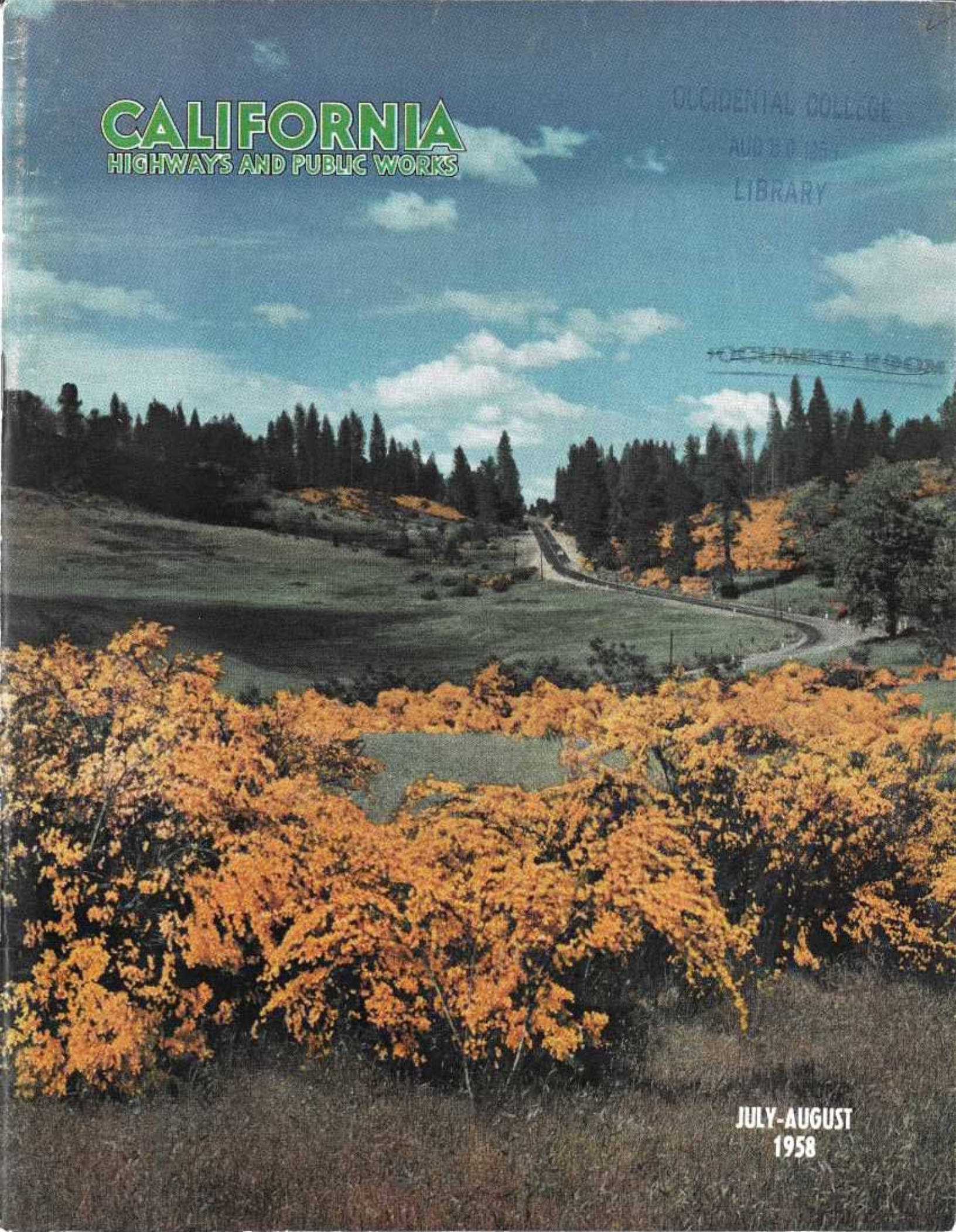


# CALIFORNIA

HIGHWAYS AND PUBLIC WORKS

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# California Highways and Public Works

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

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## FRONT COVER

Broom in bloom. State Route 93 winds its way through patches of this colorful and prolific import from Scotland. This scene near Georgetown is typical of a wide area of the Sierra foothills in the spring.

—Photo by Bill Ruland



## BACK COVER

The Mather Lode Highway (State Route 49) crosses the Stanislaus River over this bridge located at the Calaveras-Tuolumne county line between Sonora and Angels Camp.

—Photo by Robert Ross

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# Report From District III

By ALAN S. HART  
District Engineer

DISTRICT III is composed of 11 counties (Butte, Colusa, El Dorado, Glenn, Nevada, Placer, Sacramento, Sierra, Sutter, Yolo, and Yuba) lying in the northern portion of the Great Valley of California and in the Sierra Nevada region north and south of Lake Tahoe. It contains 12,688 square miles which is serviced by 1,374 miles of state highways.

The district is faced with every type of planning and construction problem, except a desert, found anywhere in the State. It contains metropolitan areas and small villages, rugged mountains and marshy lowlands, regions of extreme cold and regions of subtropical climate, large rivers (the largest in the State) and dry washes (that can become raging torrents in a matter of hours), and, above all, it has demands for increased highway capacity on its highways, caused by an unprecedented population growth in the past decade.

#### Major Routes Listed

The state highway network provides two major north-south routes and three east-west routes that cross the Sierra Nevada Mountains within the district. A fourth such trans-Sierran route passes through the district and crosses the mountain chain just to the north in District II. One north-south and one east-west route have been designated as a part of the Federal Interstate Highway System. A short section of a second north-south interstate route is also within the district.

The main north-south interstate route in the district enters the district

at the Sacramento-San Joaquin county line and proceeds northward through Sacramento to Woodland and then generally parallels the present Highway US 99W until it leaves the district at the Glenn-Tehama county line. The second north-south interstate route referred to connects the east-west interstate route near Vacaville with the north-south interstate route near Dunnigan. This connection is to provide a more direct connection for traffic between the Bay area and the Pacific Northwest.

Planning for the improvement of the many miles of highway in the district, many of which will never be graced with the title of freeway, is progressing satisfactorily. However, major emphasis in planning matters is being directed to the two interstate routes.

#### US 40 Progress

Primary emphasis has been placed in the past year, and is still being placed, on the east-west interstate route, Highway US 40. This highway enters the district at the Sacramento-Solano county line and leaves the district in Sierra County on the eastern slope of the Sierra Nevada Mountains at the Nevada state line. In addition to being an integral part of the Interstate Highway System, this route will also be required to service the many thousands of motorists that plan to attend the 1960 Winter Olympic Games to be held in Squaw Valley, near Truckee. Every effort is being made, with financing available, to convert as many miles of this highway as possible to a four-lane freeway prior to February, 1960. It is realized that all of the route

UPPER—The Camino Bypass on US 50 in El Dorado County. LOWER—State Route 93 in the vicinity of Georgetown, El Dorado County.

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Public Works Building  
Twelfth and N Streets  
Sacramento

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## REPORT FROM DISTRICT III

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cannot be completed by this time and that gaps will exist from one-half mile west of Monte Vista to Hampshire Rocks and from Soda Springs to the east end of Donner Lake. All projects—there are nine of them now under construction or advertised for bid during the 1958 construction season—will be placed in service prior to the games.

Contracts presently under construction, or offered for bid, and certain of completion before the end of the 1959 construction season, will provide 61 miles of uninterrupted four-lane divided highway (most of it to freeway standards) from Sacramento to one-half mile west of Monte Vista. The major gaps in the route occur in the next 40 miles where only six miles of freeway is currently under construction (Hampshire Rocks to Soda Springs). Twenty-one continuous miles of four-lane freeway will be available from the east end of Donner Lake to the Nevada state line with the completion of the contracts now under way. These nine contracts with the addition of the construction of two major detours, call for the expenditure of approximately \$48,500,000.

### Freeway Completed

Four of the nine contracts will be completed this construction season. Two of these were opened to traffic on June 24, 1957, and were the first full freeways to be completed in Northern California under the Federal Highway Act of 1956. One is the 3.6-mile section from one mile east of Newcastle to Elm Avenue in Auburn. The road was opened to traffic with appropriate ceremonies under the sponsorship of the Auburn Area Chamber of Commerce. Baldwin Contracting Company and H. Earl Parker, Incorporated, of Marysville were the joint contractors on the project which cost approximately \$2,570,000.

The second contract completed on this date was a 6.1-mile section from Heather Glen to Colfax. The Colfax Chamber of Commerce held a dedicatory ceremony for the opening of this section the afternoon of June 24th. Portions of this section were already being used by traffic prior to comple-

tion of the entire project. McCammon-Wunderlich Company and Wunderlich Construction Company of Palo Alto are the joint venture contractors for this \$3,842,000 project.

The 5.8-mile section of freeway from Colfax to the Magra Overhead crossing of the Southern Pacific east of Colfax, is planned for use by the traveling public some time in October of this year. Fredrickson and Watson Construction Company and Ransome Company of Oakland are the joint contractors for the project. The final construction cost for this portion of the route will be approximately \$4,035,000. Starting with this project, and continuing for the remainder of the route over the mountains the traveled way is to be of Portland cement concrete.

The fourth project to be completed on Highway US 40 this year will be from near Floriston to the Nevada state line. When completed in August, this section will provide 5.4 miles of four-lane freeway through the Truckee River Canyon. Gibbons and Reed Company of Salt Lake City are the prime contractors for this project that will cost approximately \$5,420,000. Careful planning by the contractor and the Resident Engineer for the Division of Highways avoided the anticipated long delays to traffic in the narrow canyon.

#### **Detours Constructed**

To avoid other anticipated major delays to traffic through particularly rugged terrain on this major transcontinental route during future freeway construction, two extensive detours were constructed. The first of these, from near Monte Vista to Alta, was completed in 1957 by Fredrickson and Watson Construction Company of Oakland at a cost of \$422,000. The second such detour, from near Boca to near Floriston, in the Truckee River Canyon has just been completed. H. Earl Parker, Incorporated, of Marysville is the contractor for this project which will cost approximately \$564,000.

Five contracts to construct sections of this route to freeway standards were provided for in the 1958-59 Budget. All of these contracts have been let or advertised, at the present



*This section of freeway on US 99-50 south of Sacramento will be completed this summer. The Elk Grove Road Interchange is in the foreground; the City of Sacramento on the horizon.*

time, and are expected to be completed by the end of the 1959 construction season.

The last of the five contracts, calling for the construction of 11.1 miles of freeway south of the existing highway between Roseville and Newcastle is now advertised and bids are to be opened on July 16th. This section will provide 12 structures, seven of which will provide for the interchange of traffic, and one that will be

an underpass at the Southern Pacific Railroad in Newcastle.

Bids were opened late in May for the construction of an additional 4.5 miles of freeway in the vicinity of Gold Run. The low bidder for this work was a joint venture of Fredrickson and Watson Construction Company and Ransome Company of Oakland with an offer that will cost approximately \$2,880,000. This section will join the portion now under con-



*This photo shows paving operations in progress on the US 40 freeway in the Truckee River Canyon between Floriston and the Nevada state line. It is scheduled for completion this summer.*

struction between Colfax and the Magra Overhead. The first structure on the new contract, the Alpine Interchange, will actually extend into the limits of the previous contract, but is being done at this time, rather than at a future date as originally planned, to insure there will be no crossings at grade between Illinois-town, west of Colfax, and the Nevada state line.

#### **Snow Delays Work**

A six-mile section is now under construction between Hampshire Rocks and Soda Springs at a cost of about

\$5,392,000. The heavy snow of the past winter has delayed the start of work until this time. The contracting on the project is again a joint venture composed of Clyde L. Wood, Incorporated, Kirst Construction Company and Alwood Corporation or North Hollywood.

The two remaining interstate projects under way are east of the crest of the Sierra Nevada Mountains. One, from the east end of Donner Lake to near Boca, east of Truckee, will provide 8.8 miles of freeway at an approximate cost of \$8,136,000. Fredrickson and Watson Construction

Company and Ransome Company of Oakland are again the contractors. The contract calls for the construction of structures in 11 locations, a truck scalehouse, and preliminary work for the ultimate construction of an agricultural inspection station.

The other contract will complete the 21 miles of freeway east of the Sierra Nevada from Donner Lake to the Nevada state line. This section from near Boca to near Floriston, a distance of 6.7 miles, is being constructed as a joint venture by Isbell Construction Company of Reno in conjunction with Granite Construc-

tion Company of Watsonville, and Gordon H. Ball and Gordon H. Ball, Incorporated, of Danville. The approximate cost will be \$7,420,000.

Plans are being prepared for the remaining 34 miles of this route between Sacramento and the Nevada state line that will permit construction when financing is made available. The estimated cost to complete the conversion of the entire 122 miles of the route to a four-lane facility is \$48,000,000.

#### Other Routes

Closely allied to the development of Highway US 40 and to the 1960 Olympic Games is the widening of State Sign Route 89 from 0.2 mile south of Squaw Valley Road to the Donner Creek Railroad Underpass. When completed, this project will provide a 40-foot all-paved roadway from 8.3 miles. This widened section of highway, together with the anticipated traffic controls at the time, is planned to handle the tremendous volume of traffic during the periods when visitors are entering and leaving the games site at Squaw Valley. Fredrickson and Watson Construction Company and Ransome Company are the prime contractors for this \$1,400,000 improvement that is scheduled for completion in December of this year.

West of Sacramento, plans for the improvement of US 40 are being prepared. These plans include interchanges for Davis and County Road 104 and a new causeway over the Yolo Bypass.

Work on the north-south interstate route is only beginning. The first actual construction on this route was completed in August, 1957, and provides four lanes of freeway on US 99W from High School Road through Arbuckle to Salt Creek. This required the depressing of the highway through Arbuckle to provide for grade separation at Hall Street. The 1.6-mile section was constructed by Fredrickson and Watson Construction Company of Oakland at a cost of approximately \$1,324,000.

Public meetings have been held, and the freeway route adopted, for the 23-mile section from two miles south of Willows to the Tehama county line.

On the short section of interstate highway in the district south of Dun-



*This view eastward shows the four-lane interim improvement on US 50 between Sacramento and Alder Creek. Nimbus Dam and Reservoir is to the right.*

nigan, a contract was let this year to a contracting group consisting of Gordon H. Ball, Gordon H. Ball, Incorporated, and Ball and Simpson of Danville to grade, place base material, and erect the necessary structures for two lanes of an ultimate six-lane freeway from the Solano county line to near Madison, a distance of 13.4 miles. Surfacing and the construction of the additional lanes will be done under later contracts. This new route lies east of the present State Route 90, the more commonly known Vacaville-Dunnigan Cutoff. This stage of the construction is scheduled for completion by the end of December.

#### Freeway Resolution Adopted

Two lanes of expressway have been constructed on this route through a four-mile section between 2.7 and 6.7 miles north of Madison. A freeway resolution has been adopted for the remaining five miles of this route to its junction with Highway US 99W, the other north-south interstate route in the district.

The conversion of Highway US 99-50 to full freeway standards from the San Joaquin county line north to Sacramento is rapidly approaching the ultimate development as presently planned. A. Teichert and Son, Sacramento contracting firm, plan to finish two contracts on this route during the month of August. One project calls for the construction of four lanes of full freeway from 0.7 mile south of Galt to 1.6 miles south of the Cosumnes River at the approximate cost of \$2,800,000. The second project will provide the northbound lanes of a full freeway from 1.8 miles south of the Cosumnes River to 0.2 mile south of Elk Grove Road. This work will cost about \$2,000,000.

Two contracts that will bring closer the day that this route will meet freeway standards are being let this year. The bids on the first are to be opened June 25th and will provide for the construction of structures, approaches and highway lighting facilities from 1.8 miles south of Florin Road to Broadway in Sacramento. This section,

known as the South Sacramento Freeway is on completely new alignment. Subsequent contracts will provide for surfacing and other work necessary to put the route in operation. It is estimated the initial work will cost approximately \$2,250,000.

#### **Additional Funds Provided**

The second contract on this route, the reconstruction of the existing highway from 1.8 miles south of the Cosumnes River to 0.2 mile south of Elk Grove Road to freeway standards, was made possible by additional funds included in the 1958 Federal Highway Act. These additional funds were provided to start projects prior to December, 1958, that would not be financed under the existing financial schedule. The bids for this contract are to be opened July 16th. Additional funds amounting to \$1,100,000 were added to the 1958-59 Budget by the Highway Commission for this work.

In, and near Sacramento, State Sign Route 24 (Freeport Boulevard) from Florin Road to Sutterville Road was widened to a four-lane divided street in the past year. This project, which in-

cluded signalization and lighting, was constructed by McGillivray Construction Company of Sacramento at a cost of approximately \$552,200.

The improvement of Highway US 50 from Sacramento easterly over the Sierra Nevada has progressed during the past year, and plans are being made for the conversion of the entire route to full freeway standards at a future date. In the Sacramento area, the existing route was widened to four lanes, as an interim improvement, pending the construction of a freeway on new alignment, from near the Sacramento city limit to Alder Creek. This work was necessary to ease the traffic pressure built up by the tremendous industrial, aviation, and residential growth in the area east of the state capital. This project, costing approximately \$1,000,000 was done by A. Teichert and Son of Sacramento and was accepted as completed in March of this year.

#### **Lane Signals Installed**

The conversion of this route to four lanes created a problem at the Brighton Underpass which provides

only three lanes for traffic. A contract was let to Collins Electrical Company, Incorporated, of Stockton for \$21,000 to install lane control signals through this structure. This signalization will make possible the use of the middle lane for eastbound traffic only during the morning hours, and for westbound traffic only during the evening hours. During other times the lane will not be used for the movement of traffic. The installation of this system required the relocation of Redding Avenue to give property owners in the area satisfactory ingress and egress from Highway 50. A. Teichert and Son submitted a low bid of \$21,849 for this work early in June.

In November, 1957, a \$1,000,000 project was completed to bypass the community of Camino with a four-lane expressway. A joint venture of John Delphia and Fred J. Early, Jr., Company of Patterson constructed this improvement.

#### **US 50 Improved**

Public meetings are being held, and plans being prepared, to convert US 50 to a freeway route from Sacramento to the Nevada state line. Freeway resolutions have been adopted from Brighton to Alder Creek, from near Perks Corner to the west city limit of Placerville, between Washington Street in Placerville and two miles to the east, and between Fresh Pond and Riverton. Action is well under way to secure such a resolution from Camino to Pollock Pines.

A portion of this route, from Al Tahoe to the Nevada state line, was widened in 1957 to provide a 64-foot street section. This work together with reconstruction between Mays and Al Tahoe was done by Baun Construction Company of Fresno at an approximate cost of \$340,000. Plans are being prepared for the future extension of this work to the west when financing is available.

Near Echo Summit, two projects to increase traffic safety were accomplished. Six truck turnout lanes were constructed by Harms Brothers Construction Company of Sacramento at a cost of \$157,000 that permit the passing of trucks moving slowly up-grade by the faster passenger traffic. Metal plate guardrails were installed



An aerial view of the freeway through the Town of Arbuckle on US 99W. The separation structure in the center of the picture is the Hall Street Overcrossing.



in nine locations by Wulfert Company of San Leandro.

Work was also done to improve the intersections of county roads with this transcontinental route. During the past year, two such intersection improvements were completed, both in the Placerville area, one at El Dorado Road and the other at Missouri Flat Road.

The Bureau of Public Roads is improving a section of the route between Fresh Pond and Riverton, the so-called "cliff" section, to a four-lane expressway. The first contract on this work is nearing completion, and a second contract is planned for advertising this summer.

The bureau is also improving and realigning a portion of State Sign Route 89, referred to as the Luther Pass Route, that connects Highway US 50 and State Sign Route 88. The 7.1-mile section being improved is from US 50 to Grass Lake.

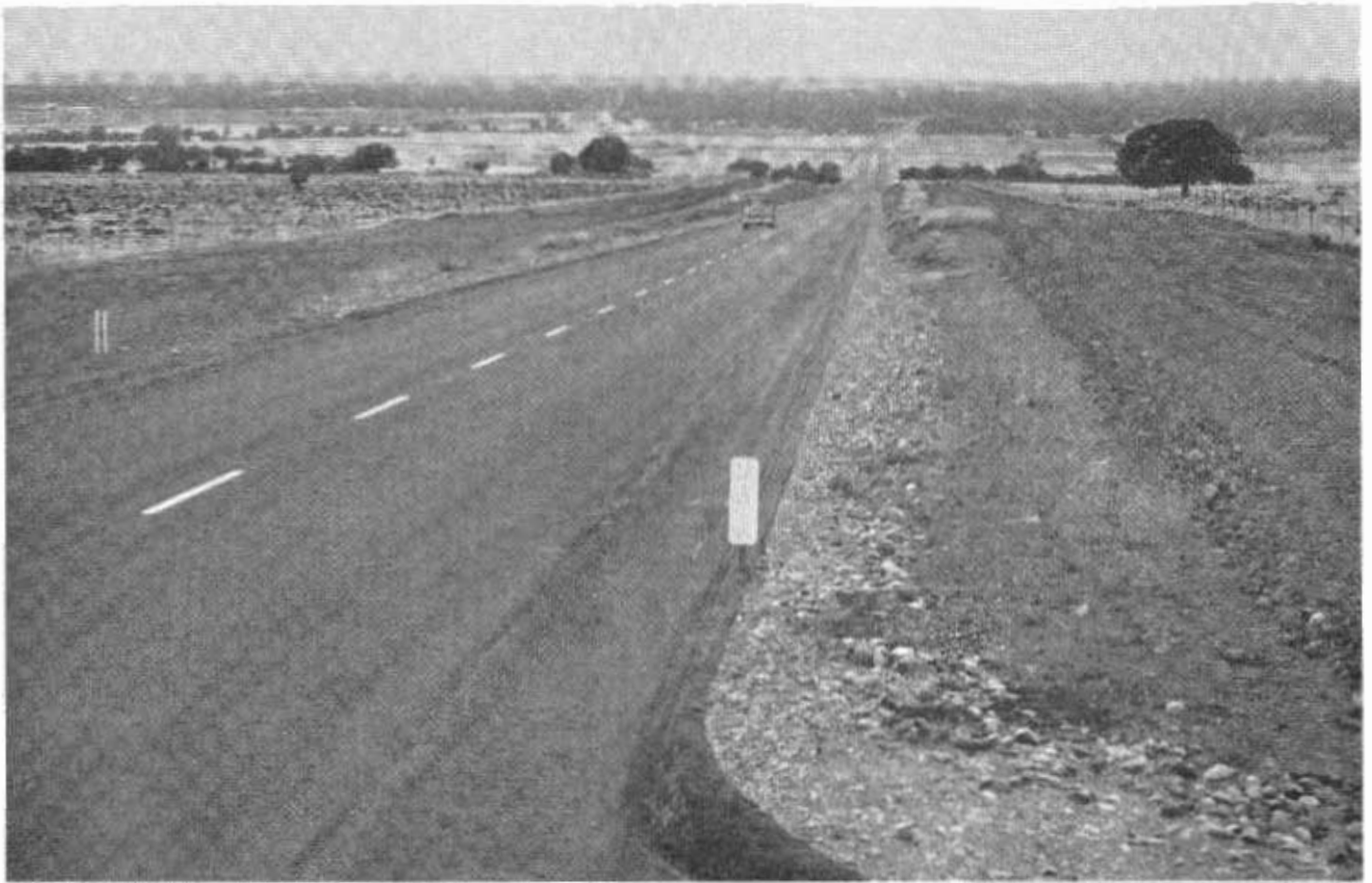
#### Relocation Necessary

The proposed construction of a major dam on the Feather River above Oroville made necessary the relocation of a portion of the Feather River Highway, Highway US 40 Alternate, from Oroville to Jarbo Gap. This relocation, to be done under several contracts, presently is requiring the construction of 13.7 miles of roadway, on new alignment, from near Wicks Corner to Jarbo Gap. This work, costing approximately \$9,500,000, is being done by McCammon-Wunderlich Construction Company of Palo Alto. Other features of this relocation, a dual purpose bridge over the West Branch of the Feather River to accommodate the highway and the Western Pacific Railroad and the extension of the relocation from Wicks Corner to Oroville with a new bridge over the Feather River at Oroville, are contingent upon appropriations by the State Legislature.

South of Oroville, Baldwin Contracting Company of Marysville has a contract for \$580,000 to relocate US 40 Alternate from the Union High School to a point near Adelaide. This work is the initial two lanes of an ultimate four-lane expressway. This contract also includes the widening of the existing highway from the end of the



UPPER—Relocation of US 40 Alternate along the Feather River between Wicks Corner and Jarbo Gap. A dual-purpose bridge carrying the highway and railroad over the West Branch of the Feather River, which extends from left to right across the center of the picture, will connect the two visible construction areas. LOWER—An aerial view eastward of the State Sign Route 32 improvement between Chico and Hog Springs. A portion of the one-way couplet in Chico shows in the foreground.



*UPPER—A ground view of the improvement on State Sign Route 32 east of Chico. See the March-April issue of California Highways and Public Works for an article on the opening of this section of highway. LOWER—An improved section of the Mother Lode Highway (State Sign Route 49) in Sierra County west of Downieville.*

relocation to the junction of the Oroville-Richvale Road. It is anticipated this improved facility will be available for public use late in September of this year.

#### Highway Relocated

In the northern end of the district, in Glenn and Butte Counties, work is being done to improve State Sign Route 32. Work was completed in the past year to relocate this route from Main Street in Chico to Hog Springs to the east. This work was done from Fir Street in Chico to Hog Springs by A. Teichert and Son of Sacramento, and the one-way couplet between Main and Fir Streets on Eighth and Ninth Streets was completed by Lester L. Rice and Sons of

Yuba City. This 6.5 mile improvement cost approximately \$1,061,000. The route has been adopted as a freeway, although only two lanes of the ultimate expressway have been constructed, and the route, and freeway resolution, has been adopted from Hog Springs to Loma.

A portion of this same route is presently being widened between Orland and 1.6 miles east of the Sacramento River. This work is being done under a contract to Baun Construction Company of Fresno and also includes the widening of two portions of the Hamilton City-Glenn Highway and a section of the Willows-Butte City Highway. This same construction firm has a second contract that extends the limits of the widening of the Willows-

Butte City Road to Codora Four Corners and calls for the replacement of the Sheppards Slough Bridge between Willows and Glenn. These two projects will call for the expenditure of approximately \$868,000.

#### Interim Improvement

After considerable discussion a freeway agreement has been approved by the City Council of Chico, and the Butte County Board of Supervisors, for the construction of a freeway along the so-called Sheridan Avenue route in Chico. Until financing of this route is possible, it is necessary to improve the present route through Chico on an interim basis. To this end, Main and Broadway will become a

... Continued on page 50



Freeway construction on US 40 near Floriston in Sierra County. The section from Floriston to the Nevada state line will be completed this summer.

# Grapevine

## Historic Canyon Section of US 99 Will Be Eight-laned

By A. G. FLUTER, District Design Engineer

**M**OTORISTS on US Route 99 between Los Angeles and Bakersfield will find a refreshing improvement in the passage through Grapevine Canyon when a new \$7,000,000 interstate highway contract recently awarded to the Guy F. Atkinson Company is completed.

The development of the original state highway through Grapevine Canyon was the direct result of the passage of the State Highway Act of 1909. Construction was completed with a portion of the \$18,000,000 raised from bonds sold as authorized by the Highway Act.

In commenting on the original Ridge Route construction, which was a complete new road between Bakersfield and Los Angeles, the Bulletin of the Highway Commission dated July, 1916, stated in part, "The route was explored by W. Lewis Clark, the Division Engineer at Los Angeles, and his findings dissipated all doubt as to its feasibility and on January 25, 1912, surveys were ordered."

Construction was started in 1914 and travelers were soon using portions of the road.

A comment of 1916 reads: "The Ridge Route has already become a great and powerful influence in promoting the unity and integrity of heretofore divided sections of the State and in discouraging state division agitation. The new road entirely does away with the old 30 percent grades which took the stamina out of a motor on the Midway Route" (via Tehachapi, Mojave, Palmdale, Newhall and Los Angeles).

The reconstruction of the Ridge Route in 1933-1934 reflected an increasing awareness on the part of the Division of Highways of the vast monetary savings accruing to the public by reducing the traveling time and mileage by better alignment. Deep cuts and high fills not previously considered because of high initial cost were constructed, together with the

then new concept of three traveling lanes on the roadbed to facilitate the passing maneuver.

A comment of 1933 describes the rebuilding as "the last word in modern highway design with the roadway carried through deep cuts and over deep fills and meandering streams to secure the most feasible direct route."

	Previous to 1914 (county road)	1914 state highway	1933 state highway	1958 state highway
Length (Bakersfield to Los Angeles) _____	170 mi.	124 mi.	117 mi.	117 mi.
Total curvature (Grapevine Station to Castaic Junction) _____	Unknown	38,571°	3,062°	2,928°
Maximum elevation _____	4,233	4,234	4,183	4,183
Minimum curve radius _____	Unknown	70 ft.	1,000 ft.	1,300 ft.
Maximum grade _____	30%	6%	6%	6%

### History

Recorded travel by Europeans through this historic pass began with Don Pedro Fages, who used this route while pursuing deserters from the Spanish Army in 1727. Kit Carson in his two trips to California in 1824 and 1854 used this route to Los Angeles.

Early Spanish settlers even before the year 1800 traveled to San Francisco and the Northern California missions and ranchos from Southern California by way of the famed "El Camino Viejo a Los Angeles," a trail that used the arid west side of the San Joaquin Valley. A modern note to this route shows that in many locations the future interstate freeway (Route 238) will occupy almost the exact site of this road, including the use of Grapevine Canyon and the northerly slopes of Wheeler Ridge.

### Fort Tejon

Because of the use of Grapevine Canyon by horse and cattle thieves, and because of its convenient location to the Sebastian Indian Reservation, General Edward Fitzgerald Beale, Commissioner of Indian Affairs for California and Nevada, persuaded the U. S. Army to establish Fort

At the dedication ceremony in 1933, it was stated that the completion of the reconstruction was truly "the greatest blow to sectionalism in California since the construction of the original Ridge Route in 1915."

The following table shows the comparison of the various routes to Los Angeles:

	Previous to 1914 (county road)	1914 state highway	1933 state highway	1958 state highway
Length (Bakersfield to Los Angeles) _____	170 mi.	124 mi.	117 mi.	117 mi.
Total curvature (Grapevine Station to Castaic Junction) _____	Unknown	38,571°	3,062°	2,928°
Maximum elevation _____	4,233	4,234	4,183	4,183
Minimum curve radius _____	Unknown	70 ft.	1,000 ft.	1,300 ft.
Maximum grade _____	30%	6%	6%	6%

Tejon near the top of the canyon at a site with abundant water. The construction on the fort began August 10, 1854. During its active years the fort was the center of social activity for the area, and was notable in other ways. For example, Fort Tejon was the western headquarters for the U. S. Army Camel Corps, established by direction of Secretary of War Jefferson Davis in 1857. The first camels arrived at Fort Tejon in November, 1857, and were stationed here in varying numbers until the fort was abandoned in 1861.

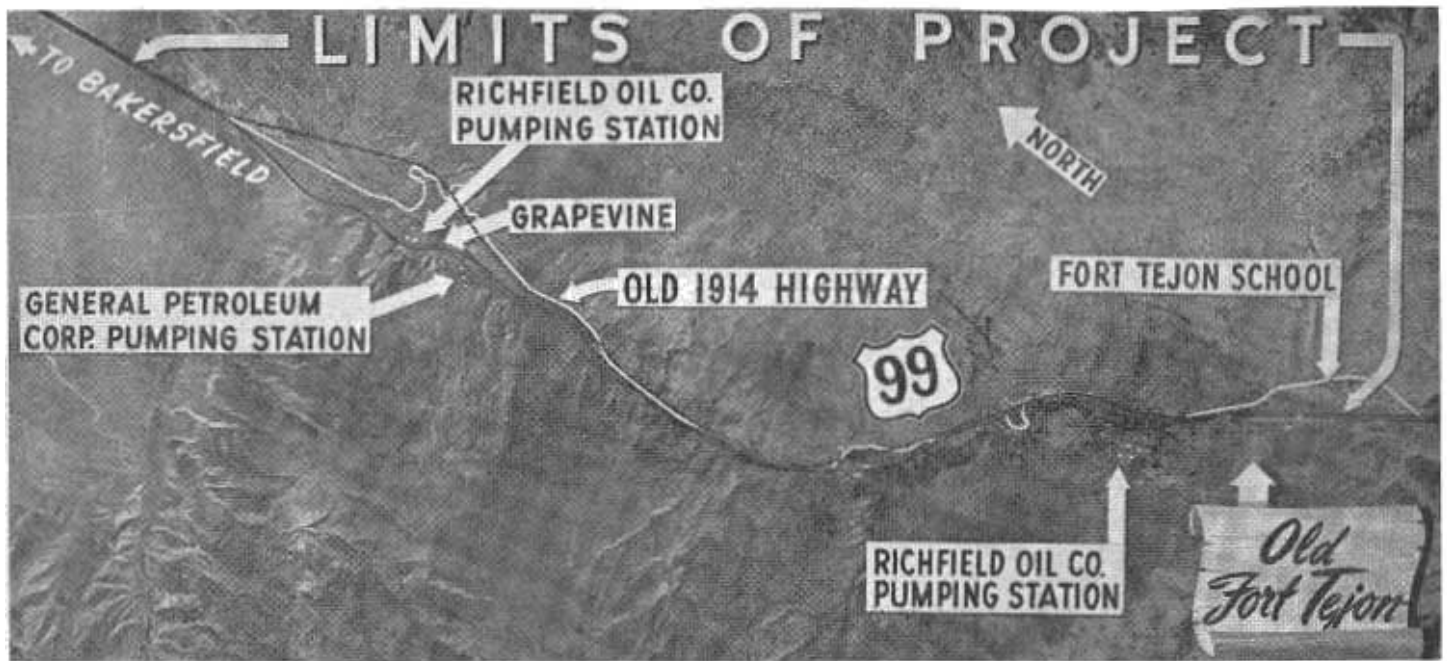
An important milestone for the fort was the establishment here of a Butterfield Overland Mail Station. The first mail stage from St. Louis stopped here October 8, 1858, on its way to San Francisco. From that date on, the stage line was on a regular schedule with the travel time between Los Angeles and Fort Tejon listed as 32½ hours. The trip today takes less than two hours at an easy pace.

Another historic user of Grapevine Canyon was Phineas Banning who established a stage line to the gold fields on the Kern River and to the frontier town of Havilah.

... Continued on page 12



A dramatic shot of the Grapevine Grade showing the present highway (right) heading southward up into the canyon and the old 1914 highway twisting its way up the grade on the left. The present highway is seven miles shorter than the old 1914 road.



The black lines superimposed on this aerial of the Grapevine Canyon show the planned location of the northbound and southbound roadways after the new freeway is completed in 1960. Some 13,000 vehicles a day now pass along this section of US 99.

## GRAPEVINE

Continued from page 10 . . .

### Drainage Problems

Grapevine Canyon is a narrow defile with steep, rocky slopes, so narrow that in order to provide the width needed for a divided highway of eight lanes, it will require, for a distance of approximately two miles, cutting back the slopes on both walls.

Grapevine Creek, also needing passage in the canyon, is to be placed in a closed conduit for 9,000 feet of its course. The calculations and considerations necessary to determine the size to use for the conduit constituted one of the major problems of the project.

After consideration of the many factors involved, such as possibility of a true cloudburst storm, possible recurrence of an intense rain similar to the record flood of 1914, possible flood on Cuddy Creek when Lake Castaic is full, the discharge finally adopted for design was 3,000 cubic feet per second. This is the equivalent of a storm of rare cloudburst intensity. An allowance for six cubic yards per second of debris load is made.

The usual economics of "estimating the damage likely to be caused by greater floods," and computing the

annual cost thereof, which "should just equal the allowable annual cost of additional capital investment to provide waterway for the greater floods," and comparing the cost of possible alternate conduits, was performed. From the above calculations a rectangular culvert 10 feet by 8 feet was chosen in which to place Grapevine Creek.

### Construction

With 9,700 passenger cars and 3,300 trucks passing through this canyon on an average day, the problems of construction take on special significance in regard to public safety.

The California Highway Patrol, the contractor, G. F. Atkinson & Co., and the Division of Highways are all concerned with the problems of making a safe passage.

The order of work for the contract was developed to minimize the disruption and inconvenience to public travel, and after many trials, was set as follows:

1. Construct sufficient detours to allow the building of necessary portions of permanent pavement on the uphill lanes to place all traffic on the west side of the canyon. During this operation 2,300,000 vehicles will pass through the work.

2. Construct all downhill lanes and place traffic on them. An estimated 4,600,000 vehicles will pass during this time.

3. Reconstruct the gaps not constructed under paragraph No. 1 (2,300,000 vehicles will pass).

4. Open completed highway to traffic.

At the contract prices, the cost of the work will be divided as follows:

Grading	\$2,700,000
Paving	1,970,000
Grapevine Creek Conduit	1,240,000
Other drainage	400,000
Bridges	380,000
Miscellaneous	260,000
<b>Total</b>	<b>\$6,950,000</b>

### NEW CONTRACT TOTAL

The State Division of Highways reports that, as of June 30, 1958, it had 355 contracts under way totaling \$405,525,900.

Completion of these projects will bring the total length of freeways, expressways and other multilane, divided highways within the State to 2,315 miles.

There have been 50 interstate projects totaling \$179,179,800 awarded since July 1, 1956. Five more interstate projects totaling some \$20,000,000 are pending award or have been advertised for bids.

# Snow Removal

*Motor Grader Units Prove Worth During Past Winter*

By A. C. DILDINE, Senior Equipment Engineer

THE MAIN east-west highway link in the northern part of California is through the Sierra. This highway system had its beginning in 1895 when the Placerville-Lake Tahoe wagon road was taken over by the State. This was followed in 1909 by the completion of state acquisition of the road which connected Auburn, Donner Lake, Truckee and Lake Tahoe. In 1919 a state road was authorized between Truckee and Verde on the California-Nevada line. These were the beginnings of the modern state highway system over the Sierra. The necessity of keeping these roads open was also the start of the snow removal problem.

In the winter months ground transportation in the Sierra is continually hampered by heavy snowfall. In

early days transportation stopped. Today too much depends on this transportation to allow the roads to be choked with snow for any long periods of time.

With the construction of the modern highway system maintenance has become increasingly important. And with increased dependency on the main east-west routes over the Sierra, it has become important to keep them open the year around. Winter usage of the highways requires dependable high-powered snow removal equipment.

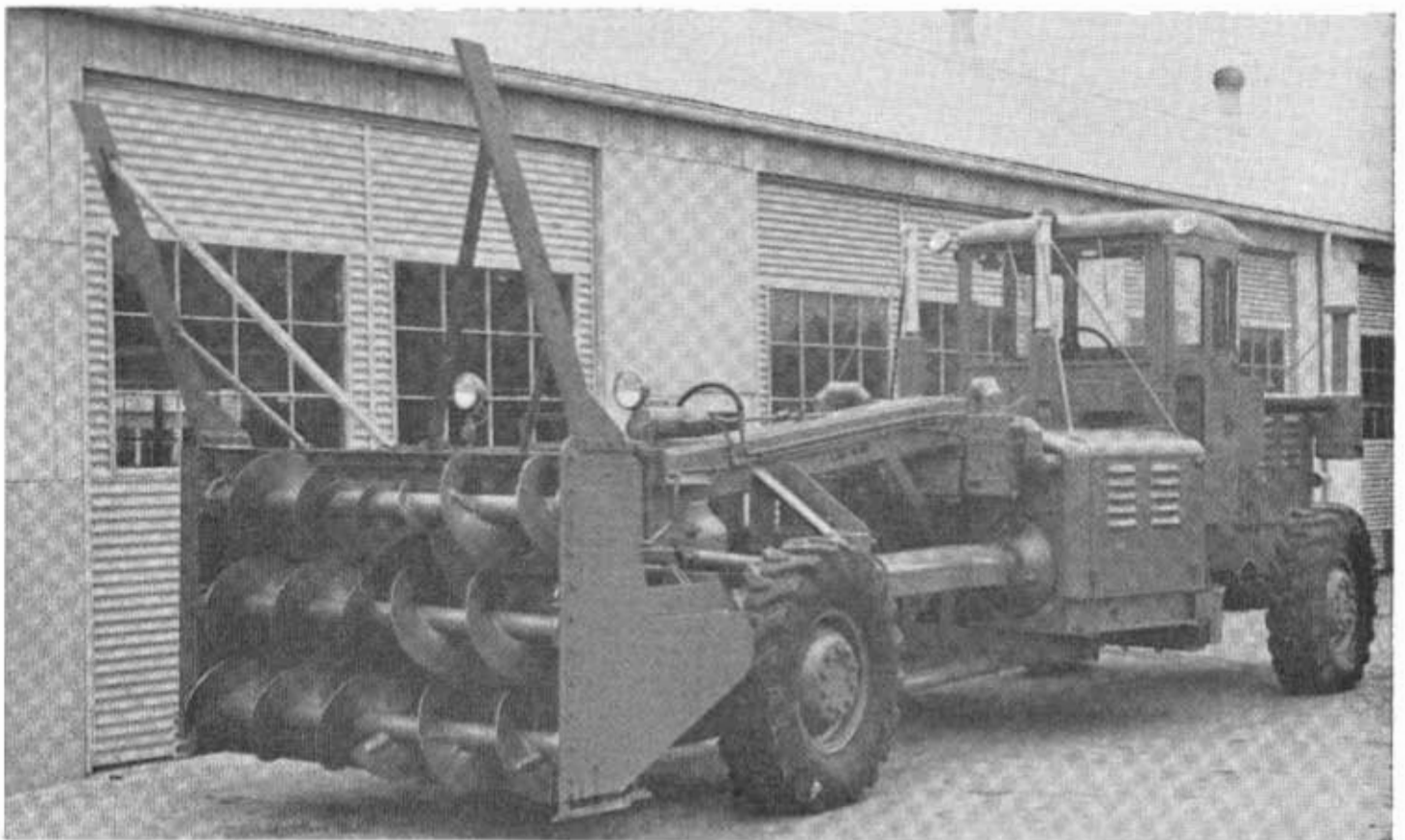
#### **More Power**

Snow removal equipment has progressed from crude wooden plows mounted across the front of trucks to modern push plows and rotary snow

removal units. The push plows displace the snow from one location to another immediately adjacent to the trailing edge of the plow. To move snow completely out of the way necessitates a machine capable of picking it up and throwing it to a location off the road. Such a machine requires power to handle the loads imposed on it. The most common snow removal units operating in the mountains at present are the auger-type rotary snowplows which are mounted on large heavy-duty four-wheel-drive trucks.

Until this past winter the Division of Highways had a fleet of 42 auger-type rotary units operating in the various mountain areas of the State.

In recent years, with the increasing capacity and use of mountain high-



*One of the auger-type rotary units mounted on a heavy-duty four-wheel-drive motor grader used by the Division of Highways in snow removal last winter*



One of the heavy new motor grader units in action last winter. Increased weight of the unit resulted in better traction, the Equipment Department reported.

ways, it was seen that heavier units would be advantageous under certain conditions of rough going. A heavier unit with a longer wheelbase and larger tires would have better traction and stability when cutting into dense snow. This would aid materially in the speed of clearing a choked highway. Consequently, two years ago the Equipment Department began investigating other methods of mounting and operating rotary plows where increased weight, which results in better traction, could be obtained.

The result of this investigation was the purchase and operation of three auger-type rotary units mounted on large heavy-duty four-wheel-drive motor graders. Two of the units are in District III (Marysville) and the third is in District IX (Bishop). The auger box is relatively the same as that mounted on the trucks, but there the similarity ends.

The common rotary unit consists of steel cutting edges and three horizontal augers that bite into the snow and move it to a fan which discharges it to one side in a steady stream. The cutting edges and augers are capable of loosening snow of any consistency, even ice, and feeding the loosened material to the discharge fan.

In the motor-grader-mounted units the auger-type rotary mechanism

is powered by two diesel engines mounted on each side of the motor grader forward of the cab. These two engines provide a total of 270 h.p. to operate the augers and fan. This is 70 h.p. more than is available on the truck-mounted units. The same model engine powers the motor grader. This makes the procurement of spare parts and repairs simplified by the standardization of the engines.

The engines are equipped with safety devices to automatically stop them in case of low oil pressure or extreme water temperature. They are also equipped with hourmeters, thermostatically controlled shutters, and electric tachometers. Power is transmitted from each engine through clutches to a common drive shaft. The clutches allow single engine operation under emergency conditions.

The new combination of the auger-type rotary unit and motor grader weighs approximately 33,000 pounds, which is 8,000 pounds more than the truck unit. The wheelbase is approximately three feet longer than the wheelbase of the truck units. This additional weight and wheelbase, plus larger tires, provides better stability and traction for crowding under rough going.

The new motor grader rotary snow-plow combinations are rigidly built

## Fred Jacobson Named To Public Works Job

Fred Jacobson, long associated with chambers of commerce in California, took office June 16th as special representative of the State Department of Public Works.

C. M. Gilliss, State Director of Public Works and chairman of the California Highway Commission, said, in announcing Jacobson's appointment:

"We are doing all we can to keep the department and the California Highway Commission in close touch with the citizens of California. One part of our program for better communications was to restore this long-vacant position to the department.

"Fred Jacobson's particular background and experience will help the department maintain and improve liaison with local governing bodies and civic organizations."

Jacobson was manager of the Retail Merchants Association of Sacramento in 1955 and 1956, and for five years before that was Central Coast District Manager of the California State Chamber of Commerce.

From 1943 to 1950, he was assistant manager of the Sacramento Chamber of Commerce. He was with the Bank of America from 1930 to 1943, his last post with the bank being assistant cashier in Yuba City.

Jacobson has made his home in Alameda recently and has been with a Bay area container manufacturing firm. He studied in Alameda schools and graduated from the Western Institute of Commercial and Trade Executives at the University of Oregon. He is past president of the California Association of Chamber of Commerce Managers.

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for continuous hard usage. The past winter's usage has proven their ability to remove heavy hard-packed snow, under severe conditions. The motor grader units will not completely replace the truck units but their capability for long heavy-duty continuous snow removal operations makes them a necessary additional tool to aid in the snow removal problem.



# New Highway Lab

Commissioners Attend  
Laying of Cornerstone

**T**HE MATERIALS and Research Department of the Division of Highways has moved into its new \$1,377,000 Headquarters Laboratory at 5900 Folsom Boulevard.

Completion of the new building was marked formally by a cornerstone laying ceremony on May 21st which was attended by members of the California Highway Commission and other state officials.

Director of Public Works C. M. Gilliss, who is also chairman of the Highway Commission, stressed the important role the Materials and Research Department has played in developing and improving highway construction methods not only in California but nationally and internationally as well.

"We spend a lot of money for highways and most of it is spent for materials to build roads and bridges," Gilliss said. "All divisions of the Department of Public Works are aware of the great responsibility involved in the large expenditures of public money. The principle of competitive bidding assures the taxpayer that the work will be performed at the lowest cost commensurate with adequate quality. It is important that the State is able to check the quality of the materials. This is one of the important missions of the laboratory."

Harmer E. Davis, Director of the Institute of Transportation and Traffic Engineering at the University of California in Berkeley, said:

"The list of honors and awards by national organizations to members of this Materials and Research group for outstanding contributions is impressive, as is the list of important committee posts held in technical and professional societies."

After the ceremonies, the commissioners and guests toured the new laboratory where the various uses of the equipment were explained by engineers of the Materials and Research Department.



Commissioner Chester H. Warlow trowels mortar while Director of Public Works C. M. Gilliss (left) and members of the Highway Laboratory staff look on

The new laboratory, which provides 65,000 square feet of space for a wide range of research and testing equipment, was designed by the Division of Architecture.

The work of the Materials and Research Department is divided into two main categories—research to develop better highway construction methods and materials, and testing to make sure the State gets its money's worth from every highway construction dollar.

When it first began operations in 1912, the department had one geologist and one testing engineer. Its laboratory was a small wooden building at the State Fairgrounds. In 1922 the Headquarters Laboratory was moved to 3435 Serra Way.

As the State's highway program has grown, the department has faced an increasingly acute need for added space. In recent years its Sacramento activities have been conducted at sev-

. . . Continued on page 50



# Report From District X

By J. G. MEYER, District Engineer

**D**ISTRICT X of the Division of Highways has made considerable progress since the enactment of the Collier-Burns Act in 1947 in providing improved highway facilities for the motoring public. This overall report has been prepared to inform Californians of this progress.

District X, which has its headquarters in Stockton, extends over a large portion of Central California. It includes 1,400 miles of state highways in nine counties with diverse terrain, ranging from the flat San Joaquin Valley to the rugged Sierra Nevada range.

The economic importance of this great area hinges to a large extent on its agricultural pursuit, on its recreational area, and on its military establishments, all of which in turn depend upon its automotive transportation system.

The flat, fertile San Joaquin Valley with its highly developed irrigation systems produces a wealth of crops each year. Agriculture and food processing activities demand an extensive road net to accommodate the trucking of harvests to the markets, canneries and mills. The mountain counties produce timber, minerals and livestock which are hauled to market by motor vehicles. Stockton is a focal point for a large movement of raw materials, food products, supplies and equipment for domestic and foreign markets, due to its central location with a deep water port and rail facilities of three major railroads.

#### Many Attractions

That portion of the Sierra Nevada mountains within the boundaries of District X contains recreation areas of worldwide interest. Yosemite National Park, Calaveras Big Trees and other parks attract thousands of tourists and vacationers each year. Ski resorts, hunting, fishing, camping and hiking appeal to many others who travel our highways in cars and busses.

There are in District X, because of its strategic location, a large number of Army, Navy and Air Force bases. Major installations of the Department of Defense include historic Benicia Arsenal, founded over 100 years ago, the U. S. Naval Shipyard at Mare Island, Travis Air Force Base near Fairfield, the Naval Supply Annex and Sharpe General Depot in Stockton, and Castle Air Force Base near Merced.

In District X, as in any highway district, the backbone of the road network is the rapidly developing system of freeways which have been constructed since World War II. The emphasis on freeway construction in the past has been primarily along the three U. S. sign routes which traverse the district. These are US 40 in the northwest area of the district, US 50 through the north-central area, and US 99, the major north-south artery. Increased traffic demands and the need to integrate some of the state highways with the National Interstate Highway System program which Congress authorized in 1956 have

PHOTOS AT TOP OF PAGE. Construction of separation structures on US 40 through Vallejo such as the one at Laurel Street (left) will do away with the traffic slowdown at present encountered at signalized intersections such as the one at Tennessee Street (right).

made it necessary to extend the district's freeway planning efforts. As a result, portions of Sign Routes 12, 16, 21, 48, 120, 132 and 152 have been adopted as freeways. Supplementing the freeway system throughout the district is an important secondary network of feeder routes and connecting laterals. This includes Sign Route 49, a foothill route on the western slopes of the Sierra Nevada; Sign Route 88, Carson Pass Highway; Sign Route 4, which connects Stockton with the industrial area around Carquinez Strait and continues east from Stockton over Ebbetts and Monitor Passes; Sign Route 108, Sonora Pass; and Sign Route 140, the all-year highway into Yosemite.

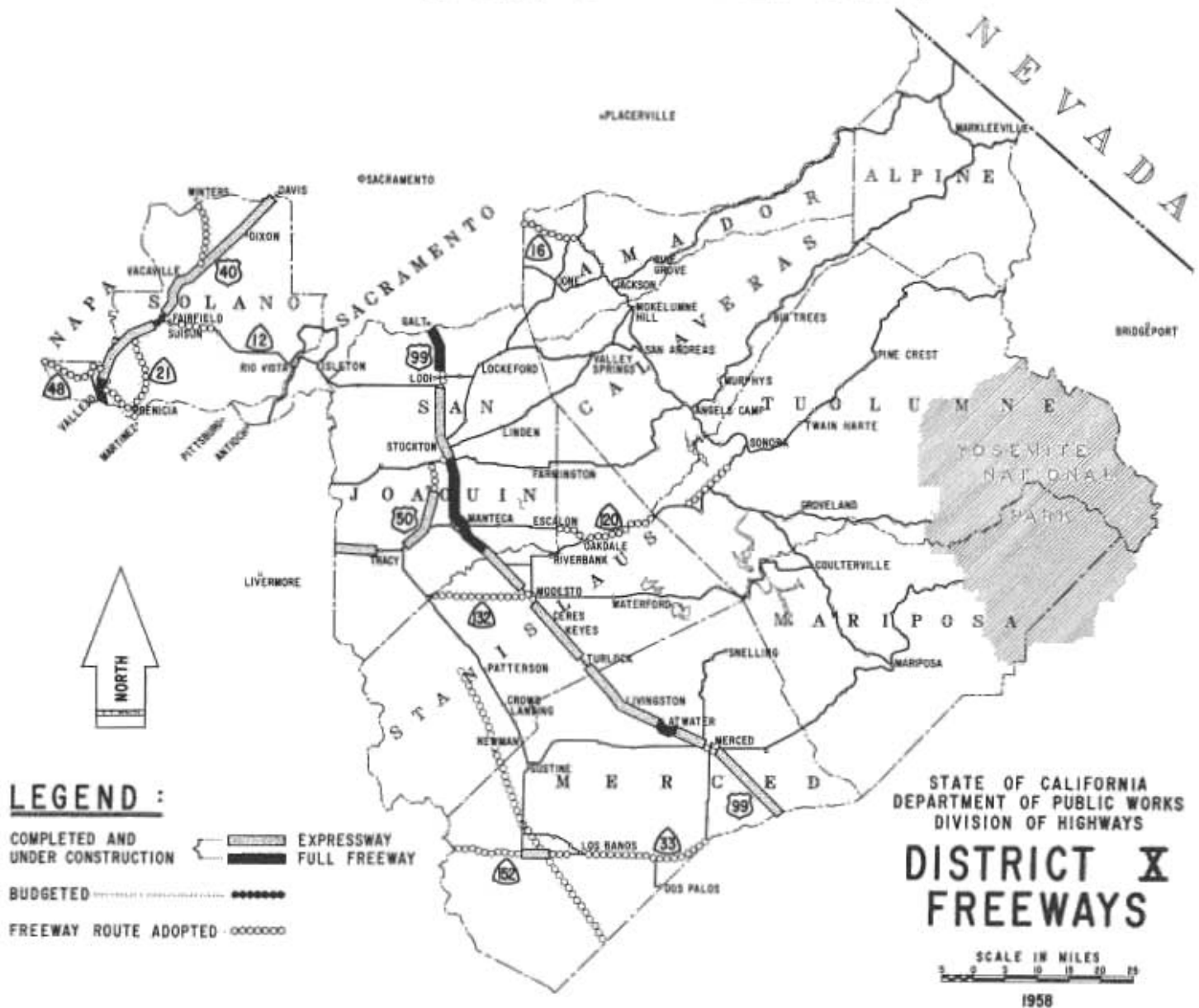
#### Interstate System

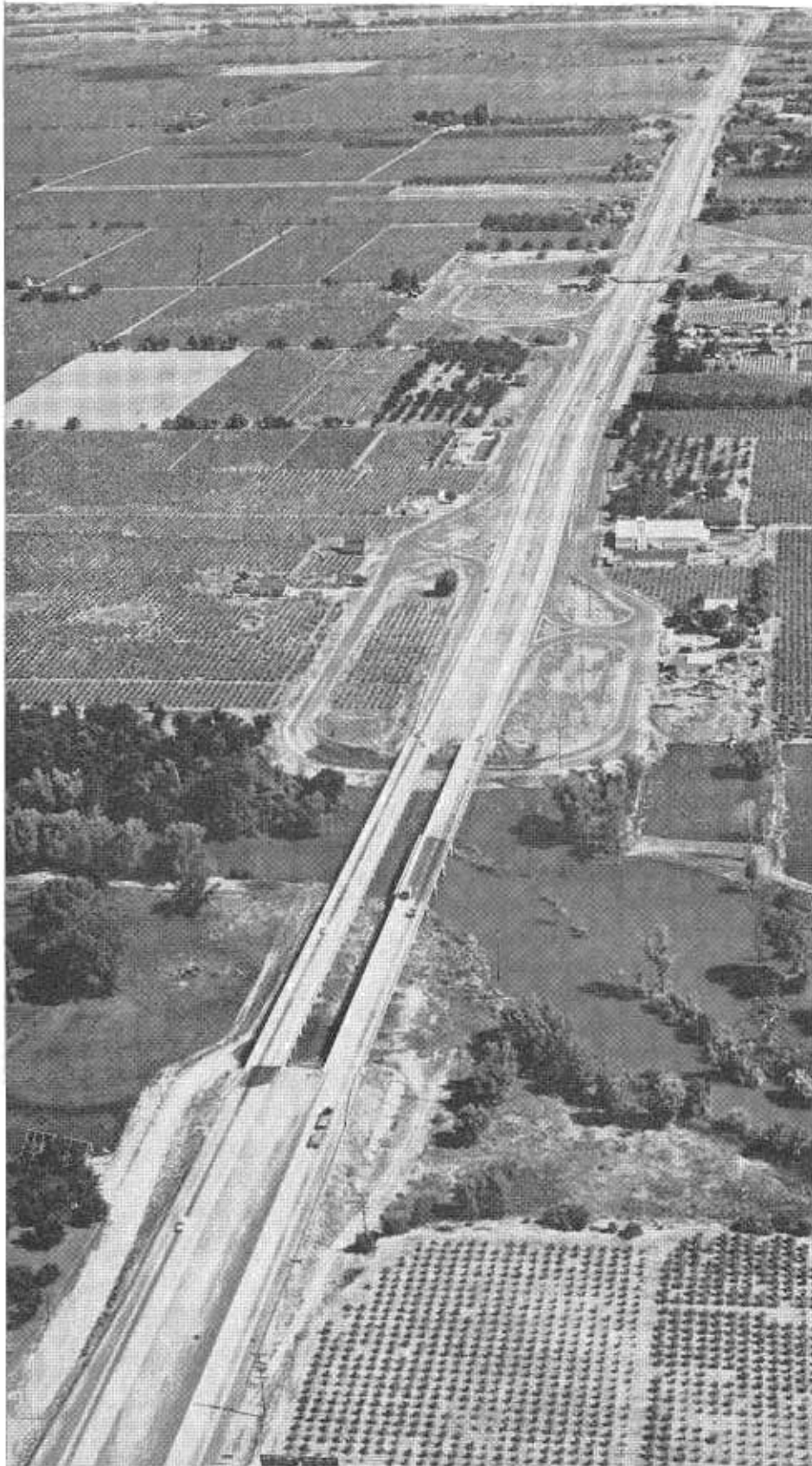
Approximately 190 miles of existing or proposed highways in the district have been included in the Federal Interstate Highway System which is proposed for rapid development as indicated by the Federal Highway Act of 1956.

Portions of the interstate system in this district on which routes have been adopted and design studies under way include 44 miles of US 40 in Solano and Napa Counties, between the Carquinez Bridge and the Yolo county line; 11 miles of State Route 90 in Solano County from US 40 near Vacaville to the Yolo county line; approximately 6.6 miles on State

Routes 74 and 75, between the Martinez-Benicia Bridge and US 40 in Vallejo. The Martinez-Benicia Bridge was authorized by the 1955 Session of the California Legislature in combination with the Carquinez Bridge. Negotiations are under way with the U. S. Government for rights-of-way for approximately three miles of road construction within the limits of the Benicia Arsenal. It is anticipated that this right-of-way transaction will be completed by October 1st. Construction of the Martinez-Benicia Bridge is scheduled to begin April, 1959.

Portions of the interstate system that have not been adopted included 110 miles of Westside Freeway and connecting links between the Alameda





An aerial view of US 99 in San Joaquin County showing the twin spans across the Mokelumne River with frontage road passing under the north end of the bridges

county line and a junction with the proposed Westside Freeway (State Route 238) east of Tracy and a connection from west of Tracy to Stockton.

#### **Westside Freeway**

In 1957 the State Legislature, in Chapter 26, Statutes of 1957, declared that Route 238 "is hereby added to the State Highway System, to extend from a point on Route 4 south of Bakersfield to a point on Route 7 near Woodland, on a route along the western side of the San Joaquin Valley to be selected by the California Highway Commission, which route may include all or portions of any existing state highway route or routes."

The portion within the limits of District X comprises about 110 miles of the route. The portion between the Fresno county line and west of Patterson has been the subject of public meetings and a definite route for this portion of the freeway was adopted by the California Highway Commission in June, 1958.

The portion between west of Patterson and south of Stockton, including the connection of legislative Route 110 and all of legislative Route 5 (US 50), has been the subject of public meetings, but no recommendations have been made as yet. Public meetings will be scheduled for the balance of the route in the near future.

A great deal of construction work has been in progress in District X. A brief résumé which has been grouped according to sign route designation, follows below:

#### **US 40**

The District X portion of this highway runs from Carquinez Bridge through Solano County to the Yolo county line.

In December of 1957 work was completed on 1¼ miles of eight-lane freeway from the Carquinez Bridge to one-half mile north of the Vallejo Wye. The work was performed by Fredrickson and Watson Construction Company and Ransome Company and required approximately 18 months to complete.

This contract, which was a part of the conversion of US 40 to full freeway status, included facilities for a

connection to the new parallel Carquinez Bridge.

The work was financed from Carquinez Strait Bridge construction funds, Chapter 960, Statutes of 1955 Bond Resolution adopted by the California Toll Bridge Authority October 4, 1955.

Closely allied with this project are several Bridge Department contracts amounting to approximately \$1,500,000 for bridge administration buildings, toll collecting systems, and bridge maintenance shops.

A second highway contract is currently in progress between 0.2 mile north of the Vallejo Wye and one-

half mile north of Redwood Street under which the existing four-lane highway is being converted to a six-lane freeway.

Work includes the construction of seven bridges, the Laurel Street Overcrossing, the Route 7-74 Separation, Benicia Road Overcrossing, Georgia Street Overcrossing, Springs Road Overcrossing, Tennessee Street Overcrossing, and the Redwood Street Overcrossing.

Harms Bros., C. M. Syar and Erickson, Philips and Weisberg are the contractors. (The estimated cost is \$4,500,000, and the project is expected to be completed in December, 1958.)

Under an already completed contract, the Magazine Street Overcrossing and the frontage roads between Sequoia and Alhambra Streets were constructed by Harms Bros., contractor.

#### US 50

US 50 enters District X through Altamont Pass, joins US 99 at Stockton and continues north to the Sacramento county line.

Approximately 15½ miles of US 50 between Tracy Overhead and Stockton are under improvement at a total cost of \$3,558,000. From Tracy to Kasson Road (better known as Grant Line Road), a 3½-mile interim proj-



Construction on the Yosemite All-year Highway (Sign Route 140) eight miles north of Mariposa is improving this important recreation route

ect is under construction, widening the existing two-lane highway to four lanes. Work on 6¾ miles of four-lane divided highway between Mossdale at the San Joaquin River and Richards Avenue south of French Camp is nearing completion. The project involves a railroad separation and an interchange with State Sign Route 120 near Mossdale. From Richards Avenue to Charter Way in Stockton, an interim project consisting of two bridges and 5¼ miles of four-lane undivided highway is nearing completion.

The interim projects on US 50 near Tracy and Stockton have been dictated by the need for added traffic capacity prior to completion of the Westside Freeway.

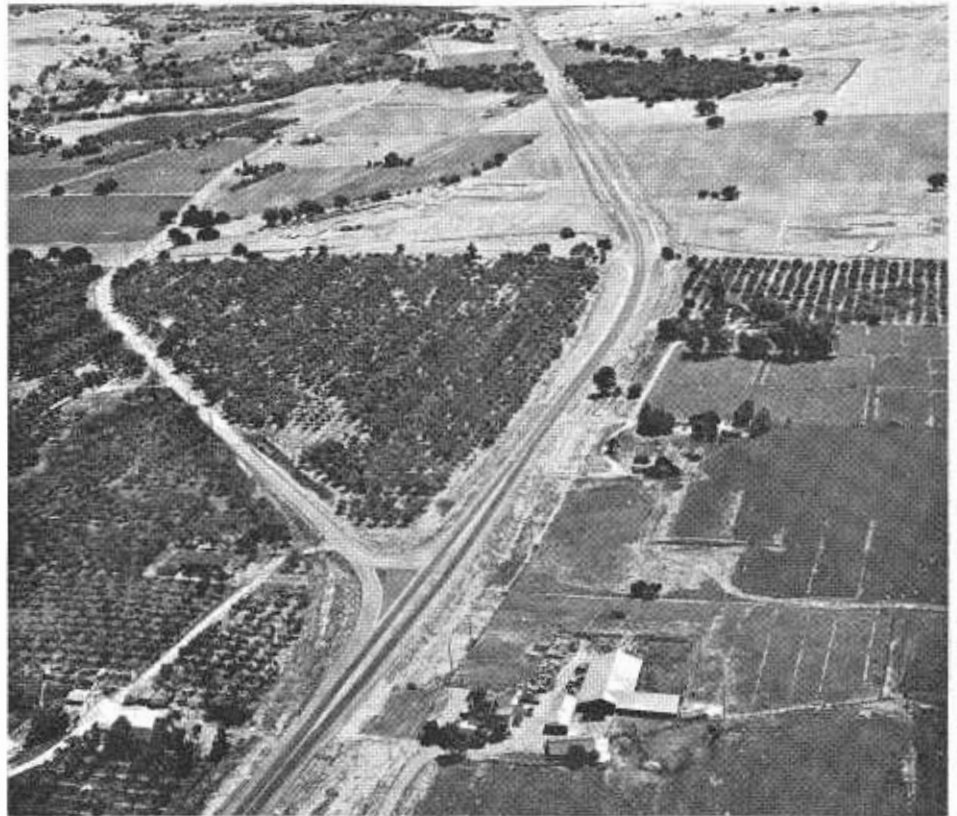
#### US 99

US 99, a heavily traveled and extremely important highway from north to south. Ultimately, a portion of its traffic will be diverted by the proposed Westside Freeway.

Two projects, totaling \$4,626,000, added 9¼ miles of full freeway to US 99 during the year. The first project included 4½ miles of full freeway with interchange and frontage roads from Canal Creek to Grove Avenue at Atwater, in Merced County. The second project is in San Joaquin County from Lodi north city limits to one-half mile north of Jahant Road. The latter project included a number of structures such as the Mokelumne River Bridge, Woodbridge Road Overcrossing, Acampo Road Overcrossing, Peltier Road Overcrossing, and the Jahant Road Overcrossing. Frontage roads were provided on both sides throughout the project.

The project in San Joaquin County was completed in September of 1957 and the Merced County project in November of the same year.

Bids were opened on July 2, 1958 for a third freeway project on US 99. The project proposes to convert a portion of the Stockton Bypass between Mariposa Road and Route 75 to full freeway status. Included in the \$1,000,000 project are the Mariposa Road Interchange, South Stockton Overcrossing and Route 4-75 (Farmington Road) separation with a system of frontage roads.



An aerial view eastward on Sign Route 120 in Stanislaus County showing relocation of the highway at Jones Curve, east of Oakdale. The old highway is to the left.

#### Sign Route 12

Highway 12 runs from the west boundary of Solano County through Jamison Canyon to U. S. Route 40 near Cordelia. It continues from Fairfield through Solano, Sacramento and San Joaquin Counties to US 99 near Lodi. From Lodi it continues east into Calaveras County to Sign Route 49 at San Andreas.

A bridge and approach contract at the Rio Vista Bridge across the Sacramento River will replace a narrow antiquated concrete bridge and bascule span and provide a separation structure at the intersection of legislative Route 99, the West Sacramento-Rio Vista Road, and Sign Route 12. This project will be completed in 1960 and the total cost is estimated at \$3,310,000.

Bids were opened in July for a 5½-mile improvement on Sign Route 12 from the east end of the Sacramento River bridge at Rio Vista to the Mokelumne River bridge. The project follows a direct route replacing a narrow, tortuous levee road. A

number of engineering problems are presented by the relocation due to the unstable peat soil necessitating the installation of 38,400 lineal feet of 18-inch sand drains to assist in draining the underlying mass by providing an escape route for the water being compressed, and by so doing it speeds up the rate of consolidation to the point that ultimately the underlying soils will be stable under the superimposed fill load. It is anticipated work will be completed concurrently with the Sacramento River bridge project.

January, 1958, 6¾ miles of Sign Route 12 were improved with the completion of a roadway on new alignment around the extended limits of Travis Air Force Base. Work was accomplished between 2½ miles east of Suisun and one-half mile east of Denverton. Fredrickson Bros. was the contractor, and the cost of the work was \$1,018,750.

#### Sign Route 49

One major improvement on Sign Route 49, the Mother Lode Highway, was completed in October, 1957. A



*The US 50-Sign Route 120 interchange at Mossdale is nearing completion. The river in the background is the San Joaquin.*

relocation project near Mokelumne Hill replaced  $2\frac{1}{2}$  miles of winding, narrow grade with an all-paved 32-foot roadway at a cost of \$327,000.

A second project between three and four miles northwest of Sonora, involving grading and surfacing, for a total cost of \$131,000, is nearly completed.

#### **Sign Route 88**

The Carson Pass Highway, Sign Route 88, starts at Stockton and traverses Carson Pass at an elevation of

8,600 feet and continues to the Nevada state line near Minden. It passes through Jackson, historic community which dates back before the Gold Rush. Two famous gold mines were located near Jackson, the Argonaut and Kennedy Mines, from which millions of dollars were taken in the early days.

A section of Sign Route 88 in Alpine County was completed in October, 1957. This improvement which is  $5\frac{1}{4}$  miles in length is between Red

Lake and a point  $1\frac{1}{2}$  miles east of Blue Lake Road. The final cost was \$729,550.

A second project on Sign Route 88 in Amador County is currently in progress. A portion amounting to  $7\frac{1}{4}$  miles between Lancha Plana Road and Martell is being graded and surfaced at a cost of approximately \$1,040,000. It is estimated that work will be completed by September, 1958.

Also of interest is the construction project now underway at Peddler Hill

under the supervision of the Federal Bureau of Public Roads. This work is an extension of two previously completed projects by the bureau. The contractor is H. E. Parker.

#### Sign Route 108

The Sonora Pass Highway crosses Sonora Pass at an elevation of 9,600 feet. It follows the same route as Sign Route 49 between Yosemite Junction and Sonora.

Four miles of Sign Route 108 is under construction from one mile west of Yosemite Junction to Montezuma Road in Tuolumne County. The project involves grading and surfacing on improved alignment at a cost of \$606,650. It is estimated that work will be completed by September, 1958. The contractor is the Rockport Redwood Company.

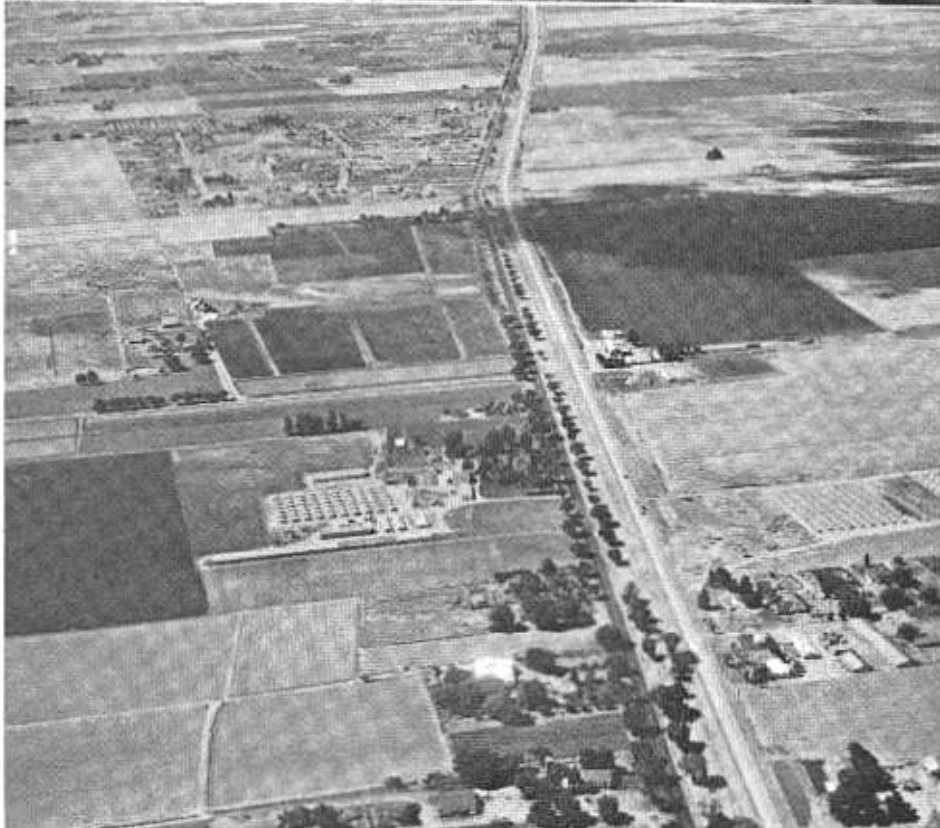
#### Sign Route 140

This route is known as the All-year Highway from Merced to Yosemite Park, inasmuch as it is not closed during the winter months as are other routes into the park. It passes through the Town of Mariposa, a community dating back to Gold Rush days, which is the southern terminus of the Mother Lode Highway.

Work was completed in December, 1957, on a five-mile realignment of Sign Route 140 in Mariposa County between Acorn Inn and King Solomon's Mine. The cost of the work was \$1,106,300. The project improved an important segment of the All-year Highway into Yosemite National Park. A second project, between Briceburg and Crane Flat, was completed in July, 1957. This project involved line changes, restoration of embankment protection along the Merced River, bridges and surfacing at a total cost of \$828,200.

Various other contracts have been completed on this route in recent years so that now the motorist has the advantage of nearly a continuous 32-foot all-paved roadway from Mariposa county line to Briceburg.

By the end of 1958 approximately 22 miles of full freeway will have been completed by current projects in District X. Interim projects will add



UPPER—This section of Sign Route 88 in Amador County near Jackson is being improved. The Town of Martell is in the distance. LOWER—An aerial showing the newly constructed southbound lanes to the right on US 50 in San Joaquin County.

... Continued on page 48



# Irvine-El Toro

New Santa Ana Freeway Section  
Completed in Orange County

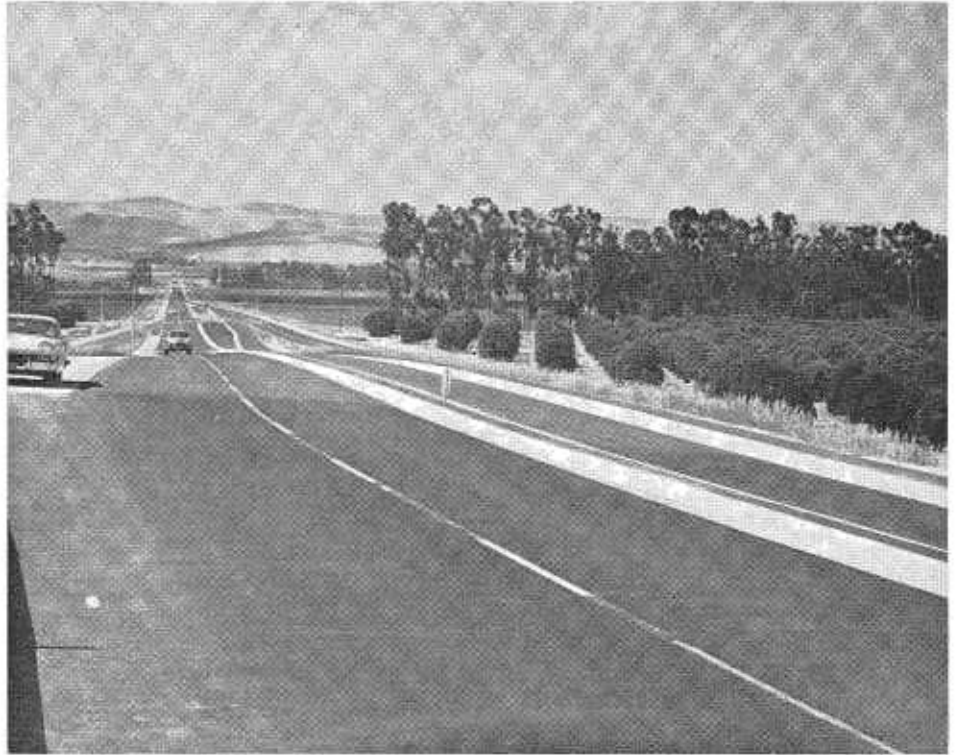
By J. D. HETHERINGTON, Resident Engineer

TO THE motorist who remembers the narrow substandard over-hill-and-dale section of US 101 in Orange County between El Toro-Niguel Road and Laguna Canyon Road, news of the completion of this four miles to full freeway standards will be welcome.

The \$2,400,000 contract for construction was awarded to Cox Bros. Construction Co. and J. E. Haddock Ltd., a joint venture, on January 30, 1957. Construction work started the first week of February, 1957, and was continuous except for time lost due to inclement weather until completion on April 21, 1958, approximately eight months ahead of the expiration of contract time.

In addition to the construction on US 101, a two-mile section of relocation of State Route 185 (Laguna Canyon Road) was included in the contract. This work was included primarily to provide a source of fill material needed for the freeway construction; however, construction of this section has provided the motorist with a two-lane highway constructed to present-day standards with provision made for ultimate improvement to a four-lane divided freeway section when traffic warrants.

At one time the quantities of material and work involved in a contract of this nature would have been quite impressive. However, with present-day construction equipment, the movement of huge amounts of material has become commonplace. Converting the more than one-half million yards of roadway excavation involved to smaller units, such as the quantity a man could haul in a garden wheelbarrow, will perhaps give a better picture of the work required in changing this farm and pasture land to a modern freeway. It would take one wheelbarrow trip each by half of the 14,445,000 population of California to move this quantity of earth. Each of these wheelbarrow trips would have to be almost a mile long.



Looking west along Laguna Canyon Road showing a considerable portion of the two miles of new roadway.

In actuality, the earthmoving was done using tractors and carryalls for short hauls and tractor and scraper units for the long hauls. To speed up loading of the scrapers, tractor push cats were used in tandem. Due to the hardness of the sandstone encountered in the excavation on the new alignment of Laguna Road, it was found necessary to use ripper-equipped tractors to break up the material prior to loading.

Due to the substandard width and alignment of the old highway, no attempt was made to salvage any of it other than utilizing a portion for sub-base for the new construction. In contrast to the old narrow two-lane highway, the motorist now has the use of two 12-foot concrete lanes in each direction with a paved shoulder to his right and a wide median between opposing traffic. Provision has also been made to add an additional lane in each

direction when needed for future increased traffic.

Since access is not permitted to the freeway, it was necessary to construct frontage roads from El Toro-Niguel Road to provide access to the Irvine Ranch and other holdings in this area. In addition to the frontage roads, an undercrossing and an overcrossing were constructed to provide access across the freeway for farm equipment.

In addition to structures needed for access across the new freeway the contract also provided for an interchange for the new Laguna Canyon Road and the freeway.

J. E. Haddock Ltd. was represented on the contract by Superintendent George Wiggers. Duncan Manning was superintendent for Cox Bros. Construction Company with the author as resident engineer.

(Other photos on next page.)



**UPPER**—This photo, taken from the new Laguna Canyon Road traffic separation structure, shows the new section of the Santa Ana Freeway looking south toward San Juan Capistrano. **LOWER**—The new traffic separation connecting Laguna Canyon Road with the Santa Ana Freeway. (Story on previous page.)

# Monterey County

King City-North County Line  
Section of US 101 Improved

By A. M. NASH, District Engineer

TODAY'S many modern business and pleasure travelers who drive on US 101 in Monterey County travel in increasing comfort, ease and safety as they visit the many scenic resorts and other fascinating points of historical interest that abound in the county, or in making the many truck and passenger trips required to keep pace with the ever-expanding industry and agriculture much in evidence throughout the area.

US 101 in Monterey County is rapidly changing from a heavily traveled, two-lane country road into a modern well-planned divided four-lane expressway or freeway. Much improvement has been made, as will be seen, but there is still much to do to provide the traveling public with the modern highways they need.

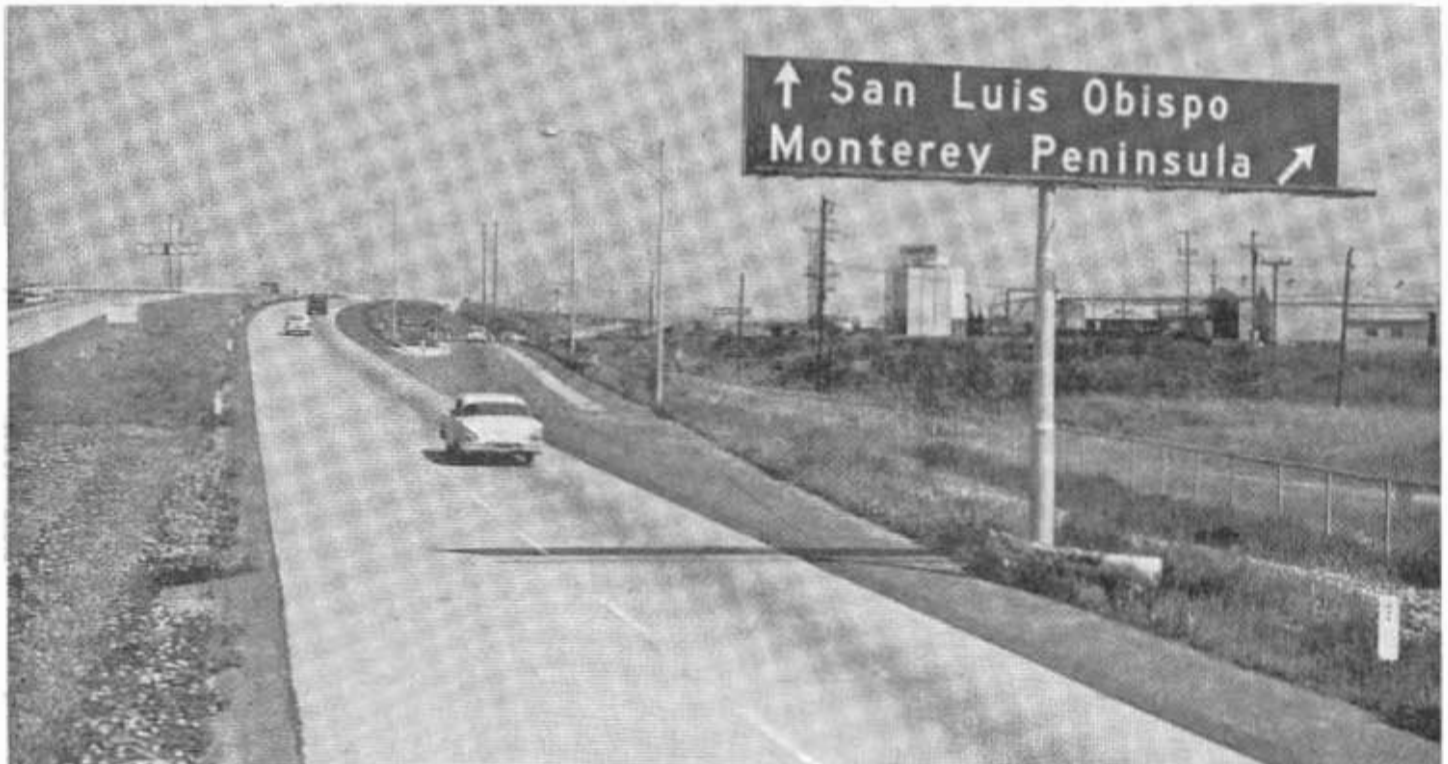
To see what has been done and will be done, let us take an imaginary trip

down historic El Camino Real from the county line north of Salinas to King City, since this section of US 101 has been receiving preferred attention for the elimination of its deficiencies during the last several years.

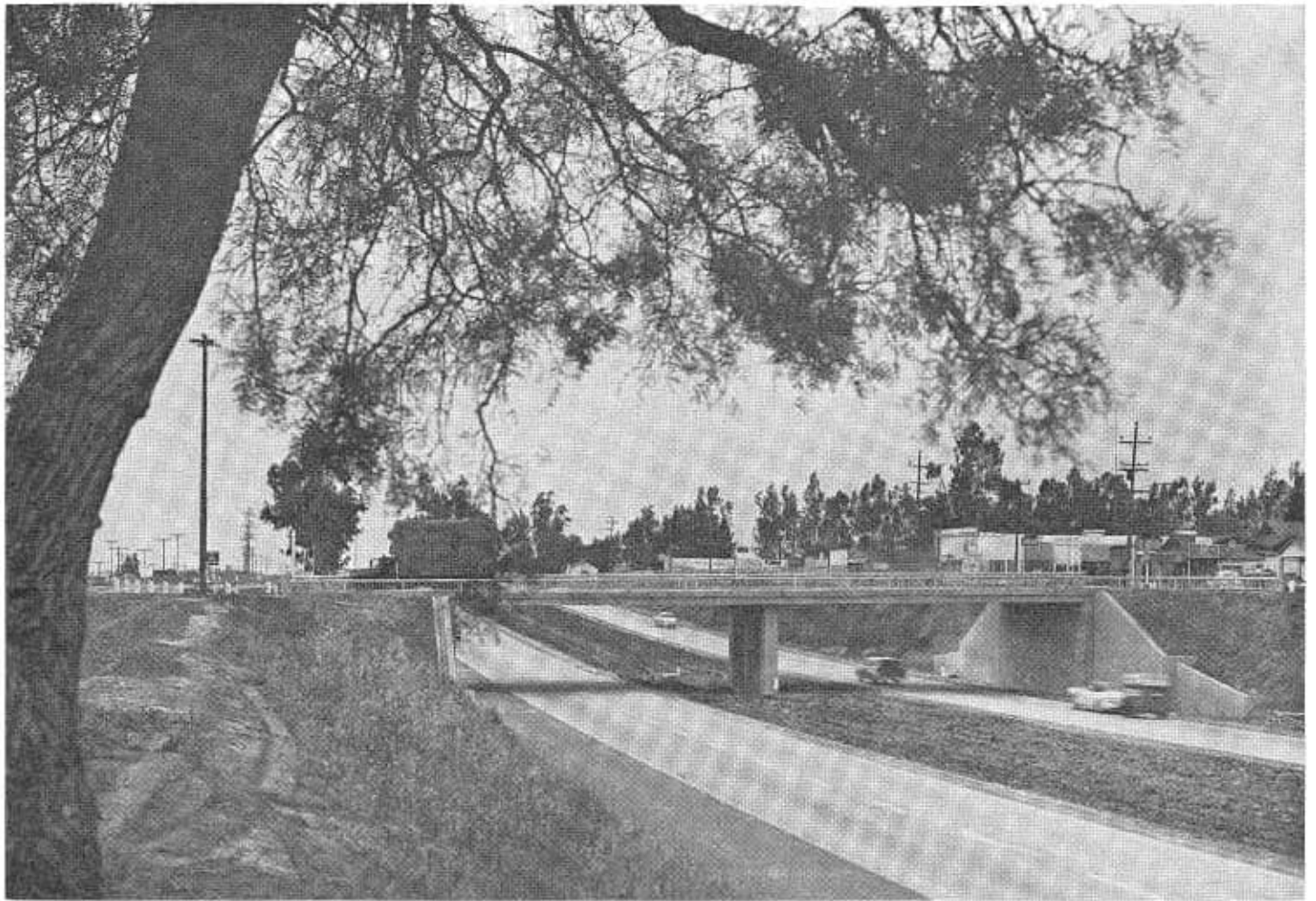
Entering Salinas Valley from the north we travel over a divided four-lane highway constructed in 1943 but no longer adequate. Plans are well under way for a full freeway development westerly of the existing highway which will bypass the business and residential development that has been built up on both sides of the existing highway, causing much of the traffic congestion. Right-of-way is presently being acquired for this freeway project which will be constructed as soon as funds can be made available.

After passing the Salinas Rodeo grounds to our left, we notice on our

right a sign directing us to a ramp leading us onto the Salinas freeway. We are leaving North Main Street and we shall now travel a distance of 6.2 miles skirting the easterly edge of busy Salinas. The first section of this full freeway from North Main Street to South Market Street was opened for traffic in 1954 and eliminated a great deal of the congestion at the intersection of Main and Market in the Salinas business district as well as reducing the heavy volume of traffic on North Main Street. The second section from Market Street to Spence Underpass and Hartnell Road was completed and this entire six-mile Salinas freeway was opened to traffic in 1956, considerably easing the local traffic problems throughout the City of Salinas, as well as facilitating and benefiting traffic to and from Los Angeles and San Francisco.



The Salinas Bypass on US 101 in Monterey County. As the directional sign indicates, the interchange ahead connects US 101 with State Route 117 to the Monterey Peninsula.



A view of the depressed section of the US 101 freeway through Chualar and the Main Street overcrossing. The old highway is on the upper level to the right along the line of buildings.

Separation structures were constructed at sufficient intervals to allow free flow of crosstown traffic and provide access to State Route 117 which leads westerly from this point to historic and scenic old Monterey, the original capital of California, as well as to the resort city of Carmel, the communities of Seaside and Del Rey Oaks, and the large army facility at Fort Ord, north of Monterey.

For details of construction of this freeway, one may refer to the July-August 1953 and March-April 1954 issues of *California Highways and Public Works*.

As we travel south on the Salinas freeway we see to the southeast rising sharply from the green valley floor the steep, craggy Santa Lucia Mountains. Looking across the valley to the east we see the green of the Salinas Valley merging into the dry, brown

rolling hills of the Gabilan (Hawk) Range that separates the Salinas Valley from the valleys farther east. We are actually entering a huge trough between these mountain ranges, a great, green plain from 10 to 20 miles wide and a hundred miles long.

#### Rich Croplands

Here we see under intense cultivation and irrigation all types of vegetables with lettuce obviously king of them all. Local people refer to the Salinas Valley as the "Lettuce Bowl of America" and as we travel south seeing the endless rows of vegetable and forage crops it is evident that the Salinas Valley is one of the most productive agricultural valleys in the United States.

Driving effortlessly we have quickly passed the southerly terminus of the Salinas Freeway at Spence Underpass

and Hartnell Road. Many road names honor original Spanish, Mexican, and "Anglo" colonists who first settled in this rich valley. These particular road names honor two British citizens who were, after the padres, among the first settlers here.

David Spence came to California from Scotland in 1824 to salt meat and hides for shipment to Peru and other Latin American countries. He prospered, married Adelaida Estrada, daughter of the commandant of Monterey, and settled down to developing the Rancho Buena Vista south of the present-day Salinas. Don William Hartnell, originally a young Lancashire man, became a prosperous trader in Monterey, married Teresa de la Guerra, a high-caste Spanish maiden from Santa Barbara, and later owned and operated the Alisal Rancho. He established a private college which

eventually failed due to depression times but which has been re-established as a two-year college in Salinas named, in his memory, Hartnell College.

#### Heavy Harvest Traffic

South of Hartnell Road we are traveling on a divided four-lane expressway built in 1952 for a distance of 5.5 miles to the northern outskirts of the little town of Chualar. This section of expressway was constructed prior to other sections in this area to facilitate the flow of agricultural produce from the surrounding fields to the market and shipping center in Salinas. The old two-lane highway previously in existence was so congested with large, slow vegetable produce trucks during the summer harvest seasons that all vehicle traffic was forced to travel at greatly reduced speeds.

A one-mile freeway section through the Town of Chualar has just been completed. Completion of this freeway has eliminated an annoying two-lane traffic bottleneck which formerly existed between the divided four-lane expressway north of town, over which we have just traveled, and the divided four-lane expressway from the southerly limits of Chualar to two miles north of Gonzales, some 3.8 miles away, which was completed in July, 1954.

#### Old Spanish Rancho

Chualar is an unincorporated community approximately 10 miles south of Salinas on El Camino Real approximately two miles east of the Salinas River, lying in the center of a level agricultural plain some 110 feet above

sea level. The town varies from 300 population in off agricultural seasons to 800 during peak harvest periods as imported farm laborers crowd the labor camps as they harvest the vegetable crops produced in the rich land for many miles around.

The land on which these crops are grown lies in the yet distinct boundaries of the old Chualar Rancho. This 8,890-acre rancho, an original land grant from the King of Spain to an old Peruvian trader named Juan Malarin, passed into the hands of a Scotsman named David Jacks in 1850 when Juan's son, Mariano Malarin, could not repay Jacks a loan on his rancho of \$3,000 which he had borrowed in a vain attempt to save his cattle operations during a long drought. The rancho is still owned by the David Jacks Corporation, which he established before his death.

M. J. B. Construction Company and Lord and Bishop, Inc., of Stockton worked on this project as a joint venture with Lord and Bishop, Inc., doing the structure work.

Work started in April 1957 and was completed approximately one year thereafter. The project consisted of constructing 1.5 miles of four-lane divided freeway with a depressed mainline section through Chualar, and a diamond-type interchange with an overcrossing at Main Street. The new alignment runs between and parallel to the old highway and the Southern Pacific Railroad. The old highway through Chualar became a frontage road. An existing county road which intersected the highway just south of Chualar was realigned to connect to the Main Street interchange.

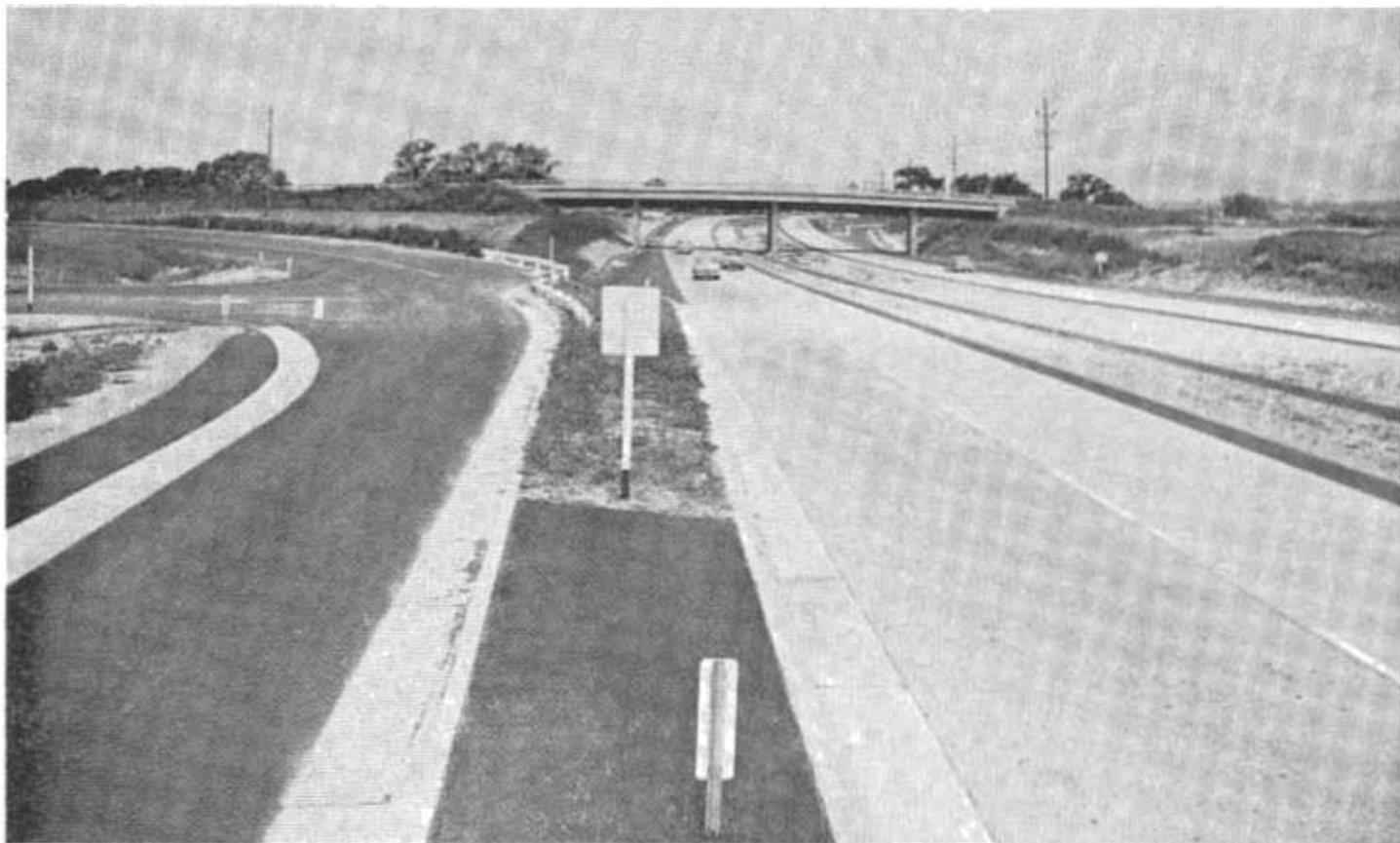
Since construction of this section of highway parallels the existing highway, and overlaps the existing four-lane divided expressways to the north and south, it was necessary to detour traffic at various stages of construction, when the existing traveled way became involved in the construction procedures. Detouring was complicated by a time element resulting from construction of the prestressed concrete overcrossing at Main Street. Setting up safe detours proved to be quite a problem since traffic approached the project from the north and the south on long level sections of high-speed divided expressway. One troublesome spot was greatly improved by erecting an oversize 8-by-8-foot advance "SLOW" sign to warn oncoming high-speed traffic.

#### Soil Problem

Excavated material encountered within the roadway area proved to be expansive. Generally, a moisture content of 20 percent was required to obtain "no shrink, no swell" moisture requirements. Subgrade samples were taken early during the grading operations. From tests on these samples, the laboratory recommended that the structural section for the base materials and pavement be increased from two feet to three feet to prevent detrimental swell of the underlying basement soils. This was done.

Construction of the depressed section resulted in a surplus of excavation of approximately 75,000 cubic yards out of a total of 124,000 cubic yards. This surplus was disposed of in areas outside of the right-of-way, some of which were selected by the State and others by the contractor. Most of this





The section of US 101 expressway between Soledad and Greenfield (upper) showing the Arroyo Seco overhead and frontage roads left and right is typical of the new divided, multilane construction replacing such sections as the existing highway through Soledad (lower) with its slow-moving traffic



*A view southward of the Salinas Bypass from the John Street overcrossing showing industrial development in the zoned area to the right*

disposal material was moved by the use of two-axle pneumatic-tired scrapers and was hauled across the railroad tracks which paralleled the job to the west. Considerable excitement occurred on two different occasions when a scraper accidentally hooked into the rails and pulled the Southern Pacific tracks out of line. Trains were able to detour via an existing siding without much delay. Part of the work under this contract consisted of constructing some fills for a Southern Pacific Railroad siding relocation necessitated by the new highway construction.

The flat terrain in this area made it necessary to set up two storm drain

systems to drain the project. First of all, the depressed freeway section, which is 15 feet below the surrounding area, is being drained by a gravity storm drain. The depressed area storm drain consisted of an intricate system of small box culverts which drain into a 30-inch reinforced concrete pipe which runs into a reservoir approximately 1,100 feet west of the project. The 30-inch reinforced concrete pipe was laid on a 0.3 percent grade and 92 feet of it was jacked under the Southern Pacific Railroad tracks.

The second storm drain runs along the old highway which will become the frontage road through Chualar. This storm drain picks up the water

from the streets of Chualar and carries it out the north end of the project. It is on a 0.3 percent to 0.4 percent grade and starts out with a 30-inch reinforced concrete pipe increasing to a 36-inch reinforced concrete pipe. All new pipe culverts on the project are of reinforced concrete pipe.

#### **Prestressed Concrete**

To meet limited clearances at the Main Street overcrossing it was necessary to construct a bridge with a minimum structural depth. A two-span continuous prestressed slab, 18 inches thick, was constructed providing two 14-foot lanes and one five-foot sidewalk.

Ninety-one 1½-inch diameter rods were used in the construction of this prestressed slab. The rods were post-tensioned to 12,000 pounds per square inch and then grouted with a cement grout. The entire stressing operation, including grouting, was completed in three days.

A borrow pit located 1½ mile south of the project suitable for imported base and subbase materials was set up in the special provisions, and the contractor elected to use this pit.

All aggregates used were obtained from commercial plants. Materials for the concrete pavement were batched at a commercial plant in Salinas. Plant-mixed surfacing was obtained from a commercial plant 29 miles north of the project.

The prime contractors were represented by Superintendent M. L. Purser. Wayne Louderback was Bridge Department representative and Al Jorge was Resident Engineer on the project.

With the elimination of the Chualar bottleneck the motorist can now drive on divided four-lane highways from the Santa Clara county line to a point two miles north of Gonzales, a distance of 35 miles.

All too soon, after a brief 3.5 miles of travel south of the new Chualar Freeway, the wide expressway ends, and we enter a section of two-lane highway extending from two miles north of Gonzales to 0.3 mile south of the Salinas River.

#### Deficiencies Recognized

It should be noted that our design engineers are even now completing plans for a 5.6 mile freeway to bypass to the east the stretch of two-lane highway we now have to travel from a point two miles north of Gonzales southerly.

Our planning engineers have long recognized the deficiencies of the existing two-lane highway in and on either side of Gonzales with its high accident rate, congestion and ribbon development through Gonzales complicated by lack of access control. Congestion has always been acute in the summer months when produce hauling from the adjacent farms to

packing and shipping points in Salinas results in a high percentage of slow-moving produce truck traffic. This congestion has resulted in considerable unsafe use of shoulders for passing purposes.

The new four-lane divided freeway facility now under design will veer off easterly from the terminus of the present expressway north of Gonzales with an interchange approximately 2,000 feet south of the project point of beginning to provide access to Gonzales on the existing two-lane highway for local traffic.

Veering east, the new alignment roughly parallels the easterly city limits of Gonzales, skirting the new subdivision areas lying within the city limits.

An overpass with north and south on and off ramps will be constructed at Johnson Canyon County Road that merges into Fifth Street within the city limits and roughly crosses in east-west direction the center of town.

#### Bypass Planned

From Johnson Canyon Road the new alignment will veer westerly, meeting the existing highway approximately one mile south of town by means of an interchange. At the southern end of this interchange the proposed bypass freeway will merge with the existing highway again.

Right-of-way acquisition has been started on this project. Construction is estimated to cost \$2,200,000 exclusive of right-of-way and will be started as soon as funds can be made available.

An intricately related part of this project is the next section directly south tying in with the above project at approximately one mile south of Gonzales. This project on which construction has just begun is designed to remove the deficiencies of the existing two-lane highway from this point to a point 0.8 mile north of Soledad. Deficiencies here are the same as cited around Gonzales and are generally



This is US 101 north of Soledad at the entrance to Soledad State Prison as it looked before the contractor began operations in June. New highway lanes will be constructed on the right, parallel to the existing roadway.



true throughout the rich agricultural portion of the Salinas Valley.

This project is a part of the California Highway Commission's route adoption between Salinas River and two miles north of Gonzales in August, 1955, which was immediately followed by freeway agreement with the County of Monterey in October, 1955. The Board of Supervisors of Monterey County have been cognizant of the great need for freeway development on this highway and have been very helpful and most co-operative in working out the many problems encountered by the state engineers in developing the necessary freeway agreements.

#### **Work Will Begin**

This construction project initially develops a four-lane divided freeway for its entire length of 5.7 miles which will be graded and paved with plant-mixed surfacing or cement-treated base with two grade separations structures to be constructed at the entrance to Soledad State Prison and at Camphora railroad station and Gloria County Road. Approximately \$1,780,000 has been budgeted by the California Highway Commission for construction.

Yet these projects in themselves do not solve our critical traffic problems in this area. We must consider two other projects presently being designed and readied for construction.

The major of these two is the Soledad bypass freeway beginning at the terminus of the project just discussed one mile north of Soledad. It is proposed to construct a four-lane freeway on new alignment 2.8 miles in length bypassing the City of Soledad on the west, through cultivated portion of the old San Vicente Rancho.

The existing highway will be used for 750 feet at the northern end of the project in making the transition to new alignment. A grade separation structure will be constructed over the existing highway and Southern Pacific Railroad approximately one-third mile north of town. An off-ramp farther north will allow traffic access to town from the freeway.

#### **Existing Highway Used**

The new alignment parallels the railroad and westerly city limits until it merges with the existing highway just south of the existing highway railroad underpass by means of an interchange. The existing highway will be used for the southerly 700 feet of the project as the freeway merges into existing alignment at the Salinas River Bridge, south of Soledad. As part of this project a second bridge over the Salinas River will be constructed directly west of and parallel to the existing bridge. Right-of-way is presently being acquired and construction is scheduled as soon as funds become available.

As we cross the bridge over Salinas River south of Soledad we can see on both sides of the highway groves of old oak trees that once provided shade for Don Gaspar de Portolá, Padre Junipero Serra and their band of 20 weary men as they camped here on their historic journey of exploration from San Diego to find a land route to the Bay of Monterey, a route which with slight deviation we now refer to as El Camino Real.

Within the oak grove on our right lies an old long rectangular adobe and wood siding building that was once the ranch headquarters of Feliciano Soberanes, a retired soldier of the King of Spain who received the surrounding Los Coches Rancho as a land grant from the King in appreciation of his long and loyal service.

Later the old adobe became a popular stagecoach stop at the intersection of the well-traveled El Camino Real and Paraiso Hot Springs Road.

As with the Chualar Rancho, the Los Coches Rancho passed into the hands of David Jacks. The very productive Los Coches Rancho is still owned by the David Jacks Corporation, who lease the land for vegetable growing and dairy operations, and one of the tenants on the rancho still lives today in this old adobe.

#### **New Interchange**

Across the highway from this old adobe a new interchange has just been constructed as part of a four-lane expressway project between the Salinas

River and one mile north of Greenfield.

This overcrossing at the north end of the project diverts traffic to the Arroyo Seco district over the freeway lanes on a two-way reinforced concrete, open beam bridge.

Grading was light over most of this 5.6-mile expressway project, with only 273,000 cubic yards of roadway excavation.

The contractor was hampered during his grading operations by high-velocity winds that blew almost daily from the north, creating a tremendous dust nuisance because of the fine, silty, sandy quality of the local soils. It became necessary to keep seven or eight water trucks steadily sprinkling the graded roadway 10 hours a day, seven days a week, using three different sources of water. When grading was completed and the left lanes paved, dust palliatives were applied on an experimental basis by our Materials and Research Department with considerable success, and the contractor was able to considerably reduce his water application operations.

Base material was manufactured from a pit in the nearby Arroyo Seco River, located at midpoint of the job. Aggregates were trucked approximately 60 miles by bottom dump truck and trailers from Aromas. Fortunately, the necessary sand was obtained from Metz, a short eight miles from the batch plant, and plant-mixed surfacing was produced from an old existing plant set up in the Arroyo Seco River just south of the base pit.

#### **Detour Necessary**

Traffic was maintained on the old lanes and around the overcrossing site by a 2,000-foot detour until the new left lanes had been completed. Traffic was then placed two-way on the new concrete lanes and the existing two-lane roadway was completely resurfaced. Two locations on the existing lanes were reconstructed to meet the high present-day highway design standards.

The only real traffic problem on the project was handling the flow of traffic to the Arroyo Seco and Mission districts which had to pass through the overcrossing construction area. The problem was solved by dividing



The detour at the beginning of the freeway project between King City and Greenfield during construction. Effective barricades such as this get traffic moving over the detour without delays. Some 9,000 vehicles a day use this section of US 101.

the main area of work into three stages of construction, meanwhile leaving a 200-foot gap in construction to allow traffic through.

The contractor was the Granite Construction Co., who was awarded the contract in April, 1957. The Bridge Department representative was William H. Schooler, and the resident engineer was R. S. Scamara. Cost of the work was \$1,145,000.

Once again we revert to two-lane highway as we enter the Town of Greenfield. This section too, through Greenfield, is included in plans for four-laning US 101 in Monterey County.

#### Farm Traffic

Generally we shall follow the same overall plan developed for bypassing the Towns of Gonzales and Soledad with a four-lane freeway bypassing Greenfield, this time to the east, some three blocks from the existing highway which passes through the business district. The present traffic congestion occurring through this area during the

summer months also results largely from produce hauling on adjacent farms to packing and shipping centers in Salinas.

An added traffic hazard in Greenfield that will be eliminated in this proposed freeway construction stems from the Greenfield Grammar School which lies adjacent to the existing highway, generating a considerable volume of pedestrian traffic across the existing highway during school hours.

Beginning a mile north of the city the project will make a transition from the recently completed project to the north, veering slightly east and paralleling the existing highway through town joining with the new expressway project nearing completion approximately 1.5 miles south of Greenfield.

Interchanges are proposed at each end of the Greenfield city limits, at Walnut Avenue near the middle of town, and a separation at Elm Avenue the main east-west county road which actually connects the Gabilan and the Santa Lucia Mountain Ranges. Present

estimated cost of construction of this 3.7-mile freeway section, including structures, is approximately 1.5 million dollars with an additional expenditure of \$500,000 required for acquisition of rights-of-way. Construction will be scheduled on this project as soon as the necessary funds become available.

#### Bridge Completed

On leaving town we see ahead another newly completed link in our chain of freeway projects in Monterey County. This particular expressway project joins on the south with the short expressway section completed in 1956 which included the new bridge across the Salinas River at King City.

Even though the expressway on which we are now traveling has recently been completed we have already nearly forgotten that the previous highway from Greenfield to King City, bounded on the east by the Salinas River, and on the west by

... Continued on page 53

# Crestmore Bridge

*F. A. S. Project Completed  
Near City of Riverside*

By DOUGLAS POWELL, Assistant Road Commissioner, Riverside County

IN MAY, 1958, a final field inspection was made by the State Division of Highways and the Riverside County Road Department to accept the Crestmore Bridge, Federal-aid Secondary Project S-1177(3). There were no ribbon-cutting ceremonies, no ap-

plauding civic groups, and no speeches, but the event did culminate some 7½ years of effort and the expenditure of some \$650,000 on behalf of the State, the Federal Government, and the county in the realization of a new northwest access route to the downtown area of the City of Riverside.

The Santa Ana River crosses the northwesterly corner of the county adjacent to the Riverside city limits. It drains an area of approximately 790 square miles, much of which lies in the rugged San Gabriel and San Bernardino Mountains. The stream rises in the mountains and is fed by nu-



*An aerial view of the new Crestmore Road and Bridge with the City of Riverside in the distance. The bridge was lengthened by Riverside County under the Federal-aid Secondary program. The river is the Santa Ana.*

merous small tributaries as it runs to the Pacific Ocean at a point just south of Huntington Beach.

In Riverside County, most of the river is deceptive in appearance, as its flow is mostly through subterranean placer gravels, and it is rarely a visible watercourse. This part of Southern California has undergone a protracted dry cycle since the early forties and most of the extensive population influx since World War II has never had an opportunity to see the river in flood stage.

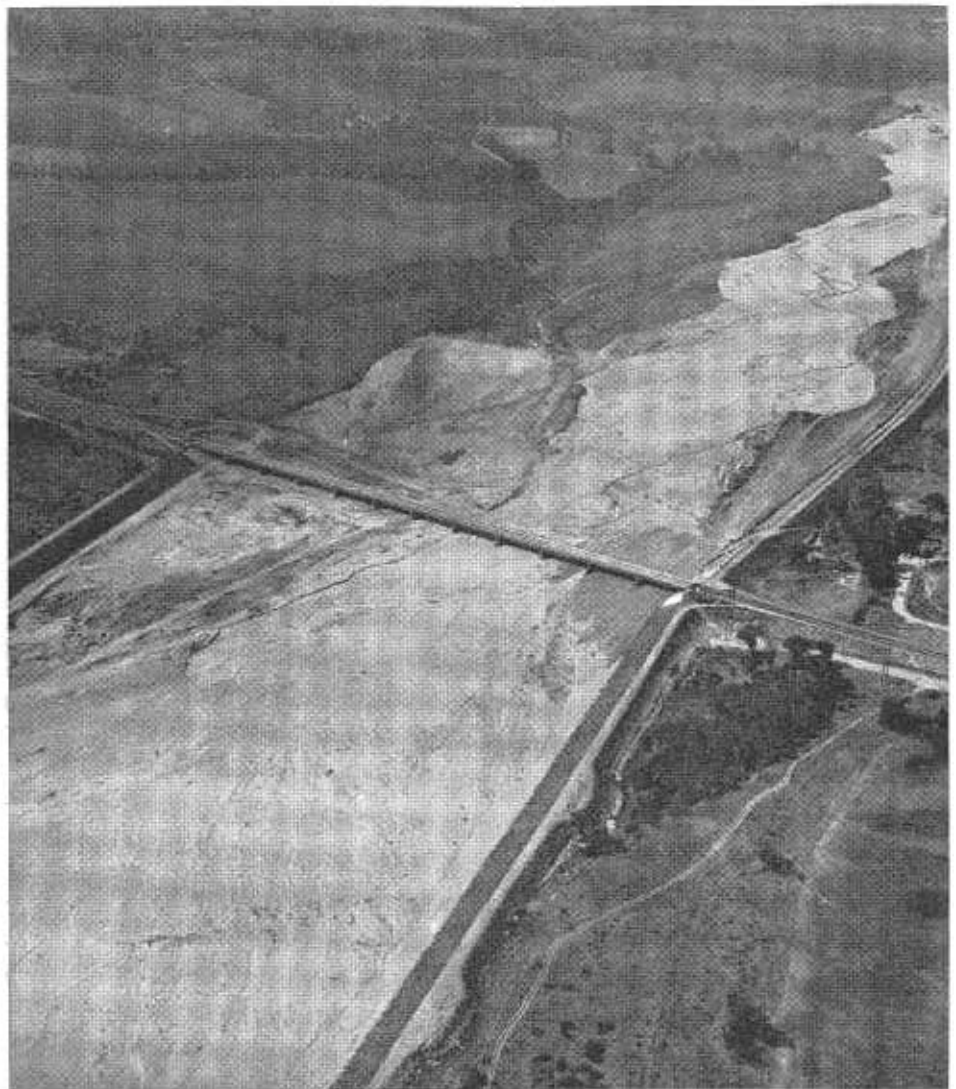
#### **Runoff Problem**

However, due to the size of the drainage basin, the steep and barren slopes of the semidesert mountains, and the magnitude of the possible storms, an accumulated runoff in excess of 100,000 second-feet is readily realized, and such flows pose a considerable problem in planning and financing any bridge crossings.

Prior to the completion of the present structure, there were only five crossings of the river inside Riverside County with the average distance between them over five miles, and basically only one bridge, the Rubidoux Bridge on U. S. Route 60, serving the City of Riverside. Needless to say, this was an inadequate arrangement from both the civilian and military standpoint, and had received considerable criticism from various public groups for several years.

Late in 1950, the county road department undertook a study of the feasibility of providing an additional crossing some two miles northerly of US 60 at a point which had formerly carried a trestle bridge on the long-since abandoned Pacific Electric Railway. A low-type road crossing at stream level had been maintained by both the city and the county at this point for some years, and in spite of its impassibility during wet weather showed an average daily use of nearly 500 vehicles.

In the preliminary review, extensive information was obtained from a report prepared in 1943 by the Corps of Engineers on a proposed flood control project for the entire Santa Ana River from its source to the ocean.



*An aerial of the recently constructed channel for the Santa Ana River and the Crestmore Bridge located northwest of the City of Riverside*

#### **Land Use Studies**

This report had been submitted to Congress in 1943, and had lain dormant in the ensuing seven years in spite of repeated efforts on behalf of the county and the flood control district to revive it.

Planning commission studies gave information on current and projected population and land use for the residential and industrial areas north and west of Riverside that such a new route would serve and a further incentive was added by the completion of the San Bernardino Freeway through Bloomington which provided an interchange connection to serve the proposed Crestmore Road traffic bound for the metropolitan areas.

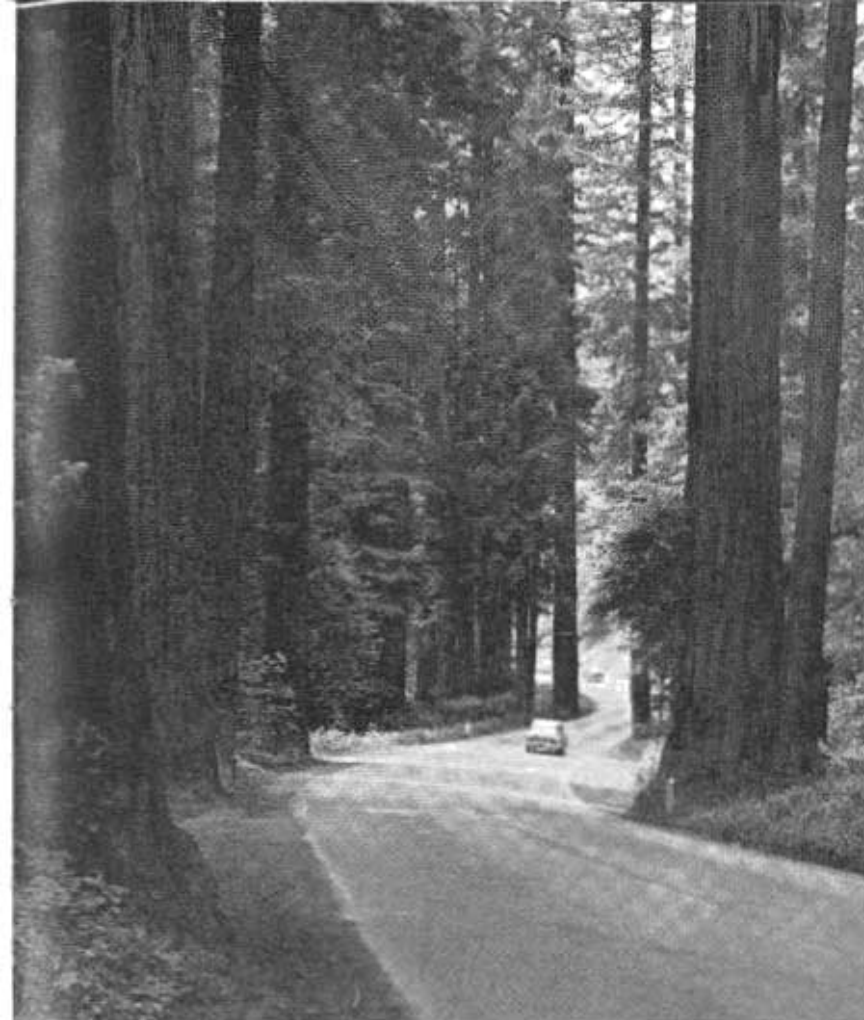
After completing this preliminary planning, the county road department submitted the following recommendations to the board of supervisors:

- (1) That the initial construction be on the basis of providing for the northbound set of lanes of an eventual four-lane divided facility, but that right-of-way be acquired immediately for the ultimate construction, and that it be acquired with full access control.
- (2) That the first stage of the work consist of the construction of a 600-foot plate-girder bridge so designed that eventual extension to double this length could

*. . . Continued on page 55*

# Report From District I

By SAM HELWER  
District Engineer



IN THE first biennial report of the California Highway Commission for years 1917-18, which accompanied the sixth biennial report of the Department of Engineering, we find the opening introductory paragraph: "In 1910 the people of the State of California adopted the 'State Highways Act' providing for the issuance of bonds to the amount of \$18,000,000 for the construction and acquisition of a system of state highways."

As a result of that forward step by the people of the State of California, the record shows that Contract No. 2 was located in Mendocino County in District I. This contract provided for grading a 12.6-mile section of highway between the Sonoma-Mendocino county line and Hopland.

The contract, dated July 23, 1912, was with the General Construction Corporation and work was completed at a cost of \$93,280, plus \$2,675 for engineering, or a total of \$95,955.

PHOTO ABOVE—US 101 between Phillipsville and Arden in Humboldt County, a scene typical of the Redwood country in District I

Other contracts followed in District I and throughout the State, and it probably appeared that a sound highway development program was well under way, promising California an adequate highway system commensurate with the thinking of the times.

The people of California had vision, but who could visualize the tremendous development of the "horseless carriage" and its utilization coupled with all developments—population, industry, etc.—would result in the present transportation and highway problems?

In District I, the "main line" is US 101, more commonly referred to and known worldwide as the Redwood Highway. In Del Norte County the Redwood Highway changes to US 199, connecting Crescent City and Grants Pass, Oregon, while US 101 continues northerly along the coast.

#### Vacation Traffic

It is doubtful if the early road-builders in District I, as they embarked on the ambitious program in 1912, realized that they were constructing a highway which would be-

come internationally known as the "Redwood Highway." The cathedral-like groves of ancient trees have continued to attract tourists in ever-increasing numbers from the four corners of the world. This has generated travel through and into the area to the extent that the tourist and vacationist expenditures have become an important segment of the area's economy.

The early construction of the Redwood Highway for many miles was entirely remote from the wagon or stage roads that served the areas. Such places as Sherwood, Bell Springs, Harris, Alderpoint were way stations on the original stage roads from the south and into Eureka. The groves of virgin redwoods as traversed by the present Redwood Highway were in a virgin state, sparsely settled.

After initiation of the California state highway development program, there was an orderly and constant development of the state highways within District I. However, it became obvious, as result of continuing advancement of automobile design as to

speed, roadability, and power coupled with increasing traffic volumes, that the development of highways was lagging. In the late twenties and early thirties highway projects under way were still replacing portions of the original wagon or stage routes that had become part of the Redwood Highway. This constant development was on a two-lane basis commensurate with stringently limited funds.

#### Modernization Begins

Many notable projects were completed in the late twenties and thirties undoubtedly inducing greater traffic volumes to the Redwood Highway as its fame became more pronounced. Growth of the area in turn generated additional volume in the form of commercial and industrial traffic.

The old Cloverdale-Hopland Grade, a portion of which was that old Contract No. 2, was eliminated by the construction of an entirely new water level grade along the Russian River between Cloverdale and Hopland. The highway between Hopland and Ukiah was also modernized. The old

Oil Well Hill grade north of Willits was reconstructed to adequate standards of the time and appeared to be the fulfillment of needs long into the future. North of Laytonville, the old road was replaced with new and modern line and grade. Especially noteworthy was new construction from old Pepperwood School over Rattlesnake Summit to Farmhouse Inn. This reconstruction replaced a portion of the tortuous and narrow road over Rattlesnake Summit and in the canyon of Rattlesnake Creek.

New bridges and considerable realignment were constructed at Big Dann and Cedar Creeks. New bridge and realignment was constructed at the South Fork of Eel River at Dyer-ville. The old highway between Fortuna and Eureka was completely reconstructed with a new relocation over Table Bluff and across Beatrice Flats.

#### Old Road Replaced

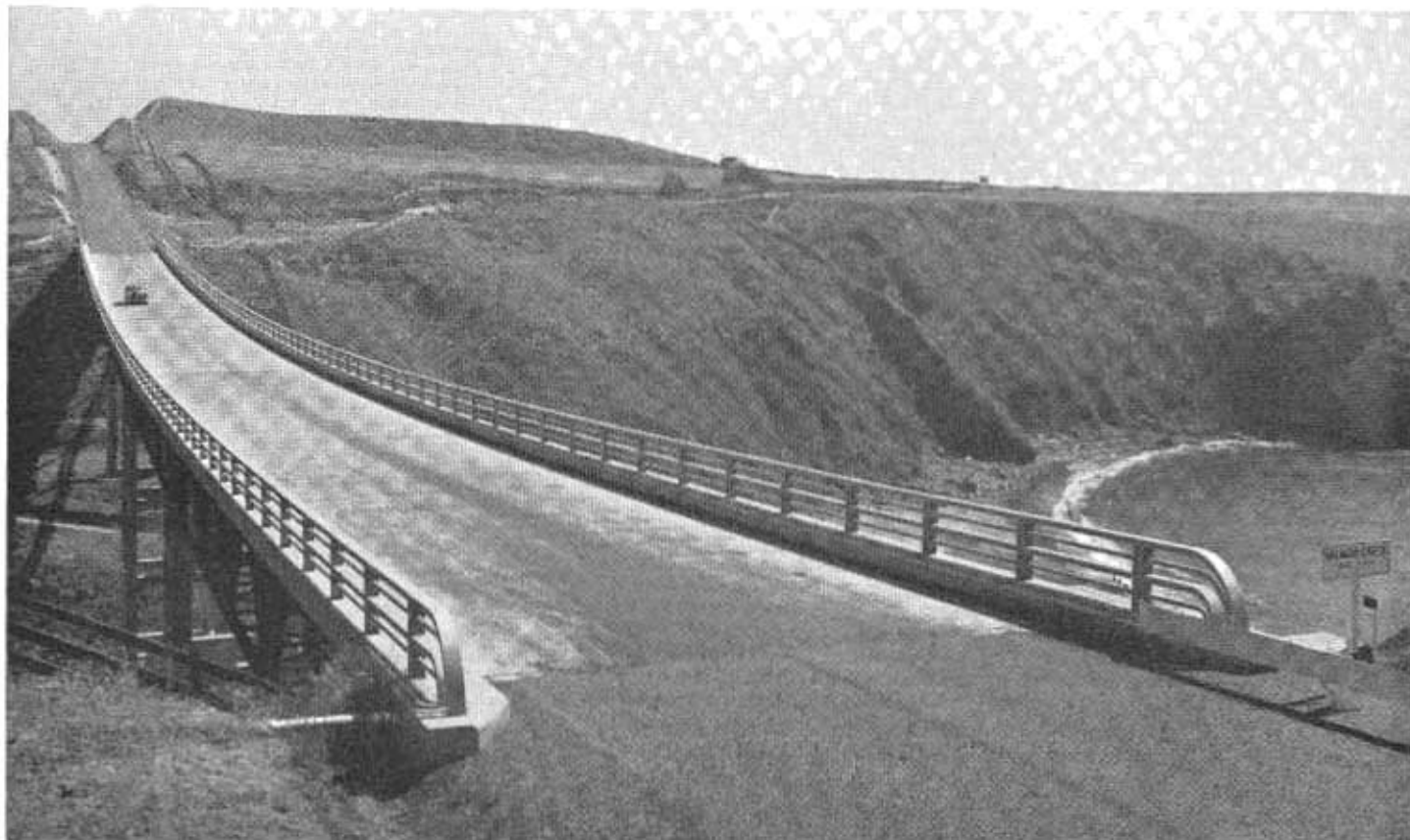
North of Eureka the same pattern prevailed, with many miles of then old substandard road being replaced by modern two-lane facility in ac-

cordance with acceptable design standards of the times. Trinidad north-erly, Orick to the county line, Last Chance Slide to Flanagans south of Crescent City, were names of projects that resulted in vast improvements to the Redwood Highway.

We have been discussing the "main line," or US 101, but improvements during this era were by no means confined to that route. Other routes in the district were receiving attention wherein the most deficient sections or bridges were being reconstructed or replaced, again commensurate with the availability of funds.

This continuing development was, of course, interrupted by World War II, when maintenance and strengthening of pavement structure were the major activities.

During the war period, demands for lumber instigated development of the vast, virtually untouched, fir timber resources in Humboldt, Del Norte, and Mendocino Counties. The heretofore long-established redwood industry was being supplemented to a



Old bridges on Sign Route 1 on the Mendocino coast have been replaced by modern structures such as this one across Salmon Creek



Heavy grading operations on the first unit of the Redwood Freeway. This aerial view southward was taken over High Rock Hill. The river in the upper left is the Eel.

rapidly increasing extent by the fir industry.

This spectacular expansion of the lumber industry within District I resulted in a somewhat suddenly added importance of the highways and roads in the counties.

#### Lumber Industry Expands

The long-established redwood industry generally utilized logging railroads for their forest-to-mill transport, and used railroad and water for transport of finished products to market. Logging techniques changed with the accelerated development of the fir industry. New areas were opened and mills of all sizes and production capacities were developed in areas only served by state and county highways.

The logging and lumber trucks became an important segment of the traffic stream. The necessary services to these far-flung timber enterprises and immigration of people to man the expanding industry gave impetus to the importance of highways, and made the deficiencies more glaring. The Redwood Highway with recreational and tourist traffic consistently recording the high traffic volumes during the summer months, had suddenly changed to a more important adjunct to the economy of the area, by servicing this greatly expanded lumber industry throughout the year.

As we all know, the postwar "boom" started in the late forties at termination of World War II and went into the fifties. The demand for timber

products went to unprecedented heights, resulting in a similar expansion of the lumber industry in the area. Since the counties in District I contained one of the major stands of timber in the United States, Humboldt County became the largest lumber producing county in the United States. Douglas Fir production, which comprised approximately 11 percent of the county's timber production prior to 1940, increased to more than 60 percent of the total after 1948.

In 1941 Humboldt County had 24 lumber mills with a "rough green" value of production amounting to about \$16,000,000. In 1952 the county had 262 mills with a "rough green" value of the timber cut being about \$86,000,000. This same change in proportionate amounts took place in Mendocino and Del Norte Counties.

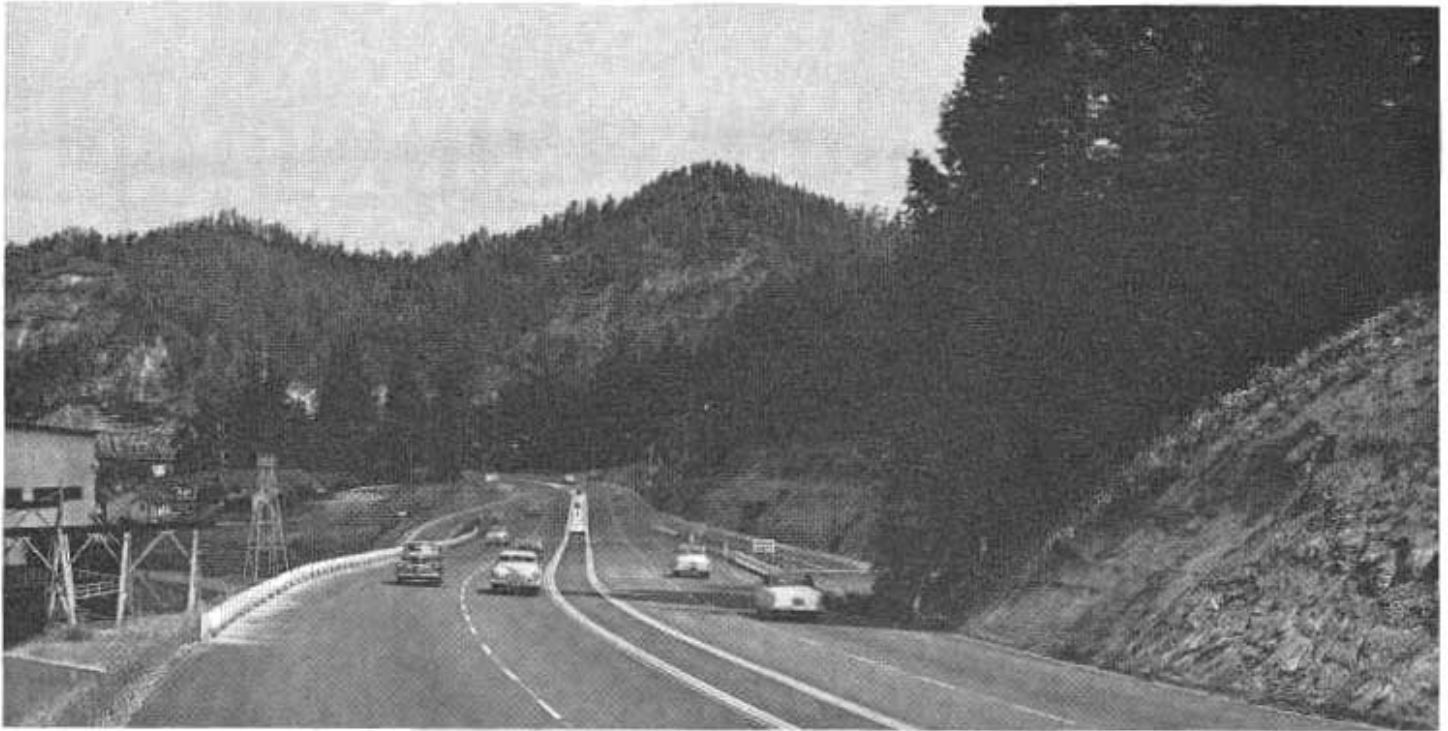
#### Population Growth

The population of Humboldt County went from 45,812 in 1940 to an estimated 89,000 in 1955, and estimated at 90,000 to 100,000 at present, also indicative of the population growth throughout the District I area.

It is obvious that with such growth the transportation of people, goods, and services became a problem of greater magnitude, and highway obsolescence was accelerated. Contributing further to the increasing traffic volumes were increased numbers of tourists and vacationists as a result of the tremendous population growth in California and the Pacific Coast States.

This whole problem, painfully manifest in terms of congestion and accidents, necessitated a complete new planning approach. It had already been assumed that US 101 in the Fortuna-Eureka-Arcata area would need four-laning, and planning and design was underway on that basis. Now it became necessary to revise the design standards upward for the entire length of the Redwood Highway in the district.

Design standards were set on a four-lane controlled access basis for all future improvements of the Redwood Highway from the Sonoma-Mendocino county line to Crescent City and northerly as justified by traffic demands. This new basis of design



The Scotia Freeway Bypass in Humboldt County. Buildings of the town are seen on the left.

standards, four-lane roadbed versus two-lane, posed entirely new problems throughout the district. Rugged and unstable terrain, tight location controls by streams and mountains, provision of adequate access to and from a four-lane freeway or expressway, and construction of these new facilities within reasonable economic limits posed problems to challenge the ingenuity and abilities of the highway engineers.

#### Early Expressways

Some of the first multilane construction in District I, although not to freeway or expressway standards, was completed before the full impact of the tremendous growth in "Redwood Land" was felt. These were within the Cities of Ukiah and Fortuna, and the unincorporated community of Rio Dell.

The first rural four-lane expressway construction in the district was undertaken in 1950 and completed in 1952. This project was in Humboldt County from Robinson Ferry Bridge just north of Scotia to Alton, a project length of 4.4 miles. This was a preview of the future improvements of the Redwood Highway within District I. Since that time, development has progressed to the full extent of

available funds with better traffic movements and increased ease and safety as each project was completed.

Reconstruction has been on a logical basis, starting improvements on those sections of highway having the greatest degree of deficiencies, highest traffic volumes, and a consideration of all the factors essential to a proper planning program.

#### Rainfall a Problem

Improvements in the three counties of District I on the Redwood Highway have served to expedite traffic movements, in that modern standards with sight distance commensurate with design speed, four lanes, etc., permitted breaking up long lines of slow-moving traffic resulting from leading slow-moving vehicles.

The advent of four-lane design standards on the Redwood Highway multiplied the problem of providing a stable roadbed in an area of heavy rainfall and unstable rough terrain. The elimination of possible slides and slipouts is a major factor considered in design. These problems were of serious concern to the highway constructors on the Redwood Highway when originally constructing and then modernizing on a two-lane basis;

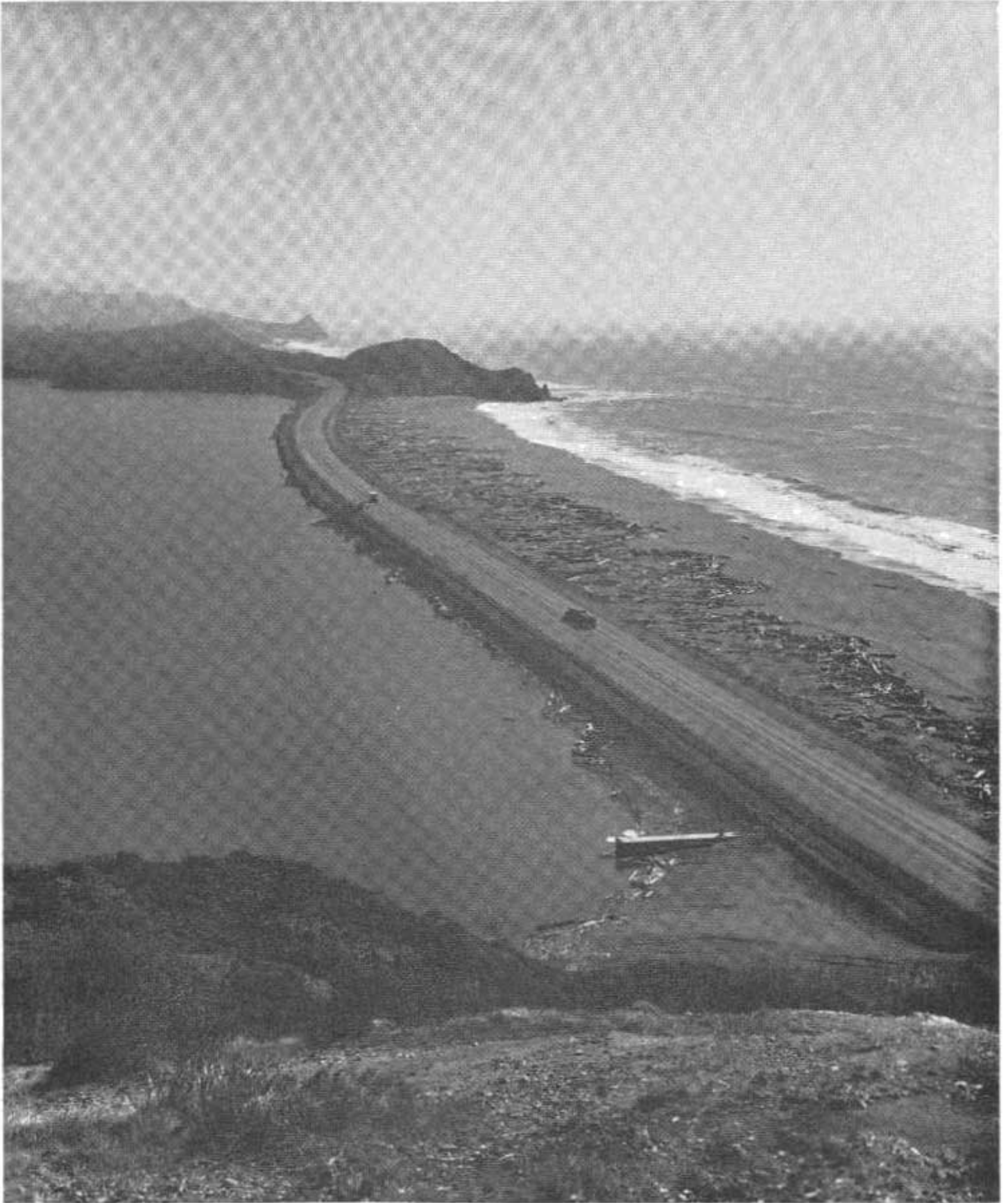
higher four-lane roadbed standards have enlarged this problem. The prevalence of rugged and unstable terrain results in expansive highway construction costs, which decrease the length of improvements obtainable by the District I highway dollar.

#### Projects Reviewed

Starting at the southerly end of the district and proceeding northerly along the Redwood Highway, we might review the more recently completed improvements, those under way, and projects planned for the future.

In the Ukiah-Willits area the major improvements have been over the Ridgewood Summit. This relocation and improvement between 1.5 miles south of Forsythe Creek and 0.5 mile northerly of the Northwestern Pacific Railroad crossing has almost been continuous since 1950. The 5.2-mile improvement to two-lane expressway in 1950 at the southerly end of the Ridgewood Grade north of Calpella, was extended with a 4.9-mile section of four-lane expressway in 1954, which carried the modernization over Ridgewood Summit. The last remaining section of the originally constructed two-lane highway on this





*At Freshwater Lagoon south of Orick, US 101 was rerouted along the sandspit*

section was eliminated in 1957, with extension of four-lane expressway from Ridgewood Summit to 0.5 mile northerly of the Northwestern Pacific Railroad crossing. This latter project included an overcrossing of the railroad eliminating a hazardous grade crossing of long standing.

In the City of Ukiah, the highway between Smith Street and Low Gap Road was widened to four lanes in 1951. This four-lane section was extended northerly from Low Gap Road to 0.2 mile north of Ford Road in 1956.

Design work is under way on a new freeway to skirt the Ukiah central area to the east. Plans are under way for such construction to extend from Crawford Ranch about seven miles south of Ukiah to just southerly of Forsythe Creek on the north. The total length of this planning is approximately 14 miles and in all probability when the project is financed, construction will be undertaken in three units.

#### Willits Bypass

Preliminary studies are also active in the planning of a freeway to bypass the central area of Willits. This future project will extend from the end of the recently completed four-lane improvement on the northerly slope of Ridgewood Summit to Reeves Creek north of Willits.

The old and very standard section of the Redwood Highway between Reeves Creek and the old Sherwood Road south of Laytonville is being eliminated by a series of projects. A four-lane expressway project 2.1 miles in length between Reeves Creek and one mile north of Hilvilla was completed in 1955. A 4.2-mile extension northerly from Hilvilla to Irvine Lodge, north of Longvale, is currently under construction with completion scheduled for this summer. Plans are almost complete, and funds for some rights-of-way acquisition have been allocated for the remainder of the section through Long Valley Creek Canyon to old Sherwood Road south of Laytonville.

As we proceed northerly over Rattlesnake Summit north of Laytonville to Farmhouse Inn, about 12 miles north of Laytonville, work is under

way on four-lane expressway construction between Farmhouse Inn and just north of Tan Oak Park, a distance of 2.8 miles. This work is transforming a portion of originally constructed highway to a modern four-lane facility. Ball and Simpson, of Berkeley, are the contractors with a low bid of \$1,814,527. This four-lane project will connect with a job completed in 1953 at a cost of \$570,000, which replaced an old timber bridge across Rattlesnake Creek with a large culvert and embankment.

#### Creek Diversion

Work was actually started on this section in 1956 when a tunnel was constructed through a rock point at Tan Oak Park to divert the course of Rattlesnake Creek where new highway embankment will infringe on the original creek channel. This 136-foot-long tunnel was constructed by Mercer-Fraser Company of Eureka at a cost of \$39,000.

On the portion between Rattlesnake Creek and the Humboldt county line, studies have been initiated for replacement of this sinuous 25 miles of two-lane road with a four-lane controlled access facility.

A short length of four-lane facility was completed in 1955 at Red Moun-

tain Creek when the old timber bridge at that crossing was replaced with a culvert and fill.

The outstanding recent event in the development of the Redwood Highway through the state redwood parks in southern Humboldt County, was the start of construction of the Redwood Freeway in 1957, in conformance with plans to provide a four-lane freeway through or near the world-famous redwood groves with minimum disturbance to the groves and park areas. Freeway routing has been officially adopted for a length of 43 miles from the Mendocino-Humboldt county line to Jordan Creek. The routing is approximately seven miles shorter than by existing highway.

#### The Big Cut

The first unit, 4.4 miles in length, now under construction, extends from one mile south of Dyerville to Englewood. Guy F. Atkinson, of South San Francisco, is the contractor on this unit, and final cost will closely approach \$7,000,000. The story of the "Big Cut" on this project was given by H. W. Benedict, Resident Engineer, in the September-October, 1957, issue of the *California Highways and Public Works*. The problems of design were covered in an article in the



This four-lane structure over Outlet Creek and the Northwestern Pacific Railroad is part of the US 101 freeway construction north of Willits.



A four-lane fill between Patricks Point Park and the north shore of Big Lagoon will replace the 4,000-foot timber trestle (left)

May-June issue by Norman G. Larsen, Project Designer.

Work on the second unit between Myers and one mile south of Dyer-ville, a distance of 6.7 miles, is scheduled to start this summer under two separate contracts. One contract will provide for clearing the right-of-way and the other will be the construction of a 540-foot-long reinforced concrete arch culvert in Mowry Creek. The 1958-59 Budget provides \$730,000 for this preliminary construction work on the second unit. Additional contracts will provide for grading and surfacing estimated to cost another \$5,700,000.

The ultimate completion of this 43-mile length of Redwood Freeway promises to add to the renown of the Redwood Highway by adding new vistas to the traveler and providing greater safety, comfort, and convenience. In all probability, greater volumes of traffic will be induced as a result of the new spectacular and

scenic freeway which will provide convenient connections to the old road remaining through the redwood groves where they may then be viewed and enjoyed at a leisurely pace.

#### Heavy Traffic Areas

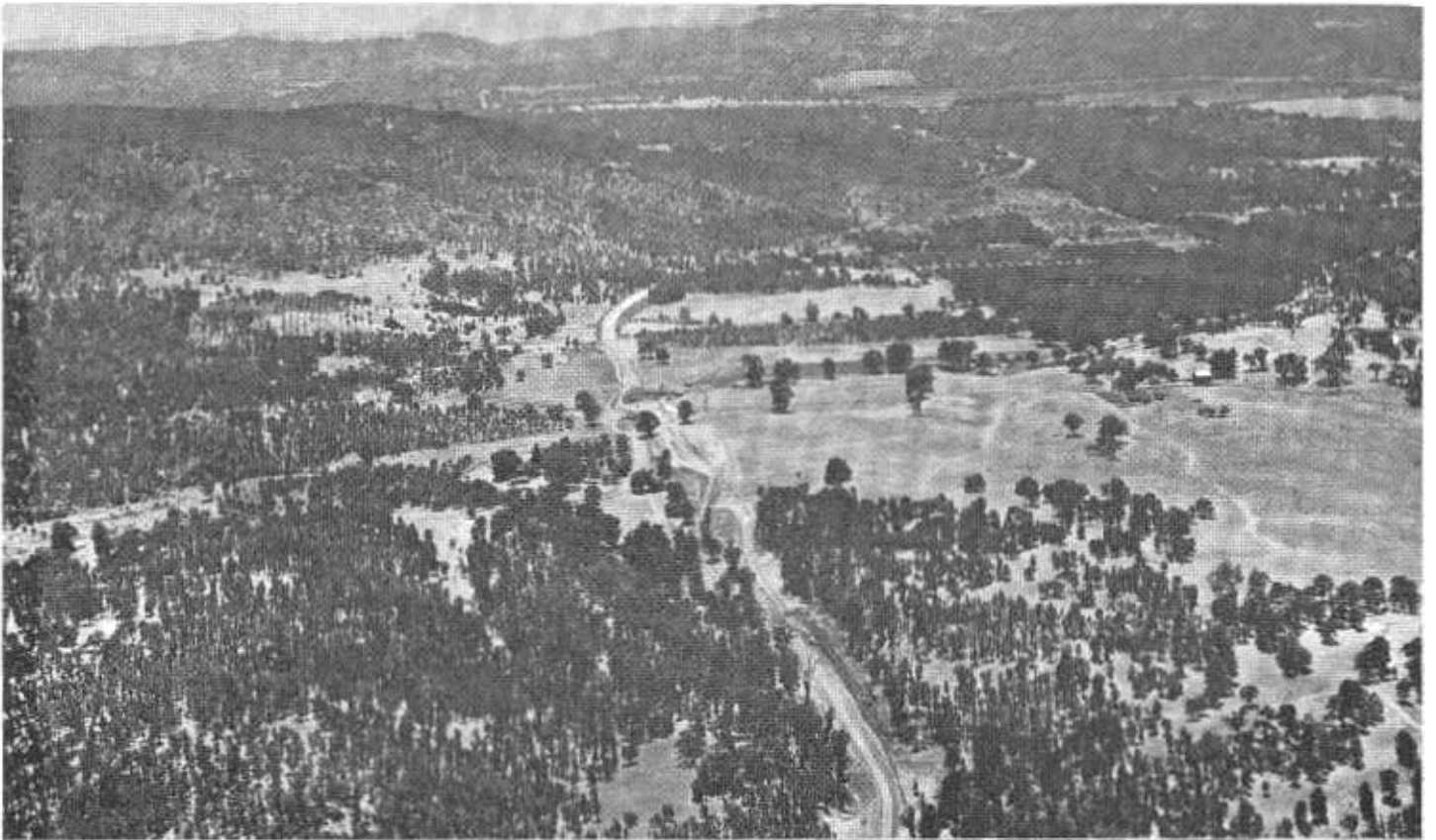
Since 1950 the major expenditure of state highway funds in Humboldt County has been on that portion of the Redwood Highway between South Scotia Bridge and Mad River north of Arcata. This section of highway serves the Humboldt Bay metropolitan area, and records the highest traffic density in the district. The continuing program of development within these limits has resulted in the completion of many important projects.

On a sidehill location fringing Scotia to the east, 1.4 miles of four-lane expressway were completed in 1952. This improvement eliminated traffic congestion in Scotia as well as conflict between highway and local

traffic since the former highway route was "Main Street" of Scotia. The four-lane expressway between Robinson Ferry bridge and Alton grade crossing, a distance of 4.5 miles, started serving the increasing traffic demands during the previous year.

From Alton grade crossing to the northerly city limits of Fortuna, four-lane freeway plans have almost been completed and some rights-of-way have been acquired.

From the northerly city limits of Fortuna to 0.4 mile north of Fernbridge, construction is in progress on a 3.2-mile length of four-lane freeway. Work is being done under two contracts, one providing for interchange structures and the other for grading and surfacing. This project connects with a recently completed project which provided a four-lane expressway from 0.4 mile north of Fernbridge to 0.7 mile north of Hookton Road on Beatrice Flat, a distance of 4.6 miles. The new expressway created consider-



*UPPER—In Lake County, Sign Route 53 is being constructed as a modern two-lane freeway. This aerial is looking southward toward Clearlake Highlands and Clear Lake (right background). LOWER—Heavy sidehill construction in the canyon of the East Branch of the Russian River in Mendocino County featured the relocation of Sign Route 20 between Calpella and Potter Valley Road.*

able interest in the area as it eliminated the old two-lane road over Table Bluff Hill near Loleta, which was a source of traffic delays and accidents.

From Beatrice Flat through Fields Landing and to Elk River just south of Eureka city limits, the freeway routing has been adopted and detailed planning is underway for a four-lane freeway.

#### **One-way Couplet**

In the Eureka area, 1956 saw the completion of improvements from 0.2 mile south of Elk River through Eureka and Arcata to the intersection of the Redwood Highway with US 299. The improvements resulted in multiple lanes for approximately 13½ miles, including a four-lane street section, a one-way couplet through Eureka, and four-lane divided expressway, the total investment being approximately \$8,097,000.

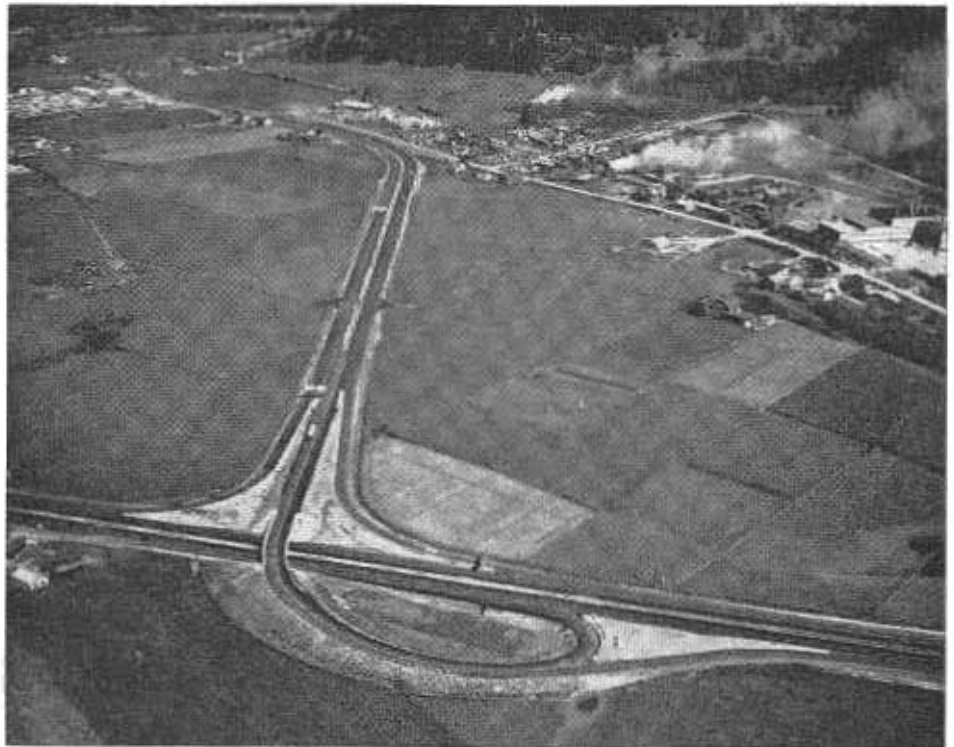
The continuation of a four-lane expressway from the US 101–299 intersection to 0.3 mile north of Mad River is under construction with the first contract providing a parallel bridge and approaches at Mad River. Bids for grading and surfacing of this 1.5-mile improvement will be called for at an early date.

From Mad River to Trinidad the freeway route has been adopted and detailed design work is underway. On the portion between Little River and Trinidad, rights-of-way are being acquired.

From Trinidad to Patricks Point State Park, preliminary studies have been started and aerial mapping has been completed.

#### **Trestle Replaced**

From Patricks Point State Park to 0.3 mile north of Big Lagoon, a four-lane expressway is being constructed at a construction cost of about \$1,740,000. The work is being done under two contracts. Clearing and grading were done under the first contract, and the second contract provides for surfacing and construction of a 400-foot bridge across the Maple Creek outlet into Big Lagoon. This project eliminates the old 4,000-foot Big Lagoon timber trestle. Deterioration in this structure has required a speed



*Reconstruction of US 101 north of Arcata resulted in a new trumpet-type interchange connecting US 101 and US 299. This aerial is looking eastward along US 299.*

limit for large trucks for quite some time.

In Del Norte County, from just south of the Humboldt-Del Norte county line to Minot Creek just north of Klamath, freeway routing has been adopted. This future project approximately nine miles long, will involve a new bridge across the Klamath River, and the eventual costs of providing a four-lane facility within these limits is estimated at \$12,000,000.

Freeway routing has also been adopted from Minot Creek to one mile north of Wilson Creek, and two projects have been completed on the adopted line. New bridges and approaches were recently completed at Minot and High Prairie Creeks, replacing old timber structures. The new bridges were positioned to allow for future expansion of the route to four lanes.

#### **Obsolete Highway**

At Wilson Creek the year 1957 recorded completion of the first section of four-lane highway in Del Norte County. This 1.1-mile project includes a new four-lane bridge across Wilson Creek on new alignment. This portion

of new highway has fulfilled a long-standing need by eliminating a stretch of obsolete highway with serious deficiencies in alignment and grade, coupled with a narrow bridge across Wilson Creek.

The old circuitous highway route through Crescent City will soon be a thing of the past. Construction is under way from 0.7 mile south of Elk Valley Road through Crescent City and to 0.4 mile north of Northcrest Drive, a distance of 2.1 miles. This new routing through Crescent City includes a one-way couplet, with L Street serving southbound traffic and M Street northbound traffic. The typical sections include improvement of two-lane existing highway, four-lane street section, and four-lane divided highway, together with channelized intersections. Work is being done by Mercer-Fraser Company, of Eureka, resulting from low bid of \$529,955.

On the Redwood Highway (US 199) northeasterly of Crescent City in the Smith River Canyon, preliminary studies for relocation and improvement are progressing involving the portion of highway from Gasquet

to Hazelview Summit. Anyone familiar with this area will realize that provision of a modern design highway in this mountainous country will pose some real engineering problems.

#### Other Routes Improved

During this period of development of the Redwood Highway, other routes have had improvements applied with resultant benefits to traffic and transportation needs of areas served by state highways.

In Lake County, in recognition of the importance of Sign Routes 29, 53, and 20 in the county's transportation picture, development of these routes has been a continuing effort for a number of years resulting in major expenditure of state highway funds.

In the St. Helena Canyon, Sign Route 53 south of Middletown has been reconstructed from the Napa county line down to the flat. Further improvement of the route on into Middletown is in the planning stage. This future project will eliminate a portion of substandard facility by relocation.

Farther north on Sign Route 53 between Putah Creek and Lower Lake, there remain several miles of old highway on which design work is under way, especially on the longer sections of old highway between Harris Creek and Lower Lake.

Sign Route 53 was relocated and reconstructed in 1953 between Lower Lake and Cache Creek. This relocation is currently being extended to

the intersection with Sign Route 20 east of Clearlake Oaks by 6.3 miles of two-lane limited access facility. This \$800,000 project will eliminate a seriously substandard section in Burns Valley, including the old Seven Creeks open fords.

In the Blue Lake-Upper Lake area, Sign Route 20 has been reconstructed and realigned for the entire distance between the Mendocino County line and Bachelor Valley Road just west of Upper Lake. The last project, completed in 1956, was a five-mile improvement at the Mendocino county line with the project partially in both counties.

In Mendocino County, Sign Route 20 between US 101 and Potter Valley Road has undergone a complete



*This expressway section on US 101 is between Robinson Ferry Bridge and Alton. It was the first long section of four-lane, divided roadway to be constructed in District I.*



US 101 in Arcata was reconstructed on a new routing east of the central business area. This view northward shows the Ninth and 14th Street overcrossings.

change. The Coyote Dam on the East Branch of Russian River will result in inundation of existing Sign Route 20 within the Coyote Valley reservoir area and necessitated rerouting the affected portion of the highway. Construction was completed in June on the new highway routing making it a modern two-lane expressway between a new connection with the Redwood Highway at Calpella and Potter Valley Road, a distance of 4.2 miles. This project was financed in the main by federal funds on a replacement basis. The Guy F. Atkinson Company, of South San Francisco, performed the work on the \$3,081,000 project.

In 1957 an additional length of Sign Route 20 was included in the State Highway System. This section is between Sign Route 1 just south of Fort Bragg and Willits on the Redwood Highway, a distance of 33 miles. Prior to the inclusion of this section of highway into the State Highway System, it was improved considerably over its original condition by Mendocino County under the federal aid secondary program. To bring pavement markings, signing, and safety devices up to state highway standards, the route has been striped and a contract is under way providing signs, guide posts, and guard rail.

#### Bridges Replaced

On Sign Route 128 in Mendocino County there has been consistent improvement of the route between its terminus with Sign Route 1 and

Dry Creek southeasterly of Boonville. Improvements have ranged from strengthening the pavement structure and resurfacing to relocation and bridge replacements. Emphasis was placed on replacing structurally deficient bridges. Old timber bridges at North Fork of Navarro River, Flynn Creek, Indian Creek, and Anderson Creek have been recently replaced by new structures and approaches. Further improvement of the route between Mill Creek and Boonville is in the planning stage, and an aerial mapping district has been completed.

In 1933, Sign Route 1 along the coast was taken into the State Highway System. In District I this included 80 miles of the route in Mendocino County between the Sonoma county line and Westport. Within the 80 miles there were 84 bridges, mostly timber structures in poor condition. Replacement of these deteriorated structures started almost immediately and has been a continuing program ever since, with only five of those original structures remaining in use at this writing.

This replacement of deficient structures is continuing, as evidenced by a current construction project for a new bridge and approaches across Gualala River at the Sonoma-Mendocino Counties line. The 1.1-mile project involving an expenditure of \$565,000 will realign the highway routing and will result in a vastly improved section of Sign Route 1.

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## Fair-bound Motorists Will See New Highways

The State Fair in Sacramento is a summer season highlight for thousands of Californians each year, and recent improvements on highways leading to the state capital will make this year's trip to the fair even more pleasant than in the past.

The 104th California State Fair and Exposition will open August 27th and continue through September 7th. Fair officials predict the 1958 event will be the "biggest and best ever" with new entertainment features added to the usual long list of topnotch attractions.

Motorists who make the trip to the fair this summer will find that every main state highway route to Sacramento has been improved in the past year, with new sections of freeway available in several places.

Between the San Francisco Bay area and Sacramento, US 40 is now nearly all freeway or expressway, with only short gaps remaining to be closed.

From the East Bay Distribution Structure to the Carquinez Strait, most of this route has been constructed as full freeway, including a 10-mile section recently opened through the hills between Richmond and Rodeo.

East of Rodeo work is entering its final phases on the "Big Cut" freeway approach to the new parallel Carquinez Bridge. The 2.9-mile freeway approach and the new bridge are both scheduled for completion in December.

#### Signals Eliminated

By the time the fair opens, construction crews will be into the final phases of converting the present four-lane divided stretch through Vallejo to a six-lane freeway. The traffic signals on that stretch will no longer be in operation. Work will be in progress on the two remaining lanes, but traffic will move smoothly through the area.

From Vallejo to Sacramento, US 40 is completed expressway, except for short four-lane undivided sections north of Vallejo and west of Sacramento (Yolo Causeway).

Another long stretch of freeway-expressway which will make a trip to

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## DISTRICT III

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one-way couplet from 11th Street to Memorial Way, with attendant channelization and signalization, during the current budget year. Plans are being developed, pending available financing, for the improvement of the route along the Esplanade to provide four lanes in the northern section of Chico.

State Sign Route 16, extending northwest from Sacramento through Yolo and Colusa Counties, is being improved under several small contracts. This work is intended to correct the most critical deficiencies in the route. Four contracts are presently awarded on this route. They are: the surfacing of a levee relocation of a 1.4-mile section between the Sacramento Weir and Kiesel; the realignment of the route from the Yolo Bypass to one-half mile north of Kiesel and the widening of this route from Bryte to Broderick; the realignment at the Flyers Club west of Woodland; and the realignment from 0.8 mile south to 0.4 mile north of Rumsey. These projects represent a total expenditure of approximately \$490,000. The contractors involved are A. Teichert and Son of Sacramento, Granite Construction Company of Watsonville, and Lange Brothers of Lakeport.

Another project for this route is included in the current budget. This calls for the realignment of the westerly approach to the I Street Bridge over the Sacramento River at Sacramento. The 1958-59 Budget contains \$500,000 to make this improvement.

In 1957, a portion of Highway US 40 Alternate in Sutter County was widened from Knights Landing to north of Robbins. This 40-foot all-paved roadway, 5.9 miles in length, was constructed by Granite Construction Company of Watsonville at an approximate cost of \$450,000.

### Mother Lode Highway

The improvement of State Sign Route 49, the third trans-Sierran route within the district, has been overshadowed by work being done on the other such routes, but its value to the traveling public who use this route is very great. The largest project is

the improvement of the route from the Placer county line to near Rattlesnake Creek in Nevada County and consists of the construction of two lanes of an ultimate four-lane expressway. This work has just been started by Isbell Construction Company of Reno under a \$1,283,000 contract. This 7.3-mile section is scheduled for completion and public use in the latter part of December.

In Sierra County, a section of this route from the North Fork of the Yuba River to Ramshorn Creek is being widened and realigned. A portion of this work was completed in 1957 at a cost of \$100,000. Bids were recently opened for the construction of a new bridge over Fiddle Creek in this section and the 1958-59 Budget contains funds for continuing the improvement of this portion of the route.

Another route being improved as rapidly as funds can be made available is the highway from Auburn through Georgetown to Placerville. Although this route is not subject to the traffic pressure of some of the other mountain routes, it is vitally important to the people of the area. In recent years its use by recreationists and the lumber industry has greatly increased. In 1957, Claude L. Youngs Construction Company of Sacramento completed a contract, at the cost of \$184,000, to widen the road from Georgetown for 2.4 miles toward Auburn. As a part of a long range continuing program a total of 2.6 miles of the route between Georgetown and the top of Morgan Grade were improved at a cost of \$112,500. Money for the further widening and realigning of the section of the route between Georgetown and Placerville is contained in the current budget.

### New Highways Added

During the past year two sections of highway were added to the State Highway System within the district. The first of these is Route 232 between Sacramento and Marysville. This route, known as the Forty Mile Road to Sacramento, receiving oiling and sealcoat treatments on sections after its inclusion in the system and a \$250,000 widening and surfacing project, is advertised for completion this

## Andrew J. Meehan

Andrew J. Meehan, Supervising Bridge Engineer, died suddenly on June 27, 1958, in Anchorage, Alaska, while on a vacation cruise with his wife, Anna.

Meehan had been with the Bridge Department of the Division of Highways for 37 years. He started in 1921 as a draftsman in the design section and had various assignments including resident engineer, designer on the San Francisco-Oakland Bay Bridge, bridge designer in the Sacramento office of the Bridge Department and for the last 10 years, in charge of design administration.

He was born on August 10, 1895, in Rochester, New York, where he attended school and was graduated from the Rochester Institute of Technology. After graduation he worked for several years as office and field engineer in various Eastern States. After a short period with the United States Bureau of Public Roads in Arkansas in 1918, he came to California where he worked as a structural draftsman for the Pacific Gas and Electric Company and later as assistant office engineer for the Bureau of Public Roads until he entered state service on August 1, 1921.

He was a registered civil engineer and registered structural engineer.

Survivors, in addition to his widow, are two sons, Dr. Carl W. Meehan, physician and surgeon, and John F. Meehan, structural engineer with the State Division of Architecture, both of Sacramento, and five grandchildren.

summer. A public meeting is scheduled for July 1st to consider a change in alignment of the freeway routing between East Nicolaus and Highway US 99E previously adopted for this route. The presentation of the DeLeuw-Cather Report on transportation facility needs in and near Sacramento has now made possible the consideration of the remainder of the freeway routing to Sacramento.

The presentation of the DeLeuw-Cather Report has also permitted an

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## Merit Award Board Winners Announced

Employees of the Department of Public Works receiving certificates of commendation and cash awards since the last list was published in the magazine are:

*Kenneth Y. Lee*, Architecture, Los Angeles. Certificate of award and \$10 for recommending the size of the original tracing sheet be printed on that sheet at the time the title block is printed.

*Warren A. Johnston*, Highways, Marysville. Certificate of award and \$25 for recommending that tracing paper forms for plan sheets be supplied in "fadeour" grid paper as well as plain.

*Gilbert E. Tolberg*, Highways, Oakland. Certificate of award and \$30 for recommending that sand pots, used by the painting crews on the bay bridges, be lowered 12 inches to reduce accident hazard of back and hand injuries.

*George D. Mablmeister*, Highways, San Diego. Certificate of award and \$25 for recommending that position markers be placed on rollback type buckets used on new TL-10-L loaders.

*Miss Ramona S. Kaplan*, Highways, Redding. Certificate of award and \$10 for recommending discontinuance of the water service meter at the Cypress Street Yard.

*Frank T. Myers*, Highways, Sacramento. Certificate of award and \$50 for recommending a positive mechanical locking device for use on highway dump body maintenance trucks.

*Robert C. Warriner*, *Frank C. Woehl*, and *David Hartley*, Highways, San Jose. Certificates of award and \$150 to be divided equally for designing and building culvert invert paving sleds in three sizes to accommodate and pave the bottom of culvert pipes.

*Ralph V. Bane*, and members of the *Paint Striping Crew*, Highways, San Francisco. Certificate of commendation for recommending the use of grease on traffic stripes prior to seal-coating to serve as the pilot line for restriping after the seal coat has been placed.

*George E. Gray*, Highways, San Bernardino. Certificate of commendation for recommending a drawing of culvert markers with reflectors be included on standard sheet A-51.

*Mrs. Rosemary Labey*, Architecture, Sacramento. Certificate of award and \$40 for recommending discontinuance of preparing supplemental agreements to construction contracts covering additional or deductual amounts in excess of \$500.

*Jack Roy*, Architecture, Long Beach. Certificate of award and \$25 for recommending that the specifications for construction contracts include a requirement that shop drawings must be adequately identified with

... Continued on page 54

## CHC Vice Chairman Chester H. Warlow Cited for 'Years of Devoted Service'

Chester H. Warlow, Vice Chairman of the California Highway Commission, was honored in his home city of



CHESTER H. WARLOW

Fresno June 30th as "Mr. Highways of the San Joaquin Valley."

He was praised for his years of devotion to state highway problems and his decades of leadership in community activities by speakers at two ceremonies—the opening of Fresno's Stanislaus Street overpass and a testimonial luncheon.

Hundreds attended the two ceremonies. National and state leaders sent messages of greetings.

The occasion was Commissioner Warlow's sixty-ninth birthday. It was proclaimed "Chester H. Warlow Day" by both the City and County of Fresno.

Chief Justice Earl Warren of the United States Supreme Court telegraphed a message pointing to Warlow's "invaluable contribution to the development of California highways." Warren told Warlow that California's "tremendous growth \* \* \* called for exceptional leadership such as yours to make certain growth meant progress."

Governor Goodwin J. Knight wrote in praise of Warlow's "notable devo-

tion to the objectives of California's highway program" and his "dedication to the service of the people of California."

C. M. Gilliss, State Director of Public Works and Chairman of the California Highway Commission, sent a message crediting Warlow's "wisdom and judgment" with "great help to the commission in reaching sound decisions." Gilliss' message continued:

"So many have depended on you during your 15 years as commissioner—during the 15 years that have seen California's freeways grow from an adventurous innovation to an established system that is the envy of the world.

"Your contribution to California's highway program cannot be measured in prosaic terms—in dollars, or miles, or statistics. The best way to express the greatness of your continuing part in our highway program is to paraphrase the poet and say—

"You are truly a man to match our mountains!"

James A. Guthrie, only other member of the California Highway Commission beside Warlow to serve since 1943, told the luncheon audience that no commissioner could match Warlow's "record of familiarity with every mile of the California Highway System."

Officials of the City and County of Fresno, the Fresno County Bar Association, the Fresno Chamber of Commerce, and the Fresno Rotary Club paid tribute to Warlow, who entered law practice in Fresno in 1912, served as president of the Fresno Chamber of Commerce in 1922, and has been a director of the Rotary Club.

Commissioner Warlow, in a response to the praise, said he would accept approbation only "for what we of the community have done together."

"No man," he said, "accomplishes things by his own efforts. When something was achieved, it was not because of me, but because the goodness of the undertaking recommended itself to many men. \* \* \* Circumstances have let me give more time than most."

## DISTRICT III

*Continued from page 46 . . .*

acceleration in the plans for state highways to service this area. The route for the cross-city North-South Freeway has been adopted and will connect the work presently being done between Florin Road and Broadway and Highway US 40 in the northeast portion of the city. This route will lie between 29th and 30th Streets from Broadway to C Streets. Right-of-way are being acquired in this area.

The exact routing of the East-West Freeway through Sacramento is being studied.

### Other Routes Studied

Another interstate freeway route being studied at the present time is the proposed West Side Freeway from Woodland to the Grapevine, which will pass through Sacramento approximately paralleling the Sacramento River.

In addition to these major projects, many minor improvements were accomplished at intersections on the various routes, drainage problems were corrected, and channelization, signalization and lighting were provided at many locations.

The improvement of many miles of county roads in the Federal Aid Secondary System were also handled through the district office, as were the hundreds of thousands of dollars of storm damage repair projects that were the result of the severe storm of the 1955-56 winter.

Although much has been accomplished during the past year in our aim to provide the highway facilities that the traveling public wants, and needs, there is still a tremendous job ahead of the district. Industry will continue to come to this portion of California. The population will continue to grow. The number of motor vehicles will increase. With each year the demand for more adequate traffic facilities in even the most remote areas of the district will increase. We are preparing the plans to solve this eventuality. With the understanding help of the motoring public that we will do the most we can, with the financing that is available, eventually all these needs will be met.

## Annual Bonneroo Awards Made in Los Angeles

Seven hundred highway construction men cheered at a Los Angeles banquet in May as honor was paid to contractors and resident engineers selected for the superiority of their workmanship on projects done in District VII of the Division of Highways during 1957.

The occasion was the seventh annual "Bonneroo," a program in which District VII rates its highway projects of a year on a basis of workmanship, job complexity, safety, and other factors. The contractor and the State's resident engineer on the 10 highest-rated jobs are honored at the annual banquet.

First place winners for 1957 were the Peter Kiewit Sons' Company, contractor, and T. L. Patterson, resident engineer, on a project on Pacific Coast Freeway, near Oxnard, between Date Street and Calleguas Creek.

C. M. Gilliss, State Director of Public Works and Chairman of the California Highway Commission, presented the winner's trophy to Alvin Galbreath, representing the Kiewit company. Patterson received his winner's trophy from Edward T. Telford, Assistant State Highway Engineer in charge of District VII.

Other winners were:

No. 2—Winston Brothers Construction Company, contractor; R. M. Innis, Resident Engineer; San Bernardino Freeway between Citrus Avenue and Ganesha Boulevard.

No. 3—Wonderly Construction Company, contractor; D. Frischer, Resident Engineer; Chambersburg Road, near Fillmore, between Guiberson Road and Santa Clara River.

No. 4—Sully-Miller Contracting Company, contractor; J. D. Hetherington, Resident Engineer; Riverside Freeway, Orange County, between Santiago Boulevard and Mohler Drive.

No. 5—J. E. Haddock, Ltd., contractor; R. D. Siefried, Resident Engineer; Lakewood Boulevard between Gardendale Street and Hall Road.

No. 6—Winston Brothers Construction Company, contractor; N. C. Brinkmeyer, Resident Engineer; San Bernardino Freeway between West Covina and Citrus Avenue.



The Peter Kiewit Sons' Company, contractor, represented by Alvin Galbreath (left), and T. L. Patterson (right) resident engineer, are the first-place winners in District VII's seventh annual Bonneroo.

No. 7—Guy F. Atkinson Company, contractor; R. A. Collins, M. L. Gould, and J. E. Kenan, Resident Engineers; Harbor Freeway between 92d Street and Gage Avenue.

No. 8—Griffith Company, contractor; J. Needham, Resident Engineer; Santa Ana Freeway between Lewis Street and Broadway.

No. 9—Ukropina, Polich, Kral and Ukropina, contractor; C. C. French, Resident Engineer; Long Beach Freeway between Southern Avenue and Atlantic Boulevard.

No. 10—J. E. Haddock, Ltd., contractor; L. W. Sixt, Resident Engineer; Whittier Boulevard between Washington Boulevard and Orange county line.

## DISTRICT X

*Continued from page 22 . . .*

12 miles of expressway; a separation structure at Mossdale, where US 50 and Sign Route 120 meet near the San Joaquin River, will eliminate a major point of traffic friction; and in addition some 44 miles of outmoded and substandard two-lane highways will have been replaced or reconstructed. In addition, approximately 13 miles of federal-aid secondary roads were improved in several counties of the district during this past year.

## Frank Balfour Given Right-of-way Award

For the first time in its 24-year history, the Board of Directors of the American Right of Way Association, a nationwide professional organization of right-of-way men, has awarded a testimonial certificate to a member of



FRANK C. BALFOUR

the profession for dedication to public service.

Before approximately 600 right-of-way leaders from all parts of the Nation, Frank C. Balfour, Chief Right-of-Way Agent of the Division of Highways, was presented with a resolution paying tribute to his public service.

Balfour has been associated with the government of the State of California for approximately 27 years; he has been Chief Right-of-Way Agent since 1942. For 11 years Balfour served as Chairman, Committee on Right of Way, American Association of State Highway Officials; he has served as National Chairman of the Board of Directors, American Right of Way Association.

The resolution commends Balfour for "leading the cause of professionalism of right-of-way practices and procedures throughout the United States" and for his "major contributions to the outstanding success of the American Right of Way Association."

The tribute to Balfour highlighted the two-day national seminar sponsored in San Francisco May 28th and 29th by the American Right of Way Association.

### NEW TRAFFIC RECORD

Another new traffic record on the San Francisco-Oakland Bay Bridge was set Friday, June 13th, with a total of 120,513 vehicles. The previous record was 118,001 vehicles, set on Friday, June 6th.

## FAIR-BOUND MOTORISTS

*Continued from page 45 . . .*

the fair more enjoyable is the 51-mile section from Oakland to Tracy. The final gap in this route (Nimitz Freeway, State Highway Route 228, and US Highway 50) was closed last fall with the completion of a section between Castro Valley and west of Dublin.

Between Tracy and Stockton three projects covering about 15 miles of US 50 are now under construction. One of these jobs, which will provide 6.8 miles of four-lane expressway between Mossdale and Richards Avenue, is scheduled to be open to traffic by fair time.

On US Highway 99-50 a 4½-mile stretch of freeway north of Lodi was completed last year. Slated for completion before the fair starts is 7.2 miles of new freeway now under construction between seven-tenths of a mile south of Galt and 1.6 miles south of the Cosumnes River. From there to south of Elk Grove Road new northbound freeway lanes, now being built, are also expected to be completed.

Motorists who take US Highway 40 or 50 to Sacramento from the mountain and foothill regions to the east will encounter new sections of freeway and improved highway at several locations.

### Other Jobs Listed

On US 40 east of Sacramento two of the current series of nine major freeway projects will be completed. These two jobs will provide four-lane freeway for 6.1 miles between Heather Glen and Colfax, and 3.6 miles from Auburn to Newcastle.

Several major improvements will also serve fairgoers on US 50. The United States Bureau of Public Roads has completed the four-laning of a short section on this route between Pacific House and Riverton in El Dorado County. The Division of Highways last fall completed four miles of expressway near Camino.

From Nimbus to Brighton about 14 miles of US 50 have been widened to four lanes, relieving previous congestion on this section just east of Sacramento.

Motorists heading for the fair from points north of Sacramento will find that realignment, widening or resurfacing jobs have improved travel conditions on several routes.

On State Sign Route 16 four projects will be finished or near completion when the fair opens.

Realignment for 1.2 miles on this route through the Town of Rumsey is scheduled to be completed around the end of August. Another realignment job, eliminating sharp turns between Madison and US 99W, will also be nearing completion.

A new 1.4-mile stretch on a relocated levee section south of Kiesel, between Woodland and Sacramento, is expected to be available to fairgoers with the present detour no longer in use. Realignment and widening north of Kiesel and resurfacing and widening between Bryte and Broderick will be almost finished.

In addition, sections of US 99W north of Yolo and of US 99E north of Yuba City have recently been resurfaced.

### GREMLIN CORNER

*Editor, California Highways and Public Works*

SIR: In the May-June issue of your magazine you have on the front cover a picture which you refer to as Bridges Creek. Actually, it is Bridge Creek in Humboldt County. There is a Bridges Creek in Mendocino County, but this is not it.

Also, on page 40 of the same issue, you have a picture of a bridge. This bridge is not across the South Fork of the Eel River at Dyerville, as you say. It is across the main Eel River at the old Robinson Ferry Crossing just north of Rio Dell on US 101.

I enjoy your magazine very much.  
Very truly yours,

ROBERT W. HEFLIN

The photographer who took the back cover photo of the Feather River Highway on the May-June issue of the magazine was wrongly identified in the magazine. It was taken by Bill Ruland.—*The Editor.*

## HIGHWAY LAB

Continued from page 15 . . .

eral different locations in the city, and its facilities have included nine temporary buildings and three trailer offices.

"The new building centralizes the department's work," said State Highway Engineer G. T. McCoy, "and makes possible substantial improvements in operating efficiency and economy."

The Folsom Boulevard structure is headquarters for a statewide research and testing organization which includes specialized branch laboratories at Los Angeles, Berkeley, Santa Maria and Bakersfield. The department also maintains technical control over laboratories in each of the 11 state highway districts.

About 60 civil service job classifications are required to cover the department's highly trained staff. These range from several types of engineering specialists and chemists to instrument makers and photographers.

Head of the department is Francis N. Hveem, internationally known authority on highway research. Hveem has been a Division of Highways employee since 1917, and was appointed Materials and Research Engineer in 1951, succeeding T. E. Stanton, who had headed the laboratory since 1928.

In addition to making sure the State's high standards for materials are being met, the department also checks on such things as the durability of paints, the stability of soils, the efficiency of highway lighting, the effect of temperature changes on pavements, the skid resistance of various pavements, and the durability of roadways under heavy traffic.

Work of this kind requires precise tools. Testing equipment and facilities used by the department include a giant press which can exert 440,000 pounds pressure, compression machines, refrigeration and humidity chambers, photometers, intricate measuring and weighing devices, and special cameras and magnifying equipment.

The new concrete and steel building has a level composition roof. Its interior walls are mostly concrete block with natural finish. Many of the structure's mechanical fixtures, such as

## J. Frank Walsh

J. Frank Walsh, former senior right-of-way agent for the State Division of Highways, passed away on April 22, 1958, after a lengthy illness.

Walsh was born in Cottage Grove, Oregon, on August 9, 1899, and spent most of his youth in Salem, Oregon. He first came to work for the State Division of Highways as a title researcher in February, 1931, after having had seven years' previous experience in this field with the Title Insurance and Trust Company. Prior to that he had been with the State Department of the State of Oregon for 4½ years.

Walsh organized and developed the Title and Escrow Section of the Right-of-Way Department for District VII of the State Division of Highways and supervised its operation through the years to the time of his retirement from state service on April 10, 1956. He was a charter member of Chapter No. 1 of the American Right of Way Association and a former editor of the association's official magazine, *Right of Way*.

Walsh is survived by his brother, Leo Walsh of Los Angeles.

ventilation equipment, were installed on the roof to reduce the need for expensive ductwork.

Louvered window boards and partitions add a modern touch to the exterior of the structure. A scale model of the building will be permanently displayed in the main entrance-lobby as a guide to visitors. This model was originally prepared by the materials and research staff in connection with the architectural design studies.

General contractor was Cal-Central Construction Company of Sacramento. Plumbing contractor was Luppen & Hawley, Inc., of Sacramento, and the electrical contractor was Collins Electrical Company, Inc., also of Sacramento. The Jackson-Hopkins Company of Bakersfield handled the heating, air conditioning and refrigeration work.

## Lynn Latimer Retires; Joined State in 1938

A dinner was held in Los Angeles on May 15th to honor Lynn L. Latimer, Assistant Bridge Engineer, Bridge Department, Division of Highways, on the occasion of his retirement. Latimer was born on June 6,



LYNN L. LATIMER

1893, in Clear Lake, Iowa. He received his early engineering training with Cerro Gordo County.

Latimer moved to California shortly after returning from France at the close of World

War I. During the next 15 years he worked with the Corps of Engineers, the County of Los Angeles, and the City of Los Angeles.

He joined the Bridge Department immediately after the flood of 1938 and worked on the investigation of bridge structures which were damaged by the flood.

He later worked on the four-level structure in Los Angeles, as well as on many major bridges on the San Bernardino and Harbor Freeways.

His plans after retirement include travel and deep sea fishing.

SAN FRANCISCO

*Editor, California Highways and Public Works*

DEAR SIR: I would like to take this occasion to commend the Highway Commission for their splendid work and continued progress in spite of the many protests and controversies which arise each time a new freeway is to be built.

Without these superhighways, transportation and life would be intolerable in a fast-growing State.

The public should realize that freeways are the main arteries through which life circulates and that they are absolutely essential for the development of the State of California.

Perhaps through your constant efforts and initiative, this ridiculous opposition will cease.

Sincerely yours,

J. L. DALANG

## Edward S. Gripper

Edward S. Gripper died after a short illness on April 15, 1958. Gripper retired from state service on October 7, 1949, at which time he was City and County Co-operative Projects Engineer for District VII.

Gripper was born in Pasadena, March 3, 1884. His service with the State Division of Highways dated back to February 15, 1912, when his name appeared as the Chief of Survey Party No. 3 on the first payroll for Division VII, as it was then called. He spent considerable time in making surveys in San Diego County for the Coast Highway, the San Diego and El Centro Highway, and the old original Ridge Route in Los Angeles County. Although Gripper's service with the State was not continuous he did participate in all phases of the work, being at various times superintendent of day labor operations and resident engineer on important grading and paving projects.

In October, 1933, he was appointed District City and County Projects Engineer. He was in responsible charge of administering and co-ordinating the 1/4-cent expenditure by cities from allocated state funds and also for the federal aid secondary projects as carried out by counties. At the time of his retirement Ned had responsibility for administering the state funds for 64 cities.

He is survived by his wife, Mrs. Ethel S. Gripper of Sierra Madre, his daughter, Eunice Pitzer, and a grandson, Edward Pitzer of Arcadia.

SAN MATEO, CALIF.

Editor, California Highways and Public Works

Sir: I have from time to time thought of writing to you and expressing my appreciation for the pleasure and information I derived from your magazine.

The last issue having had to do with Highway 101 therefore prompts these few lines.

I was reared in Eureka and make frequent trips back and forth over

and Public Works

## Basil Frykland Retirement Marked

Basil N. Frykland, District VII Construction Engineer for the California Division of Highways, retired on June 1st after 30 years in state service.

Basil Frykland was born of Swedish immigrant parents in Santa Cruz,



BASIL N. FRYKLAND

California, on August 23, 1897. He attended public schools in Santa Cruz and studied engineering at Polytechnic College in Oakland and the University of California. He went to work as resident engineer with the Southern Pacific Railroad in 1925. In September of 1927 he entered state service in a classification equivalent to junior civil engineer. Until 1932 he worked in District II, after which he came to District VII, where he has been ever since.

Basil Frykland is a veteran of both World Wars. In World War I, 1918-1919, as a second lieutenant he gave instruction in pursuit flight. In 1942 he joined the Army and was stationed in Phoenix, Arizona, Washington, D. C., and Tucson, Arizona. He served as battalion commander of the 869th Aviation Engineering Battalion in the Philippines. He holds four combat stars and the Purple Heart.

Basil Frykland and Mrs. Frykland (nee Hazel Blewett) intend to travel, fish and relax after his retirement. He is homesteading a 40-acre ranch near Mt. Palomar.

this highway, so can fully appreciate every bit of what you have to contend with in that area.

The information and pictures are outstanding and unless an opportunity presents itself to read this last issue, the motorist has not the slightest conception of what takes place to make his traveling comfortable and convenient.

Sincerely,

RUSSEL PETTINGILL

## Nine Current US 40 Freeway Jobs Listed

Four-laning of another 11 miles of US 40 in Placer County was scheduled to start in August, bringing to nine the number of current freeway jobs east of Sacramento on this interstate route.

This latest project involves grading and paving of 11.5 miles of four-lane, divided roadway and 12 bridges between one-half mile east of Roseville and a mile east of Newcastle.

Located on new alignment south of the present highway, the new route will bypass the Towns of Rocklin and Loomis. Interchanges and access connections will be provided for traffic service to these communities.

The Roseville-Newcastle project is one of five large-scale freeway projects on US Highway 40 east of Sacramento which are included in the 1958-59 State Highway Budget. It was the last of five to be advertised.

These 1958-59 projects, together with four other previously budgeted jobs, make a total of nine freeway projects under construction or advertised for bids on this portion of US 40. Estimated total construction cost of these projects is \$48,500,000.

When these projects are completed there will be 88 miles of freeway and expressway on the 122 miles of US 40 from Sacramento to Nevada. This will include 61 continuous miles between Sacramento and east of Gold Run and 21 miles from the east end of Donner Lake to Nevada.

The freeway projects now under construction on US 40 east of Sacramento are as follows:

Newcastle to Auburn, 3.6 miles (to be completed this summer).

Heather Glen to Colfax, 6.1 miles (to be completed this summer).

Colfax to Magra (west of Gold Run), 5.8 miles (due for completion this fall).

Magra to west of Monte Vista (east of Gold Run), four miles.

Hampshire Rocks to Soda Springs, six miles.

East end of Donner Lake to Boca, nine miles.

Boca to Floriston, 6 1/2 miles.

Floriston to state line, 5.4 miles (to be completed late this summer).

## Twenty-five-year Awards Announced

Employees who received twenty-five-year awards since those listed in the May-June, 1958, edition of *California Highways and Public Works* are:

### District I

Faulkner, Frank  
Klein, Earl  
Mitchell, Archie R.

### District II

Eslinger, Rolin M.  
Raymond, Charles R.

### District III

Bernard, Paul E.  
Robinson, Edwin E.  
Schiffmann, Phillip C.  
Wallace, Malion P.

### District IV

DeLainey, Willis T.  
Hayler, Richard Arthur  
Welch, Elwood B.

### District V

Dito, Peter L.  
Franklin, Howard J.

### District VII

Barnes, John E.  
DeGroff, Ray E.

### District X

Hull, Archie J.

### District XI

Casey, Eugene A.

### Headquarters Office

Israel, Rudolph J.

### Bridge Department

Cordero, Fernando P.  
Langenbach, W. O.

### Materials and Research

Gates, Clyde G.

### Shop 5

Duclo, Alma A.

### Shop 11

Leisure, James R.

### Headquarters Shop

Hatton, Arthur R.

## I. T. E. Holds Annual Confab in Sacramento

Traffic engineers from 11 western states spent a week in Sacramento in mid-June at two professional gatherings, a freeway operations seminar and the eleventh annual meeting of the western section of the Institute of Traffic Engineers.

The magnitude of the challenge that faces traffic engineers was pointed to by the keynote speakers at both meetings.

C. M. Gilliss, California State Director of Public Works and Chairman of the California Highway Commission, and William A. Bugge, Director of Highways, State of Washington, both expressed assurance that the traffic engineers would meet the challenge.

## Benicia-Martinez Bridge Construction Starts in April; Work to End in 1962

Construction of the Benicia-Martinez Bridge is scheduled to begin next April. The project is expected to be completed and open to traffic in March, 1962.

This tentative schedule of target dates was announced by C. M. Gilliss, State Director of Public Works and Secretary of the California Toll Bridge Authority.

Gilliss said the Department of Public Works expects to complete negotiations with the Federal Government for rights-of-way through the Army's Benicia Arsenal by October 1st. The tentative schedule calls for advertising the bridge construction work and the sale of the Bridge Authority's revenue bonds during the first two months of next year, and for sale of bonds and the award of the construction contract in April, 1959.

The bridge will be parallel to and just downstream from the railroad bridge across the Carquinez Strait. It will be operated as a toll bridge and will replace the state-owned Benicia-Martinez Ferry.

"These target dates are being announced," Gilliss said, "so that residents of the Benicia-Martinez area may be accurately informed as to current plans. The schedule is, of course, tentative and subject to revision as

"You have before you a big job," Gilliss said, "the problem of converting the thoughts of today and tomorrow into action, into a program that will achieve the results you want. Every one of you do well in your effort to continually better the service of highways, I am sure."

"Whether we meet the future successfully depends upon the traffic engineering profession," Bugge's keynote address said. It was read for him, in his absence, by Herbert C. Higgins, veteran engineer of Washington's highway department.

"The challenge is yours," Bugge's talk concluded. "I know that you will not fail to meet its demands."

preconstruction planning and negotiations continue."

The bridge will be financed from a portion of the \$80,000,000 in revenue bonds authorized by the California Legislature in 1955 for construction of the parallel Carquinez Bridge and approaches, now nearing completion, and the Benicia-Martinez Bridge and approaches. Of the total authorized amount \$46,000,000 in bonds have already been sold to cover the Carquinez Bridge project.

The remaining \$34,000,000 in revenue bonds will be available to finance the Benicia-Martinez Bridge and approaches, including the Escobar Street connection to Martinez.

The bonds will be redeemed from toll collections on the two bridges. The Toll Bridge Authority has set a 25-cent toll rate for passenger cars using the Carquinez Bridge. Collections will start on the Carquinez Bridge after the parallel bridge, due for completion in December, is opened to traffic.

Three-mile sections of freeway leading to either end of the Benicia-Martinez Bridge will be built with state highway funds. This state highway work will be timed for simultaneous completion with the bridge.

## MONTEREY COUNTY

Continued from page 32 . . .

long rows of towering eucalyptus trees, consisted of two lanes, substandard in both horizontal and vertical alignment in many locations, and the deficiencies in sight distance that created a great deal of congestion as heavy truck traffic entered the highway from surrounding ranches at numerous locations because of the lack of access control.

### Existing Road Converted

The project undertaken on this particular portion of US 101 was the conversion of the existing two-lane facility to a four-lane expressway and construction of nine crossovers at grade. (Right-of-way has been purchased for future expansion to full freeway, at which time the crossings will be separated by means of structures.)

The contract was awarded to the Granite Construction Co. of Watsonville, on February 5, 1957, and provided for the construction of 7.9 miles of highway between King City and Greenfield. The work started on February 15, 1957, and involved about 75 percent new construction and 25 percent resurfacing.

The structural section for the new construction was 0.67 foot of Class "B" cement-treated base over imported subbase material which ranged in thickness from 6 inches to 14 inches. This was paved with 0.33 foot of Type "A" plant-mixed surfacing and 0.06 foot of open graded plant-mixed surfacing.

The resurfacing consisted of placing 0.13 foot of Type A plant-mixed surfacing and 0.06 foot of open graded plant-mixed surfacing over the existing pavement.

The grading, which was relatively light, was completed early in the contract time. The contractor moved approximately 400,000 cubic yards in the first stage and 175,000 cubic yards in the second stage with an average production during heavy excavation of from 8,000 to 9,000 cubic yards per day. The roadway excavation was accomplished by using three-axle pneumatic-tired scrapers for the long haul material, and crawler tractor and

scraper combinations for the short hauls. Compaction equipment consisted primarily of standard sheepsfoot rollers and occasionally a compactor or 50-ton pneumatic-tired roller. Satisfactory results have been obtained from all three types of compaction equipment.

### Drainage Difficult

The majority of the drainage structures consisted of reinforced concrete pipe ranging in size from 18 inches to 60 inches. The only thing that approached a major structure on the project was the construction of an eight-foot concrete arch culvert which extended an existing concrete arch culvert.

On the north end of the project the land is uniformly flat and slopes slightly toward the Salinas River to the northeast. There is so little fall, however, that proper surface drainage is difficult. To eliminate the difficulty, vertical drains are being constructed at approximately 1,000-foot intervals to divert the surface drainage into porous subsurface strata which underlie the area.

The contract required 134,000 tons of imported base material and 81,000 tons of imported subbase material; the imported base material was used under shoulders, frontage roads, and as aggregate for cement-treated base. This material was produced by a portable crushing and screening plant located in the Arroyo Seco River approximately four miles from the project. Also produced in the Arroyo Seco was the mineral aggregate for the various types of plant-mixed surfacing (69,600 tons). The imported subbase material was obtained from a pit on the bank of the Salinas River adjacent to the project.

The horizontal alignment of the expressway lanes generally follows the existing alignment, although it does not parallel it. The existing lanes are being utilized as one pair of lanes throughout portions of the project, sometimes the left lane, and sometimes the right. This switch from left to right has been made at several locations to improve the horizontal alignment in the existing lanes and to clear various obstructions.

## San Francisco Will Have AASHO Meeting

Plans and arrangements are well advanced for the Forty-fourth Annual Meeting of the American Association of State Highway Officials, which will take place in San Francisco December 1st through 5th.

An estimated 1,500 or more delegates and visitors will be housed at 10 hotels in downtown San Francisco.

This will mark the first year since 1946 that California has been the host state for the annual meeting of A. A. S. H. O. The association met in Los Angeles in 1946, and in San Francisco in 1936 and 1924.

The Host State Committee responsible for California's share of the arrangements is headed by Director of Public Works C. M. Gilliss as chairman, with State Highway Engineer G. T. McCoy, a past president of A. A. S. H. O., as vice chairman. This committee, assisted by a staff committee, is working in close collaboration with A. E. Johnson of Washington, D. C., Executive Secretary of A. A. S. H. O.

All sessions of the five-day meeting will be held in the Sheraton-Palace Hotel with the exception of an all-day field trip scheduled for December 3d. This trip will cover current and recent highway construction projects in the San Francisco Bay area.

The project was allotted 310 working days and was completed in March, 1958. D. E. Connelly was resident engineer.

### Road Removal Necessary

As construction progressed approximately 50 percent of the existing highway was either removed or resurfaced. Therefore, it was not possible to route traffic continuously over the existing highway during the construction period. It was necessary to construct the job in two stages. Traffic was routed over a portion of the existing highway and first stage construction while second stage construction was in progress. We had to provide numerous detours to handle traffic. As many as six construction detours were in use at one time during second stage work.

. . . Continued on page 56

## MERIT AWARD WINNERS

Continued from page 47 . . .

corresponding contract drawings, sections, and details.

*John W. Maxwell*, Architecture, South Pasadena. Certificate of commendation for recommending that a grid system be used on drawing sheets to assist in locating specific items shown thereon.

*Gary L. Simms*, Highways, San Luis Obispo. Certificate of award and \$25 for recommending use of a three-center curve table and graph which he developed to supplement calculations done by I. B. M.

*Herman R. Jantzen*, Highways, Stockton. Certificate of award and \$10 for recommending that Form R-24, Daily Extra Work Report, be made up in individual snap-out carbon sets.

*Franklin L. Young*, Highways, San Francisco. Certificate of commendation for recommending the use of a nonrepro pencil on original or master drawings that will not reproduce on copies run through a Bruning or Ozalid machine.

*Orrin H. Roundt*, Highways, Marysville. Certificate of commendation for recommending that an indicator needle be attached to the face of the hydraulic jack for cement testing.

*Thomas Royce*, Highways, Sacramento. Certificate of commendation for recommending a revision of the Bridge Department Photograph Form to include space for the job stamp.

*Mrs. Josephine M. Andino*, San Diego. Certificate of award and \$15 for recommending the use of special folders with the "out" card front for use in the file room of the Right-of-Way Department.

*Arthur K. Owen*, San Luis Obispo. Certificate of award and \$15 for recommending a revision of Form R-33, Daily Record of Platform Scale Weights, to include a larger column for the tare weights.

*Gary E. Layton*, Sacramento. Certificate of award and \$150 for recommending the use of Diazo developed, enlarged, photographic film positives in the preparation of design and contract plans for traffic signal and highway lighting plans.

*Alexis A. Shimonauff*, Sacramento. Certificate of commendation for recommending use of a rubber stamp to hand stamp the contract number on "as-built" originals.

*Warren A. Johnston*, Marysville. Certificate of award and \$15 for designing a special slope and scale triangle to be used for plotting cross sections.

*Sylvester Evans*, San Francisco. Certificate of award and \$150 for designing and constructing a spray gun for applying high concentration, low volume soil sterilants.

*Leroy R. Eglin*, Point Richmond. Certificate of award and \$15 for recommending the use of clear lucite covers in place of solid metal covers on Standard-Johnson coin separators and counting machines used on the bridges to permit immediate observation of money jamming in the coin boxes.

*William J. Ziegler*, Redding. Certificate of commendation for recommending use of one-half-inch drafttape instead of one inch in drafting rooms.

*Vernon W. Messick*, Division of Architecture, now of Spokane, Washington, who shared with Burton G. Beamer, an award, now a member of the Department of Finance. Certificate of award and \$50, to be divided equally, were authorized for this suggestion which proposed a safety device to be installed on multiple-use crane booms to make it possible for the operator to know by visible inspection whether they are safe to operate.

*Thomas E. Baumberger*, Highways, San Luis Obispo. Certificate of award for recommending that in design projects developed from aerial survey contour maps, narrow sepia on standard 19-inch paper be made up instead of making full-size prints from 36-inch to 42-inch in width and 6 feet to 12 feet in length. An award of \$100 was granted.

*C. Roy Erickson* and *Culmer F. Dickson*, San Bernardino, Highways. Certificates of award and \$25 to be divided equally for developing a method whereby photostat machines could be converted into an effective photographic enlarger.

*Edward W. Coble*, Highways, San Francisco. Certificate of award and \$40 for proposing a revision in the structure details of the horizontal reflector unit W61R as shown on highways standard sheet A-51, to facilitate removal of the posts when damaged or broken.

*William C. Bastian*, Highways, Fresno. Certificate of award and \$25 for proposing a new method of cleaning sheet metal stencils used for pavement markings.

*Miss Barbara J. Blair*, Highways, Los Angeles. Certificate of award and \$15 for recommending the use of a form as a front sheet for setting up appointments for prospective new tenants to inspect rental property of the division acquired in connection with the highway construction program.

*George W. Havins*, Highways, San Diego. Certificate of award and \$10 for a revision in the method of determining if the termination of liability of a highway permit bond is satisfactory to all concerned.

*Robert W. Apperson*, Highways, San Diego. Certificate of commendation for designing and building an ice plant cutter from excess Allis-Chalmers parts.

*Leonard R. Nelson*, Highways, Sacramento. Certificate of commendation for proposing that a steel catch bin be placed on all sheetmetal shears to catch small pieces of steel that may have been cut from larger pieces.

*Raymon E. Harden*, Highways, Alhambra. Certificate of commendation for recommending a device which he designed to reduce or eliminate the possibility of inhaling fumes when making ethylene dichloride tests.

## State, Five Cities Receive I. T. E. Awards

California and five of its cities were among 11 states and 53 cities recognized by the Institute of Traffic Engineers for traffic engineering performance during 1957.

Certificates recognizing these cities and states for achieving this high level of performance will be issued by the institute.

States recognized were: California, Connecticut, Delaware, Illinois, Maryland, Massachusetts, Michigan, Oregon, Texas, Virginia, and Washington.

California cities receiving recognition were: Modesto, Oakland, Pasadena, Riverside and Stockton.

### Hall G. Williams

Hall G. Williams, Highway Engineering Associate in District XI of the State Division of Highways, died on June 11th after a brief illness.

Williams was born in East St. Louis, Illinois, February 23, 1911. After graduating from high school in 1928, he attended the Missouri School of Mines, and later completed his college training at Chicago Technical College.

On leaving college, Hall was employed as a surveyor on several construction projects and worked several years as manager of a chain grocery store. From 1934 to 1940 Williams was employed as a teamster in the stockyards of East St. Louis, when he quit to come to California for his wife's health.

For four years Hall was employed by a large San Diego lumber company, as a yard foreman. From there, Williams went to the Ryan Aeronautical Company as an engineering draftsman, working on one of the Country's first jet fighters. Shortly after the conclusion of World War II, in 1946, Williams became an employee of the California Division of Highways in District XI as a senior aid.

Williams is survived by his wife, two daughters, Mrs. Walter L. Hewitt of El Cajon and Mrs. W. D. King of La Mesa, and a brother, W. S. Williams of El Cajon.



## CRESTMORE

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be easily accomplished in the event the Corps of Engineers levee project were built. Grade and waterway clearances for the first stage bridge were to be established from the recommendations of the corps report.

- (3) That the proposed road be established as a federal-aid secondary route, and that F. A. S. funds be used in its construction.

Following route adoption, the designation "FAS Route 1177" was established for Crestmore Road, and the first stage bridge plans (Project S-1177(1)) were prepared by the county road department with the assistance of the State Division of Highways Bridge Department in Sacramento.

The proposed structure was to consist of six spans of 100 feet each, a 28-foot-wide concrete deck; and a sub-structure of concrete piers on timber or concrete piles. Spans were to be riveted plate girders of 6½-foot depth. Design was conventional in all aspects except that the abutments were so formed as to be similar in outward appearance to the other piers following minor modification. This was done to provide for uniform appearance upon future extension of the structure.

This project was advertised in June, 1951, and seven bids were received, the low bidder being C. B. Tuttle of Long Beach, his bid being in the amount of \$266,184.00.

### Access Limited

Second stage work was designated Federal-aid Secondary Project S-1177(2) and was to consist of the construction of a two- and four-lane roadway extending from the bridge abutment north and west to an intersection with FAS Route 706, Bloomington Boulevard. Construction was to be on expressway standards with access limited to three points along the route. Nearly 1,800 feet of the alignment was to be approach fill for the bridge.

The project was advertised on March 13, 1953, and the low bidder was the E. L. Yeager Company and

J. A. Payton of Riverside with a bid of \$98,932.76. Work was completed on October 2, 1953. During the same period, the City of Riverside had also constructed the approaches and connection to Market Street, and the road was opened to through traffic immediately upon acceptance.

Public comment on the new route was most favorable and was reflected in the traffic usage which built up rapidly. A count made at the bridge one year after opening showed 4,600 vehicles per day were using the new road.

Late in 1955 the Corps of Engineers announced that allocations had been established which would allow it to proceed with the preparation of the final plans for the Riverside portion of the work. These plans were transmitted to the county in February, 1956, together with advice to the effect that the contract could be advertised in May. Extension of the Crestmore Bridge was not a part of the proposed work, and the county was requested to establish this as an independent project.

### Extension Required

Review of the plans showed that a graded and lined channel with a bottom width of 930 feet was to pass through the present bridge site. Alignment was such that a skew length of 1,200 feet would be required to complete the crossing, and this would mean that a 600-foot extension of the structure would be necessary. The Corps of Engineers policy required a positive commitment from the local agency to instigate such concurrent construction before they would commence their own work on the levees.

In order to accommodate the new construction, it would be necessary to remove 600 feet of the west approach fill, and it was proposed that this be done by county forces prior to the start of the work.

Following completion of the bridge plans, they were transmitted to the district office of the Corps of Engineers for comment. The corps had meanwhile constructed a 1/120th scale hydraulic model of the entire channel project and from the observed results of its operation, they requested that

the piers on the new portion of the bridge be skewed to coincide with their levee alignment rather than being made parallel with the existing piers. This resulted in a rather awkward "half-open venetian blind" appearance, but the model studies clearly demonstrated that erosion and flow characteristics under maximum flood conditions would be much improved.

These recommendations were accordingly incorporated in the final plans and the project was advertised on September 28, 1956.

Fifteen bids were received on October 25th, and Mr. C. B. Tuttle of Long Beach was again low with a bid of \$221,810. Construction was started on December 3, 1956, and completed May 6, 1958.

### Channel Work

Most of the operations required cooperation between the contractor and the prime contractor for the corps levee project, Matich Bros. of Colton, who were simultaneously engaged in the channel work above, below, and through the bridge site. This work was of considerable magnitude and involved extensive earthmoving operations. It was begun in April, 1957, and was completed in November, 1958.

Final cost of the original bridge and its extension, including extra work and construction engineering was \$495,817. Crestmore Road and approaches cost \$108,060 making a total for the county portion of the route \$603,877 exclusive of right-of-way acquisition costs.

Construction engineering was done by the County of Riverside. Resident Engineer for the county on Projects S-1177(1) and S-1177(2) was Paul E. Stout, and on Project S-1177(3), Robert L. Wilson.

The completion of the third stage of improvements of FAS Route 1177 has provided an adequate connection for the present traffic; however, area development and the attendant highway user increase clearly indicate that such adequacy is only temporary. Latest traffic counts show vehicle counts in excess of 5,600 per day, and presage the not too distant day when development of the route to full four-lane status will be necessary.

## DISTRICT I

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### Replacing Timber Bridges

In 1958-59 highway construction budget funds in the amount of \$325,000 are provided to replace another of the last remaining timber structures on Sign Route 1 on the Mendocino coast. This is the Pudding Creek Bridge at the north limits of Fort Bragg. It is expected that bids for this project will be issued this summer.

Another of these last remaining old structures, Big River Bridge just south of Mendocino, is receiving attention toward its eventual replacement. The U. S. Army Engineers have given approval of location and clearance of a new bridge crossing the navigable waters of Big River. Design work is progressing on the new structure and approaches.

In 1957 additional mileage of Sign Route 1 northerly from Westport to Leggett on the Redwood Highway was placed in the State Highway System. This addition, amounting to 28 miles, also included some bridges badly deteriorated to the extent that immediate action was taken. Old timber structures at Cottoneva Creek at Rockport and North Fork of Cottoneva Creek northerly of Rockport have already been replaced by modern concrete structures.

US 299 within District I, both in Humboldt and Trinity Counties, has been undergoing constant improvement since 1940. The routing for ultimate improvement of US 299 from its intersection with US 101 to Berry Summit has been adopted and an aerial survey, to provide maps for detailed study, is under way covering the portion between Mad River through Blue Lake and to North Fork of the Mad River.

### Interchange Constructed

As a portion of the four-lane expressway development of the Redwood Highway, a new connection of US 101 and 299 resulted. A trumpet-type traffic interchange was constructed, and 299 between the intersection and Mad River was developed on a new routing providing four lanes.

Proceeding easterly on 299 there is a 0.9-mile project under way between 0.1 mile west of Essex Gulch Road

and 0.2 mile east of Fieldbrook Road. This is a project to correct an especially deficient section of old highway as to line and grade. It will key in with the future development to four lanes, with this reconstructed portion of old highway serving as a frontage road.

In the Lord Ellis Summit-Redwood Creek area, construction activities are under way both by Honor Camp 42 and under contract.

In 1956 Honor Camp 36 at Burnt Ranch on US 299 in Trinity County was moved and re-established as Camp 42 at Preston Ranch near Lord Ellis Summit on 299 in Humboldt County. The honor camp forces are now working on the relocation and modernization of US 299 in Humboldt County with present efforts being expended on the portion easterly toward Redwood Summit, Green Point, and Redwood Creek. In connection with this activity, a concrete arch culvert is being constructed in Lupton Creek by Tom Hull, contractor of Eureka, on a low bid of \$169,350.

### Federal Funds Used

From Berry Summit 10 miles easterly to Willow Creek, the U. S. Bureau of Public Roads, under a series of contracts have completed all grading work and applied penetration treatment to the greater portion of the completed grade. Their planning program provides for placing a plant-mixed surfacing this summer. The completion of this work will provide a modern highway facility greatly enhancing highway travel in the area. Construction funds were from federal sources; the California Division of Highways purchased all rights-of-way for the 10.4-mile project.

From Willow Creek easterly through Del Loma and to Prairie Creek, the Districts I and II boundary, a distance of 36 miles, US 299 is now a modernized two-lane facility with some work done by several early contracts, but the greater portion of work was accomplished by honor camp forces. Subsequently, the greater length of the 36 miles has received plant-mixed surfacing under private contracts.

During this development period in District I, the occurrence of the cata-

strophic December, 1955, flood, resulted in the most extensive and serious damage ever suffered by the State Highway System. When floodwaters receded, it appeared that all gains were wiped out. Work costing in excess of \$5,000,000 was necessary to make emergency and finally permanent repairs to flood-ravished District I highways. A series of flood damage repair contracts were completed along with the normal construction programs, and the last flood damage repair project was completed in 1957.

The district's highways also suffered damage from early 1958 storms and abnormally heavy rainfall. Damage was to the extent that seven repair contracts will be under way at an aggregate cost of about \$1,538,000. Plans for this work are complete, and construction will be under way along with the regularly budgeted improvement program.

Much has been done since the completion of that old Contract No. 2 of 1912, and much remains to be accomplished to adequately fulfill the modern transportation needs of a growing area.

## MONTEREY COUNTY

. . . Continued from page 53

Passing through this new addition to our expressways in Monterey County, we now travel on a project some 2.7 miles long completed in 1956 which will bring us into the city limits of King City.

This project originated early in planning for the four-laning of US 101 in Monterey County principally to improve the deficiencies of the narrow Salinas River Bridge and its substandard approaches. Inadequate lane capacity, severely restricted sight distance, particularly as it pertained to traffic coming from the Mission San Antonio and the Hunter Liggett reservation to US 101 north of the bridge were major deficiencies that required immediate correction. Now with the expressway, a second bridge over the Salinas used for the northbound lanes of expressway, and the addition of an interchange at Pine Canyon Road, the glaring highway deficiencies in this area have been corrected.

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