yet to be financed.

The Ventura Freeway has been cleaned up westerly of Calabasas by the allotment going to a section easterly of Camarillo. The Golden State Freeway, with the new project in District VI at Grapevine, will be placed in excellent condition from the Tunnel Station Interchange north of San Fernando to a point just southerly of Bakersfield.

From the facts at hand, it is very apparent that western Los Angeles County and also the San Fernando Valley will have to have early relief. With this in mind, the Golden State Freeway from the Olympic Freeway north has received and is receiving substantial financial attention. There is a section just north of the Pasadena Freeway that is not presently financed though the freeway route has been adopted. The two latest budgets (1956-57, 1957-58) have assigned a total of \$23,000,000 for the purchase of rights of way on the Olympic Freeway between the Santa Ana Freeway and La Cienega Drive, while at the November meeting of the commission the route from La Cienega westerly to Santa Monica was adopted.

It is going to take early work on the Hollywood extension and on the Riverside Freeway to and through San Fernando Valley to connections with the Golden State Freeway to properly take care of the traffic going to and from that portion of Los Angeles County.

There are many other projects requiring early attention but to get usable units constructed some of them will have to wait a little longer. It is going to take at least 10 years and a

billion dollars to work up the Los Angeles County part of the District VII freeway system, so you have plenty to look forward to and considerable action coming up.

#### District IV

The situation in the City and County of San Francisco has been primarily physical and political rather than financial. The present community thinking there on the matter of freeways is about where the thought was 10 years ago in other California metropolitan areas. A little time and a little patience will clear the atmosphere but I must say that the planning bodies of San Francisco have for many years realized the public necessity and economic value of an adequate freeway system in San Francisco and its relation to other transportation facilities.

The Bayshore Freeway and the Skyways in San Francisco on US 101, US 40 and 50, have been completed from the county line to the Bay Bridge. A spur on US 101 is completed or financed across Market Street and a spur on Route 224 (the Embarcadero Freeway) is financed and, after numerous delays, the construction contract has been signed and work started. The seagoing free-

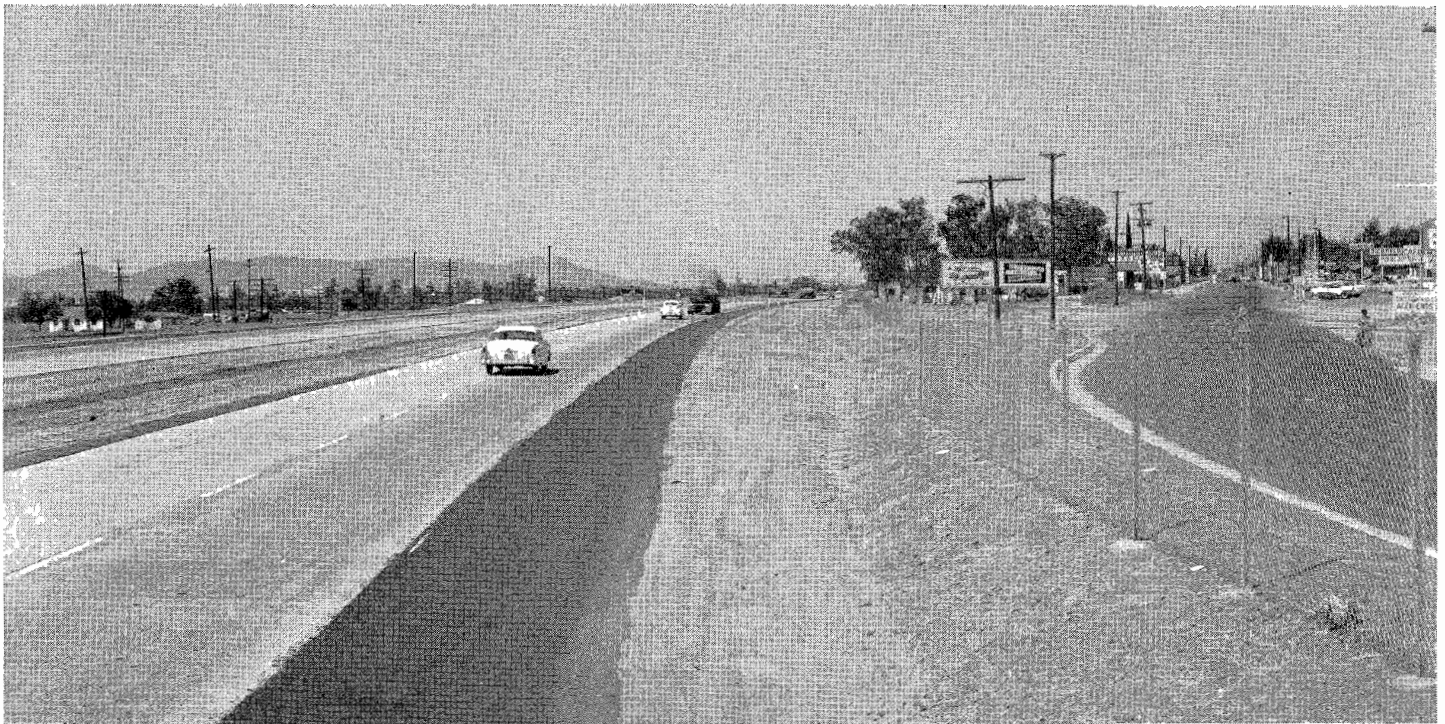
way around South San Francisco is being completed under the 1956-57 budget.

#### North of San Francisco

Looking to US 101 north of San Francisco, we find the north approach to the Golden Gate Bridge completely constructed and a freeway constructed, under construction, or budgeted to a point north of Santa Rosa except for bits of work yet to be done north of San Rafael and in the vicinity of the junction with the San Quentin lateral.

On the east side of the bay, the Eastshore Freeway is constructed, or financed, from the Eastbay Interchange south to a connection with US 101 at San Jose, the incompleted section north of Warm Springs being included in the 1956-57 budget. There is an easterly spur leaving the Eastshore Freeway in the neighborhood of San Lorenzo which, with the work now under way or financed, provides a freeway from Tracy into the downtown section of San Francisco.

There are serious highway problems in Santa Clara County due to the major industries that are being located north and west of San Jose, and substantial efforts in the future will have to be made to complete



Recently completed Banning Freeway on US 99 in Riverside County



Arrow points to first unit of Embarcadero Freeway in San Francisco now under construction

the Bayshore Freeway (US 101) from the north Santa Clara County line to San Jose and to break open State Route 5 from the north city limits of Los Gatos to a junction with both the Eastshore and the Bayshore Freeways.

#### US 40

We will now look at US 40 between San Francisco and the state line near Floriston. There is some work to be done on this highway just south and east of Richmond, the

El Cerrito structure, to provide an interchange for the lateral which goes to the Richmond-San Rafael Bridge, but with that exception US 40 is financed to the Yolo Causeway. This causeway will soon have to be replaced and a route change necessary for this purpose was adopted by the commission at its November meeting.

The ultimate routing of US 40 through Sacramento has not been determined, but from Sacramento to a point east of Roseville we have a recently constructed freeway. From

this point to the state line there is a very substantial amount of work to be done both physically and financially. East of Roseville there are several sections which have not been reconstructed to expressway standards or better. They are as follows:

- (a) East of Roseville to east of Newcastle;
- (b) West of Gold Run to Hampshire Rocks;
- (c) Soda Springs to Boca, a point seven miles east of Truckee, and from there to Floriston.



The 1960 Winter Olympic Games at Squaw Valley have presented the problem of providing a highway escape route which would be necessary to avoid catastrophe in the event of a Sierra blizzard occurring during that meet. Accordingly, the 1957-58 highway budget sets up the sum of \$350,000 for the construction of detours through the Truckee River Canyon looking toward the probable inclusion in the 1958-59 budget of funds to construct the section from Boca to Floriston to full freeway standards.

On Sign Route 89 \$1,450,000 has been set up to provide a four-lane undivided highway from 2.1 miles south of the Squaw Valley Road junction to the Truckee Y on US 40 and, without present commitment, we are hoping that we may be able to provide in the 1958-59 budget funds to four-lane this route from Tahoe City to the Squaw Valley junction point.

#### **US 101 South of San Francisco**

We have a full freeway on the Bayshore financed to the Santa Clara line, a four-lane undivided section to the junction of the Eastshore Freeway and the northerly end of the San Jose bypass. South of the bypass to South of Morgan Hill we have a four-lane divided section which needs early attention, but priority attention will have to be given to the reconstruction of the section of the Bayshore north and west of San Jose and the section of Route 5 south and west of that city.

The freeway on US 101 from north of Gilroy to south of Chualar is built to expressway standards or better, but, with the exception of budgeted sections south of Soledad and between Greenfield and King City, we have the old coast route to a point north of San Miguel. From here to Ventura US 101 is in fair shape except for sections at Santa Maria, between Zaca and Buellton, southeast of Gaviota, at Goleta, and between Carpinteria and Ventura.

South of Ventura we have constructed or financed freeway, expressway, or four lanes divided to the Mexican border except for sections from Calabasas to the Holly-



*This photo shows completed section of Roseville Freeway in Sacramento County*

wood Freeway, south of Irvine, San Juan Capistrano to San Clemente, a short section north of San Onofre and sections at Encinitas, south of Del Mar and through the City of San Diego.

While we have four lanes divided from Carlsbad to San Diego, except as noted, a full freeway route for ultimate construction between these points has been given intensive study without yet reaching a decision.

#### **US 99**

Condition of this route is getting into fairly good shape. The south freeway entrance to Sacramento is yet to be financed although the route has been adopted. We then find unfinanced sections at Lodi, Modesto, Turlock, Merced, and a seven-mile section of three-lane highway immediately south of the San Joaquin River in Fresno County. A relocation of US 99 at Bakersfield is now under consideration and an alignment, when adopted, will be built to full freeway standards. There is a further gap between San Fernando and Burbank and a short strip just north of the junction

with the Pasadena Freeway, but we are getting very close to having the longest completed expressway in California which will include many full freeway sections. The short section through Lodi will not have to be reconstructed for several years because the present highway is there six lanes wide. The freeway route alignments through Modesto and Merced have been adopted and satisfactory progress is being made on the freeway agreements. Right of way is being purchased on the new alignment of the Fresno County section against possible construction being provided for in a later budget.

#### **US 101 North of San Francisco**

Traffic on the south end of this route is quite heavy, gradually diminishing from 40,000 vehicles per day just north of the Golden Gate Bridge to 8,000 vehicles per day at Geyserville. As previously pointed out, freeway and limited access construction has been extended to north of Santa Rosa except for short gaps near San Rafael and at the San Quen-

tin Y leading to the North Bay Bridge.

North of Geyserville traffic volumes are spotty, with the majority of the counts in the 5,000 to 6,000 bracket per day. However, there are volume high spots at Ukiah, Garberville, Alton, Fernbridge to Arcata, and at Crescent City. The grades on this northerly section of US 101 and the nature of the terrain, taken together with the variation in traffic volumes, have made necessary spot undertakings rather than continuous expressway extensions. Accordingly, we have expressway undertakings on the Ridge-wood grade between Ukiah and Willits, at Arnold, at Dyerville, and with rather extensive semicontinuous work between Scotia and the junction of US 101 with US 299 north of Arcata. There is another spot project budgeted north of Trinidad.

Early this year, after long study and with the approval of the Division of Beaches and Parks, the California Highway Commission adopted a recommended freeway route between the Mendocino County line and Jordan Creek, a short distance south of Scotia. The first section of construction on this new freeway is a 4.2-mile unit extending from one mile south of Dyerville to Englewood and is financed with state highway funds matched by a special legislative appropriation. A continuation of this matching policy for construction of this freeway, which by-passes but still provides excellent access to the local communities and to these magnificent redwood groves, will speed up construction through this rugged portion of Humboldt County and will materially benefit the state parks and entire Redwood Empire.

#### **US 99 North of Sacramento**

North of Sacramento US 99 is split into two alignments designated "99-East" and "99-West." The routes join again at Red Bluff. The major expressway development on this highway begins at Anderson, 11 miles south of Redding, and continues north of Redding to Shasta Lake. Freeway construction has also been commenced through the rugged Sacramento Canyon. An additional seven-mile section north of Lamoine will be advertised

this December, the 1957-58 budget allocating the sum of \$4,520,000 for that construction.

Summing up, as of November 15, 1956, the State had 1,592 miles of completed multilane divided highway and an additional 319 miles under contract or advertised for bids. Some 200 miles more of multilane are included in the 1957-58 budget for a total of 2,111 miles.

This total includes 318 miles of full freeway with an additional 230 miles under construction or advertised. The State also has 803 miles of expressways with an additional 89 miles of expressways under construction or advertised, with the remaining 671 miles being four-lane divided construction.

It is to be noted that all of the 319 miles of multilane divided highway now in the mill for construction are designed to full freeway or expressway standards. All in all, we have in California, constructed or under construction as full freeways or expressways, a total of 1,440 miles of highway, but this is barely 10 percent of the entire State Highway System.

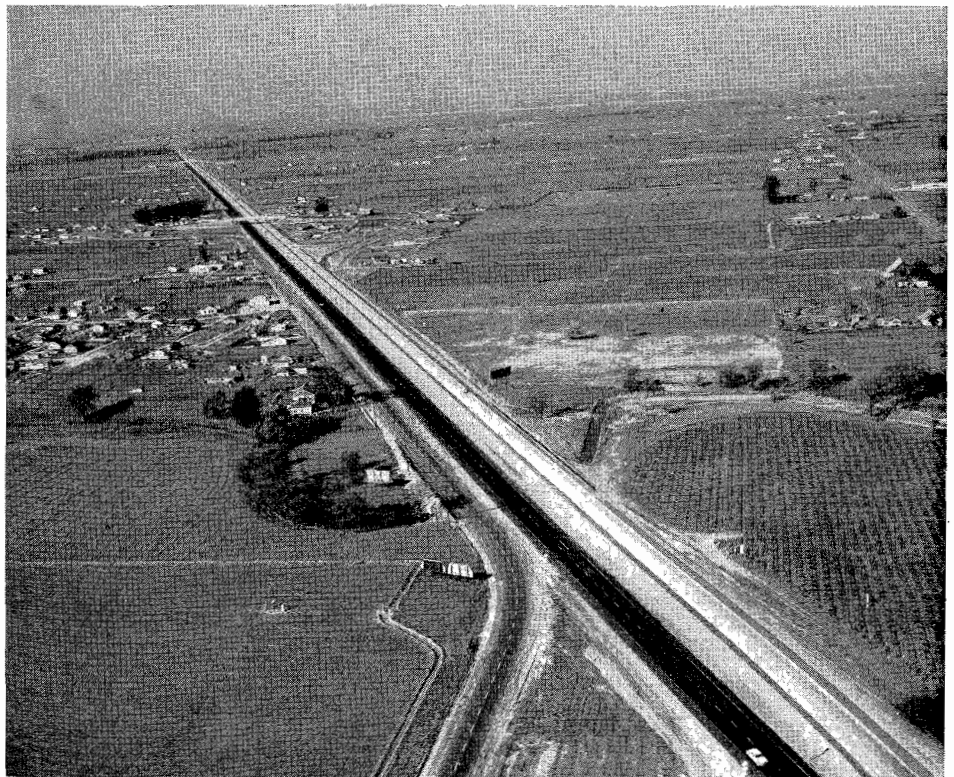
#### **Much Work to Be Done**

Again making comparisons, on July 1, 1945, there were but 329 miles of multilane divided highway in California, most of which would now be considered substandard and practically none of it then under access control. As above pointed out, we presently have completed or have in the mill for completion 1,911 miles of freeways or expressways, approximately six times as much as we had 13 years ago.

The foregoing is but a brief sketch of what has been done and what is immediately programmed for our highways. Obviously, there have been substantial amounts of work done over the State which are impossible to here note. Looking to the future, I would say that there is yet a tremendous amount of work to be done in California both from the standpoint of planning and actual construction.

The Division of Highways and the members of the California Highway Commission have in mind a general view of what the freeway system of the State should be. The actual locations of many sections of that system

*This section of the Sacramento-Lodi Freeway on US 99/50 is between Galt in Sacramento County and Lodi in San Joaquin County*



have not been precised. Under the circumstances, the commission looks forward to a multitude of freeway hearings and the Division of Highways has a problem of location studies preparatory to recommendations that is staggering to one who is familiar with the studies and procedures involved.

It has been said that if all the persons who are interested in a particular location problem were laid end to end, each would be pointing in a different direction. This seems to be true to one who has been on the Highway Commission as long as I have.

#### Adequate Highway System Essential

It would appear to me that an adequate State Highway System, including a system of freeways completely joining and traversing the major areas of the State, is absolutely essential to the economic growth and welfare of the State. Those who are far-sighted enough to see what the problem is, and to assist in solving it, will be rendering valuable contributions to the general public welfare. In each of these problems the members of the Highway Commission and the Division of Highways are very much concerned with getting all the facts regarding each particular undertaking from every possible source. So far as the commission itself is concerned, even after a recommendation for a freeway location has been made by the State Highway Engineer and the public hearing has been held by the commission, still we search for and seek out additional information to cover every material point of issue that has been raised. Long before the passage of the Hegland Bill or the present Federal-aid Bill, the commission has vigilantly concerned itself with the analysis of the economic impact of each possible freeway location upon the community traversed. I am very sure that in all our doings no consideration will be given to factors other than finances, traffic service, economic benefits and detriments, certain humanitarian factors and the ultimate welfare of the State with the least possible detriment to individuals. It is unfortunate that we

cannot build highways without taking property for that purpose.

There has occasionally been a reason for adopting a line other than that recommended by the State Highway Engineer. These, of course, have been very few because of the meticulous studies made by the Division of Highways in advance of recommendation.

I assure you that in the absence of changes in the laws of our State, the California Highway Commission will continue to act as an independent collateral board of appeals in the Department of Public Works to which communities may prefer their suit in the event that they feel they are distressed by a route recommendation made by the State Highway Engineer.

#### LETTER FROM TOKYO

K. C. ADAMS, *Editor*

DEAR SIR: I wish to take this opportunity to express my sincere thanks for the privilege of receiving your splendid publication.

I am a young civil engineer of the Planning Division of Japan Highway Public Corporation which was recently organized by the Japanese Government for the construction and supervision of a toll express-highway in Japan.

I am very much interested to find that *California Highways and Public Works* is one of the most valuable magazines for our engineering work. After reading the magazine, I circulate it among a number of our men and I keep a file of them as I am referring to them in my work.

May I thank you very much for your kindness in sending the magazine to me.

Your very truly,

T. AIZAWA  
Japan Highway Public  
Corporation  
Tokyo, Japan

#### MERIT AWARDS

*Continued from page 46 . . .*

tion recommending the discontinuance of hand lettering of the word "California" in the location portion of the title blocks on standard drawing sheets. Not only reduces drafting time and checking time, but liberates the space for more pertinent data.

#### COST INDEX

*Continued from page 53 . . .*

eight to seven items in the computations for this period. The items of plant-mixed surfacing and asphalt concrete pavement have been consolidated under the heading of asphaltic and bituminous mixes. Construction methods and bid prices for the two items have been so nearly uniform that it is believed the previous separation is no longer necessary.

Four of the seven construction items show a decrease during this period; two items show an increase and the item of roadway excavation remains the same as last period. Untreated rock base dropped \$0.06 to \$2.21; asphaltic and bituminous mixes dropped \$0.19 to \$5.93; portland cement concrete pavement is down \$0.62 to \$14.95 and bar reinforcing steel is lowered slightly to \$0.112, a drop of \$0.009.

Reductions in cost represented by the foregoing items were offset by Class "A" portland cement concrete for structures which rose \$3.31 to \$59.63, a price higher than at any time in the history of this index, and structural steel which increased \$0.019 to \$0.197, a price still under the second quarter average.

All reductions in average prices are fairly small and these reductions are without doubt reflections of the proximity of projects to material sources. The increase in structure concrete is not readily explainable but it is believed that some of the increase is related to the availability of form labor and higher transportation rates. Structural steel price increases are largely the result of higher rail rates.

#### WILLIAM A. BUGGE

*Continued from page 51 . . .*

hereby extends after the twenty-fifth year of meritorious public service these congratulations and good wishes for a long and happy continuance in this chosen field of work."

California Division of Highways personnel receiving the awards are:

George Langsner, District Engineer, Los Angeles; H. S. Miles, District Engineer, Redding; H. C. McCarty, Office Engineer, Sacramento; Frank C. Balfour, Chief Right of Way Agent, Sacramento; A. L. Elliott, Bridge Engineer, Sacramento, and J. E. McMahon, Bridge Engineer, Los Angeles.



# District II

## Highway Construction in North in 1956 Reviewed

By H. S. MILES, District Engineer

### SISKIYOU COUNTY

The 5.6-mile section of Scott Valley Road from Moffett Creek to Fort Jones was completed. This is the third contract and there is now a completed section of highway of about 9.5 miles extending from Fort Jones across Forest Mountain Summit toward Yreka. This represents an expenditure of over \$1,200,000.

There still remains a section of about 5.4 miles in length to bring the improvement down to Highway 99.

Surveys have been completed and plans are under way to close this gap. It will probably be covered in two contracts.

Just south of Yreka there is a going contract costing \$552,000, covering 4.7 miles of Highway 99. This contract was let in late 1955. Grading and structures are completed and surfacing started; it will be completed in 1957.

South of Fort Jones, in Scott Valley, a job costing \$951,500 is under way. This is largely a relocation necessitated by damage sustained by the existing highway due to last winter's storms. Most of the grading is complete and the structures in place. It will be finished in 1957.

About \$20,000 was spent this season for surfacing between Mt. Shasta and Dunsuir.

In December of this year bids were opened for improving about one mile of road between 4.5 and 5.5 miles east of Hamburg on the Klamath River Road. This closes a gap left when the road was improved as a mineral access road during the war. The land was under lease to be mined and operations were scheduled to start. It was never mined and it remained as the worst portion of the road between Highway 99 and Seiad. Low bid on this work was \$127,396.

While the work in Sacramento Canyon so far performed has been in Shasta County, the importance to Siskiyou County is very great.

### MODOC COUNTY

In Modoc County, 18 miles of the Adin-Tulelake Road was sealed at a cost of about \$35,000. Also about eight miles on the west end of the road over Cedar Pass to Surprise Valley was covered by a contract let late in the season. This provides surfacing for the grading performed by honor camp forces and is in the amount of \$106,000. It was considered too late to start work this year.

An eight-mile section of highway between eight miles east of Adin and the Pit River Bridge on the Redding-Alturas Road received some base reinforcement and a complete resurfacing under a \$210,000 contract just completed.

### LASSEN COUNTY

A \$302,000 contract let late in 1955 and completed this year, closed a 3½-mile gap on Route 395 between Madeline and Likely. This covered what was probably the worst spot remaining on this section between Susanville and Alturas.

From Madeline, a section to the north 21.5 miles long was sealed. This cost \$142,000 and came to within seven miles of Alturas.

To repair damages sustained during last winter's storms, two contracts were awarded for repairs of Long Valley Creek structures on the road to Reno. One entirely new structure was built at a cost of \$120,000 and two others repaired at a cost of \$101,000.

### PLUMAS COUNTY

A repair job consisting of restoration of a fill and culvert washed out last winter at Bardee Creek was completed. It was only three-tenths of a

mile long but cost \$130,000. This was on the Feather River Highway about two miles west of Pulga, but is actually in the small portion of Butte County contained in the Redding District.

A contract covering some paving and storm drainage corrections in Greenville was completed at a cost of \$38,000. This job was awarded last year but not completed and was finished this season.

A surface treatment partly in Plumas County west of Delleker and Feather River Inn in Plumas County and from Secret Valley to Ravendale in Lassen County was completed, the cost was \$447,000 and extended over 17 miles.

From Indian Creek on the Feather River to about five miles east of Quincy a light bituminous blanket was placed on 17 miles of surfacing. This work ended at the beginning of the contract completed by the Bureau of Public Roads.

Within the last month the department has opened bids on two jobs in Plumas County. One is a 5.2-mile section of new location between 0.7 mile north of Spring Garden to Sloat. This extends from the southerly end of work completed this year by the Bureau of Public Roads. The low bid was \$1,218,856.

The other job provides placing tunnel linings in areas of three tunnels in the Feather River Canyon. These areas have leaked considerable water in wet weather and it is anticipated that the current contract will correct this trouble. Low bid was \$55,404.

### TEHAMA COUNTY

A minor improvement was completed near the Tedoc Road on the Red Bluff-Alton route at a cost of \$27,000.

Ten miles of seal coat from the Butte County line to Los Molinos on

Highway 99E and 14 miles just east of Paynes Creek on the road to Susanville were completed at a cost of \$33,000.

A bituminous blanket covering about 14 miles from Proberta to Red Bluff on Highway 99W and then north to Nine Mile Hill was completed at a cost of about \$92,000.

During December the department has opened bids on two jobs contained in the 1957-58 Budget in Tehama County. The first of these is on the Red Bluff-Susanville Road. It calls for complete reconstruction of 6.2 miles between 1.5 miles east of Lassen Camp and Mineral. Low bid was \$1,129,956.

The other project is on the Red Bluff-Alton Highway beginning 3.2 miles east of Tedoc Road and extending to Dry Creek. It is 6.2 miles in length and also calls for complete reconstruction. It joins the work completed to the west in 1955. Low bid was \$613,779.40.

#### SHASTA COUNTY

During this summer, two contracts covering reconstruction of the highway on the west side of Hatchet Mountain were completed. These were let in 1955 and represented an expenditure of about \$1,200,000.

East of Redding on Highway 44, a paving job from Palo Cedro covering eight miles of the road westerly toward Redding was completed at a cost of \$49,000.

Nearer town a project for widening the highway from the Sacramento River Bridge easterly one-half mile was covered by a contract awarded in November. This has not been completed.

In Redding, Eureka Way was widened and paved from the Southern Pacific overhead westerly about 1.5 miles. The cost of this improvement was about \$186,000 and the relief afforded traffic was immediately apparent.

Up the Sacramento River Canyon, above the relocation around Shasta Lake, three contracts let in 1955 have been completed. These cover construction of 6.5 miles of road and a new bridge over Dog Creek. Total cost was about \$4,000,000.

## In Memoriam

### FRANK J. ESCOBEDO

The Department of Public Works was shocked and saddened by the untimely death on January 27th of Frank J. Escobedo, Assistant Deputy Director. Frank suffered a heart attack while playing tennis on that date and passed away in Sutter Hospital in Sacramento.

Director of Public Works Frank B. Durkee on September 1, 1954, appointed Escobedo personnel officer of the Department of Public Works. At that time Escobedo was finishing a two and one-half year term as personnel director for the City of Philadelphia. Prior to going to Philadelphia at the request of Mayor Joseph S. Clark, Jr., now a United States Senator, to establish a civil service system, Escobedo had been in state service in California for 14 years as personnel officer of the State Relief Administration, later with the Social Welfare Department and for five years before going east, with the State Board of Equalization. During World War II he had three and one-half years' personnel experience in the United States Army, in which his last assignment was battalion personnel officer and adjutant. In July, 1956, he was promoted by Durkee to the post of assistant deputy director.

Frank was born in Santa Monica, California, in 1915. He was graduate of the University of California at Berkeley, where he also completed graduate study in the Bureau of Public Administration.

Frank leaves a widow, Constance, and a three-year-old son, John.

Bids were opened in November on another section 6.9 miles in length immediately to the north. Low bid on this was \$4,605,588.

It is incidental that the work in the canyon is in Shasta County because its benefits are state-wide. It is the only north-south interstate route north of San Francisco and upon completion of the interstate system will be of national importance.

## In Memoriam

### JOSEPH M. KANE

Joseph M. Kane, Assistant Office Engineer for the Division of Highways until his retirement last August, died suddenly of a heart attack at his home on January 24th.

Kane came to work for the division in 1927. During his long career he supervised the preparation of individual job specifications on more than two billion dollars worth of highway construction. He had charge of the production of the division's "Standard Specifications" for more than a quarter of a century. These specifications set up standards governing the execution of all highway construction work done by or for the division and have served as a model for other organizations being used extensively as a reference by other state and federal government agencies.

Born at Genoa, Nevada, Kane attended public schools there and in Carson City. He studied engineering at the University of Santa Clara and later at the University of California, where he received a B.S. degree in engineering in 1918.

Kane's first professional employment as an engineer was with the Nevada Department of Highways where he became chief testing engineer and later office engineer. He came to work for the California Division of Highways in 1927.

Kane served as a second lieutenant in the U. S. Army during World War I and was Past Commander of the American Legion, Department of Nevada. He was a member of the American Society of Civil Engineers.

Kane is survived by his wife, Doris.

### TRAFFIC WEAVER

Don't be a traffic weaver. Weaving from lane to lane on a busy highway you may gain a few minutes in traveling time. You may also lose your life.

### MONEY FOR ROADS

In 1893 Congress appropriated \$10,000 for the establishment of an Office of Road Inquiry, reports the California State Automobile Association.

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