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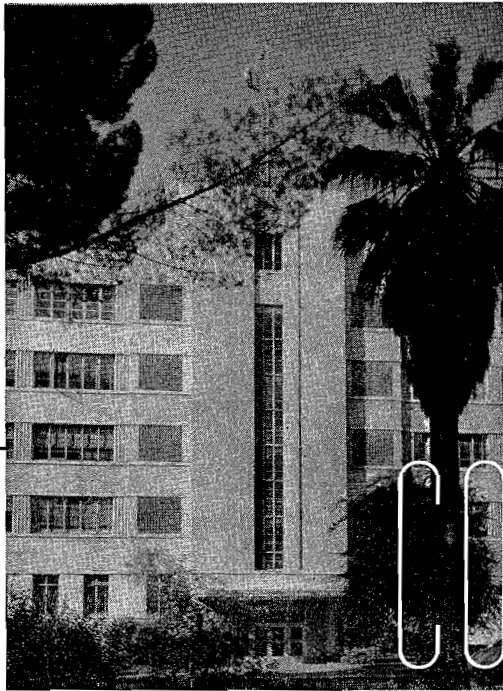
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Address communications to

CALIFORNIA HIGHWAYS AND PUBLIC WORKS
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Financing of

By JAMES GALLAGHER, Senior
Bridge Engineer (Retired)

*What Can Be Done to
Obviate Legal Delays*

Grade Separations

What can be done to eliminate or at least minimize the long legal delays which threaten to hold up important highway construction projects involving railroad grade separations?

The railroads and the road-building public agencies involved are bound to disagree over how much of the cost of the project each party should bear. Unfortunately, while the argument continues, an increasing volume of highway and railroad traffic is subjected to the delays and dangers of existing grade crossings.

In this article Mr. Gallagher reviews the history of this problem in California and other states and suggests a method of getting the separation built first and ironing out the financial dispute later.

Mr. Gallagher retired at the compulsory age of 70 on September 30, 1954, after 33 years of service in the Bridge Department of the Division of Highways. He is widely recognized as an authority on the complex problems of railroad-highway grade crossing elimination.—*Editor*.

WHEN THE RAILROADS WERE first constructed in California, highways were few and far between. The railroads, at their own expense, constructed crossings at grade or at separated grades, depending on the topography. At this time, grade separations were few and usually occurred only when made necessary by the topography.

With the development of the motor vehicle, highways assumed a constantly increasing importance in the national economy. California, in particular, became a "state on rubber-tired wheels," its motor vehicle registration growing from 36,000 in 1909 to about 6,000,000 in 1954. Since 1927 highway construction in general has been financed from various special taxes paid by these increasing numbers of highway users, plus some federal aid. The annual expenditure for major highway construction purposes in California now approximates \$200,000,000 per year.

Separations Necessary

"Stop, Look and Listen" was the standard warning in the old days to the occasional slow-moving highway vehicles approaching a grade crossing traversed by fast-moving trains. Nowadays highway traffic is neither occasional nor slow-moving, nor is the motoring public willing to "stop, look and listen" at every railroad crossing.

The safe and expeditious movement of both railroad and highway traffic demands that major points of conflict be resolved by separation structures.

Such structures are expensive. Who should bear their cost, and to what proportionate extent? The importance of a practical solution to the problem grows in proportion to the rapidly expanding population and economy of this State.

Early Decisions

The problem is by no means new. The Public Utilities Commission of the State of California was organized in 1911 (under the name of the California Railroad Commission). Its powers and duties were defined in the Public Utilities Act of 1915. Among the powers delegated to the commission was:

" * * * exclusive power to determine and prescribe the manner, including particular point of crossing and the terms of installation, operation, maintenance, and use of railroad-highway crossings."

Thus, even in 1915 the need was apparent for a body to adjudicate conflicting interests of railroads and highways at crossings.

Over the course of the next 18 years the problem proved not too difficult of solution. Financial limitations kept the volume and standards of highway

construction at a relatively low level, and there were not very many crossings where highway traffic was heavy enough to make a separation structure urgent. Nor, at that time, did the railroads regard highway transportation as a seriously competing industry.

During that 18-year period the commission apportioned to the railroads a varying proportion of the cost of highway-railroad separations, depending on the particular circumstances of each case. But it did hold consistently that the railroads do constitute a barrier to the interchange of traffic, whether it be a horse-drawn cart or the speedy horseless carriage of today and that railroads do have a continuing obligation to provide, or to participate in the cost of providing, safe and convenient means of crossings of their tracks.

In general, prior to 1933, the commission apportioned to the railroad involved 50 percent of the cost of a highway-railroad grade separation which eliminated an existing grade crossing; and 25 percent or less where an existing separation was reconstructed or where the new separation was on new alignment which did not eliminate an existing grade crossing.

As the volume and speed of vehicular traffic continued to rise and with them the standards of highway con-

struction, there came a marked increase in the number and the over-all cost of grade separations. Also, the railroads began to contend that the improvement of major cross-country highways had reached the point where they were being increasingly used by long-haul motor trucks. If required to contribute to the cost of a grade separation in excess of railroad benefit the railroads argued, they were in effect being forced to contribute to the construction of a roadway for the use of a competitor.

The commission took cognizance of this argument in its 1933 Decision No. 25551 for construction of the Plaza Garage Underpass in Tulare County. This was a grade separation which eliminated an existing grade crossing on US 99. The decision required the Southern Pacific Company to contribute \$15,000 towards the construction of this grade separation costing \$66,700 exclusive of paving, or about 22 percent of cost, as compared with 50 percent apportioned by previous commission decisions in similar cases. It is to be noted that this decision was rendered at the depth of a financial depression, when the earning capacity of business was very low.

Federal Aid Truce

The next decade or so was a period of uneasy truce, with the inevitable showdown deferred as a result of the Federal Emergency Relief Act of 1935. That act provided Federal Works Progress funds for complete financing of the elimination of hazards at railroad-highway grade crossings, including construction of grade separations as well as installation of automatic crossing protection devices.

Approximately \$17,000,000 was allotted to California for these purposes under 1935 and subsequent federal appropriations up to 1944 and a total of 101 grade separations were built in this State with federal funds. These grade separations involved no cost to the railroads, except that they were reimbursed on the basis of direct out-of-pocket costs for work done by railroad forces, with no allowance for overhead and similar items.

Actually, it was 1949 before the Public Utilities Commission issued an-

other decision which adjudicated the cost of a grade separation between the railroad and the public. The railroad grade separations on the state highways constructed during this period were practically all financed with federal grade crossing funds, apportioned under the 1935 and subsequent acts or with federal funds under the 1944 Federal Aid Highway Act. A few separations on new highway alignment, which did not close any existing grade crossing, were financed wholly with state funds by agreement.

Benefit Principle

The Federal Aid Highway Act of 1944 introduced a new element. The act provided that for construction of a highway-railway grade separation, the railroad involved is liable for the amount of the railroad benefit but not to exceed 10 percent of the cost. In passing the 1944 Highway Act, Congress recognized that the railroads have an obligation to contribute to the cost of grade separations, but limited the railroad's obligation to 10 percent as maximum railroad benefit, possibly to protect the railroads from too heavy a financial burden incident to the construction of numerous grade separations as part of accelerated highway programs throughout the Nation.

What constitutes railroad benefit? For three years after the passage of the 1944 Federal Highway Act, the State of California and the railroads were unable to reach a satisfactory agreement on this point. The railroads placed a very small valuation on the intangible benefit accruing to them from a grade separation. They computed it either on the basis of average annual out-of-pocket costs at the crossing in question for claims, legal expenses, repair of damage, and grade crossing maintenance, or on the total amount paid by the railroad because of crossing accidents on its California trackage, divided by the total number of its grade crossings. On the latter basis, one railroad figured its annual savings by elimination of hazards at an average grade crossing at less than \$200.

Other states faced the same problem of establishing railroad benefit, with the consequent stoppage of con-

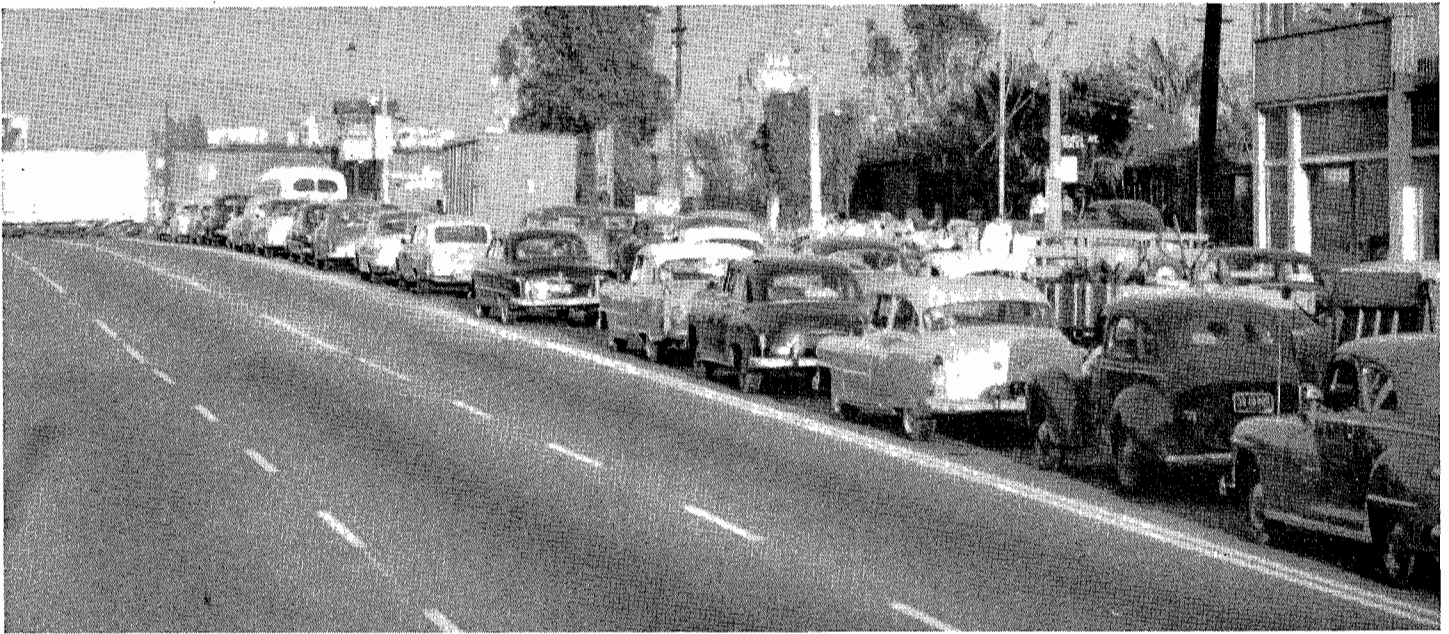
struction of grade separations under the 1944 act. A definition of railroad benefit was needed. It was provided by joint committee action of the American Association of Highway Officials and the Association of American Railroads, and was set forth in General Administrative Memorandum No. 325 of the U. S. Bureau of Public Roads, dated August 26, 1948.

This memorandum provides in effect that if the existing grade crossing which the separation is designed to eliminate is closed, the railroad benefit and railroad contribution is 10 percent; if this principal grade crossing is not closed, the project is considered of no benefit to the railroad and therefore no railroad contribution is required.

In California both the State and the railroads have accepted G. A. M. No. 325 as a basis for figuring railroad contribution to the cost of grade separations financed in whole or in part with federal funds; and since 1948, California has had very little difficulty in reaching satisfactory agreements with the railroads for construction of grade separations on federal aid projects.

In the case of totally new crossings, G. A. M. No. 325 considers a new highway crossing of the railroad as being of no benefit to the railroad and therefore requiring no railroad contribution; while a new railroad crossing of an existing highway is considered wholly for the railroad's benefit and should be financed 100 percent by the railroad. This apportionment has been followed in California not only on federal aid projects but also on those financed with state or railroad funds alone.

The total cost of a highway-railroad grade separation for the purpose of determining railroad benefit and liability under the 1944 Highway Act, is specified in G. A. M. No. 325 as the cost of that portion of an improvement which will accomplish reduction or elimination of railroad crossing hazard including cost of construction engineering and right of way. This includes cost of underpass or overhead structure, necessary highway approach and rail approaches thereto, railroad shoofty, highway detour and all work necessary to effect



At the Los Feliz Road grade crossing (Glendale-Los Angeles city line) heavy traffic backs up behind the gates while one of numerous daily trains passes

the separation. In California we have used the definition as given in G. A. M. No. 325 for the last several years and have had very little difficulty in reaching agreements with the railroads as to what items should be included.

Washington Boulevard Case

The issue regarding apportionment of cost for improvement or replacement of existing grade crossings not involving federal aid, was brought to life sharply by a Public Utilities Commission decision in 1949 in the case of a proposed widening of the Washington Boulevard underpasses of the Santa Fe tracks in the City of Los Angeles.

The case originated in 1932, when the commission had apportioned 25 percent of the cost of the widening to the railroad and 75 percent to the city, but the project was deferred by the city, and was revived in 1949.

The commission's 1949 decision apportioned to the railroad not 25 percent, but 50 percent of the cost of widening the underpasses from the existing 24 feet to 56 feet, the width of the adjacent street sections. Neither party was satisfied. The railroad contended the widening was of no benefit to the railroad and the city contended the railroad should pay the total additional cost due to presence of railroad,

for widening of the underpasses to 96 feet, the planned ultimate width of that part of Washington Boulevard. Both sides asked for a rehearing.

In June, 1952, the commission issued its Decision No. 47344, apportioning to the Santa Fe 50 percent of the estimated \$569,000 cost due to presence of railroad of widening the underpasses to 96 feet.

Commission's Decision

The commission's Decision No. 47344 covering the rehearing, states:

"There is no statutory requirement that this commission follow any particular theory of allocation of costs. Under the theory advanced by the City of Los Angeles that the railroad should pay the additional costs of construction resulting from the presence of the tracks, the railroad's share would amount to about 86 percent of the total costs. Under the theory advanced by the railroad that it should pay only according to the benefits it receives, and considering its contention that it receives no benefits, its contribution would be nothing.

"The authority of this commission to allocate costs, as designated in Section 1202 of the Public Utilities Code, supra, is an exercise of the police power on the part of the State of California through the medium of its agency, the Public Utilities Commission. We hold that the law is well established that under the exercise of the police power a state may regulate the crossings of railroad with its highways, and may require grade separations to be erected and maintained, ap-

portioning the costs in the exercise of its sound discretion."

Los Feliz Case

At about the same time the commission issued its Decision No. 47420, concerning the Los Feliz Road crossing of the tracks of the Southern Pacific. In this case it apportioned the total estimated \$1,493,200 cost of a grade separation as follows: 50 percent to be borne by the Southern Pacific Company, 25 percent by the County of Los Angeles, 12½ percent by the City of Glendale and 12½ percent by the City of Los Angeles.

The railroad's contention was that its contribution should not exceed \$118,340, computed on the basis of its net annual monetary savings by the closing of the grade crossings, capitalized at 5 percent. The City of Glendale, on the other hand, maintained that the railroad should bear the entire cost of the separation, since in the absence of the railroad the present street would be adequate and no grade separation necessary. The commission's decision in this case reaffirmed its position as outlined in the Washington Boulevard decision.

Both decisions were appealed by the respective railroads to the Supreme Court of California. When the state court denied the appeals, they

were taken to the United States Supreme Court. The railroads contended that in the allocation of costs the orders of the commission take railroad property without due process of law, are so arbitrary and burdensome as to constitute an interference with interstate commerce, and that costs should be distributed on the basis of benefits.

Supreme Court Decision

The United States Supreme Court, in its decision of November 9, 1953, upheld the orders of the Public Utilities Commission. This settled the Washington Boulevard and Los Feliz cases but did not provide a permanent solution to the problem. On the contrary, it practically insures the fact that railroad-highway grade separations (unless they are on a federal aid construction program) will not be constructed without prolonged and costly hearings, with each case being fought out individually.

The U. S. Supreme Court decision dealt primarily with the question of whether the allocation of the reasonable cost of grade separation improvements by the P. U. C. was arbitrary unless it was based on the benefits received, as contended by the railroads.

The court drew a distinction between benefits in the ordinary sense, which serve to enhance the value of the property involved, and the improvements expected to result from the grade separation project. The decision said in part:

"Rather, in the cases at bar, the improvements were instituted by the State or its subdivisions to meet local transportation needs and further safety and convenience, made necessary by the rapid growth of the communities. In such circumstances, this Court has consistently held that in the exercise of the police power, the cost of such improvements *may be* allocated all to the railroads. There is the proper limitation that such allocation of costs must be fair and reasonable. *Nashville, C. & St. L. R. Co. v. Walters*, 294 U. S. 405, 415, and the cases there cited. This was the standard applied by the Commission. It was not an arbitrary exercise of power by the Commission to refuse to allocate costs on the basis of benefits alone. The railroad tracks are in the streets not as a matter of right but by permission from the State or its subdivisions. The presence of these tracks in the streets creates the burden of constructing grade separations in the interest of public safety and convenience.



Cars pile up behind a grade crossing on State Highway Route 162 (Fletcher Drive) in Los Angeles

Having brought about the problem, the railroads are in no position to complain because their share in the cost of alleviating it is not based solely on the special benefits accruing to them from the improvements."

Nashville Case

The court went on to state that in the *Nashville* case relied on by the railroads, in the first place the grade separation was on a state highway system rather than serving a local community, thus bringing in the factor of long-haul competition; and in the second place, the fixing of the railroad's share of the cost at 50 percent could be considered arbitrary and unreasonable. In that case the 50 percent was fixed by statute, with no consideration of the special facts of the case involved.

The California commission, on the other hand, considered all the evidence

offered, the decision continues, "and properly applied the rule of allocation sanctioned by this court. There is no showing on these records of arbitrariness or unreasonableness in the commission's orders, and none is claimed except as the commission refused to allocate costs on the basis of benefits received, which we hold it was not required to do.

"Certainly, if the commission has the right to order these improvements and has not, in allocating the costs, acted so arbitrarily as to deprive the railroads of their property without due process of law, the fact that the improvements may interfere with interstate commerce is incidental. The construction and use of public streets is a matter peculiarly of local concern and great leeway is allowed local authorities where there is no conflicting federal regulation, even though interstate commerce be subject to material interference.

"When the appellants went on the streets in question, they assumed the burden of sharing on a fair and reasonable basis the costs of any changes for the reason of public safety and convenience made necessary by the growth of the communities.

"The orders of the commission are not arbitrary or unreasonable and do not deprive the appellants of their property without due process of law, nor do they interfere unreasonably with interstate commerce."

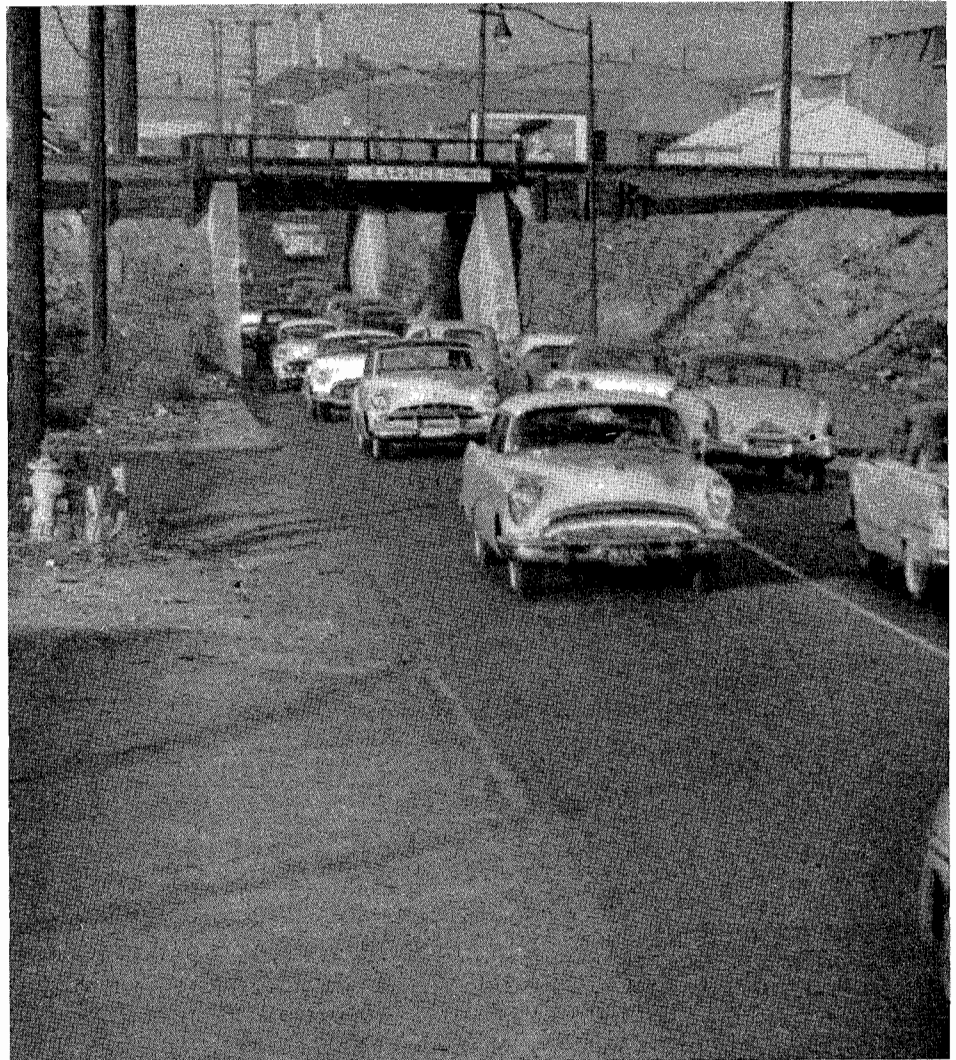
Effect of Decisions

While the Supreme Court decisions represent a clear-cut solution to the Washington Boulevard and Los Feliz situations, they may have the result of requiring the Public Utilities Commission to apportion costs for all similar separations proposed for state highways and other streets and roads in California unless they are on the federal aid construction program.

Other States

A report put out by the Association of American Railroads in 1950 based on questionnaires sent to states throughout the Union, shows that in 18 states the apportionment of cost between the railroad and the public is by a commission, 19 states have legislation requiring the railroads to contribute 50 percent or more, and six states require railroads to contribute 10 to 25 percent. In five states, railroad contribution is based on benefits not to exceed 10 or 15 percent of the cost. Six of the states differentiate between local highways and through highways. The laws of several states require railroads to contribute to the cost of new grade separations on new highway alignment.

In 1951 the Tax Research Association of Houston, Texas, submitted a questionnaire to all of the states and the District of Columbia regarding the financing of grade separations. The results of this questionnaire were published in a report March 1, 1952. The Texas report includes tabulations showing number of grade separations built from 1939 to 1950 inclusive, in each of various states, the total cost of said separations and the source of funds. Six states are not included in the tabulation because they did not answer the questionnaire or did not include sufficient information.



Four lanes of Washington Boulevard traffic in Los Angeles funnels into this two-lane underpass

Texas Report

The Texas report shows clearly that in the 1939-1950 period the majority of states used federal funds for financing grade separations. Of the five states which have statutes requiring 50 percent railroad contribution, only one (Virginia) showed a railroad contribution of more than 10 percent. Two other states with statutes requiring railroads to contribute 15 percent showed a total of only 10.37 and 7.50 percent railroad contributions.

The New York Grade Crossing Elimination Act of 1939 provides that the cost of grade crossing elimination shall be paid initially by the state, with the amount of railroad contribution to be adjudicated later by the Public Service Commission and the state reimbursed to that extent.

Under this system New York reports a total of 196 grade separations constructed between 1939 and 1950, inclusive, at a total cost of \$60,791,000, to which the railroads contributed \$8,290,000, or 13.64 percent.

It is apparent from the Texas report that those state laws requiring a 50 percent railroad contribution are largely inoperative. (Also, as indicated in the Supreme Court decisions, a fixed percentage may be ruled by the courts as arbitrary.) Except for Virginia, the states which have obtained the largest contributions from the railroads have been those states with laws requiring a more moderate railroad share and those states where the apportionment of cost is determined by a commission.

Delay Problem

There is one serious defect, however, in the commission procedure as now practiced in California. The necessary time-consuming steps in arguments, hearings, reviews, briefs and appeals means that the construction of badly needed grade separation is not effected at the time they are needed. The delay extends into years where there is disagreement over apportionment of costs. The process is particularly slow when the railroads contest the basic principles on which apportionments are made. The City of Los Angeles made its application in the *Washington Boulevard* case in 1948; the U. S. Supreme Court decision was issued in November, 1953.

The railroads' position apparently is that they will not voluntarily assume any greater costs than they are legally required to do. This means that, in the absence of further action by the Legislature, elimination of existing grade crossings or widening of existing separations not involving federal aid must be delayed for a year or more after the filing of an application with the P. U. C. On nonfederal aid projects, California has been unable, except in a few isolated cases, to reach satisfactory agreement with railroads as to the amount of railroad contribution to crossing projects which involve elimination of a railroad grade crossing or reconstruction of an existing separation.

Actually, the cost to the public caused by the delay in the construction of a needed grade separation may be more than the amount of any anticipated railroad contribution. The prime responsibility of the highway builder is to provide safe and adequate roadways for vehicular traffic as rapidly as possible, and also as economically as possible so that the highway user gets full value for his tax dollar. This means, among other things, that the railroads should pay their proper share of the cost of a grade separation.

Conflict Over Benefits

The railroads have taken the position that their proper share is the amount of monetary benefit they would receive from the construction

of the structure and the elimination of the grade crossing hazard. Since 1944 the railroads in California have endeavored to obtain passage by the State Legislature of a law directing the Public Utilities Commission to apportion the cost of grade separations on the basis of benefits. The *Washington Boulevard* and *Los Feliz* decisions, apportioning 50 percent of the costs to the railroads, will undoubtedly result in a particularly strong concerted effort in 1955 to obtain enactment of such a law, since these decisions indicate a trend toward higher apportionments to the railroads.

If a law involving benefits is to be effective in expediting negotiated agreements with the railroads, it should clearly define "benefit."

As indicated earlier, the railroads' interpretation of benefit to them is the capitalized value of the annual monetary savings or tangible benefits accruing to the railroads by reason of construction of a separation. By inference, they consider anything else to be for the benefit of vehicular traffic. They omit all costs and intangible benefits not appearing on their books. Thus, where a 24-hour crossing watchman and manual gates are eliminated by a grade separation, the capitalized value of annual savings accruing to the railroad might approximate 10 percent of the cost of the separation; but for a crossing protected by such devices as automatic flashing lights the monetary saving to the railroad will amount to only 1 or 2 percent of the cost of separating grades.

Railroads' Interpretation

The railroads' interpretation of a benefit does not include, for example, the often substantial cost of a temporary shoofly or trestle to carry rail traffic during construction of an underpass; nor does it include the benefit accruing to the railroad by elimination of interference from vehicular traffic.

The railroads' interpretation completely disregards the public's right to the use of a safe and convenient crossing of the tracks. The railroad's passengers and freight certainly have no superior and inalienable rights to the use of a crossing. The apportionment

of 50 percent to the users of the highway and 50 percent to the users of the rails, which is specified in numerous past decisions of the California Public Utilities Commission and in legislation in various other states, is not unreasonable on the basis of mutual obligations for the elimination of conflict between rail and vehicular traffic at a grade crossing.

The railroads have often cited the great number of grade crossings in the United States, stating that a requirement to eliminate them all at railroad expense would bankrupt the railroads. As far as California is concerned, the current construction program (July, 1953, to January, 1955) includes 38 railroad-highway grade separation projects, 30 of which (21 new crossings are on new alignment and nine widenings are on federal aid projects) involve no railroad contribution. Of the remaining eight, seven separations will eliminate existing grade crossings and are being financed with federal aid with 10 percent railroad contribution. The other project is not on a federal aid route; it involves widening of an existing underpass, and proceedings to determine apportionment of the cost have been commenced with the Public Utilities Commission.

Railroad Contributions

The total railroad contribution, for the seven elimination projects in California under federal aid projects totals about \$450,000. This does not indicate a serious drain on railroad finances for the elimination of existing grade crossings. As a matter of fact, the railroads are currently spending approximately \$1,200,000 for constructing separations at new railroad crossings of existing state highways.

In the meantime, while debate over apportionment goes on, a method must be found to insure the prompt construction of urgently needed grade separations. The cost in terms of delay and danger is too great at many existing grade crossings to wait until a final judgment is issued by a court of last resort.

Railroads and highways are both essential to the national economy. In the

... Continued on page 63

New Freeway

*Ramona-99 Project Through
Pomona, Claremont, Ontario
And Upland Now Completed*

By **GEORGE L. LAIRD**, Bridge Construction Engineer, Southern Section; **C. J. McCULLOUGH**, Resident Engineer, District VII, and **E. A. BANNISTER**, Resident Engineer, District VIII

ON NOVEMBER 16, 1954, that portion of the US 99-Ramona Freeway in Districts VII and VIII between San Dimas Avenue in Los Angeles County and Archibald Avenue in San Bernardino County was opened to public traffic. This 13.5 miles of freeway passes through the Cities of Pomona, Claremont, Upland, and Ontario. It is the longest single section of full freeway to be opened at one time in the State of California. It is rare indeed that two adjoining major construction contracts, in this case totaling some \$9,000,000, progress to completion so that the opening to public traffic can be on the same day and at the same time.

This highway is one of the most important traffic arterials entering the Los Angeles metropolitan area. It is the most direct route connecting Los Angeles with Imperial Valley and

roads leading to the eastern section of the United States. Its importance is shown by the fact that this state route was one of the first in the Los Angeles area to be declared a freeway by the State Highway Commission.

Seven Major Contracts

Although we have here the situation of a 13.5-mile length of freeway being in effect a single unit, it is interesting to note that there are 6.3 miles in Los Angeles County within the District VII area and 7.2 miles in San Bernardino County within the District VIII area and also that it took seven major construction contracts to carry this vital freeway link to completion. The completed construction provides a four-lane freeway with provision for ultimate expansion to six lanes by the addition of two lanes in the median area. The lanes of the

traveled way consist of portland cement concrete pavement. Shoulders, auxiliary lanes and ramps are of plant-mix surfacing.

The interchanges in the Pomona-Claremont area are of several types with the diamond shape used predominately. These points of ingress and egress are located at important cross streets and are, in general, evenly spaced throughout the area. The braided connection with the existing traveled way near the westerly end of the project not only provides a convenient entrance to Pomona but also becomes the junction of two freeways. The westerly one mile of existing Route 26 becomes Route 77. The latter route has been declared a freeway from its junction with the Ramona Freeway to the San Bernardino county line. The Ramona Freeway also crosses State Route 19 which is

Looking southerly along San Antonio Avenue showing dual Ramona Freeway bridges





Looking north along Park Avenue showing freeway bridge structure

Garey Avenue. This route, carrying approximately 10,000 vehicles per day is the most important north and south connection between Foothill Boulevard, State Route 9 and the City of Pomona.

Diamond Type Interchanges

The diamond type interchanges constructed in the Upland-Ontario area will permit traffic to move in the desired direction without circuitry of travel. The anticipated volume of left-turn movements is relatively low and does not justify the high right of way costs that are involved in the construction of cloverleaf loops. At the easterly end of the project a direct connection to the old highway is provided, affording safe and convenient access from the east to the Ontario business section.

Steps are presently being taken to purchase six acres of vacant land in the northeast quadrant of the Route 26/192 interchange (Euclid Avenue) for the ultimate construction of a loop. It is anticipated that eventually the left turn traffic increase from south to west will become too heavy for efficient operation with the dia-

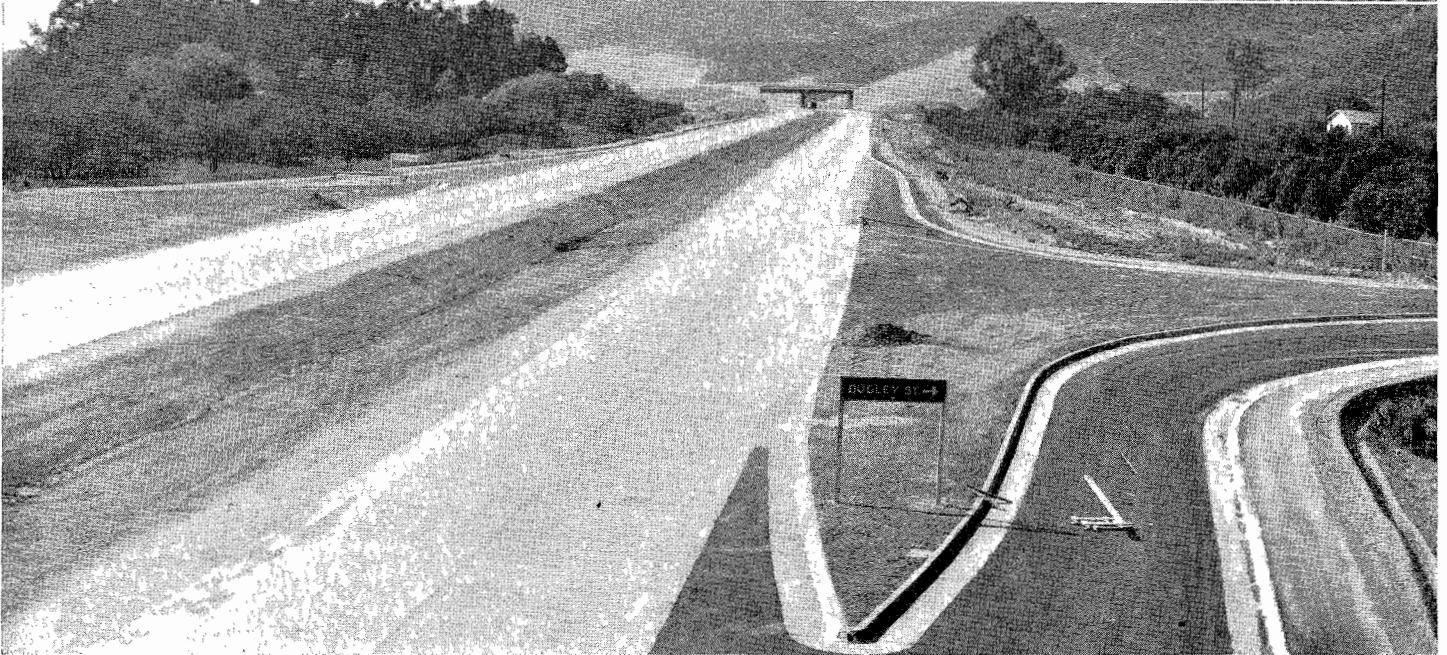
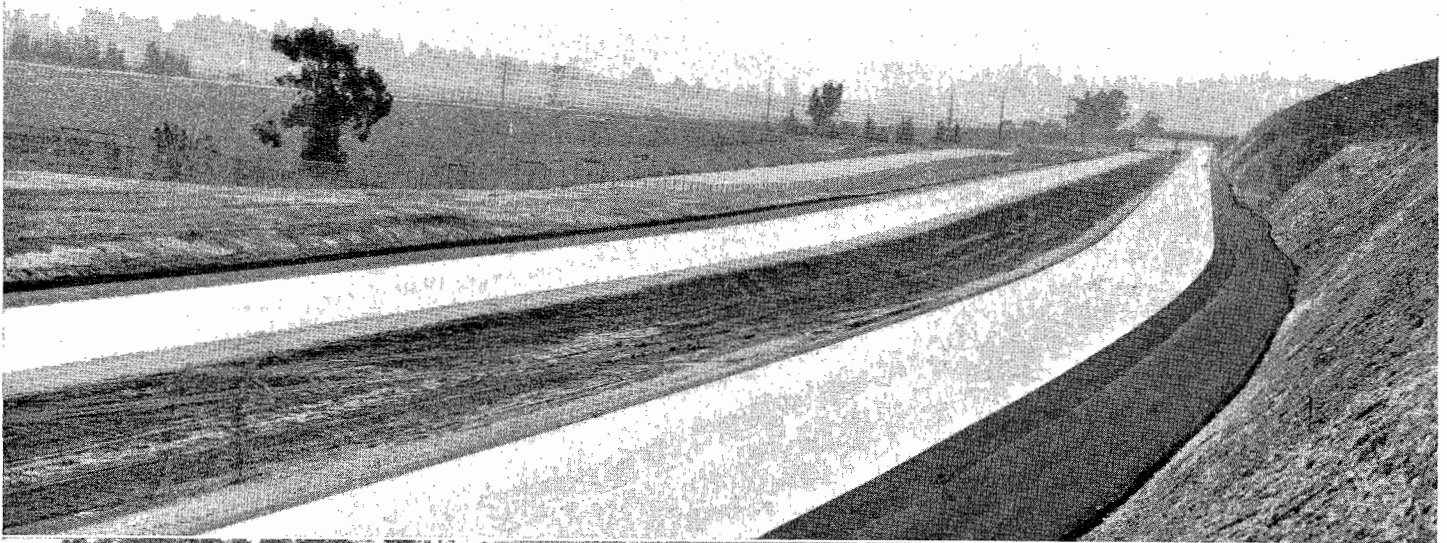
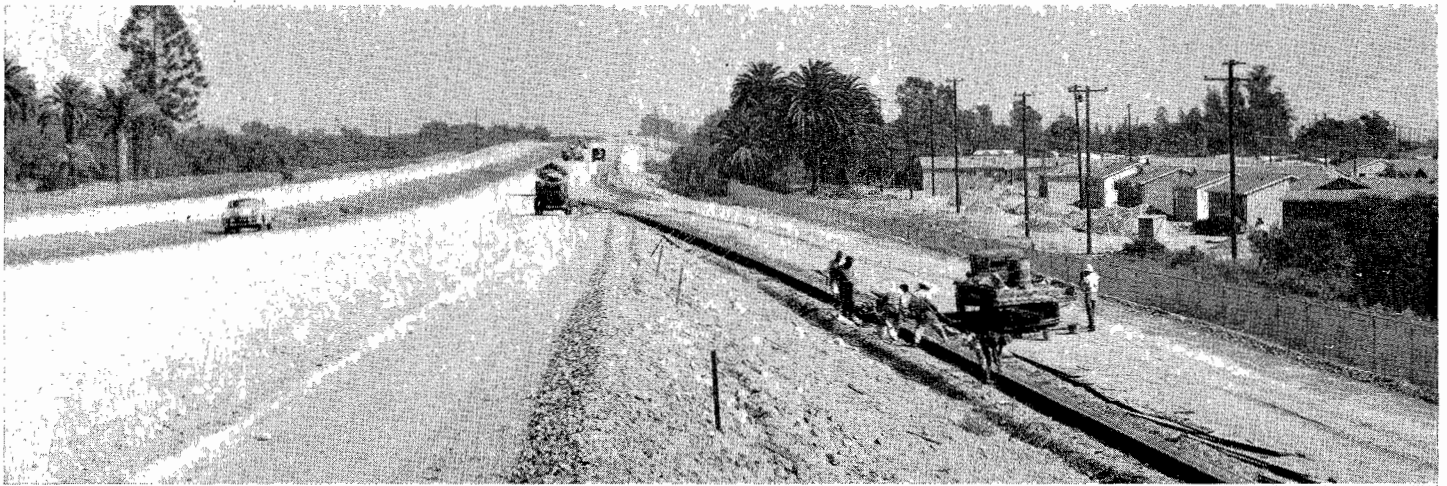
mond-type interchange as constructed. Advance right of way protection funds will be used to purchase the necessary land to permit this construction when warranted by traffic.

Traffic Bottleneck

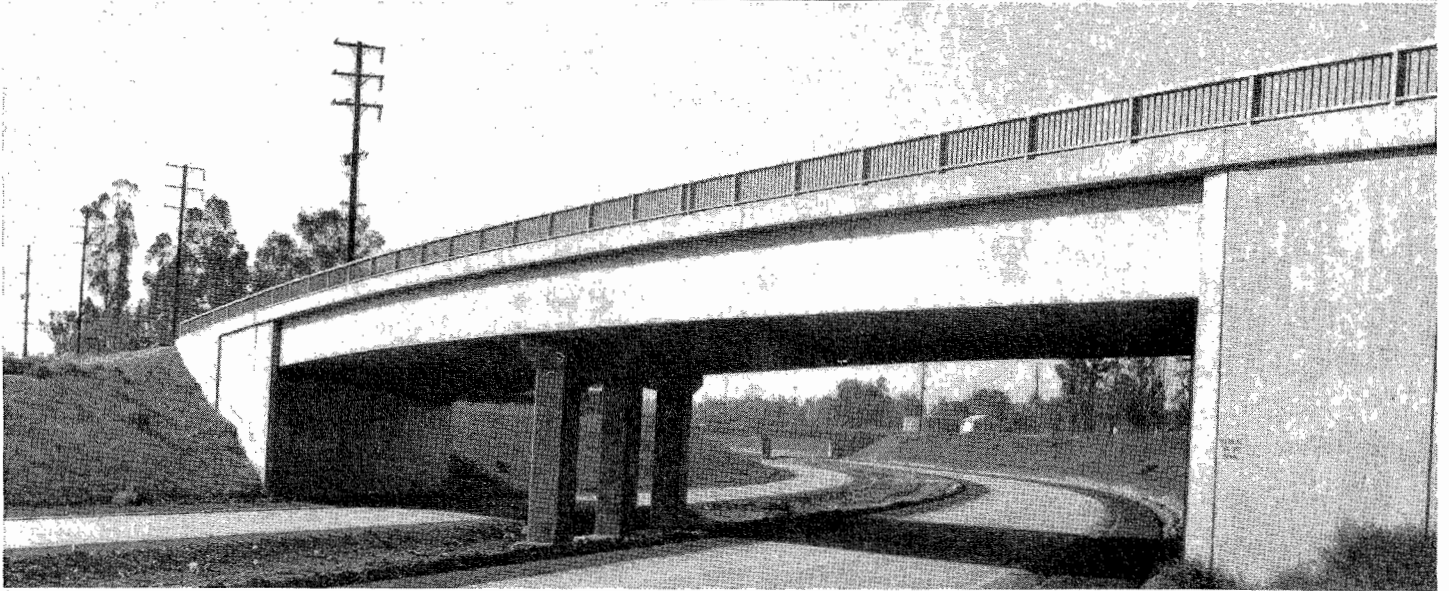
That portion of US Highway 99, where it passed through the business sections of Pomona and Ontario, had long been one of the chief bottlenecks for through traffic. On November 1, 1947, this portion of the state highway was declared a freeway by the Highway Commission, and the planning and design for routing the freeway northerly, away from the business districts, was started. The Highway Commission decided not to wait until funds were available to do all of the work at one time. Rather, in the interests of speeding up construction of this important section of the freeway through Pomona, Claremont, Upland, and Ontario, it was decided to let separate structure contracts ahead of the road contracts. Toward this end, the first contract for seven structures in the Los Angeles County was awarded on June 4, 1952, for bridges in the City of Pomona.

A contract in the amount of \$1,206,625.30 was carried out by R. M. Price Co. as general contractor and O. A. Johnson as resident engineer for the Division of Highways. The following bridges were included in this contract:

1. Dudley Street Overcrossing consisted of a two-span reinforced concrete box girder type of bridge, 141 feet long. Cost \$86,200.
2. White Ave. Undercrossing consisted of two parallel concrete box girder bridges, 107 feet long. Cost \$112,500.
3. Park Ave. Undercrossing also consisted of parallel bridges and was 92 feet long. Cost \$105,700.
4. Route 26/19 Separation consisted of parallel bridges over Garey Ave., McKinley St. and Orange Grove Ave. and was the longest bridge on this section of freeway, being approximately 820 feet long. Cost \$471,900.
5. Towne Ave. Undercrossing was a twin box girder bridge, 158 feet long. Cost \$167,800.
6. San Antonio Ave. Undercrossing consisted of two parallel box girder bridges, 93 feet long. Cost \$109,200.
7. Alexander Ave. Undercrossing also consisted of two parallel bridges and was 84 feet long. Cost \$88,700.



UPPER: Looking easterly along Ramona Freeway showing finishing-up operations in progress. CENTER: View along completed Ramona Freeway looking westerly from Ganesha Avenue Bridge showing Route 77/26 grade separation bridge and Kellogg Hills in background. LOWER: Looking westerly from Dudley Street Bridge showing completed Ramona Freeway with Ganesha Avenue Overcrossing in background.



UPPER: Looking easterly at east end of project showing Archibald Avenue in background. CENTER: Looking westerly along completed freeway showing Sixth Street Overcrossing Bridge in City of Ontario and Campus Avenue Bridge in background. LOWER: Looking easterly along freeway at San Bernardino Avenue.

In San Bernardino County

The second contract was awarded on June 20, 1952, for construction of eight US 99 freeway bridges in San Bernardino County between the Los Angeles county line and Euclid Avenue, and included the following structures:

1. Mills Ave. Undercrossing consisted of two parallel reinforced box girder bridges, each 77 feet long. Cost \$69,000.
2. San Antonio Wash Bridge consisted of two parallel concrete slab bridges, each 107 feet long. Cost \$116,200.
3. Monte Vista Ave. Undercrossing consisted of two parallel box girder bridges, each 65 feet long. Cost \$90,100.
4. Central Ave. Undercrossing consisted of two concrete box girder bridges, each 106 feet long. Cost \$113,700.
5. Benson Ave. Undercrossing consisted of two parallel box girder structures, each 70 feet long. Cost \$76,000.
6. Mountain Ave. Undercrossing also consisted of two parallel box girder bridges, each 70 feet long. Cost \$72,700.
7. San Antonio Ave. Overcrossing was a two-span box girder bridge, 111 feet long. Cost \$48,700.
8. Route 192/26 Separation consisted of two parallel concrete box girder bridges, each 111 feet long. Cost \$104,300.

This contract, in the amount of \$746,708.20, was performed by Charles MacClosky Co. Homer J. Scott acted as resident engineer for the Division of Highways.

Third Contract

The third contract in the amount of \$724,873.10, was awarded on July 11, 1952, to W. F. Maxwell for the construction between Euclid Avenue and Archibald Avenue in San Bernardino County of the following bridges:

1. Sultana Ave. Overcrossing, a reinforced concrete box girder bridge, 111 feet long. Cost \$50,700.
2. Campus Ave. Overcrossing, also a box girder, 115 feet long. Cost \$54,200.
3. Sixth St. Overcrossing, a two-span box girder type bridge, 217 feet long. Cost \$110,600.
4. Grove Ave. Undercrossing consisted of two parallel, single-span box girder bridges, 86 feet long. Cost \$105,400.
5. San Bernardino Ave. Undercrossing consisted of two parallel box girder bridges, 100 feet long. Cost \$151,800.
6. Vineyard Ave. Overcrossing, a two-span concrete bridge, 114 feet long. Cost \$67,700.
7. Cucamonga Wash Bridges consisted of two parallel concrete bridges, 97 feet long. Cost \$56,700.
8. A St. Off-ramp Undercrossing was a concrete box girder bridge, 94 feet long. Cost \$72,400.

Homer J. Scott also acted as resident engineer on this contract.

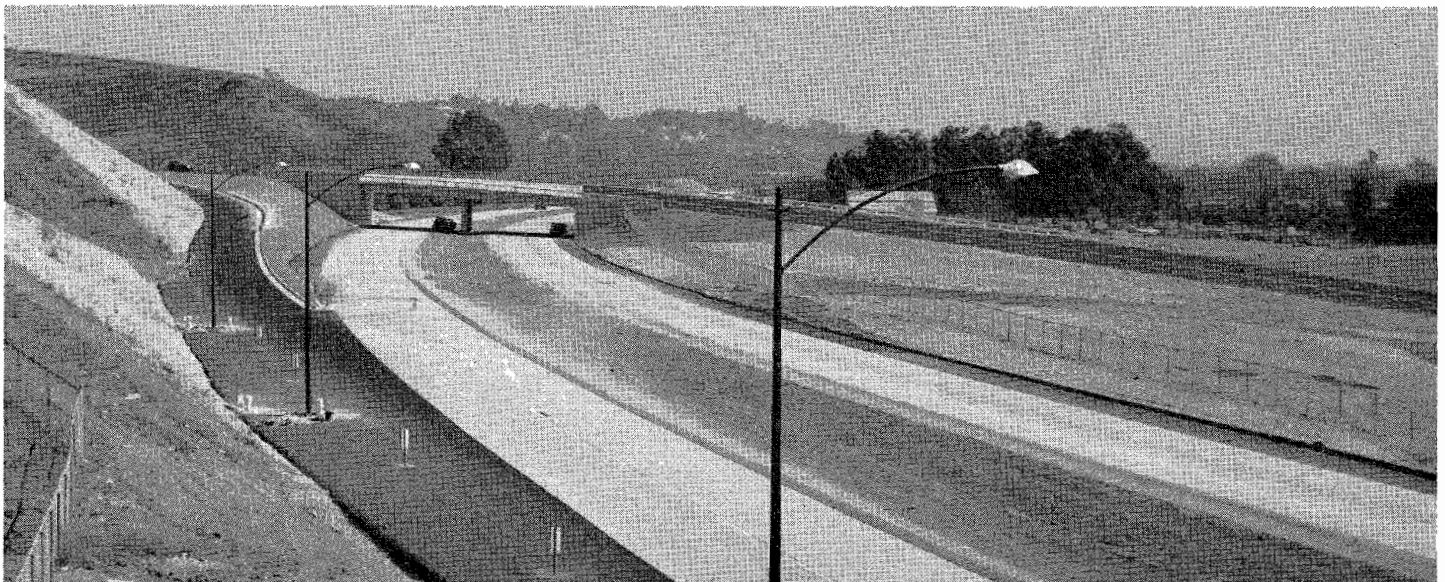
Fourth Contract

The fourth contract to be advertised was for the remaining construction to complete the 7.2 miles of US 99 freeway in District VIII from the Los Angeles-San Bernardino county line to Archibald Avenue east of Ontario. The contract was awarded to a joint venture consisting of J. A. Payton, Clyde W. Wood & Sons, Inc., and Geo. Herz & Co. on April 1, 1953. The contract allotment was \$2,465,387. The resident engineer on this job was E. A. Bannister.

The entire length of the project was constructed on new location as a four-lane freeway with provision for ultimate expansion to six lanes by the addition of two lanes in the median area.

Something of the magnitude of the project can be seen by reviewing a few of the major items of work. One million one hundred fifty thousand cubic yards of roadway excavation were moved, involving 85,000,000 station yards overhaul to reach its final location. Even this tremendous volume was not enough, and 210,000 cubic yards of imported borrow were necessary to complete the roadway embankment. Reinforced concrete pipe, ranging in diameter from 12 to 48 inches, was installed for a total length of 17,000 feet. Forty-five thousand cubic yards of portland cement concrete were poured in the pavement, and 27,000 tons of plant-

Looking easterly along Ramona Freeway showing Ganesh Avenue Overcrossing Bridge and westbound inlet ramp. Ganesh Park in background.



mixed surfacing were used for shoulders, auxiliary lanes, and ramps.

Depressed Section

Through the Upland-Ontario area, the freeway was constructed as a depressed section for a distance of two miles.

To take care of the drainage in the depressed section, a storm drain of reinforced concrete pipe, 9,500 feet in length, was installed in the median area, draining by gravity flow into Cucamonga Wash. The storm drain pipe ranged in size from 24-inch to 48-inch diameter. Side drain laterals of 15-inch diameter were connected to the storm drain at 300-foot intervals to take care of surface drainage.

The Metropolitan Water District aqueduct, carrying water from the Colorado River, crosses the freeway

at two locations. One crossing is near the westerly end of the project at Ramona Street, and the other crossing is in the vicinity of Sixth Street in Ontario. The aqueduct is a 12-foot 8-inch inside diameter concrete pipe. These crossings were protected by means of reinforced concrete bridges that will enable access to the aqueduct at all times.

The roadway excavation was accomplished by means of one four-cubic-yard dragline and one 2½-cubic-yard power shovel. Fourteen bottom-dump Euclid wagons hauled the excavated material. Approximately 10,000 cubic yards of material were moved during a nine-hour shift.

Design of Roadway

The four lanes of the traveled way are of standard design of eight-inch

portland cement concrete over four-inch cement-treated subgrade. Shoulders, auxiliary lanes, and ramps are plant-mixed surfacing.

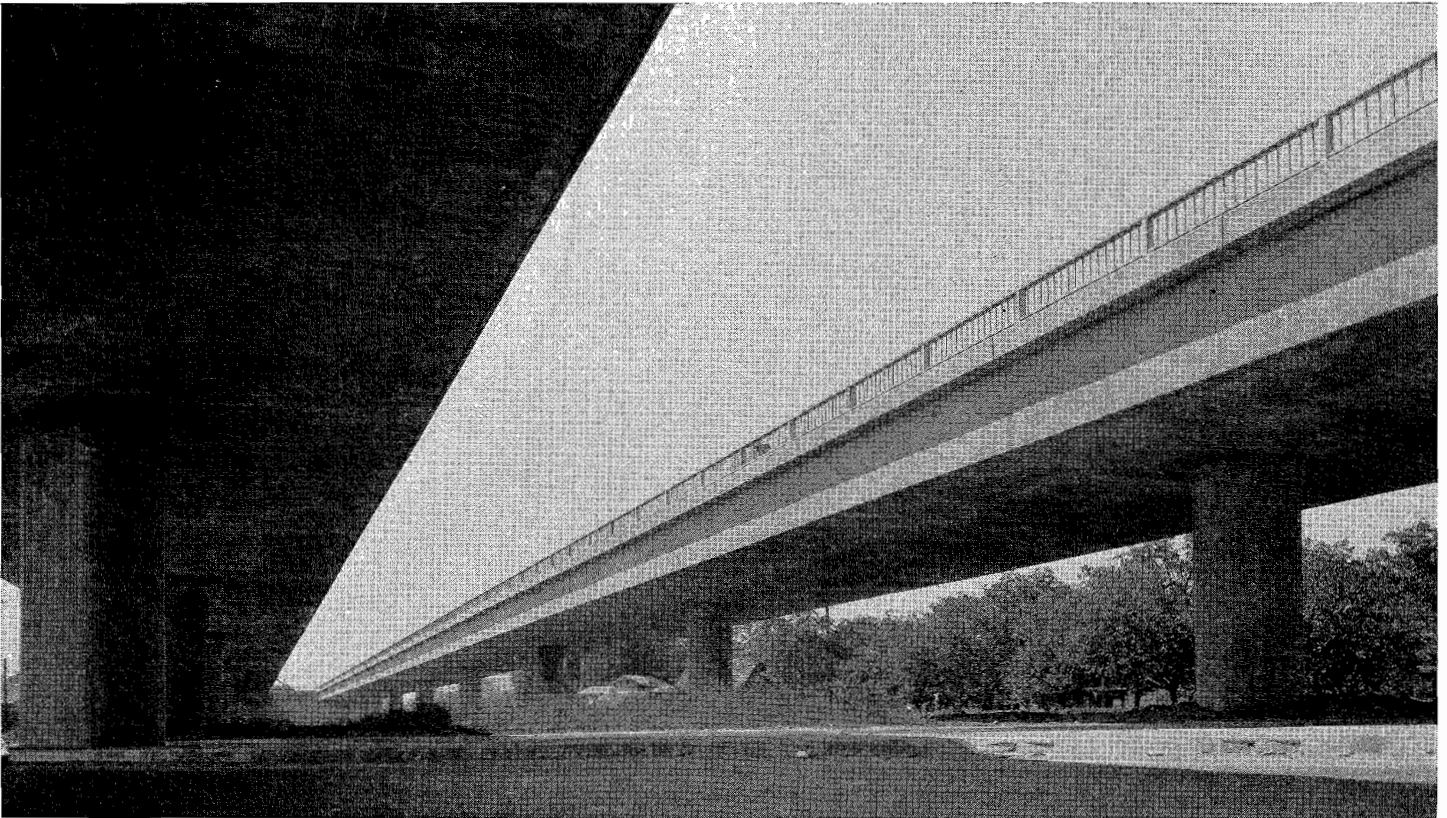
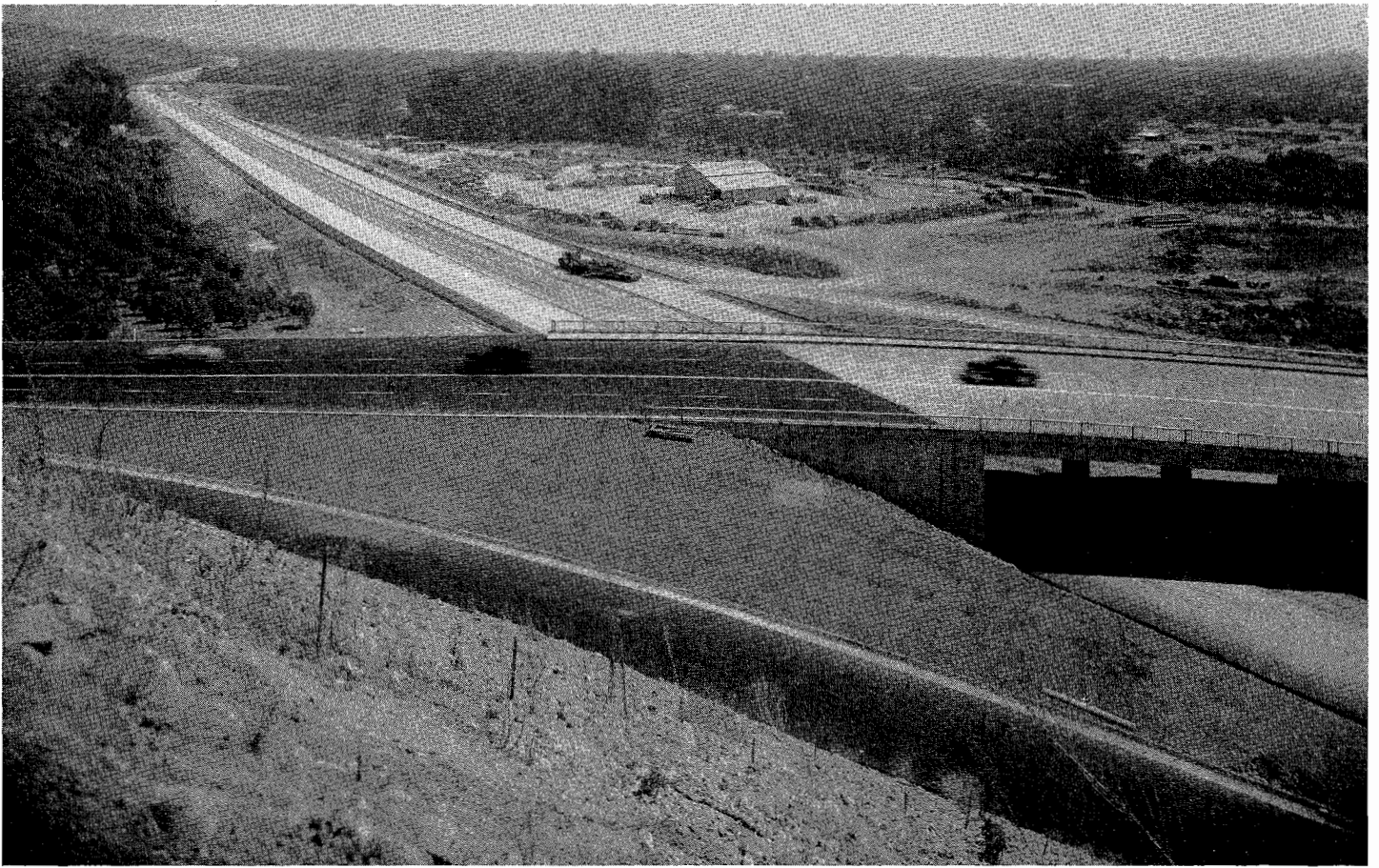
All weakened plane joints were at standard 15-foot intervals, and were cut with a power-driven saw to a uniform depth of two inches. The time for sawing these joints varied according to weather conditions. When weather was hot, the joints were sawed as early as six hours after the concrete was poured.

The production record for the portland cement concrete pavement was 45,000 cubic yards laid in 49 starts, averaging 917 cubic yards per day. The largest single day's output was 1,148 cubic yards, representing almost 2,000 feet of 12-foot-wide traffic

... Continued on page 32

Freeway structure viewed from Monte Vista Avenue





UPPER: Looking easterly along Ramona Freeway showing Ganesha Avenue Bridge in foreground. Ganesha Park and City of Pomona in background. LOWER: Looking westerly from under the two long bridges that span Garey Avenue and Orange Grove Avenue in the City of Pomona.

New Elvas

Freeway

By A. M. NASH,
District Engineer

TRAFFIC using the new Elvas Freeway, opening of which has been delayed by wet weather, will be afforded relief by lessening of the load on the present three crossings of the American River in the vicinity of Sacramento. At present, the three crossings—the Jibboom Street Bridge, the 16th Street Bridge, and the H Street Bridge—provide access from the fast developing area north and east of Sacramento to the Sacramento city area.

The average daily traffic and the peak hour traffic on these three river crossings are tabulated below:

| Bridge | 1954 ADT | Peak hour | Lanes |
|-----------------------------|----------|-----------|-------|
| Jibboom St. (County Bridge) | 7,800 | 750 | 2 |
| 16th St. (Route 3) | 63,600 | 6,100 | 4 |
| H St. (Route 98) | 33,900 | 3,200 | 4 |
| | 105,300 | 10,050 | 10 |

Traffic Figures

Surprisingly, the sum of the average traffic on the three crossings is in excess of that on the San Francisco-Oakland Bay Bridge.

In 1948, the two state highway crossings, the 16th Street Bridge and the H Street Bridge (Routes 3 and 98) carried an average daily traffic of about 55,000 vehicles on six lanes (counting both directions), carrying traffic in and out of the City of Sacramento on 12th Street, 16th Street and H Street which totaled 10 narrow lanes on a signalized city street system. Even at that time, congestion was considered intolerable. Since 1948, traffic across the American River has increased about 85 percent without any major traffic facility relief. There have been several "improvements" which have afforded some relief. These improvements include:

- (1) Widening of the 12th Street Underpass, a city structure. (Completed in 1949.)
- (2) The gradual development of an effective one-way street operation within the City of Sacramento.
- (3) Widening the H Street Subway, the H Street Bridge and Fair Oaks Boulevard as a cooperative city, county and state project in 1951.
- (4) Construction of the J Street Underpass and Interchange by the city, financed by local bond issue.

In the meantime, following the report of the 1947-48 Origin and Destination Survey of the Sacramento Metropolitan area, studies had been initiated for another crossing of the American River as recommended in that report.

Project Evolved

The project, which evolved from these studies is a four-lane freeway—with provision for expansion to six lanes—

... Continued on page 16

Elvas Freeway

Bridges

By R. N. BRINK, G. D. GILBERT,
Associate Bridge Engineers

ANOTHER link in the freeway system, which will ultimately connect the North Sacramento Freeway with the proposed South Sacramento Freeway will be completed with the opening of the Elvas Freeway to traffic.

This three-mile freeway will connect 29th and 30th Streets at the north city limits of Sacramento with the North Sacramento Freeway at Swanston Road.

The freeway is presently being constructed to provide a four-lane divided highway with provisions for future development to a six-lane divided highway.

Elvas Major Structure

The major structure in this new three-mile length of highway is the American River Bridge at Elvas. This river crossing was constructed under two separate contracts, at a cost of \$1,612,473. This was done principally because of the structural steel shortage of 1950. The contract for the substructure was awarded July 26, 1950, to Lord and Bishop of Sacramento on their bid of \$608,569 and the contract for the superstructure was awarded May 16, 1952, to Ukropina, Polich and Kral of San Gabriel on their bid of \$1,003,904. Both contracts were delayed due to strikes, floods, and steel shortages with the result that all work was not completed until August, 1954.

The American River Bridge is in reality two parallel bridges, one for two lanes of eastbound and the other for two lanes of westbound traffic, with design details being based on future widening to three lanes in each direction. These structures are about 1,890 feet long and provide a clear roadway width of 28 feet between curbs. Each consists of eight riveted steel plate girder spans 125 feet long and 17 welded steel beam spans, two at 68 feet and 15 at 50 feet, all with reinforced concrete deck slabs, supported by concrete piers, bents, and abutments, with steel pile foundations.

Plate Girder Spans

The plate girder spans are approximately 125 feet in length with two 8-foot girders spaced 21 feet apart in each span. The deck slabs are 11¼ inches thick and designed with two cantilevers varying from five to six feet outside the girders.

The welded beam spans are composed of four 36-inch beams spaced eight feet apart. The deck slabs are 6¾ inches thick with 3-foot 10-inch cantilevers outside the beams.

The piers for the 125-foot spans are supported on 52 steel bearing piles 50 feet± long driven into the brown clay strata to refusal with the footings being some 15 feet

... Continued on page 16



This photograph shows the Elvas Freeway swinging off to left in background. The North Sacramento Freeway swinging toward right is shown in the center of picture. Arden Way passes under the freeway in center foreground.

NEW ELVAS FREEWAY

Continued from page 14...

between 29th and 30th Streets and C Street in Sacramento to existing Route 3 near Swanston Road (Arden Way). With the completion of the freeway, traffic will use it and 29th and 30th Streets (as a one-way street couplet) in Sacramento to provide a north-south through route. The South Sacramento Freeway, for which rights of way are now being acquired, will terminate at 29th and 30th Streets near U Street and 29th and 30th Streets then will become a cross-town link between the South Sacramento Freeway and the Elvas Freeway. Future planning contemplates freeway development between 29th and 30th Streets, from U Street to C Street, linking these two freeways into a continuous north-south full freeway route.

The Elvas Freeway project, 2.9 miles in length, includes the A Street Overcrossing in the City of Sacra-

mento, parallel two-lane bridges 1,889 feet in length across the American River, two railroad separations (the B Street and Elvas Underpasses), a grade separation (State Fair Overhead) providing access from one side of the freeway to the other for the new State Fair site, and structures for the interchange with Route 3 near Swanston Road.

Grade Separations

One of the two railroad grade separations is under the railroad's Elvas Wye. This railroad wye carries trains every few minutes for it connects the San Francisco-Sacramento main line from the West with the Roseville-Truckee transcontinental line and the Marysville-Red Bluff branch on the northeast and the Stockton-Los Angeles main line on the south. All three legs of the wye are double tracked. Construction of the Elvas Underpass involved extensive railroad work, in that tracks had to be moved several

times and involved adjustments to the signal and switch interlocking system each move.

Work actually began in May of 1950 with the beginning of the contract for the substructure of the river crossing bridges. The project suffered a severe setback in 1951-52 as a result of steel shortages. The advertising of the B Street and Elvas Underpasses and the superstructure of the two river crossings were delayed for a considerable time until steel priorities could be cleared.

The opening of the Elvas crossing to traffic will undoubtedly attract appreciable volumes of traffic from both the 16th Street and H Street Bridges, thus providing considerable relief from the congestion and delay occasioned during peak periods by the large volumes of traffic now concentrated on these two structures.

The project will be completed under a total of six contracts as tabulated below:

| Description | Contractor | Resident engineer | Construction period | Cost |
|--|-------------------------------------|-------------------|-----------------------|-------------|
| American River Bridge Substructure | Lord and Bishop | T. C. Royce | May, 1950-May, 1952 | \$617,428 |
| B St. and Elvas Underpasses | J. C. Gist | J. C. Nelle | June, 1952-Feb., 1954 | 1,386,778 |
| American River Bridge Superstructure | Ukropina, Polich and Kral | R. N. Brink | June, 1952-Aug., 1954 | 1,047,570 |
| Grading and structures north of river | Ukropina, Polich and Kral | D. R. Hislop | Dec., 1952-Aug., 1954 | 713,914 |
| Grading, structures south of river, paving | Ukropina, Polich, Kral and Ukropina | D. R. Hislop | May, 1954-Dec., 1954 | 874,800 |
| Highway lighting, illuminated directional signs | Reliable Elevator Works | D. R. Hislop | Aug., 1954-Dec., 1954 | 48,800 |
| Total construction cost, exclusive of engineering and right of way | | | | \$4,689,290 |

ELVAS FREEWAY BRIDGES

Continued from page 14...

below the present stream bed. The piers which are some 50 feet high are of cellular type with elliptical-shaped noses.

The two column bents for the approach spans are also supported on steel bearing piles and are founded well below the anticipated scour line.

Freeway Alignment

The horizontal and vertical alignment for the freeway in the vicinity of the bridge was controlled by the Elvas wye tracks of the Southern Pacific Company and the heights of the various levees along and adjacent to the American River. It was found de-

sirable to go under the tracks while swinging northerly on a long 1,500-foot curve on an ascending grade to meet high water requirements at the south bank of the river. This alignment resulted in the 1,500-foot radius curve on more than one-third of each bridge requiring a superelevation transition on the structures. Since the river piers were placed parallel to the stream flow, much time was required for calculation of layout and elevations both by the designer and the men in the field.

The importance of good foundations cannot be overstressed especially when the flood of November 21, 1950, in this locality is recalled. Footing con-

struction requiring cofferdams for five spans across the main channel, was under way at that time. Due to a sudden rise of 30 feet in the river, the contractor was unable to get his equipment to high ground and 18 pieces, including four cranes were submerged. Cofferdam work was then postponed until June, 1951.

Type of Cofferdams

A cofferdam is not an integral part of a finished structure, but merely a facility to place a footing below water level. The majority of our modern highway structures are built on dry land or across small streams that are dry during most of the construction season; thus eliminating the necessity for expensive cofferdams. Many old



Elvas Underpass under Southern Pacific tracks in foreground. This view of the Elvas Freeway is looking south toward Sacramento.

timers in construction work, when structures were built for water crossings only, are familiar with cofferdams of all types; but there are many others who are inexperienced in this type of work, hence it may be of interest to point out a few details of one of the simpler types of cofferdams as used on this project.

The footing area was first excavated to an open hole, commonly called a "glory hole," and leveled off to about one foot above water level to permit working in the dry as well as to eliminate the use of longer sheet piles. A crib (similar to a box without sides) consisting of two horizontal walers spaced seven feet apart was erected in exact position. Interlocking steel sheet piles, 16 inches in width, were then placed vertically around the crib thus forming the cofferdam. Considerable care and accuracy must be used in placing the sheets around the crib since one-fourth inch slack, as designed in each interlock, can (and often does) result in having too much space in which to place the last or "closing" sheet. This slack, if permitted to accumulate, will also permit the succeeding sheets to get out of plumb and cause instability of the entire group.

Driving Technique

After the cofferdam was erected the sheets were driven with a double acting steam hammer and the interior of the cofferdam excavated. It was expedient to drive the sheets about five feet, then excavate and lower the crib, and repeat the process until the desired elevation was reached, in this case approximately 15 feet below the stream bed. The next process was to drive the bearing piles and pour a tremie seal (concrete deposited under water through a tube operated in such manner as to keep the outlet end of the tube in fresh concrete at all times). After the concrete had hardened for five days, pumps were placed in the cofferdam and it was dewatered, thus exposing the seal and tops of bearing piles. After removing high spots from the top of the seal and preparing the tops of the bearing piles protruding through the seal, the main footing was placed thereon and the



"A" Street Overcrossing and floodgates are shown in center foreground with Southern Pacific Railroad line immediately in back of these structures. View is looking south toward Sacramento.

pier shaft poured above the river level. The cofferdam had then served its purpose and was removed by use of a steam hammer for extracting the sheet piles and a crane for removing the crib.

Important Details

Several very important details were continually checked: e.g., that the tip of the sheet piles were well below the bottom of footing; that the excavation inside the cofferdam was sufficiently low to permit swell during driving of the bearing piles; that the sides of the cofferdam were clean of any clayey material which might hang up in the irregular portions of the sheet piles; that the top of the bearing piles be at or above required grade; and that concrete having a proper slump (about 6 inches) was used for the seal.

During the fabrication of the welded steel beams some difficulties were encountered in attaining the required straightness. Proper sequence of welding was not established at once and considerable work was necessary to straighten several beams. The Materials and Research Department handled the shop inspection and through the cooperation of the fabricators, the difficulties were soon remedied and

the remaining beams fabricated without incident. The beams, weighing five to eight tons each, were shipped to the job site via trucks and were readily erected in their final position by use of a truck crane.

Fabrication of Girders

The eight-foot plate girders, approximately 125 feet long, were fabricated in sections and shipped to the job by rail and by truck. Each girder, composed of three sections, was then assembled on the ground in a location convenient for erecting to its final position in the structure. Riveting of the field splices was not started until each assembled girder was checked for proper camber (two inches) and alignment and all unfair rivet holes reamed. After riveting was completed each girder (40 tons) was erected by use of two truck cranes of 20 and 25 tons capacity equipped with 60-foot booms.

No difficulties were encountered in placing the 2,200 tons of structural steel required for the superstructure.

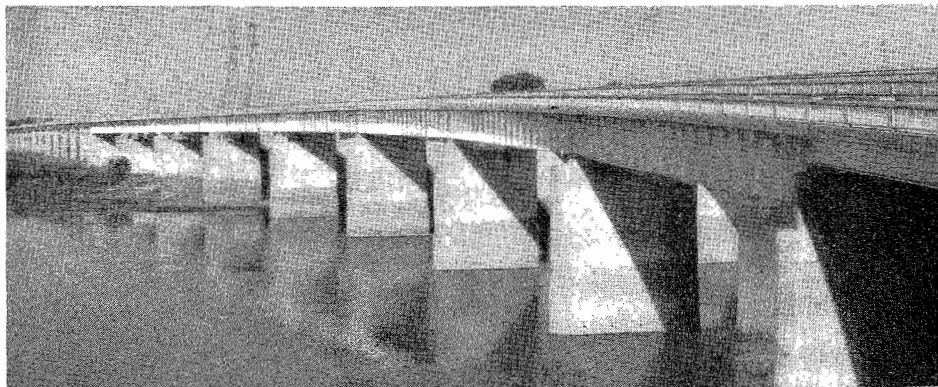
Major Items

Major items and quantities involved in constructing the bridge are tabulated as follows:

| | |
|--|-----------------|
| Structure excavation (Type "A") | 4,413 cu. yds. |
| Structure excavation (Type "B") | 6,268 cu. yds. |
| Class "A" concrete (footing) | 1,475 cu. yds. |
| Class "A" concrete (structure) | 9,812 cu. yds. |
| Structural steel | 2,233 tons |
| Steel piling | 43,798 lin. ft. |
| Driving piles | 1,280 each |
| Bar reinforcing steel | 617 tons |
| Steel railing | 7,544 lin. ft. |

There were eight other structures required in this three-mile section, namely:

- B Street Underpass: A two-span steel girder bridge carrying Southern Pacific Company tracks over the freeway.
- A Street Overcrossing: A two-span tee-beam bridge carrying future A Street over freeway.
- B Street Underpass
- Floodgate: A steel and timber



Two views (see also below) of completed Elvas Bridge which will be opened to traffic when the Elvas Freeway is completed

portable gate system for flood protection.

Elvas Underpass: A double two-span steel girder bridge carrying the Elvas Wye tracks of the Southern Pacific Company over the freeway.

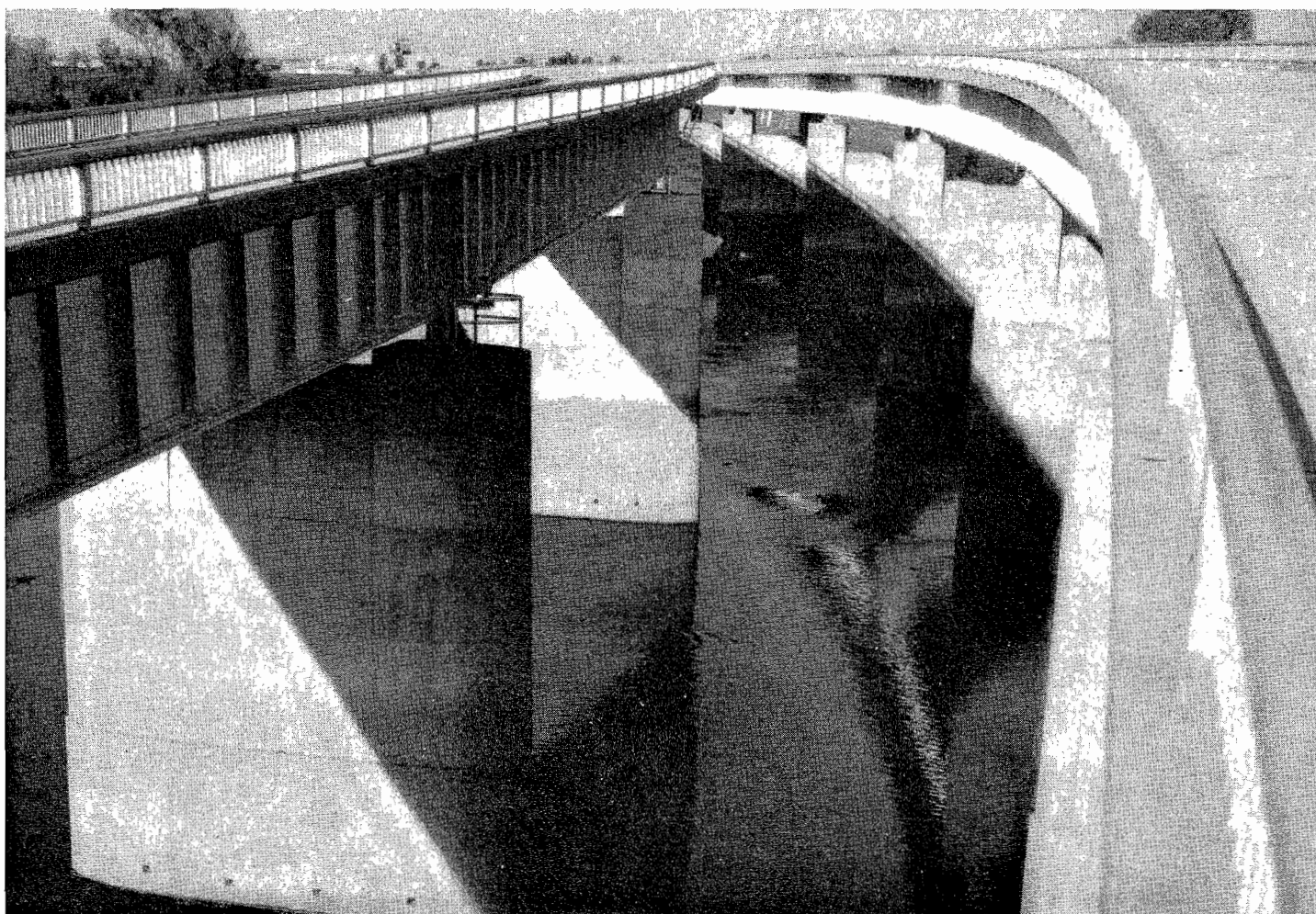
State Fair Overhead: A single span concrete slab to carry future

Southern Pacific Company tracks under the freeway.

Route 98/3 Separation: A three-span box girder structure carrying Elvas Freeway traffic over Route 3.

Swanston Road Undercrossing: A three-span slab structure carrying

... Continued on page 20



EMPLOYEES RECEIVE TWENTY-FIVE-YEAR AWARDS

Employees of the Division of Highways who became eligible for their 25-year service awards prior to September 30, October 31, and November 30, 1954, are:

| Name | Birthdate | Total service | | | Name | Birthdate | Total service | | |
|---------------------------------------|-----------|---------------|------|---|--------------------------------------|-----------|---------------|------|------|
| | | Yrs. | Mos. | Days | | | Yrs. | Mos. | Days |
| ELIGIBLE ON SEPTEMBER 30, 1954 | | | | ELIGIBLE ON OCTOBER 31, 1954 —Continued | | | | | |
| District I | | | | | District IV | | | | |
| Knight, Kenneth M. | 4-20-01 | 25 | 0 | 22 | Delee, Charles W. | 5-24-06 | 25 | 0 | 15 |
| District II | | | | | Beckwith, George L. | 7- 2-96 | 25 | 0 | 20 |
| Burris, Victor S. | 10-23-93 | 25 | 0 | 5 | District V | | | | |
| District III | | | | | Burger, Roy H. | 5-31-96 | 25 | 0 | 3 |
| Havey, Joseph C. | 12-23-89 | 25 | 0 | 15 | Hyssel, Clarence A. | 2-21-02 | 25 | 0 | 29 |
| Frink, Lauriston H. | 1-23-98 | 25 | 0 | 18 | District VI | | | | |
| District IV | | | | | Percival, Robert B. | 11- 6-03 | 25 | 0 | 14 |
| Pusey, R. C. | 4-21-98 | 25 | 0 | 24 | Stearns, Philip B. | 8-17-05 | 25 | 0 | 16 |
| Grover, Newell A. | 12-12-99 | 25 | 0 | 21 | District VII | | | | |
| District VI | | | | | Aisthorpe, C. L. | 7-15-05 | 25 | 0 | 4 |
| McKenzie, Roland H. | 5-27-09 | 25 | 0 | 14 | Warnick, Benjamin A. | 6- 5-97 | 25 | 0 | 15 |
| District VII | | | | | District VIII | | | | |
| Higley, Lawrence S. | 10-25-07 | 25 | 0 | 19 | Kaufman, Howard J. | 1- 1-93 | 25 | 0 | 10 |
| Mohr, William H. | 7- 4-06 | 25 | 0 | 19 | Reith, Joe Francis. | 10-30-03 | 25 | 0 | 28 |
| Hoy, A. W. | 4-12-06 | 25 | 0 | 14 | Headquarters Shop | | | | |
| Greeley, John William | 11-28-02 | 25 | 0 | 04 | Sanford, Albert H. | 1-31-01 | 25 | 0 | 19 |
| District VIII | | | | | Bridge Department | | | | |
| Lambert, Theria D. | 6-24-91 | 25 | 0 | 26 | McIntyre, William A. | 10-10-03 | 25 | 0 | 24 |
| Comerford, William L. | 3-27-00 | 25 | 0 | 16 | Babb, George A. | 1-14-08 | 25 | 0 | 22 |
| District X | | | | | Central Office | | | | |
| Stevens, Arthur L. | 11-22-92 | 25 | 0 | 7 | McCorkle, Nathan C. | 4-12-02 | 25 | 0 | 7 |
| District XI | | | | | Welch, William L. | 4- 5-02 | 25 | 0 | 2 |
| Ruplinger, Paul E. | 6-16-06 | 25 | 0 | 1 | ELIGIBLE ON NOVEMBER 30, 1954 | | | | |
| Headquarters Shop | | | | | Katerndahl, Ella M. | 2-21-92 | 25 | 0 | 27 |
| Kingman, Harold V. | 3- 4-00 | 25 | 0 | 21 | Beatty, M. E. | 12-15-97 | 25 | 0 | 12 |
| Central Office | | | | | Hinsdale, Charles C. | 8-18-92 | 25 | 0 | 12 |
| Stanley, Jerome N. | 10-22-00 | 25 | 0 | 8 | Kane, William. | 2- 7-91 | 25 | 0 | 24 |
| ELIGIBLE ON OCTOBER 31, 1954 | | | | | Bowers, H. Dana. | 7-27-03 | 25 | 0 | 7 |
| District I | | | | | Bagley, Fritz A. | 4- 5-10 | 25 | 0 | 24 |
| Boulware, Verne A. | 4-25-03 | 25 | 0 | 9 | Hicks, Neal D. | 1-24-10 | 25 | 0 | 2 |
| Martin, Melford S. | 1-24-11 | 25 | 0 | 22 | Lyon, Charles H. | 8-13-92 | 25 | 0 | 7 |
| Totten, Raymond G. | 2-13-02 | 25 | 0 | 26 | Cross, J. Clive. | 1-14-13 | 25 | 0 | 26 |
| Togni, Chester W. | 12-21-04 | 25 | 0 | 16 | | | | | |

Governor Wants Full Completion North Bay Span

Evidencing his great interest in highway and bridge construction projects, Governor Goodwin J. Knight personally inspected jobs in the San Francisco Bay area, including San Francisco freeways, widening of the southern approach to the Golden Gate Bridge toll plaza, the six-lane divided Waldo approach job, the new six-lane divided bridge over Richardson Bay, and the site of the Alto grade separation structure to be started next spring. An inspection was also made of the Richmond-San Rafael Bridge, scheduled to be open for traffic in October, 1956.

The Governor made the following statement of policy with reference to completion of the lower deck of the Richmond-San Rafael Bridge:

"It is of great importance to the Richmond-San Rafael Bridge project that the second or lower deck should be built as part of the present construction job, rather than wait for several more years to do it as originally planned.

"The second, or lower deck, will provide for a divided six-lane highway—three lanes on one deck going east, and three lanes on the other deck going west. This will permit the accommodation of much more traffic and also increase safety factors.

"Already several million dollars have been saved on the current construction program and will be used to help finance the second, or lower deck of the bridge. My administration is adopting the definite policy of proceeding with this lower deck now and the steps necessary to insure construction will be taken immediately.

"Additional legislation is not necessary. Certain moves will have to be taken by the California Toll Bridge Authority when it convenes.

"I am directing my Director of Public Works, and Secretary of the California Toll Bridge Authority, Mr. Frank B. Durkee, to take all necessary steps. These include:

ELVAS BRIDGES

Continued from page 19...

Route 3 traffic over Swanston Road.

Swanston Road On-Ramp

Undercrossing: A three-span slab structure carrying Swanston Road traffic onto Elvas Freeway.

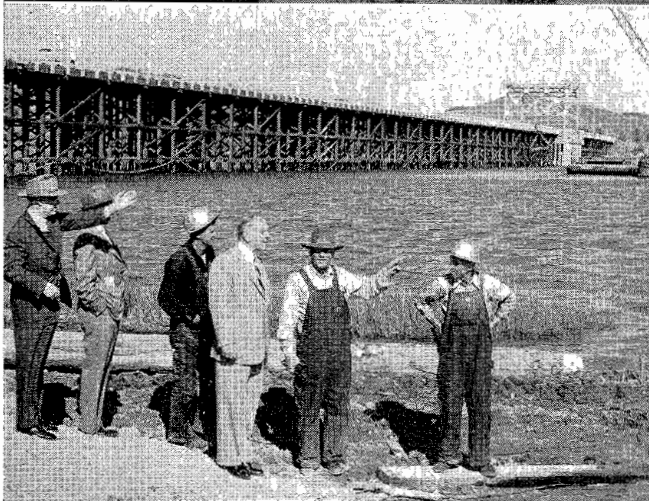
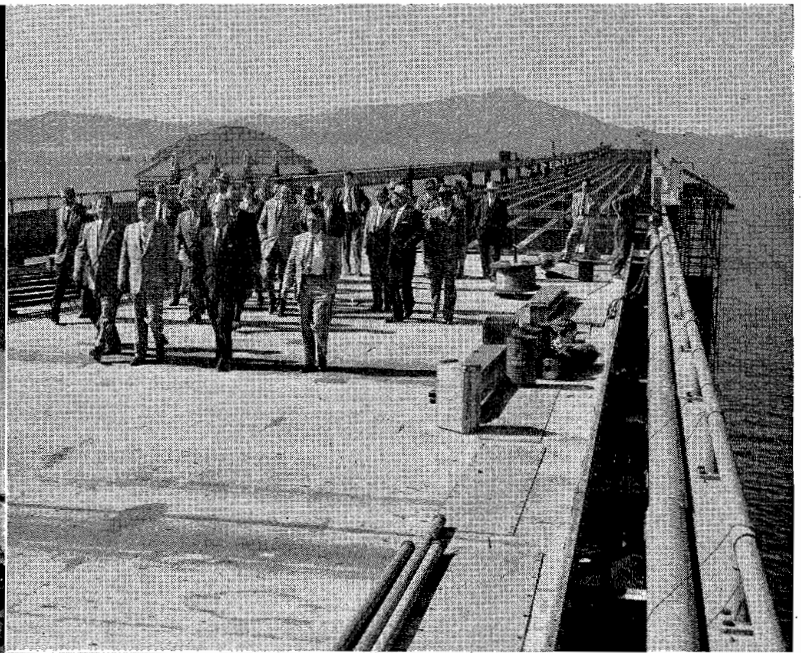
Structures North of River

The structures to the north of the American River, that is, State Fair Overhead, Route 98/3 Separation, Swanston Road Undercrossing and Swanston Road On-Ramp Undercrossing and the grading from the river crossing to Swanston Road were awarded to Ukropina, Polich & Kral

November 13, 1952, on their bid of \$728,139.

The final contract for constructing A Street Overcrossing, B Street Underpass Flood Gate, grading from C Street to south end of river crossing and placing concrete paving over the entire length was awarded April 9, 1954, to B. J. Ukropina, T. P. Polich, Steve Kral & John R. Ukropina on their bid of \$815,459.

The Elvas and B Street Underpasses were awarded to John C. Gist of Sacramento May 12, 1952, on their bid of \$914,182. In addition, the Southern Pacific Company expended approximately \$343,000 handling rail traffic and revising signals and wire installation.



UPPER LEFT: Director of Public Works Frank B. Durkee points out to Governor Knight features of new Waldo Tunnel Approach to Golden Gate Bridge, a cooperative project of the State, and the Golden Gate Bridge and Highway District, involving construction of a six-lane, divided freeway. UPPER RIGHT: First official inspection of the Richmond-San Rafael Bridge shows Governor Knight leading group of public officials, engineers and contractors at the end of completed 1,700 feet of upper deck on Richmond side. It was here that Governor made announcement of administration policy that lower deck would be completed now under present construction program, rather than several years later. LOWER LEFT: Governor Knight inspects site of new six-lane, divided bridge over Richardson Bay in Marin County, to replace obsolete four-lane structure shown in background. LOWER RIGHT: With Contractor Charles L. Harney, Governor inspects section of Bayshore Freeway at 13th and Mission Streets, San Francisco.

1. Determine the amount of additional funds required to finance completion of the construction of the lower deck.
2. Discuss with bond advisors the procedures required to secure additional financing.
3. Prepare necessary resolutions for

adoption by the Toll Bridge Authority to carry this policy into effect.

"I am confident that this bridge will carry an immense flow of traffic and that the construction of the second deck now will more than justify itself. It is good business to do this job now."

FISHERMEN SET RECORD

California sport fishermen caught an estimated 44,000,000 fish in inland waters during 1953 to break all previous records, according to the National Automobile Club. Trout made up approximately 50 percent of the catch.

New Span

Dedication of Ten Mile River Bridge and Approaches Held

AN OCTOBER coastal shower, while wetting the participants and spectators alike, failed to dampen the enthusiastic spirits of some 200 Mendocino Coast highway boosters as they witnessed the formal dedication of the new Ten Mile River Bridge and highway approaches north of Fort Bragg.

A green ribbon, festooned with forest foliage and suspended between two Mendocino County conifers which were lashed to the bridge railing, was symbolically cut by Frank B. Durkee, Director of Public Works. His action culminated a colorful, if somewhat damp, ceremony officially dedicating this spectacular bridge to the public use and opening the roadway to vehicular passage.

Official Caravan

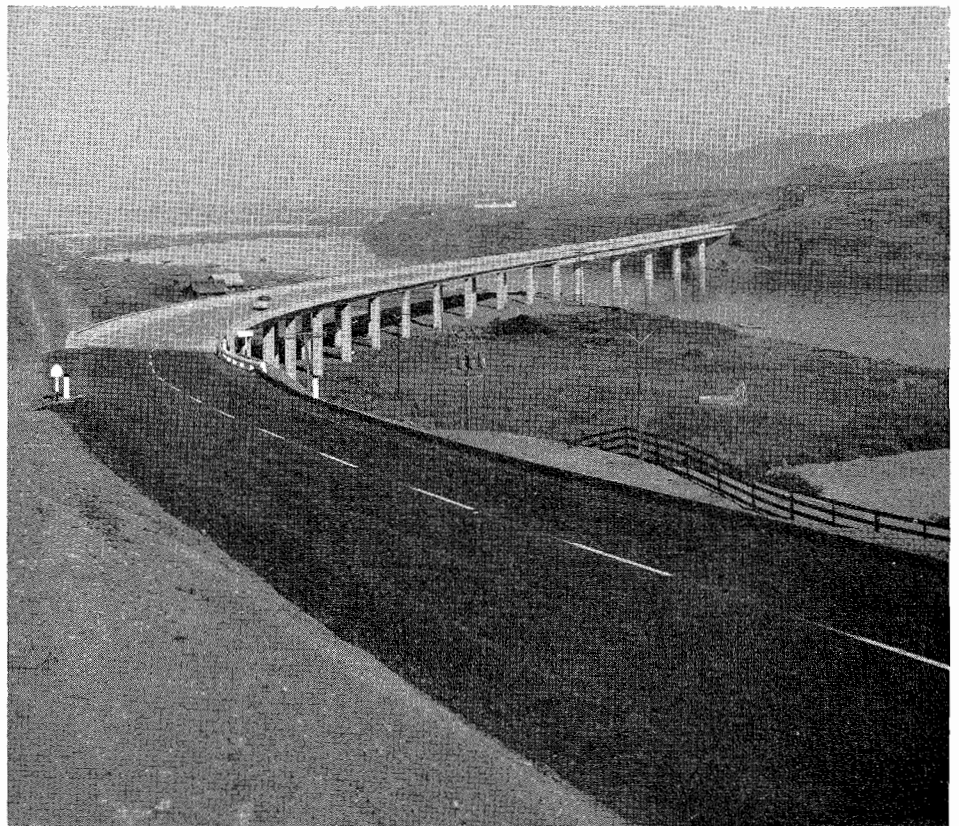
Paced by the official caravan car which included, in addition to Director Durkee, Fred W. Panhorst, Assistant State Highway Engineer, under whose direction this graceful bridge was designed and built, the first traffic moved slowly over the structure and its roadway approaches.

Ten Mile River merges with the Pacific Ocean at a point approximately 7½ miles north of Fort Bragg. The Mendocino Coast is spectacular throughout its entire length, and at this particular point the new highway bridge adds its own beauty to the area. The new structure is 1,351 feet long and provides a 26-foot-wide roadbed. Of reinforced concrete throughout, the design is most pleasing and harmonious with the area.

On New Alignment

The over-all length of the project is 1.4 miles with most of the road approach work on new alignment southerly from the bridge. The 26-foot-wide roadway is surfaced with cement treated base material and road mixed surfacing.

Bishop, Younger and Bradley, of San Francisco, was the contractor on the project with Al Erickson in charge



New Ten Mile River Bridge in Mendocino County

of the structure work. The project was under the direct supervision of the Bridge Department with George Hood and Loren Kreuger in charge as resident engineers. Robert Brown represented the district on the road portions.

Exclusive of rights of way and engineering, the contract value of the work was in the vicinity of \$700,000.

The original bridge over Ten Mile River was a high, timber, deck truss bridge built by Mendocino County in 1915 and had a traveled way width between rails of 15 feet. It became the responsibility of the Division of Highways in 1933 when this portion of the Shoreline Highway was taken into the state system.

Old Bridge Posted

Constant repairs by state forces had contrived to keep this structure in a

condition capable of carrying legal loads. By 1952, however, this repair work was no longer enough to keep up with the increased demands of traffic, especially heavy log hauling.

The bridge was posted, therefore, for weight limits on July 3, 1952, and plans were expedited for the immediate construction of a temporary detour bridge downstream from the old bridge. The need of this temporary structure and its approaches was particularly urgent because the imposed load limits on the old bridge hampered the lumbering industry to a certain extent because of the necessity of longer haul distances and hauling uneconomical-size loads.

Temporary Structure

The temporary bridge and approaches thereto were constructed be-



Officials at dedication, left to right: Charles Kasch, Commissioner, Division of Beaches and Parks, Ukiah; Harold Bainbridge, Supervisor, Fort Bragg; Fred W. Panhorst, Assistant State Highway Engineer, Sacramento; Frank B. Durkee, Director, Department of Public Works, Sacramento; Al Erickson, contractor's representative; Frank Hyman, program chairman, Chamber of Commerce, Fort Bragg; Joseph Hartley, Supervisor, Hopland; V. M. Moir, State Chamber of Commerce, Santa Rosa; L. R. Howsley, President, Chamber of Commerce, Fort Bragg; Alan S. Hart, District Highway Engineer, Eureka; Arthur W. Way, State Senator, Eureka; James Busch, State Senator-elect, Ukiah; Bert Busch, State Senator, Lakeport.

tween August 4 and September 12, 1952. This bridge was approximately 500 feet long with an 18-foot-wide roadway.

As soon as the temporary bridge was completed and placed in service, plans previously started for the new permanent bridge were rushed to completion.

Work started on the permanent structure on May 12, 1953, culminating in the dedication one year and five months later.

The dedicatory ceremonies were concluded on October 16, 1954, with a dinner in Fort Bragg given by the Fort Bragg Chamber of Commerce under whose guidance the entire dedication program was handled. L. R. Howsley, President of the Fort Bragg Chamber of Commerce, presided at the dinner, with Angelo Penitenti as master of ceremonies. Director Durkee was the principal speaker at the dinner.

Frank Hyman, of the Fort Bragg Chamber of Commerce, was the program chairman for the event and handled all of the details which were involved in bringing about a successful dedication to public use of a major unit of the Shoreline Highway.

TRAFFIC FATALITY RATE

The traffic fatality rate for the United States during 1953 was 7.1 per 100,000,000 vehicle miles, the lowest traffic fatality rate since records have been kept, according to the National Automobile Club.

MOTOR VEHICLES STOLEN

A total of 1,444 vehicles were reported stolen in California during the month of September, according to the National Automobile Club. These vehicles were valued at more than \$720,000.

REQUEST GRANTED

SAN FRANCISCO

K. C. ADAMS, *Editor*

DEAR MR. ADAMS: For many years I have been privileged to be on the mailing list for your magazine and have always enjoyed it to the utmost, keeping up to date on the progress of the state highways, and now that I am retired from Standard of California, I hope that I may be privileged to continue on the mailing list.

My associations with the Right of Way Department of Standard brought me into many pleasant contacts with Frank Balfour and his crew, and there is nothing that I should like better in my present unattached capacity than to keep in touch with the affairs of your department, as exemplified by your magazine, *California Highways and Public Works*.

Sincerely yours,

S. W. SELFRIDGE

GUARD RAILING REDUCES SEVERITY OF ACCIDENTS

By M. H. WEST, District Traffic Engineer, District XI

US 101 in Leucadia in San Diego County was the scene of numerous accidents involving single vehicles striking trees adjacent to the roadway. Installation of metal plate guard railing along trees in the median and along trees on the easterly side of the northbound lanes has resulted in a marked reduction in the frequency and severity of single vehicle accidents.

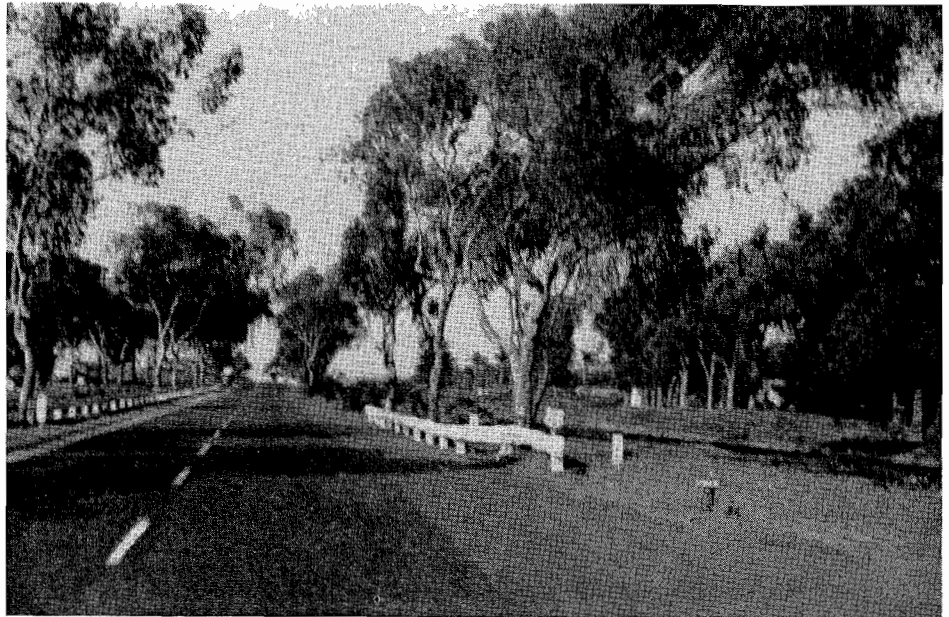
This portion of US 101 is 2.17 miles in length. It consists of 0.65 mile of four-lane undivided highway with cypress trees flanking the easterly shoulder, and 1.52 miles of four-lane divided highway with cypress and eucalyptus trees in the 20-foot median, along the easterly shoulder, and behind the westerly curb line.

Northbound Vehicles Strike Trees

Accident studies over a period of several years revealed that 83 percent of the total number of accidents, in which vehicles collided with trees, occurred in the northbound lanes. This indicated preferential protection treatment for northbound traffic. A contract was completed in September, 1953, for the installation of 10,136 linear feet of metal guard railing along the right shoulder of the northbound lanes at tree locations and along both sides of the median. No guard railing was installed on the westerly side of the roadway. The project included the removal of 215 trees 4 inches to 49 inches in diameter, many of which were in poor condition and misshapen. This thinning operation greatly improved the appearance of the area and likewise resulted in a reduction in guard rail cost. The contract price for this work was \$77,461 of which \$38,011 was for metal plate guard railing. The work also included construction of concrete curbs and paving of median lanes at the several crossovers.

Guard Railing Reduces Accidents

Before-and-after accident studies indicate that significant results have



These photos show how guard rails prevented auto collisions with trees

been achieved as a result of the guard railing installation. Comparison of accident records for a one-year period after construction with a one-year period before construction indicates that the number of single vehicles striking objects during the after period was reduced 35 percent (from 26 to 17), the number of fatalities was

reduced 67 percent (from 6 to 2); and the number of persons injured was reduced 22 percent (from 27 to 21). These reductions were made in the face of a slight increase in average annual daily traffic. One fatality, during the after period, was the re-

... Continued on page 63

Traffic Signals

What the Average Driver Should Know About Safety Devices

By R. W. MATTHEWS, Assistant Traffic Engineer

THE TRAFFIC SIGNAL is a valuable device for the control of vehicles and pedestrians because it assigns right-of-way to the various movements at intersections. The traffic signal is not necessarily a safety device and it is certainly not a cure-all. In some instances the accident frequency may be increased after the installation of signals at an intersection. This is especially true of the rear-end type of accidents. However, if the traffic signal is justified by traffic and roadway conditions and is well designed, effectively placed, properly operated, and well maintained, it will facilitate the flow of traffic in a safe and orderly manner.

Two Types of Signals

Traffic signals are of two general types: (1) the fixed time signal and (2) the traffic actuated signal.

The fixed time signal is operated by a synchronous electric motor similar to your electric clock. This controller provides a fixed green time on the highway and a fixed green time on the cross street. For instance, we could have 40 seconds of green on the highway and 20 seconds of green on the cross street. This cycle would be repeated and repeated without regard to changing traffic conditions.

The traffic actuated signal is quite different in that the length of green light on the highway and on the side street depends on the number of cars approaching the intersection on each of the two streets. Vehicle detectors are placed in the pavement on all approaches to the intersection, and when a car goes over a detector an impulse is sent to the controller. The controller is actually an electronic computer which provides the length of green time on both streets as required by the number of cars on that particular street. In general, the more cars approaching the intersection on

either street the longer will be the green light for that street.

Two-way Signals

Most signals are of the two-way or two-phase type. This type of signal provides a green light for first the main street and then the cross street and then repeats. In some cases we have a very heavy left turn movement. Frequently it is necessary to provide a separate way or phase for this movement.

Figure 1 illustrates a three-way traffic actuated signal. In the "A" phase, the through highway traffic has a green light and the left turn traffic and cross traffic have red lights.

In the "B" phase, the left turn traffic has the green light.

In the "C" phase, the cross street traffic has the green light.

This signal system can also be arranged to permit through traffic in one direction to move with left turn traffic in the same direction.

The traffic actuated signal is used mostly in isolated locations.

Progressive Signal System

Fixed time signals, because they are operated by synchronous motors, can be coordinated to provide a progressive movement through a series of signals on a major street.

Figure 2 illustrates a time space diagram of a progressive signal system.

The main street is designated by the horizontal line at the top of the diagram. The various cross streets are designated by the vertical lines above the horizontal line.

A traffic signal has been installed at 54th, 56th and 57th Streets but not at 55th Street.

The vertical distance down the sheet represents time in seconds. The light vertical bars at the signalized intersections represent green time and the dark vertical bars represent red time.

Thus, you can see that at the 54th Street intersection there are 40 seconds of green time and 20 seconds of red time. Now suppose you are traveling on the Main Street approaching the 54th Street intersection and the signal is red. You stop and after waiting a bit you get the green light. As soon as the light turns green, you start up and travel at the speed of 25 miles per hour. You will find that by the time you arrive at 56th Street the signal will be green and by the time you arrive at 57th Street the signal will be green.

However, if when you started up at the beginning of the green light at 54th Street and had traveled 40 miles per hour or faster you would find that the signal at 56th Street would be red when you arrived there and you would have to stop.

Perfect Progression Not Possible

Also, if when you started up at the beginning of the green light at 54th Street you had traveled only 15 miles per hour you would find that when you arrived at 56th Street the signal would be red and you would have to stop. In other words, this particular progressive system has a rated speed of 25 miles per hour.

It is hardly ever possible to provide a perfect progression in both directions through a signal system. For instance, for a perfect progression a 30 miles per hour speed would require the signalized intersections to be 1,100 feet apart under average conditions. Any variation from this will reduce the progressive band width.

In our case, the intersections of 54th, 56th, and 57th had signals but 55th Street did not. You will note that it took us about 40 seconds to travel the two blocks from 54th Street to 56th Street, and if we travel in the other direction in this system it will take us only half that time or 20 sec-

onds to travel the distance of one block from 57th Street to 56th Street. It is these differences in travel time caused by unequal signal spacing that often make it difficult to provide an efficient progressive system.

An Example

As an example, in our system here if you were traveling again on Main Street but arrived at 54th Street about 30 seconds after the light had turned green, you would find that even though you traveled at the rate of 25 miles per hour when you arrived at 56th Street you would have a red light and would have to stop. Of course, you could have speeded up a little and gotten yourself back into the progressive band.

In many urban areas the heavy traffic volumes are directional at various times of the day. For instance, in the morning, most of the traffic may be coming into the downtown area and in the evening most of the traffic may be going out of the downtown area. Provisions can be made in signal systems to facilitate the heavy inbound traffic flow in the morning, giving them a good progressive movement at the expense of the light out-bound traffic. This system can be reversed for the evening heavy out-bound traffic flow. During the day an average arrangement such as shown in the diagram could be used.

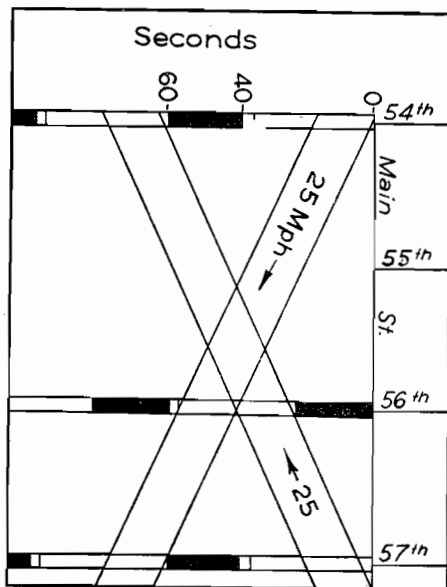


CHART 2

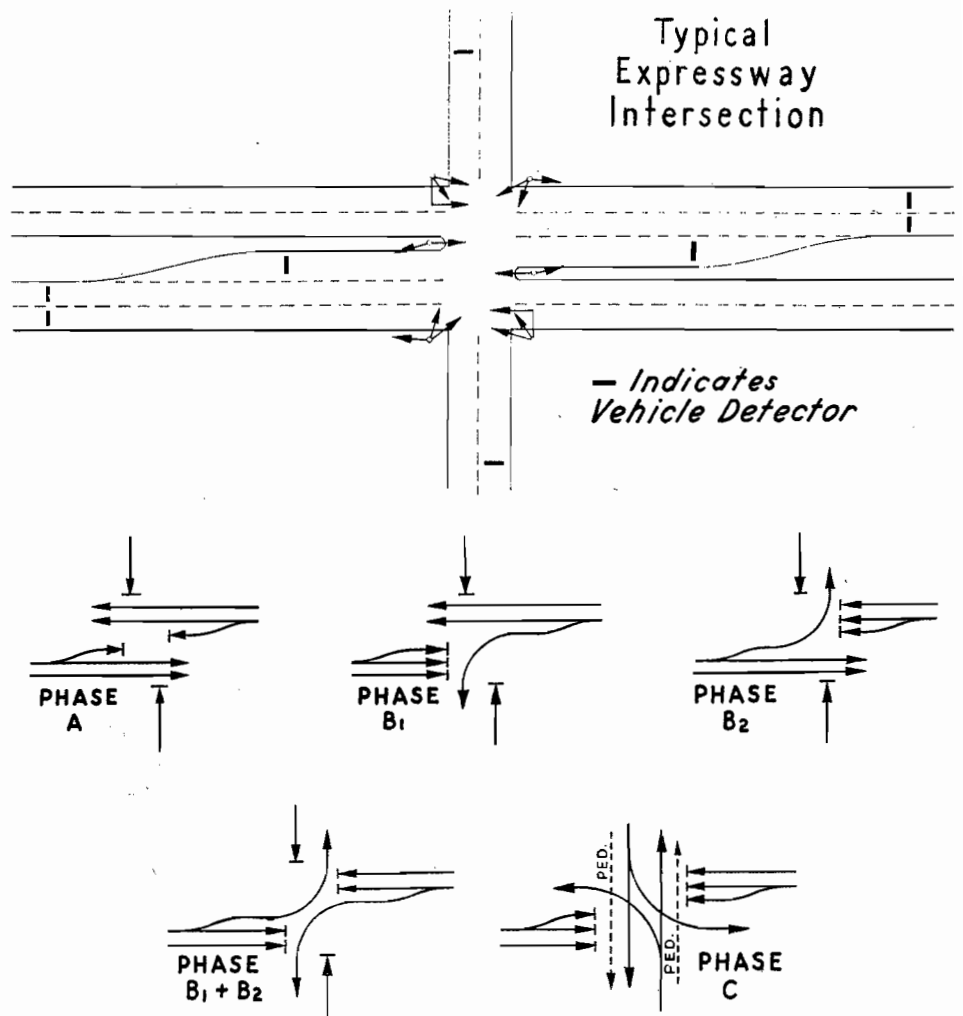


CHART 1

Combination of Features

In some of our newer progressive signal systems, a combination of fixed time and traffic actuated features is involved. In this case a vehicle detector is placed on each cross street approach. The progressive band is set up in the normal way but as long as no car has actuated the detector on the side street, the signal will remain green. Now if we are again traveling on Main Street and arrive at 54th Street intersection about 30 seconds after the beginning of the green and we travel at the speed of 25 miles per hour, we will find that when we arrive at 56th Street we will get a green light instead of the red light if there are no waiting cars on 56th Street. We can then continue on through the remainder of the progressive system.

You can see from the diagram that if we placed a signal at every inter-

section there would be very little progressive movement of traffic and this would result in intolerable delay. Signals are placed on the State Highway System only after an engineering study which takes into account the vehicle volume, turning movements, pedestrian volume, speeds of vehicles, details of physical layout, accident record and relationship with adjacent signals. If such a study shows that the proposed signals will provide safe and orderly movement of traffic, the installation is considered justified. If the study shows that the installation will create delay and probable accidents, the installation is not considered justified.

MOTOR VEHICLE DRIVERS

There are an estimated 70,000,000 motor vehicle drivers in the United States, according to the National Automobile Club.

Road Bond Issue

Contra Costa County Makes
Big Strides With FAS Program

By W. C. DALTON, Construction Engineer, Contra Costa County

PROGRESS on Contra Costa County's road bond issue program has moved ahead another important step with the completion of the second project financed with bond and FAS funds. A 2.6-mile section of the Pleasant Hill Road connecting with State Highway Route 106, the Arnold Highway, was recently finished by the Alves Construction Company of Pittsburg. This project involved modernization of 1.4 miles of existing roadway and 1.2 miles of construction on a new location which connects with the Arnold Highway at the intersection of Alhambra Avenue, the main route to Martinez. The county, under an earlier contract with Alves, had extended Alhambra Avenue from the city limits to the Arnold Highway.

The new intersection area had been established by joint studies of the Division of Highways, Contra Costa County, and the City of Martinez. Location surveys of the county route were made in the 1930's by George Berry (now Assistant County Road Commissioner) to coincide with the construction of the Arnold Highway. In spite of the route planning previously accomplished and the general state-county-city agreement regarding an intersection which would conform with the future development of the state freeway, public interest in the project demanded full exploration of all alternates. The original location provided a better intersection and a lower cost than any other proposal, as well as best serving the present and future road needs of local and regional traffic.

State-County Cooperation

Continuous state-county cooperation in road matters, and on this road in particular, resulted in the installation of traffic signals and channelization of the new intersection by state contract. Additional lanes and width, as well as islands and traffic-actuated

McCOY COMMENDS COUNTY

Commenting on the accompanying article State Highway Engineer Geo. T. McCoy said:

"A significant feature of the Pleasant Hill Road project described in Mr. Dalton's article is the limitation of access on a portion of the relocated section. On the Kirker Pass improvement, next in line for construction, Contra Costa County has not only acquired sufficient rights of way for ultimate additional lanes but has also provided for limitation of access on almost the entire 4.4-mile project.

"The county is to be commended on its foresight in applying the freeway principle to important county roads. Access control has proved of tremendous value in preserving for future generations the safe, free-flowing characteristics built into modern state highways, and it is bound to be equally valuable in the case of county roads where applicable."

signals, have been completed to coincide with the opening of the new county route. Contractor for the \$45,000 state project was Gallagher and Burk of Oakland, and D. R. Burns was the Division of Highways' Resident Engineer.

The county project, which was started November 24, 1953, provides two 12-foot traffic lanes flanked by 8-foot shoulders, but also provides two additional passing lanes 800 feet long at the summit. Four channelized intersections, two box culverts, 3,200 lineal feet of concrete-lined channel, and extensive underdrains were features of this project. The structural section included two and one-half inches of plant mixed surfacing on traffic lanes

and one and one-half inches on shoulder areas over six inches of crusher run base. Imported and selected materials up to 20 inches in depth were used under the crusher run base to attain adequate structural values. Construction costs for this project will total \$440,000.

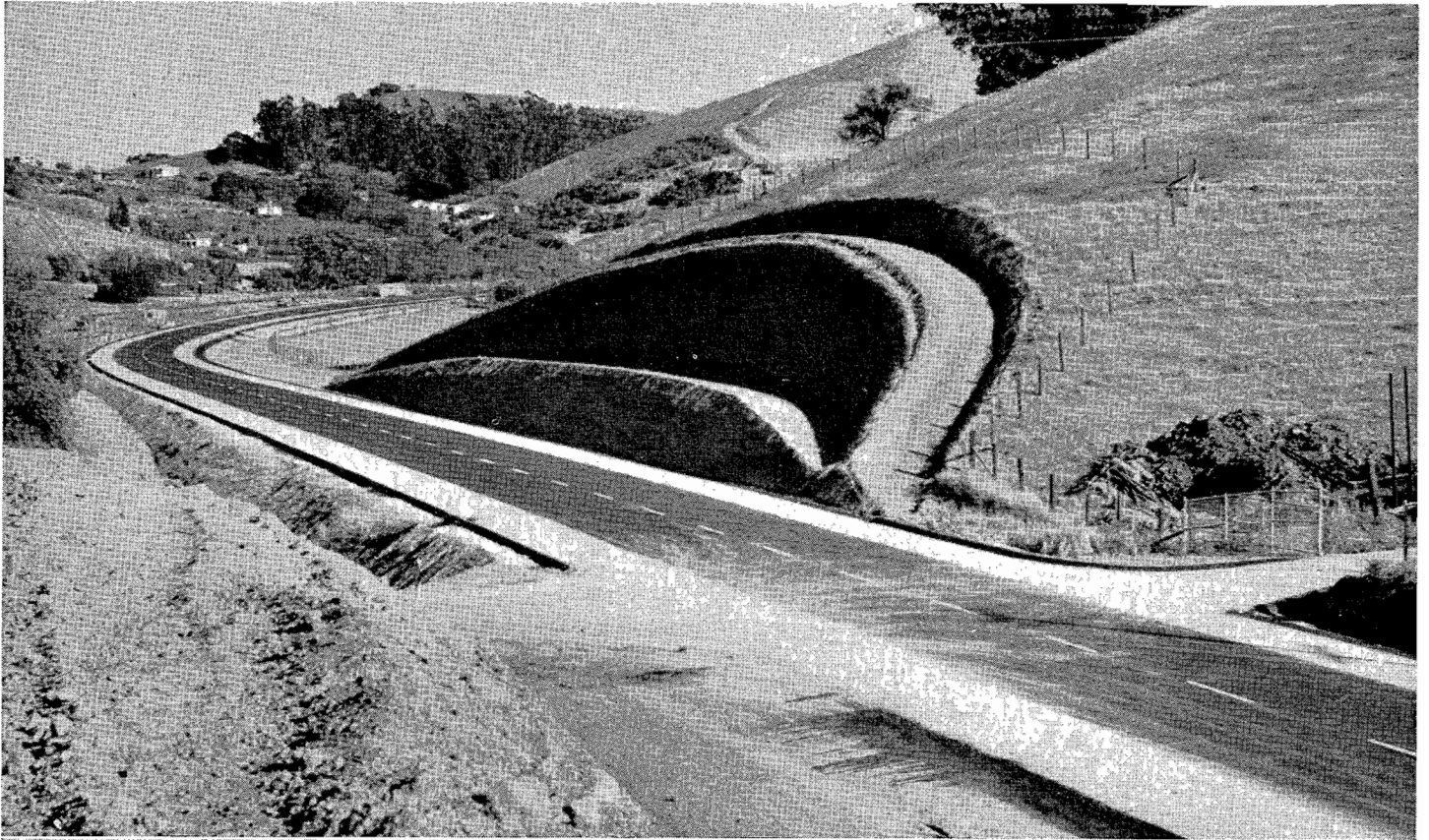
First of Series

This project is the first in a series planned for the entire Pleasant Hill Road, which connects the Martinez area at State Sign Route 4 with the Lafayette area at State Sign Route 24. The total length is eight miles and the bond estimate has provided \$1,300,000 for improvement to modern two- and four-lane standards.

About a year has passed since the completion of the first road bond issue contract, which was also an FAS project. The third and largest such project, the Ignacio Valley road extension to Kirker Pass Road, has now been advertised by the Division of Highways. Its 4.4 miles will provide a new and shorter link between the central and eastern sections of the county. On these projects, Contra Costa County usually does the preliminary engineering, prepares plans, and submits the project at this stage to the Division of Highways for review, preparation of specifications, and advertising. In this particular project, however, a consulting engineer assisted in the preparation of plans and field survey work. Construction engineering will be handled by county engineers.

Program Gathers Momentum

The county highway bond issue program is gathering momentum with the expected construction completion total reaching \$2,000,000 by the end of 1954. Another \$1,300,000 will be under contract by the end of this year, and it is anticipated that bond issue contracts totaling over \$2,300,000 will be advertised in 1955.



UPPER: Completed 40-foot-wide Pleasant Hill Road. Constructed by Contra Costa County as FAS and bond issue project. LOWER: Pleasant Hill Road in Contra Costa County following completion. Note four-lane passing section over summit.

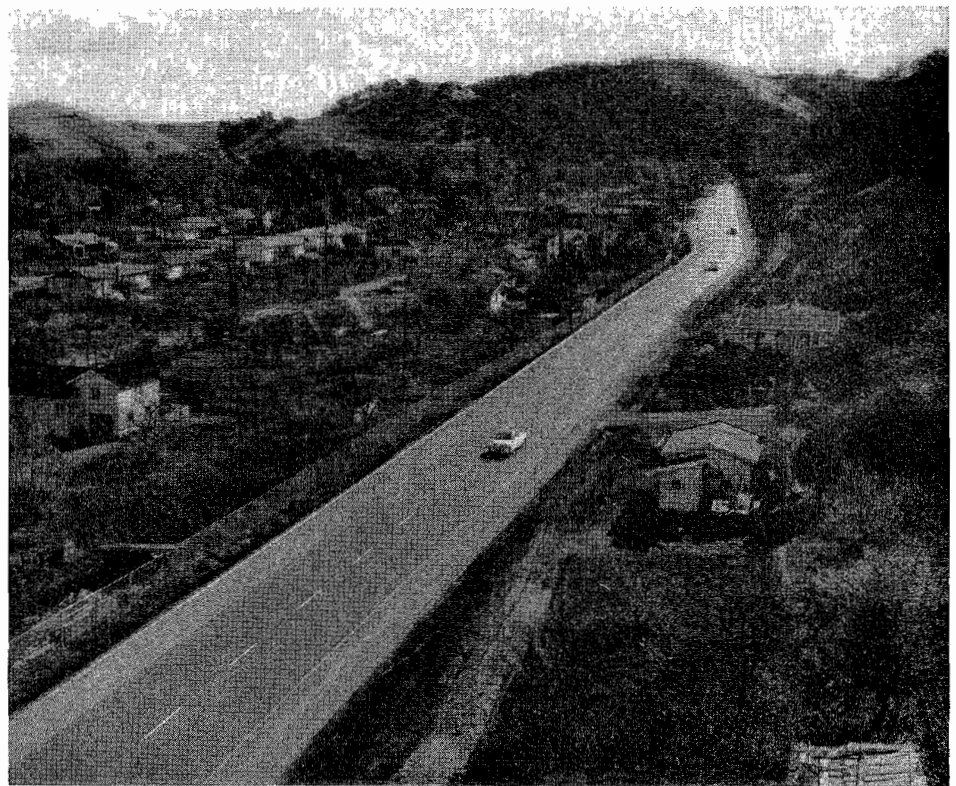
Among next year's projects will be additional four-lane construction on the San Pablo Dam Road near Richmond, a new Crockett road connecting US 40 near the Carquinez Bridge with the Arnold Highway, four-lane construction on the Lafayette end of the Pleasant Hill Road, and modernization of Buchanan and Somersville Roads in the Pittsburg area, Moraga Road in Lafayette, and Waterfront Road near Martinez. Several of the proposed projects will be of more than local interest because they will provide cross-county traffic with new or improved alternate routes not closely paralleled by state highways. Virtually every larger bond project intersects a state highway and in many cases, will involve reconstruction of state facilities such as was necessary on the Pleasant Hill project. Some of this work will be on new state free-ways such as the multimillion-dollar section through Richmond, San Pablo, and El Sobrante, and some will involve revision of existing intersections. The close cooperation, which resulted in the integrated construction of this latest project, will be continued.

Early Bond Issue Project

Many people familiar with highway problems have exhibited considerable interest in Contra Costa County's approach to its traffic problems, and it might be appropriate to mention here that this is not the first road improvement program in this county financed by a bond issue.

Shortly after World War I, the need for road improvements in Contra Costa County was so apparent that a \$2,600,000 road bond issue was passed by a 20-to-1 margin. Work was started on the first project the month after the election in July of 1919, and the peak of construction came in 1921 when over half of the entire program was completed. A majority of these improvements later became state highways, and some of this mileage has since reverted back to the county when freeways on new locations superseded the old roads.

Seventy-three miles of portland cement concrete and 37 miles of asphaltic macadam-surfaced roadways were completed from 1919 to 1923. An unusual feature in the design of



Two views of federal aid secondary county highway near Martinez. This section was constructed on a limited access freeway basis.

concrete pavements was introduced in the use of the eight-foot concrete traffic lanes separated by a four-foot divider strip surfaced with asphaltic

materials. The service given by the concrete slabs constructed at that time has been remarkable in that many

... Continued on page 63

A Champion

Tommy Kono Sets New Record in Weight Lifting

THE STATE Department of Public Works can now boast that it has a world champion among its employees. He is Tommy Kono, 24, draftsman in the Highway Planning Section of the Division of Highways at Sacramento, who recently returned from the World Weightlifting Championships in Vienna, Austria, where he won first place in the light heavyweight division.

Tommy defeated the former title holder, Lomakin, a member of the Russian team, and established a new world's record for the light heavy class.

During the same series of lifts, he also broke the world's light heavyweight record for the clean and jerk, lifting 381 pounds to better a record of 379 pounds established by himself a few days before while in training in Copenhagen.

New World's Record

Later, while on an exhibition tour in Lille, France, he also established a new world's record in the two-hand military press, lifting 288½ pounds to better the old record by more than seven pounds.

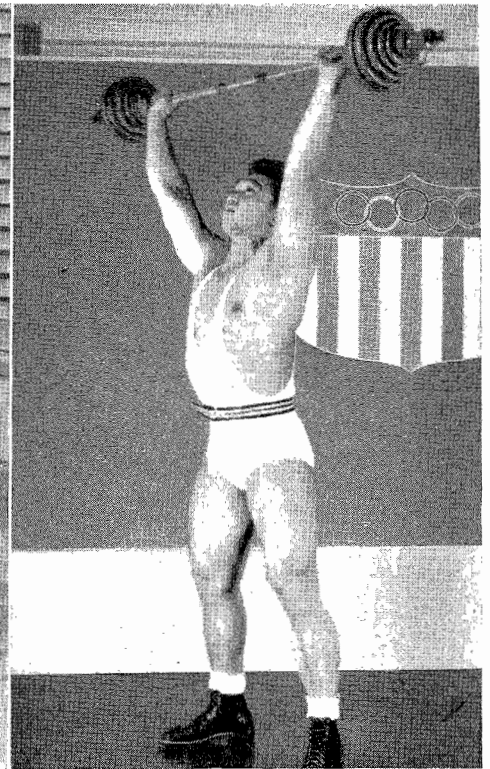
While in Europe, the American team, of which Kono is a member, visited Denmark, Sweden, France, Austria and England, giving exhibitions in many cities and at U. S. Army camps.

Tommy, a native of Sacramento, first achieved international prominence as a weight lifter in 1952 when he was chosen as a member of the American Olympic team sent to Finland. At Helsinki, he won first place in the 148-pound lightweight class, lifting a total of 798 pounds in three lifts.

Also taking part in the games at that time was the man who was to be Tommy's opponent in Vienna this year, the Russian Lomakin. Lifting in the light heavy class, Lomakin hefted a total of 925 pounds to win first place



Tommy Kono is shown at his desk in the drafting room of the Division of Highways at Sacramento and exhibiting the skill which won him his weight-lifting championship



in this division and establish a new world's record.

Defeats Russian

It was also at the 1952 Olympic games that Tommy began to show his versatility as a shift-around man. Although a natural middleweight at the time, he reduced from 171 to 148 pounds to enter a lighter class and better the American team's chances.

This year, in Vienna, he performed the same feat "in reverse," increasing his weight so that he could participate as a light heavy against the Russian champion, Lomakin.

It was a gamble on the American team's part. During the 1952 Olympics Lomakin, as a light heavy, had lifted 127 pounds more than Tommy, then a lightweight, and although Tommy had increased his lifting capacity greatly in the intervening two years, it was only natural to suppose

that the Russian would be able to better his 1952 total as well. The question was, how much.

There was a certain amount of tension in the air as the Russian performed his three lifts and it was determined that he had lifted a total of 942 pounds, 17 pounds better than his 1952 record.

Sets Another Record

And then it was up to Tommy. In three lifts he made a total of 959 pounds, bettering Lomakin by 17 pounds and surpassing his own total as a lightweight at the 1952 Olympics by 161 pounds. He had established a new world's record for the light heavyweight class. The feat also won for him the best lifter award for 1954.

Queried about the Russian team, Tommy said that they were quite friendly this year, in marked contrast

... Continued on page 63

Stepping Stones

Santa Cruz County Completes
Seventh FAS Road Project

By WALTER I. NILSSON, Resident Engineer

ON AUGUST 23, 1954, the Director of Public Works of Santa Cruz County accepted the work done on Mt. Hermon Road between Camp Evers and Mt. Hermon, which officially completed the seventh step in the county's advance toward the total improvement of its Federal Aid Secondary Highway System.

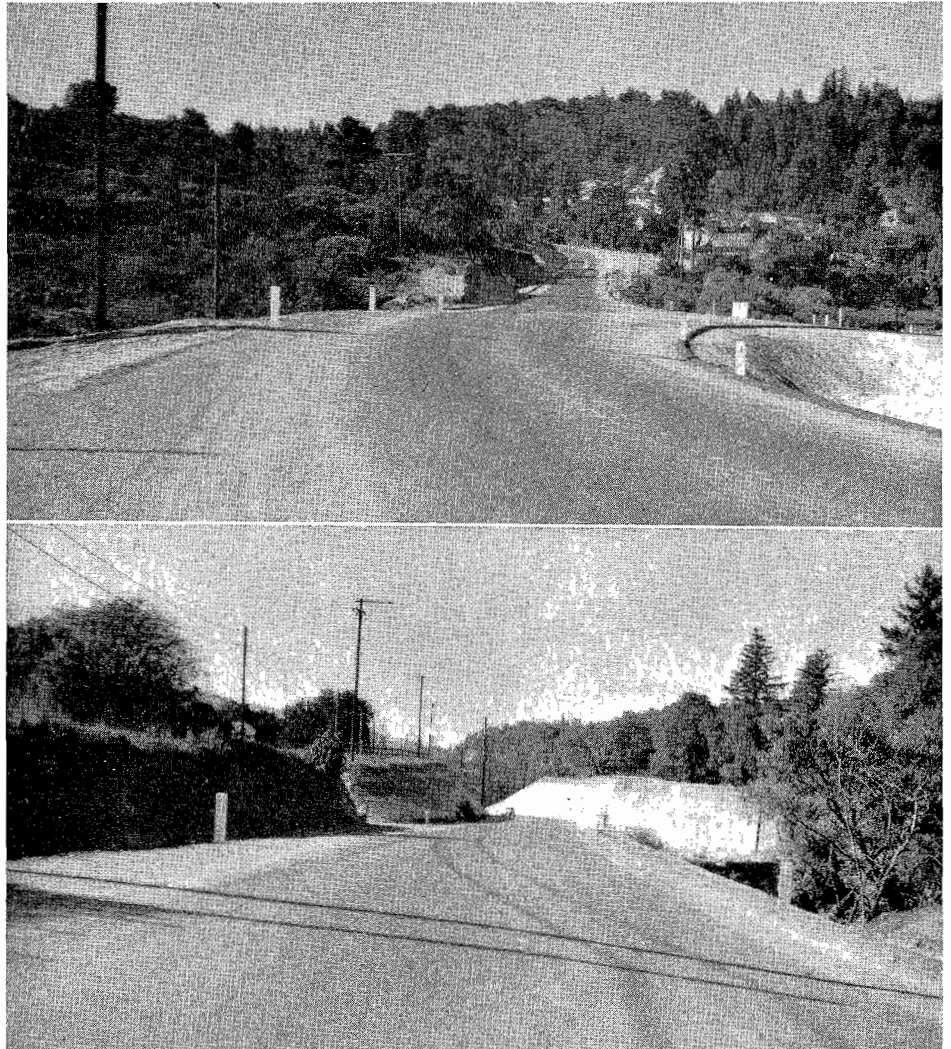
For the past eight years the county has been cooperating with the State Division of Highways and the U. S. Bureau of Public Works in an effort to keep the county's FAS system abreast of the Nation's expanded highway program. Preliminary and construction engineering connection with the federal aid secondary program is done by county forces in conformity with the State's Standard Specifications and the design and actual construction are accomplished in close cooperation with representatives from the state and federal agencies.

Seven Projects Completed

The seven projects in the county's FAS Road Program, completed in the past years, are as follows:

1. San Andreas Road—2.3 miles.
2. Corralitos Creek Bridge.
3. Soquel Creek Bridge south of the Town of Soquel.
4. Summit Road—1.2 miles.
5. Watsonville to Freedom Road—1.1 miles.
6. San Lorenzo River Bridge on Bear Creek Road.
7. Mt. Hermon Road—1.3 miles.

The Mt. Hermon Road improvement consisted of widening the present traveled way from 16 feet to 22 feet, with additional shoulder width of five feet on each side, and general realignment to eliminate the many existing sharp turns and steep grades. The existing road built in 1925 had curves with radii as small as 200 feet and in many cases the sight distance was reduced to practically zero due to the winding nature of the road. The



Two views of Mt. Hermon Road in Santa Cruz County after reconstruction under the Federal Aid Secondary Highway Program. UPPER: Completed Mt. Hermon Road, between 1.8 miles easterly of State Route 166 and 0.4 mile westerly of Sign Route 17. LOWER: Mt. Hermon Road, between 1.8 miles easterly of State Route 116 and 0.4 mile westerly of Sign Route 17.

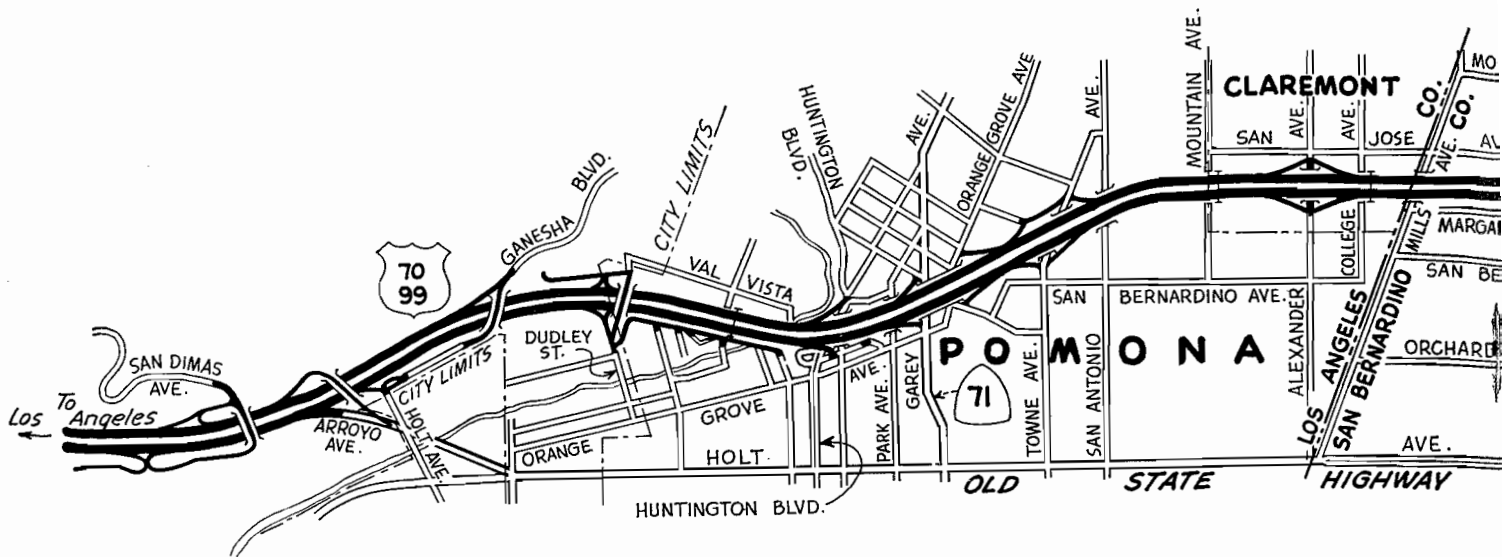
present alignment has less than half the number of curves than previously, and these are flattened out considerably to insure clear vision. The two 11-foot traffic lanes were paved with three inches of plant-mixed surfacing on six inches of untreated rock base. The five-foot shoulders consist of nine inches of untreated rock base and Class "C-Double" seal coat. Plant-

mixed dikes and embankment protectors were installed to control drainage of the roadbed.

Sand Excavation

The Granite Construction Company was the general contractor on the Mt. Hermon contract. However, the earthwork and culvert installation

... Continued on page 59



This map shows the 13.5-mile section of the Ramona-US 99 Freeway in L

NEW FREEWAY

Continued from page 12...

lane. The smallest day's run was 397 cubic yards.

Fifth Contract

The fifth construction contract to be advertised was for freeway construction between San Dimas Avenue west of Pomona to the San Bernardino-Los Angeles county line. The contract was awarded on May 21, 1953, to Guy F. Atkinson Co. The contract allotment was for \$3,588,130. The resident engineer on this project was C. J. McCullough. The construction of bridges was under the supervision of L. E. Crayne, Bridge Department representative. The bridge work in this contract included the following:

1. San Dimas Ave. Overcrossing, a reinforced concrete box girder bridge, 111 feet long. Cost \$53,600.
2. Route 77/26 Separation carried Route 77 over the freeway and was 162 feet long. Cost \$70,000.
3. Ganesha Blvd. Overcrossing was a box girder type bridge, 154 feet long. Cost \$100,000.
4. San Jose Wash Bridge was a box culvert type bridge, 510 feet long, and carried the wash under the freeway. Cost \$158,700.
5. Three pedestrian undercrossings at Cleveland St., Mountain Ave. and College Ave. crossed under the freeway. Cost \$37,700.

A requirement to be met by contractor was that public traffic should have access to Ganesha Boulevard three days prior to, during, and for three days after the Los Angeles County Fair. During 1953, traffic to the county fair was allowed to use all of the main roads into the fairgrounds and during 1954, traffic to the fair was allowed to use completed freeway facilities on the west end up to Ganesha Boulevard.

Kellogg Hills Excavation

The roadway excavation in the Kellogg Hills area was moved by DW-20s, and rock cuts were removed by 3½-cubic-yard shovel and Euclid end-dump "off-the-road" equipment. Fills were compacted by sheepfoot rollers and 50-ton pneumatic rolling equipment. All equipment was routed over fill areas and material dumped on fill, then placed by dozer, so as to get full benefit of hauling equipment in compacting the roadbed.

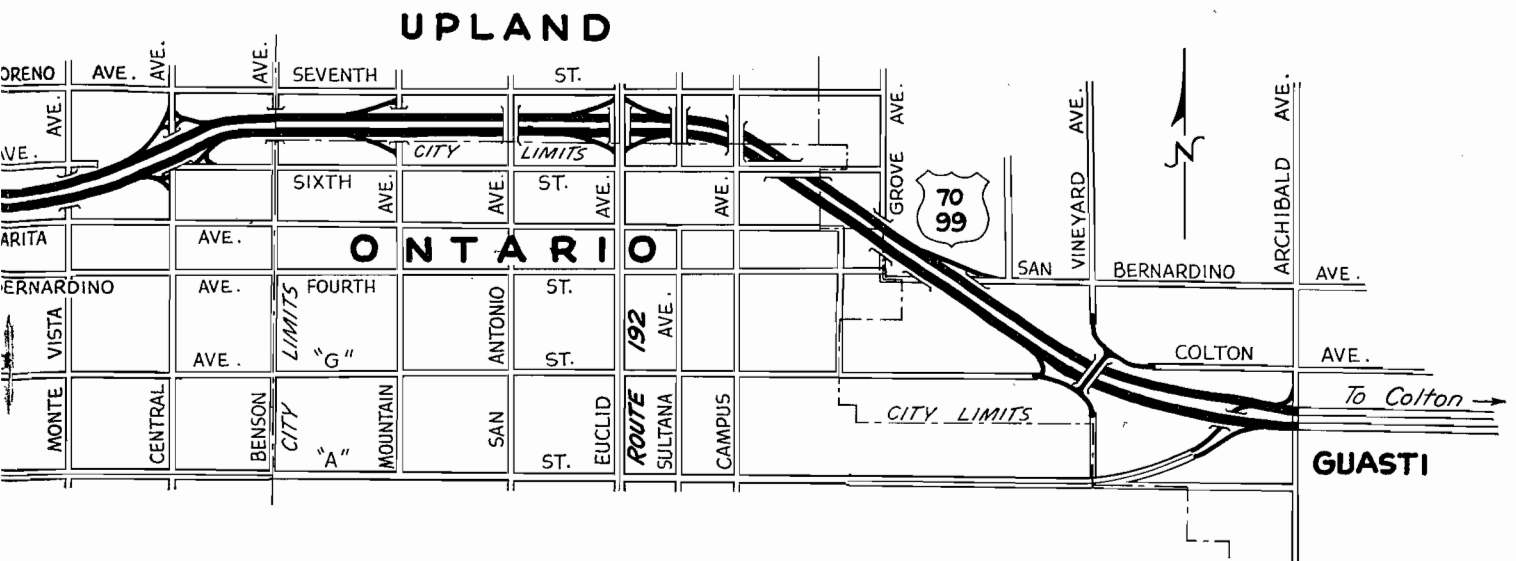
The contractor had considerable trouble locating an imported borrow source that would keep his hauling equipment from the hazard of traveling city streets. Borrow was finally located in San Antonio Wash at the east end of the project. An agreement was worked out between the contractor and the San Bernardino County Flood Control, the Chino Basin Water District and U. S. Army Engineering Corps to use the borrow pit as a still-

ing basin for Mt. San Antonio Dam now under construction by Army engineers. Material was excavated by 1201 Lima and Bucyrus-Erie shovels using five-cubic-yard drag buckets. Also working in pit was a Northwest 80 with four-cubic-yard bucket. Material was hauled to job site in Schorrock cable operated trucks, Gar Wood telescoping hoist trucks and other large capacity trucking equipment. The contractor worked two 8-hour shifts on borrow, excavating and hauling, running as high as 35,000 tons per day. Rolling and compacting of borrow material was by standard equipment.

Portable Crushers Used

The contractor processed his imported base material from the same pit as was used to obtain borrow. Two portable crushers were set up and material crushed to specified size, elevated to bins and hauled to grade by truck. Material was spread to required thickness by spreader attached to tractor.

The top four inches of the imported base material was cement treated for subgrade for the portland cement concrete pavement. Material was sized into windrows, the cement then applied by a metered spreader and mixed through a Woods mixer. Material was then spread and cut to grade and rolled by tandem rollers and wobble wheel roller pulled by a watering



Los Angeles and San Bernardino Counties opened on November 16, 1954

truck. Asphaltic seal coat was then applied.

The pavement operation followed a day behind cement treatment. Pavement was placed by a dual drum paver, followed by Blaw-Knox spreader, finisher and Johnson float. The contractor turned out a maximum of 1,200 cubic yards per nine-hour shift. The joints were sawed by a late model Felker concrete saw. This saw was approximately 2,000 pounds lighter than old model and no trouble was caused by the machine leaving marks in new pavement. The 60-foot joints were cut, then machine dropped back to cut 15-foot joints. Very few cracks showed up following saw operation. Pavement was cured with Hunt process membrane.

The accommodation of public traffic did not present much of a problem as most of the job was on new alignment. Adequate flagmen were maintained at all city street crossings, and at major streets the contractor installed standard signal devices operated manually by off-duty City of Pomona policemen.

No major construction difficulties were encountered in the work once full operations were under way, and all contract work is expected to be finished shortly after the opening date.

The sixth construction contract on the freeway was for lights and signs in the Pomona-C Claremont area. This contract was awarded to Ets-Hokin

and Galvan, Inc., on July 23, 1953. The contract allotment was \$177,500. The resident engineer was Ray DeGroff.

The seventh and final contract was awarded to Paul R. Gardner on October 14, 1953, for lights and illuminated signs through the District VIII portion. This contract carried an allotment of \$73,317. The resident engineers were Paul Kirst and Arthur Nelson.

The total of the allotments for the seven contracts described above is close to \$9,000,000, of which over \$3,000,000 was for major bridge construction. Right of way acquisition cost for this 13.5-mile length totaled approximately \$3,000,000. Thus the total cost of the freeway was \$12,000,000, or about \$900,000 per mile.

WHEN IN THE DARK

The habit of failing to replace the dash light bulb with a new one if the old bulb has burned out is likely to result in serious trouble for the driver, warns the National Automobile Club. When driving in the dark the operator is in the dark as to the exact speed he is traveling. He is likely to outdrive his headlights without knowing it, which means that he may be held up for speeding or caught in an accident. Besides, the ammeter or the oil pressure gauge could be registering various kinds of trouble and he would never know it until stranded.

Hal H. Hale of A.A.S.H.O. Resigns

After more than 10 years of service to the American Association of State Highways Officials as its executive secretary, Hal H. Hale has resigned, effective December 31st, to accept a new post with the Association of American Railroads.

Hale was appointed to the A. A. S. H. O. secretaryship on January 1, 1944. Since then he has been in the forefront of the nation-wide movement to obtain better highways, and has been active in the promotion of cooperation between the Federal Government and the various states.

He has also served as editor of *American Highways*, quarterly magazine of A. A. S. H. O. He has become intimately acquainted with highway problems in all states of the Union not only through his close contact with their highway officials but also through frequent personal visits to the states.

Hale is a graduate of the University of Tennessee. He became city engineer of Knoxville in 1933, a post he held for five years. Subsequently he was associated in engineering capacities with the Tennessee Valley Authority and the Portland Cement Association. In 1941 he joined the Washington staff of American Society of Civil Engineers, leaving A. S. C. E. in 1944 for his post with A. A. S. H. O.

LONG BEACH FREEWAY LINK OPENED BY GOVERNOR

The second major link of the Long Beach Freeway in Los Angeles County was officially opened for travel on Friday, October 29, 1954, by Governor Goodwin J. Knight.

what had been done and what was planned for the immediate future. He also spoke of the tremendous growth of California and the vital need for the freeway program to be continued.



Governor cuts ribbon. Front row, left to right: W. S. Grant, Assemblyman-elect, Long Beach; Governor Goodwin J. Knight; George Vermillion, Mayor of Long Beach; Burton Chace, Supervisor, Los Angeles County and former mayor of Long Beach. Immediately back of George Vermillion is Herbert Klocksiem, Assemblyman from the 44th District, and Robert E. McClure, member of California Highway Commission from Santa Monica.

Sponsored by the Long Beach Chamber of Commerce, the dedication ceremonies were held on the new freeway just south of the Atlantic Avenue separation structure.

Master of ceremonies was Lloyd C. Leedom, President of the Chamber of Commerce. George M. Vermillion, Mayor of Long Beach; George C. Rockafeld, Chairman of the State and Federal Highway Committee of the chamber; Burton W. Chace, Supervisor for Los Angeles County and former Mayor of Long Beach; Herbert Klocksiem, State Assemblyman from the 44th District; Paul O. Harding, Assistant State Highway Engineer in charge of District VII; and Robert E. McClure, Member of the California Highway Commission from Santa Monica were the speakers. McClure had the pleasure of introducing Governor Knight who made the principal address of the day.

Governor Knight told of his interest in the entire highway program, of

Immediately following his remarks, the Governor stepped from the platform and posed for pictures and then cut the ribbon and officially led the caravan of cars over the new freeway to Long Beach.

A PLEASING LETTER

THE UNION METAL MANUFACTURING CO.
Canton 5, Ohio

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: Many publications cross my desk and, regretfully, one does not have the time to give all of them the attention they deserve. Yours is an exception.

There is something refreshing about *California Highways*. The format is pleasing, the type matter easy to read and the photographs are excellent. Congratulations! It's a job well done in reporting California's wonderful highway progress.

Sincerely yours,

A. S. FROMM
Advertising Manager

Mendocino Opens First Four-lane Highway in County

Sparked by the Mendocino County Chamber of Commerce, the first four-lane highway in that county was opened for travel to the motoring public the afternoon of October 31, 1954.

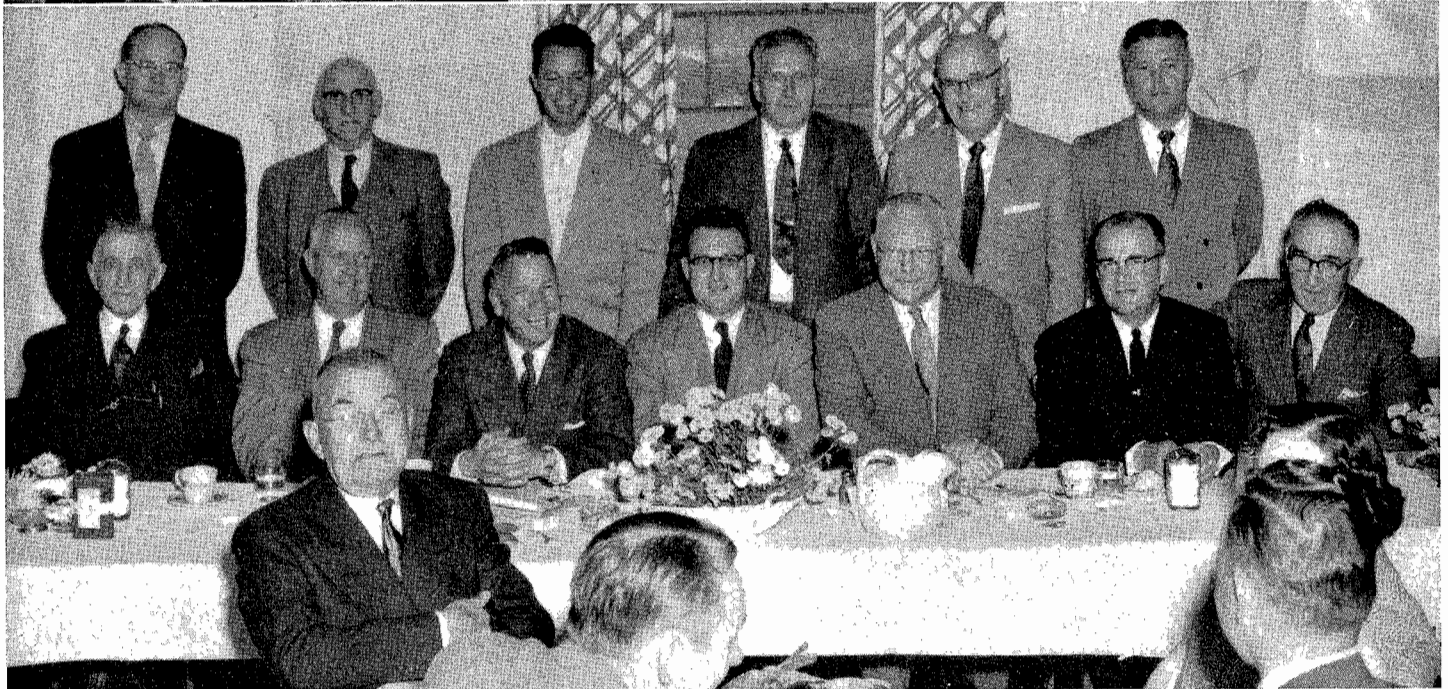
The new section of the Redwood Highway eliminates some bad grades and sharp curves that were on the old alignment. Built many, many years ago the old alignment did not take into consideration the marvelous growth of California nor the immense increase in the number of automobiles registered in our State.

The old alignment was 5.28 miles in length while the new road, between the same points, is 4.85 miles. This is a saving in distance of but 0.43 mile. But the saving in time is something else. As one speaker stated, the saving in distance is small but the saving in time is large.

Starting with a civic luncheon at the Brook Trails Lodge, in Willits, the celebration got off to a good start. Art Schilder of Ukiah was master of ceremonies. The speeches were short and to the point. F. Walter Sandelin, Ukiah, member of the California Highway Commission, was the principal speaker at the luncheon. The interest of Governor Knight was apparent when Sandelin read a telegram from the Governor expressing his continued interest in the highway program and his regrets at not being able to be in attendance due to commitments in the southern part of the State.

Immediately after the luncheon the entire assemblage formed a caravan and proceeded to the new section of highway, being met there by hundreds of people from Mendocino County who were also interested in the opening of this new section of highway.

Speeches at the dedication ceremonies were also brief. With the help of Walter Sandelin and Alan Hart,



District Engineer for the Division of Highways from Eureka, a "cat skinner" hauled a log from the highway and the signal was given for the crowd to proceed over the new road.—R. C. K.

UPPER: The crowd on the highway at the dedication ceremony. LOWER: Lunch at Willits under auspices of Willits Chamber of Commerce. Back row, left to right: Alan S. Hart, District Engineer from Eureka; Harry Haehl, Mayor of Willits; Leonard Nix, Mayor of Ukiah; Ray Archibald, Division Engineer, Bureau of Public Roads; Robert Farrell, President, Willits Chamber of Commerce; State Senator-elect James Busch. Front row, left to right: George Anderson, Director, Golden Gate Bridge District, Ukiah; T. Fred Bagshaw, Special Assistant to Director of Public Works; Art Schilder, master of ceremonies, Ukiah; Don Stanwood, President, Ukiah Chamber of Commerce; F. Walter Sandelin, member, California Highway Commission, Ukiah; State Senator Bert Busch, Ukiah; E. Safford, Supervisor, Mendocino County, Willits. The 14th man at the head table took the picture.

Promotions

*Milton Harris, Frank Baxter and
Walter Nett Are Given New Jobs*

PROMOTION of Milton Harris to the position of Construction Engineer for the California Division of Highways to succeed Don G. Evans, retired, was announced by State Highway Engineer G. T. McCoy.



FRANK E. BAXTER

To replace Harris as district engineer of District IX, with headquarters in Bishop, McCoy promoted Frank E. Baxter, who has been assistant district engineer of District II, with headquarters in Redding.

Baxter's post in Redding was filled by Walter M. Nett, who for the past year has been assistant construction engineer for the division, working out of Sacramento headquarters.

Graduated From Oregon State

Harris has been district engineer of District XI, covering Inyo, Mono, and the eastern part of Kern Counties, since February, 1953. Before that he was service and supply engineer for the division, a post he assumed after



MILTON HARRIS

his return from World War II military service with the Army Engineers and the Allied Military Government in Italy.

He is a native of Oregon, and received his degree in civil engineering from Oregon State College in 1917. He served in World War I and then entered engineering work, joining the Division of Highways staff in 1928 as an instrument man in the Eureka district. Subsequently he served in Bishop and the Sacramento headquarters office.

As service and supply engineer prior to 1953, Harris had full charge of procedures for procurement, warehousing and distribution of materials and supplies used by the Division of Highways.

Baxter Goes to Bishop

Baxter, the new district engineer of District IX, is a native of Los Angeles, an engineering graduate of the University of California, and an employee of the Division of Highways since 1930.

Until April, 1951, when he was transferred to Redding, his highway work was in the San Joaquin Valley and adjoining mountain areas. Working out of the District VI headquarters at Fresno, Baxter served as dis-



WALTER M. NETT

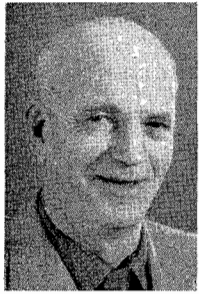
trict materials engineer, district office engineer, and district maintenance engineer.

As assistant district engineer of District II, Baxter has been in general charge of construction and maintenance of state highways in Siskiyou, Modoc, Lassen, Shasta, Plumas, and Tehama Counties and the eastern part of Trinity County.

Nett, in assuming Baxter's post at Redding, is returning to a district where he served as district construction engineer between January, 1952, and September, 1953. Prior to that, his career with the division had been in the Fresno district, starting in 1930. He served in the Seabees in World War II.

Don G. Evans

Retirement of Don G. Evans, construction engineer for the California Division of Highways, marking the end of 25 years of state service, was announced on November 6th.



DON G. EVANS

Evans came to work for the division in 1929 as location engineer and later as construction superintendent in District VII at Los Angeles.

As construction engineer for the division, a post he has held for the past three and a

half years, Evans' scope of supervision of highway construction has been state-wide, covering hundreds of projects, large and small, along the 14,000-mile State Highway System.

Previously, he had served as assistant district engineer-operations for District VI, with headquarters at Fresno, a post in which he had direct supervision of all construction and maintenance work on state highways in Madera, Fresno, Kings, Tulare, and Kern Counties.

Born in Indiana

Evans was born in Terre Haute, Indiana, in 1890, where he attended public schools and the Rose Polytechnic Institute, receiving his bachelor of science degree in engineering in 1911. He later took a postgraduate engineering course at the Colorado School of Mines.

Between 1912 and 1919 he worked as an engineer on various mining jobs in Colorado, Arizona and Central America, including two years as construction engineer for the United Verde Copper Company in Arizona.

In 1920 he was employed by the U. S. Bureau of Public Roads and for the next nine years served as resident engineer, chief locator and finally chief of forest and park roads in Arizona and New Mexico.

Evans' pre-World War II experience with the Division of Highways includes five years as location engineer

BURNS MEMORIAL FREEWAY REDEDICATED



At dedication, left to right: Ray Bradbury, Humboldt County Chamber of Commerce; Mrs. O. A. Moore, daughter of Mrs. Burns; George Cole, President, Humboldt County Chamber of Commerce; Mrs. Michael J. Burns; Alan S. Hart, District Engineer, District I; Richard Denbo, Secretary, Humboldt County Chamber of Commerce; Mrs. Sophie Benson, sister of Mrs. Burns; Cliff Dumm, President, Eureka Chamber of Commerce

At a brief roadside ceremony on October 18th, the Humboldt County Chamber of Commerce rededicated the first unit of the Michael J. Burns Memorial Freeway to the memory of the man who was co-sponsor of the revolutionary highway financing legislation known as the 1947 Collier-Burns Highway Act.

Humboldt County's beloved Senator Mike Burns passed away on May 1, 1949. By House Resolution No. 230 on June 15, 1949, the State Legislature named the proposed freeway, which

for District VI in Fresno and another five years as resident engineer during which he supervised the construction of many highway projects in the Bakersfield area.

At the outbreak of World War II Evans joined the U. S. Corps of Engineers. He held the rank of colonel when he left active military service in 1946 to resume his career with the State of California. He is a member of the American Society of Military Engineers.

Evans and his wife will live in Los Angeles, from where they plan to make extensive trips throughout the United States. During the next two years they hope to visit every state in the Union.

was yet to be built, from the north city limits of Eureka to the north city limits of Arcata, the Michael Burns Memorial Freeway.

The first unit of this four-lane divided freeway was opened to traffic on July 20, 1954, which unit extended from Gannon Slough, south of Arcata, to a point just north of the north city limits of Arcata. The second and last unit of the Burns Freeway extends from the north city limits of Eureka to Gannon Slough. The grading for this unit is complete and the base and surfacing will be placed during the summer season of 1955.

To give form and substance to the Burns Freeway, official signs so designating this fact were purchased and installed by the Division of Highways. The sign facing northbound traffic at Gannon Slough will be repositioned to a point near the north city limits of Eureka and facing northbound traffic next fall when the last unit of the Burns Freeway is completed.

The rededication on October 18th was handled by the Humboldt County Chamber of Commerce with President George Cole, of Eureka, in charge. Mrs. Michael J. Burns, wife of the late Senator, was introduced to the group by Cole.

US 50 Project

Open New Four-lane Divided Expressway in San Joaquin County

By FRANCIS O'NEILL, District Planning Engineer

THE NEW four-lane expressway between the Altamont Pass Road in Alameda County and the west city limits of Tracy was opened to traffic during November. This road has been under construction since September, 1952, when the first contract for rough grading and structures was awarded to McCammon-Wunderlich Co. and C. K. Moseman of Palo Alto. A second contract with Gordon H.

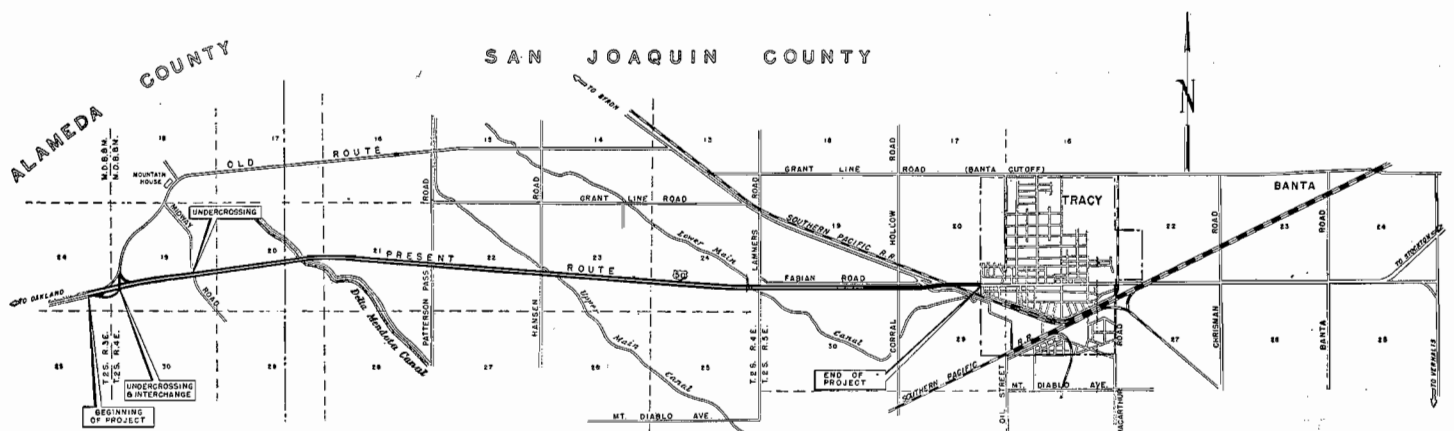
Ball, San Ramon Valley Land Co., and Clements and Co. was approved June 30, 1954, to provide for completion of the project by construction of connections at each end and surfacing with portland cement concrete pavement.

Old Two-lane Route

The old two-lane route is approximately 9.5 miles in length, with nu-

merous curves and steep grades at the westerly end. The steep grades, narrow pavement and restricted sight distance caused considerable inconvenience to the motoring public because of the difficulty that trucks and trailers encountered in negotiating this portion of the old facility. The average daily traffic on this road is 11,300 vehicles, 12.5 percent of which are

This photo shows typical traffic slow-up on old Altamont Pass-Tracy Highway



trucks. Week-end and holiday traffic moved "bumper to bumper" in both directions. Many accidents occurred due to attempted passing without sufficient sight distance.

The new route is 8.4 miles in length on smooth alignment and grades and provides two lanes in each direction with adequate shoulders for emergency parking.

Interchange and Separation

An interchange was constructed at the west end of the project connecting to the old Altamont Pass Route and Mountain House. A separation is provided at Midway Road with no connections to the freeway at this location. Channelized intersections at grade have been constructed at Patterson Pass Road, Hansen Road, Lambers Road and Corral Hollow Road. Adequate rights of way were acquired for the future construction of interchanges at these locations so as to develop this road ultimately to a full freeway.

The Southern Pacific Railroad tracks, west of Tracy, are crossed at grade with automatic crossing gates provided for traffic safety and protection.

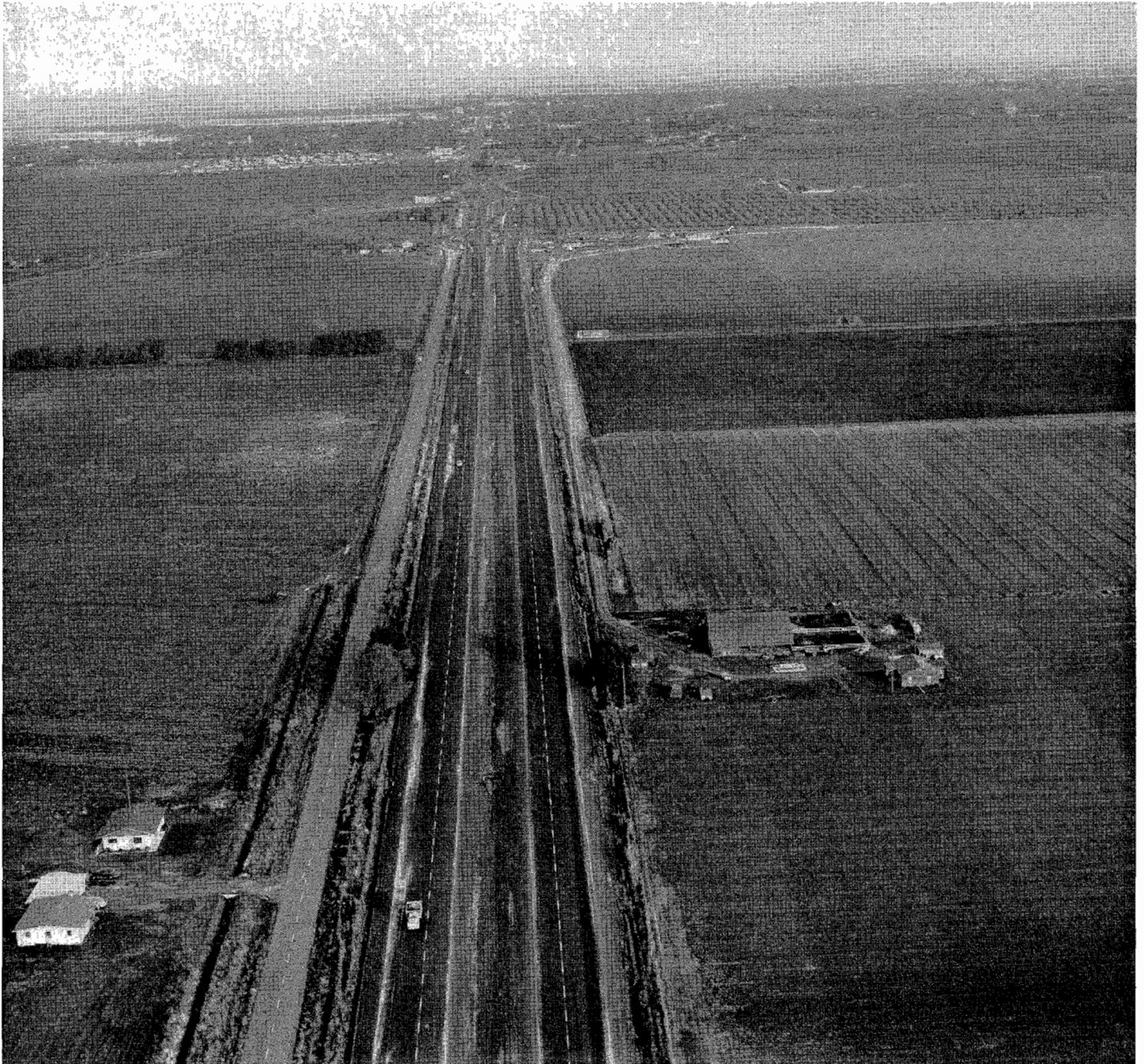
Fabian Road, paralleling the expressway to the north between Lambers Road and Corral Hollow Road, is utilized as a frontage road to provide traffic circulation for abutting property owners.

Rapid Paving

One of the outstanding construction features of the second contract was the speed at which the portland cement concrete pavement was placed. An average of 1,090 cubic yards of portland cement concrete placed per day was maintained throughout the concrete paving of the project. This rapid paving schedule enabled the contractor to complete the placing of plant mixed surfacing on the shoulders and road connections during favorable weather. This work would otherwise have had to be delayed until next year. The project engineer for



New Altamont-Tracy Expressway. UPPER: Mountain House interchange looking east. LOWER: Expressway crosses Delta-Mendota Canal, on right.



This aerial of Altamont Pass-Tracy Freeway is looking east toward Tracy

the paving contractor was J. W. Vickrey, Jr.

The old road, which will be reverted to Alameda and San Joaquin Counties, has been resurfaced in part to present a smooth riding pavement.

The first contract was constructed under the state supervision of Resident Engineer E. L. Craun and the second under Resident Engineer H. Atherstone.

TEN SECONDS TO PASS

It takes about 10 seconds to pass another moving automobile, says the California State Automobile Association, which adds that at 60 miles an hour your car will travel 880 feet in that time. If another car is approaching at equal speed, the distance required for you to pass safely is 1,760 feet, to which a margin should be added for safety.

DRIVERS' LICENSES

Californians had a total of 6,144,126 drivers' licenses as of August 31, 1954. Of this total, 5,667,488 were operators' licenses and 476,638 were chauffeurs' licenses.

HIGHWAY USERS PAY BIG TAX BILL

Highway users in the United States pay 6 billion dollars per year in special automotive taxes.

New Budget

Highway Commission Allocates Total of \$291,739,600 for 1955-56 Fiscal Year

THE CALIFORNIA HIGHWAY COMMISSION'S budget providing \$198,266,000 for major construction purposes on state highways for the fiscal year beginning July 1, 1955, was made public today by Governor Goodwin J. Knight.

In transmitting the budget to Governor Knight, the Highway Commission pointed out that the estimated revenue from state taxes for the 1955-56 budget had to be based on the reduced highway user taxes which are slated to go into effect on July 1, 1955. The 1953 legislation which made possible the present accelerated construction program provides that on next July 1st the taxes on gasoline and diesel fuel will be reduced one-half cent per gallon, with proportionate decreases in other highway user taxes.

Plans Will Be Ready

The commission said, however, that plans for other urgently needed construction projects will be ready in the event that the present level of highway revenues is retained by the Legislature after July 1, 1955. It is estimated that in that case the additional amount available for major state highway improvements next year would be \$25,000,000.

The over-all budget total, including certain allocations to cities and counties, is \$291,739,600. Of the \$198,266,000 scheduled for major construction purposes on state highways, \$122,018,000 is allocated for construction projects and \$76,248,000 for rights of way for future highway improvement.

Comparable figures for the 1954-55 budget adopted in November, 1953, include: over-all budget, \$298,998,830; major state highway construction purposes, \$205,110,000.

The balance of the 1955-56 budget, \$93,473,600, provides \$58,950,000 for other state highway expenditures, plus \$25,416,000 state funds to cities for city streets, \$6,530,000 federal aid secondary funds for county roads, \$2,500,000 state funds to counties to assist the required matching of federal

aid secondary funds and \$77,600 for outdoor advertising supervision.

Start of Major Projects

State Director of Public Works Frank B. Durkee, ex officio Chairman of the Highway Commission, pointed out that this budget signals the start of many major developments on highway routes and in areas where deficiencies have long been recognized. He said also that the 1955-56 budget provides for the completion of many urban freeway projects, extension of multilane intercity freeways and expressways, construction of new bridges and straightening, widening, and surfacing on many rural routes.

A conception of the highway improvements which will be accomplished by the expenditures from this budget can be gained from these facts: the major construction projects affect more than 400 miles of state highways; the right-of-way allocations affect many additional miles; a total of 40 bridges across streams and 133 other structures including highway separations and railroad separations will be constructed; 65 miles of the proposed improvements involve full freeways, which will bring California's total of full freeways to a new high of 388 miles. The proposed 64 miles of expressway construction (with some intersections at grade) will increase the mileage of multilane divided highways to 1,639, a toll-free mileage of that type far in excess of the total in any other state.

Budget Items

The fiscal year covered by the new budget does not begin until next July but a number of the projects will be advertised for bids beginning in January, 1955. State law permits the awarding of contracts on or after April 1st, three months before the actual start of the fiscal year, so that full advantage may be taken of favorable construction weather.

The state highway items in the budget are as follows:

Major construction projects, \$110,018,000; construction engineering, \$12,000,000; rights of way, \$76,248,000; maintenance \$23,000,000; contingencies, \$4,925,000; preliminary engineering, \$15,000,000; administration, \$6,575,000; buildings and plants, \$4,500,000; state-wide highway planning, \$2,000,000; honor camps, \$1,500,000; maintenance of the San Francisco-Oakland Bay Bridge, \$1,200,000; and minor improvement and betterment, \$250,000.

The largest single item in the construction portion of the budget is \$7,015,000 for an eight-lane section of the Eastshore Freeway in the City of Oakland, between 10th Street and the distribution structure. The next largest is \$4,600,000 for extension of the Harbor Freeway in Los Angeles from Gage Avenue to 88th Street.

Rights of Way

Among the budget allocations for acquisition of rights of way on major freeway routes are:

In Northern California, \$2,000,000 for the Embarcadero Freeway and \$5,100,000 for the US 101 freeway connection from the Bayshore Freeway to Turk Street, both in San Francisco; \$1,700,000 for the Bayshore Freeway between San Carlos and the Santa Clara county line; \$1,250,000 for Sign Route 24 in the Walnut Creek area of Contra Costa County; \$650,000 for US 101 in Marin County between Waldo and north of Greenbrae and \$800,000 for the South Sacramento Freeway on US 50-99. (With \$750,000 additional 1954-55 funds allocated October 21st this brings the total right of way allocation to more than \$2,500,000 for the South Sacramento Freeway.)

In Southern California

In the Los Angeles metropolitan area, \$14,650,000 for the Golden State Freeway (US 6-99); \$5,000,000 for the Ventura Freeway (US 101) and \$3,000,000 for the Hollywood Free-

... Continued on page 45

Construction Projects in State Highway Budget

| County | Route | Description | Approximate mileage | Estimated cost |
|-----------------------|------------------------|---|---------------------|----------------|
| Alameda | 69 (SR 17) | Eastshore Freeway—Beard Rd. to Jackson St. (Route 105); grade, pave and structures for 4-lane freeway | 5.6 | \$4,500,000 |
| Alameda | 69 (SR 17) | Eastshore Freeway, 10th St. in Oakland to Distribution Structure; grade, pave and structures for 8-lane freeway | 1.4 | 7,015,000 |
| Alameda, Contra Costa | 107 (SR 21) | US 50 to 0.2 mile north of Alameda-Contra Costa county line; grade, surface and structure—some realignment | 2.0 | 700,000 |
| Alameda | 227 | Mountain Blvd., from US 50 to SR 24; (portions); grade and surface for 4- and 6-lane freeway (State's share) | 9± | 300,000 |
| Alameda | Various | Rights of way on state highway routes | | 2,192,000 |
| Amador | Various | Rights of way on state highway routes | | 109,200 |
| Butte | 3 (US 99E) | Fagan to vicinity of Biggs Rd. (portions); base and surface—widening | 3.3 | 200,000 |
| Butte | 87 | 4 miles to 9.5 miles north of Oroville; three bridges and approaches | | 118,000 |
| Butte | Various | Rights of way on state highway routes | | 125,000 |
| Calaveras | 24 (SR 4) | At Avery; drainage correction | | 30,000 |
| Calaveras | 65 (SR 49) | Angeles Camp to Tuolumne county line; grade and surface (widening) | 6.5 | 100,000 |
| Calaveras | Various | Rights of way on state highway routes | | 95,000 |
| Colusa | 7 (US 99W) | Through Arbuckle; grade, surface and structure for 4-lane expressway | 1.5 | 750,000 |
| Colusa | Various | Rights of way on state highway routes | | 20,000 |
| Contra Costa | 75 (SR 24) | West of Sunnybrook Dr. to west of Pleasant Hill Rd. (portions); grade, pave and structures for 6- and 8-lane freeway | 2.6 | 3,800,000 |
| Contra Costa | 75 (SR 24) | West of Pleasant Hill Rd. to east of Pleasant Hill Rd.; grade, pave and structures for 6- and 8-lane freeway | 1.3 | 1,500,000 |
| Contra Costa | 75 (SR 21 and 24) | Near north city limits of Walnut Creek to 0.3 miles north of Monument; grade, pave and structures for 4-lane freeway | 2.8 | 3,580,000 |
| Contra Costa | 107 (SR 21) | Danville to 0.7 mile north of south city limits of Walnut Creek (portions); reconstruct | 4.4 | 285,000 |
| Contra Costa, Alameda | 107 (SR 21) | US 50 to 0.2 mile north of Alameda-Contra Costa county line; grade, surface and structure—some realignment | 2.0 | *700,000 |
| Contra Costa | Various | Rights of way on state highway routes | | 1,958,000 |
| Del Norte | 1, 71 (US 101) | US 199 to Smith River Bridge; surface on relocation (grading now under way) | 6.2 | 500,000 |
| Del Norte | 71 (US 101) | Winton Corners to Oregon state line; reconstruct | 5.5 | 255,000 |
| Del Norte | Various | Rights of way on state highway routes | | 80,000 |
| El Dorado | 11 (US 50) | Through Placerville; surface, lights and signals to complete 4-lane expressway | 1.5 | 490,000 |
| El Dorado | Various | Rights of way on state highway routes | | 100,000 |
| Fresno | 4 (US 99) | San Joaquin St. to West Ave. (portions); grade, pave and structures for 6-lane freeway | 1.6 | 2,250,000 |
| Fresno | 41 (SR 180) | O and P Sts. from Stanislaus St. to Ventura Ave., (one way); resurface and signals | | 135,000 |
| Fresno | Various | Rights of way on state highway routes | | 489,000 |
| Humboldt | 1 (US 101) | 16th St. in Fortuna to north city limits; surface | 1.0 | 30,000 |
| Humboldt | 1 (US 101) | South city limits of Eureka to 0.6 mile north of north city limits; grade, surface and structure (widening and additional Eureka Slough bridge) | 4.5 | 900,000 |
| Humboldt | 1 (US 101) | North city limits of Eureka to Gannon Slough; surface (expressway under construction) | 5.0 | 850,000 |
| Humboldt | 1, 20 (US 101 and 299) | 0.9 mile north of Plaza Ave. to Mad River Bridge and US 299 intersection (portions); structures and approaches (for interchange) | 2.2 | 448,000 |
| Humboldt | 35 (SR 36) | Cummings (Fox) Creek, bridge and approaches | 0.4 | 70,000 |
| Humboldt | Various | Rights of way on state highway routes | | 520,000 |
| Imperial | 12 (US 80) | Coyote Wells Underpass, junction of Rt. 202; grade, pave and structure for widening highway | | 400,000 |
| Imperial | 12 (US 80) | Dahlia Canal to US 99; grade and pave for 4-lane highway | 0.5 | 95,000 |
| Imperial | 27, 187 (US 80) | Alamo River to 0.3 mile east of Holtville and in City of Holtville; grade, pave and channelize (widening) | 1.3 | 165,000 |
| Imperial | 201 | Rt. 187 to 0.5 mile north; grade and pave (reconstruct and widen) | 0.5 | 60,000 |
| Imperial | Various | Rights of way on state highway routes | | 243,000 |
| Inyo | Various | Rights of way on state highway routes | | 12,000 |
| Kern | 4 (US 99) | Fort Tejon to 0.5 mile north of Grapevine Station; reconstruct (portions) | 4.7 | 400,000 |
| Kern | 4 (US 99) | 1.4 miles north of Grapevine to 0.6 mile south of McKittrick Rd; grade and surface (convert divided highway to expressway with limited access) | 17.7 | 200,000 |
| Kern | 4 (US 99 and 399) | Union Ave. Underpass; grade, pave and structure (widen to 6-lane divided) | 0.3 | 450,000 |
| Kern | 4, 142 (US 99 and 466) | Garces Circle Interchange; grade, pave and structure | | 1,500,000 |
| Kern | 57 (SR 178) | 2.0 miles west of Democrat Hot Springs to Democrat Hot Springs; grade and surface (widen and some realignment) | 2.0 | 80,000 |
| Kern | 23 (US 6) | Kern-Los Angeles county line to 8.0 miles south of Mojave; surface | 8.4 | 125,000 |
| Kern | 23, 58 (US 6 and 466) | 0.5 mile north of Mojave to Boron (portions); grade and surface (some widening over crests; channelization at junction north of Mojave) | 23± | 430,000 |
| Kern | Various | Rights of way on state highway routes | | 1,192,000 |
| Kings | 125 (SR 41) | South Fork of Kings River; bridge and approaches | | 108,000 |
| Kings | Various | Rights of way on state highway routes | | 20,000 |
| Lake | 15 (SR 20) | Laurel Dell Lake to Tule Lake (portions); grade and surface (realignment) | 2.5 | 525,000 |
| Lake | 49 (SR 53) | Long Valley Creek Bridge and Guenoc Cattlepass; structures | | 30,000 |
| Lake | Various | Rights of way on state highway routes | | 100,000 |

SR = State Sign Route

for 1955-56 Fiscal Year Total \$198,266,000

| County | Route | Description | Approximate mileage | Estimated cost |
|---------------------|--------------------------|--|---------------------|----------------|
| Lassen | Various | Rights of way on state highway routes | | \$30,000 |
| Los Angeles | 2 | Whittier Blvd.-Painter Ave. to Washington Blvd.; grade, pave and structures (widen) | 0.6 | 350,000 |
| Los Angeles | 4, 161 (US 6-99) | Golden State Freeway-Glendale Blvd. to 0.5 mile north of Los Feliz Blvd. (portions); structures for Los Feliz Blvd. interchange | | 1,300,000 |
| Los Angeles | 4, 161 (US 6-99, SR 134) | Golden State Freeway-0.5 mile north of Los Feliz Blvd. to University Ave., (portions); bridge over Los Angeles River near Victory Blvd. | | 2,600,000 |
| Los Angeles | 9 (SR 118) | Foothill Blvd.-Tujunga Canyon Blvd. to Alta Canyada Rd.; grade, pave and structures (widen) | 4.7 | 600,000 |
| Los Angeles | 9 (SR 118) | Canada Ave.-Montana St. to Lincoln Ave. in Pasadena; reconstruct | 0.6 | 95,000 |
| Los Angeles | 19 (SR 71) | Pearl St. in Pomona to US 66 (portions); grade, pave and structures (widen) | 3.1 | 600,000 |
| Los Angeles | 23 (US 6) | Palmdale to Lancaster (portions); grade and shoulders | 6.4 | 30,000 |
| Los Angeles | 61 (SR 2) | Near Glendale Ave. to Town St.; grade, surface, signals and illumination (widen) | 0.8 | 250,000 |
| Los Angeles | 156 (SR 27) | Topanga Canyon Rd., 0.2 mile north of US 101 Alternate to 2.9 miles north of Los Angeles city limits, (portions); grade and surface (some realignment) | 0.7 | 110,000 |
| Los Angeles | 165 (US 6 and SR 11) | Harbor Freeway-88th St. to Gage Ave.; grade, pave and structures for 8-lane freeway | 1.8 ± | 4,600,000 |
| Los Angeles | 167 (SR 15) | Los Angeles River (Long Beach) Freeway-0.2 mile south of Rosecrans Ave. to Southern Ave. (portions); grade, pave and structures for 6-lane freeway | 3.3 | 1,820,000 |
| Los Angeles | 167 (SR 15) | Los Angeles River (Long Beach) Freeway-Southern Ave. to north junction Atlantic Blvd. (portions); structures and approaches for 6-lane freeway | 3.8 | 2,868,000 |
| Los Angeles | 167 (SR 15) | Los Angeles River (Long Beach) Freeway-north junction Atlantic Blvd. to east 26th St.; grade, pave and structures for 6-lane freeway | 0.2 | 1,700,000 |
| Los Angeles | 170 (SR 35) | Workman Mill Rd.-Pioneer Blvd. to San Jose Creek; grade, surface and structures (some realignment and drainage improvement) | 1.5 | 82,000 |
| Los Angeles | 173 (SR 26) | Ninth St. Viaduct (Los Angeles River); bridge railing | | 50,000 |
| Los Angeles, Orange | 174 (US 101, SR 14) | Santa Ana Freeway-Coyote Creek to Orangethorpe Ave.; grade, pave and structures (incl. Buena Park realignment) | 2.0 | 2,100,000 |
| Los Angeles | 178 (US 91 and SR 18) | Carson St.-San Gabriel River to Orange county line; grade, pave and structures (widen to 4 lanes divided) | 1.8 | 300,000 |
| Los Angeles | Various | Rights of way on state highway routes | | 36,992,000 |
| Madera | 4 (US 99) | 0.5 mile south to 1.5 miles north of Madera (portions); irrigation and relocation | 3.6 | 30,000 |
| Madera | Various | Rights of way on state highway routes | | 521,000 |
| Marin | 1 (US 101) | Waldo to 0.3 mile north of Alto intersection (portions); grade, pave and structure for 6-lane freeway, including Alto interchange | 2.5 | 1,730,000 |
| Marin | Various | Rights of way on state highway routes | | 715,000 |
| Mendocino | 48 (SR 128) | 8.75 miles to 15.25 miles easterly of Boonville (portions); reconstruct | 6.4 | 130,000 |
| Mendocino | 48 (SR 128) | Flynn Creek; bridge and approaches | | 80,000 |
| Mendocino | 56 (SR 1) | 0.7 mile south to 0.2 mile north of Greenwood Creek; grade, surface and structures (replace bridge, improve approaches) | 0.9 | 475,000 |
| Mendocino | 56 (SR 1) | Little River; temporary bridge and approaches | 0.1 | 55,000 |
| Mendocino | Various | Rights of way on state highway routes | | 255,000 |
| Merced | 122 (SR 140) | East Side Canal; bridge and approaches | | 100,000 |
| Merced | 123 | Sign Rt. 152 to Merced (portions); widen 11 bridges | 7 ± | 220,000 |
| Merced | Various | Rights of way on state highway routes | | 80,000 |
| Modoc | Various | Rights of way on state highway routes | | 20,000 |
| Mono | 40 | Pole Line Rd.-US 395 to Nevada state line (portions); grade and surface (widen) | 10 ± | 200,000 |
| Monterey | 2 (US 101) | Canal St. (King City) to 1.8 miles north of Salinas River; grade, surface and structure (4-lane expressway and additional bridge) | 2.8 | 1,366,000 |
| Monterey | 117 (SR 1) | Camino El Estero to Del Monte Junction; grade, surface and structure for 4-lane expressway | 1.2 | 410,000 |
| Monterey | Various | Rights of way on state highway routes | | 340,000 |
| Napa | 6 (SR 37) | East city limits of Napa to 6.5 miles east (portions); grade and surface (widen, some realignment) | 1.2 | 75,000 |
| Napa | Various | Rights of way on state highway routes | | 210,000 |
| Nevada | 38 (US 40) | East Truckee to Boca (portions); reconstruct | 5.5 | 125,000 |
| Nevada | Various | Rights of way on state highway routes | | 210,000 |
| Orange | 62 (SR 39) | Imperial Highway to Whittier Blvd. west of La Habra; grade, surface and structures (widen) | 1.6 | 200,000 |
| Orange, Los Angeles | 174 (US 101 and SR 14) | Santa Ana Freeway-Coyote Creek to Orangethorpe Ave.; grade, pave and structures (including Buena Park realignment) | 2.0 | 2,100,000 |
| Orange | 174 (US 101) | Santa Ana Freeway-La Palma Ave.-Brookhurst St. interchange | | 1,070,000 |
| Orange | 174 (US 101) | 0.2 mile west of Euclid Ave. in Anaheim to 0.2 mile east of South St. and Ball Rd. interchange; grade, pave and structures (realignment through Anaheim) | 1.7 | 2,332,000 |
| Orange | Various | Rights of way on state highway routes | | 2,430,000 |
| Placer | 17, 37 (US 40) | 1.0 mile east of Newcastle to Elm St. in Auburn; structures for 4-lane freeway | 2.7 | 900,000 |
| Placer | 38 (SR 89) | 2.8 miles north of Tahoe City to Truckee River Bridge; reconstruct | 2.1 | 70,000 |
| Placer | Various | Rights of way on state highway routes | | 200,000 |
| Plumas | 21 (US 40 Alt) | In Portola; drainage correction | | 50,000 |
| Plumas | 83 (SR 89) | Middle Fork Feather River Bridge and line change; grade, surface and structure | 1.0 | 280,000 |
| Plumas | 83 (SR 89) | In Greenville; drainage correction and surfacing | 0.5 | 30,000 |

SR = State Sign Route

| County | Route | Description | Approximate mileage | Estimated cost |
|------------------------|----------------------------------|--|---------------------|----------------------------|
| Plumas | 83 (SR 89) | Westwood Rd. to Almanor Dam; grade and surface (realignment) | 0.7 | \$70,000 |
| Plumas | Various | Rights of way on state highway routes | | 24,000 |
| Riverside | 26 (US 60-70-99) | 22d St. in Banning to 0.7 mile east of Banning; grade, pave and structures for 4-lane freeway (some structures under contract) | 3.5 | 1,350,000 |
| Riverside | 26 (US 60-70-99) | West city limits of Indio to 0.5 mile north of the Indio Overhead; grade, pave and structures (widen to 4-lanes divided) | 2.6 | 820,000 |
| Riverside | 43 (US 91-395 and SR 18) | In Riverside, 0.4 mile south of 14th St. to Russell St.; grade, pave and structures for 4-lane freeway | 2.2 | 2,100,000 |
| Riverside | 187 (SR 111) | In Palm Springs, Palo Verde Ave. to Ramon Rd.; grade, surface and structure (widen) | 1.3 | 180,000 |
| Riverside | Various | Rights of way on state highway routes | | 1,290,000 |
| Sacramento | 4 (US 50-99) | San Joaquin county line to 1.5 miles south of Cosumnes River; grade, surface and structures for 4-lane freeway | 6.8 | 3,600,000 |
| Sacramento | 11 (US 50) | Mills to 1.0 mile west of Nimbus; surface | 4.9 | 75,000 |
| Sacramento | Various | Rights of way on state highway routes | | 1,205,000 |
| San Benito | Various | Rights of way on state highway routes | | 80,000 |
| San Bernardino | 26, 43 (US 70-99) | Warm Creek to south E St. and Rt. 26 to Santa Ana River; grade, pave and structures for 4-lane freeway (including Santa Ana River Bridge) | 1.3 | 1,785,000 |
| San Bernardino | 31 (US 66-91-395) | Near Verdemon to 0.6 mile north of Devore; grade and surface (widen existing highway) | 2.1 | 85,000 |
| San Bernardino | 31, 190 (US 66-91-395 and SR 30) | Highland Ave. separation and overhead; grade, pave and structures for north-south freeway | 0.4 | 1,100,000 |
| San Bernardino | 190 (SR 30) | Riverside Ave. to US 66-91-395 in San Bernardino; grade and surface (widen) | 3.3 | 325,000 |
| San Bernardino | Various | Rights of way on state highway routes | | 3,190,000 |
| San Diego | 2 (US 101) | Laurel St. to San Diego River; cooperative drainage | | 250,000 |
| San Diego | 2 (US 101) | At Cudahy Creek; grade and pave | | 130,000 |
| San Diego | 12 (US 80) | Fairmount Ave. to El Cajon Blvd. (portions); grade, pave and structures for converting expressway to full freeway | 4.5 | 400,000 |
| San Diego | 12 (US 80) | Jackson St. separation; structure for converting expressway to full freeway | | 260,000 |
| San Diego | 77 (US 395) | Fulton St. to Aero Dr. (portions); grade, pave and structures (separation of intersections) | | 823,000 |
| San Diego | 195 (SR 76) | In Oceanside, Loma Alta Canyon Dr. to Mesa Dr., grade and pave (widen to 4 lanes divided) | 0.5 | 70,000 |
| San Diego | 198 (SR 67) | Main St. in El Cajon to 0.3 mile north of Broadway; grade and pave (widening, signals and channelization) | 1.2 | 290,000 |
| San Diego | 200 (SR 94) | College Ave. to Campo Rd.; grade, pave and structures for 4-lane freeway | 2.5 | 3,480,000 |
| San Diego | Various | Rights of way on state highway routes | | 3,026,800 |
| San Francisco | 56 (SR 1) | Fulton St. to Lake St.; grade and surface (widen to 6-lane expressway) | 0.9 | 200,000 |
| San Francisco | 224 | Embarcadero Freeway—San Francisco—Oakland Bay Bridge at Fremont St. to Broadway (portions); grade, pave and structures | 1.2 ± | 2,600,000 |
| San Francisco | Various | Rights of way on state highway routes | | 7,150,000 |
| San Joaquin | 4 (US 99) | Lathrop Rd. to Turner Station; grade, surface and structures for 4-lane freeway | 4.8 | 1,400,000 |
| San Joaquin | 24 (SR 12) | 1.2 miles east of Clements to Calaveras county line; grade and surface (realignment) | 4.4 | 400,000 |
| San Joaquin | Various | Rights of way on state highway routes | | 750,000 |
| San Luis Obispo | 56 (SR 1) | Morro Creek; bridge | | 25,000 |
| San Luis Obispo | Various | Rights of way on state highway routes | | 835,000 |
| San Mateo, Santa Clara | 2 (US 101) | El Camino Real, 0.1 mile north of University Ave. to 0.1 mile north of the Santa Clara—San Mateo county line; grade and surface (widen) | 0.5 | 240,000 |
| San Mateo | 2 (US 101) | El Camino Real, Rosedale Ave. to Victoria Ave.; grade and surface (widen) | 0.9 | 300,000 |
| San Mateo | 56 (SR 1) | 0.3 mile north of Finney Creek to Lake Lucerne (portions); grade and surface (widen and some realignment) (Joint Highway Dist. No. 9) | 11.1 | 150,000 |
| San Mateo | 68 (US 101 Bypass) | Bayshore Freeway—Willow Rd. interchange; structure | | (State's share) 930,000 |
| San Mateo | 68 (US 101 Bypass) | Bayshore Freeway—0.3 mile north of Butler Rd. to San Francisco county line (portions); grade and structure for 6-lane relocation across Candlestick Cove | 3.5 | 2,000,000 |
| San Mateo | 68 (US 101 Bypass) | Bayshore Highway in Burlingame and Millbrae (portions); drainage | | 120,000 |
| San Mateo | Various | Rights of way on state highway routes | | 1,775,000 |
| Santa Barbara | 2 (US 101) | Los Olivos St. (Santa Barbara) to El Sueno Rd; grade, pave and structures for 4-lane expressway | 3.2 | 2,200,000 |
| Santa Barbara | 2 (US 101) | 0.5 mile west of Arroyo Hondo to Gaviota; grade and surface for 4-lane expressway | 3.4 | 850,000 |
| Santa Barbara | 2 (US 101) | 1.0 mile north of Los Alamos to 4.0 miles south of Santa Maria; grade and surface for 4-lane expressway | 11.9 | 1,855,000 |
| Santa Barbara | 57 (SR 166) | 1.7 miles east of Clear Creek to 2.3 miles west of second crossing of Cuyama River; grade and surface (straighten and widen) | 0.4 | 80,000 |
| Santa Barbara | Various | Rights of way on state highway routes | | 1,470,000 |
| Santa Clara | 2 (US 101) | Llagas Creek to Ford Rd.; grade and surface (widen to 4 lanes) | 12.3 | 1,000,000 |
| Santa Clara, San Mateo | 2 (US 101) | El Camino Real, 0.1 mile north of University Ave. to 0.1 mile north of the Santa Clara—San Mateo county line; grade and surface (widen) | 0.5 | 240,000 |
| Santa Clara | 42 (SR 9) | Saratoga Creek; redeck 2 bridges | | 15,000 |
| Santa Clara | 68 (US 101 Bypass) | Bayshore Freeway—Santa Clara St. in San Jose to Rosa St.; grade, pave and structures for 4-lane freeway | 1.6 | 1,600,000 |
| Santa Clara | 114 (SR 9) | Mathilda Ave.—El Camino Real to Beemer Ave.; grade and surface (widen) | 0.8 | 100,000 |
| Santa Clara | 119 (SR 25) | San Benito county line to US 101; grade and surface (realignment) | 2.3 | 420,000 |
| Santa Clara | Various | Rights of way on state highway routes | | 1,355,000 |

SR = State Sign Route

| County | Route | Description | Approximate mileage | Estimated cost |
|------------|-----------------|---|---------------------|----------------|
| Santa Cruz | 56 (SR 1) | Los Gatos Highway (Rt. 5) to Mission St.; grade, pave and structures for 4-lane expressway | 1.3 | \$1,270,000 |
| Santa Cruz | Various | Rights of way on state highway routes | | 325,000 |
| Shasta | 3 (US 99) | Crespo's to Vollmer's; grade, surface and structures for 4-lane expressway (Dog Creek Bridge under construction) | 2.5 | 1,200,000 |
| Shasta | 20 (SR 44) | South Cow Creek; bridge and approaches | | 168,000 |
| Shasta | 28 (US 299) | Stillwater Creek; bridge | | 80,000 |
| Shasta | 28 (US 299) | Montgomery Creek to 0.2 mile east of Hillcrest; grade and surface (realignment) | 3.5 | 685,000 |
| Shasta | 83 (SR 89) | Doyel Cattlepass; reconstruct | | 30,000 |
| Shasta | Various | Rights of way on state highway routes | | 305,000 |
| Sierra | Various | Rights of way on state highway routes | | 3,000 |
| Siskiyou | 3 (US 99) | Fisher's to Pine St. in Dunsmuir; grade and surface (some widening and realignment) | 1.5 | 60,000 |
| Siskiyou | Various | Rights of way on state highway routes | | 335,000 |
| Solano | 7 (US 40) | Carquinez Bridge to Greenfield Ave. (portions); interchange structure at Manzanita St. | | 310,000 |
| Solano | 7 (US 40) | Greenfield Ave. to Sign Rt. 48; grade and surface frontage roads | 1.8 | 120,000 |
| Solano | 53 (SR 12) | Suisun to 5 miles easterly; grade and surface (widening) | 5.0 | 250,000 |
| Solano | Various | Rights of way on state highway routes | | 1,285,000 |
| Sonoma | 56 (SR 1) | Jenner to Mendocino county line (portions); grade and surface (widen) | 10± | 200,000 |
| Sonoma | 104 | Gravenstein Highway-Sebastopol to US 101 (portions); reconstruct | 2.7 | 140,000 |
| Sonoma | Various | Rights of way on state highway routes | | 415,000 |
| Stanislaus | 13 | In Riverbank; grade and surface (widen) (State's share) | 0.7 | 50,000 |
| Stanislaus | Various | Rights of way on state highway routes | | 160,000 |
| Sutter | 15 (SR 20) | Meridian to Sutter Bypass (portions); surface | 3.0 | 60,000 |
| Tehama | 3 (US 99E) | Butte county line to Los Molinos; grade and surface (widen to match previously widened bridges) | 12.0 | 850,000 |
| Tehama | Various | Rights of way on state highway routes | | 12,000 |
| Trinity | 20 (US 299) | Vitzhum's to Tom Lang Gulch; grade and surface (realignment) | 3.5 | 700,000 |
| Trinity | 20 (US 299) | Humboldt county line to Prairie Creek (portions); surface | 11± | 75,000 |
| Trinity | Various | Rights of way on state highway routes | | 10,000 |
| Tulare | 4 (US 99) | 0.5 mile north of Earlimart to 0.5 mile north of Pixley; grade, pave and structures for 4-lane freeway | 6.0 | 2,000,000 |
| Tulare | 129 (SR 65) | 1.5 miles north of Deer Creek to Linda Vista Ave.; grade and pave to complete Porterville relocation | 7.6 | 900,000 |
| Tulare | Various | Rights of way on state highway routes | | 500,000 |
| Tuolumne | 40 (SR 49-120) | Shawmut Grade; grade and surface (realignment) | 2.0 | 375,000 |
| Tuolumne | 65 (SR 49) | Columbia Wye to Calaveras county line; grade and surface (portions) (widening) | 7.6 | 100,000 |
| Tuolumne | Various | Rights of way on state highway routes | | 25,000 |
| Ventura | 79 (SR 126) | Near Mound School to 2.4 miles easterly; reconstruct | 2.4 | 75,000 |
| Ventura | 138 (US 399) | US 101 to 0.3 mile south of Mill School; grade, pave and structures for 4-lane freeway | 3.9 | 2,000,000 |
| Ventura | Various | Rights of way on state highway routes | | 1,435,000 |
| Yolo | 7 (US 99W) | 0.5 mile south of Cache Creek to 0.5 mile north of Yolo; grade, surface and structure (realignment, including new bridge) | 1.5 | 460,000 |
| Yolo | Various | Rights of way on state highway routes | | 21,000 |
| Yuba | 3 (US 99E) | Olivehurst to Marysville; grade (for 4-lane expressway) (structures under contract) | 4.0 | 700,000 |
| Yuba | 87 (US 40 Alt.) | Simmerly Slough Bridge and line change; grade, surface and structures (realignment, railroad underpass and bridge) | 1.5 | 725,000 |

SR = State Sign Route.

NEW BUDGET

Continued from page 41 . . .

way Extension (Route 159), both in the San Fernando Valley; \$4,750,000 for the Olympic Freeway; \$2,500,000 for the Long Beach (Los Angeles River) Freeway; \$2,820,000 for the Harbor Freeway; and \$2,200,000 for the Sepulveda Freeway.

The Sepulveda Freeway right-of-way item includes start of work on the unit from Ohio Avenue to Waterford Street through the U. S. Veterans Home in West Los Angeles. Under pending right of way agreement with the Federal Government, the State, in exchange for land to be occupied by the new freeway, will provide a separation structure, and

accomplish county road and utilities adjustments.

In other Southern California areas, \$1,350,000 for rights of way on the Santa Ana Freeway in Orange County; \$1,100,000 for a north-south freeway in the Riverside area; \$2,500,000 for a north-south freeway in the San Bernardino area; \$1,341,000 for the Sign Route 94 freeway in San Diego; and \$900,000 for the freeway in the vicinity of La Mesa, east of San Diego.

HILLS AND MOUNTAINS OF CALIFORNIA

Three-fourths of the area of California comprises rolling hills, foothills, and mountains ranging in elevation from 500 feet to 14,000 feet.

MAGAZINE DISPLAYED

THE CITY OF TULSA, OKLAHOMA

November 8, 1954

*California State Highway Commission
Sacramento, California*

DEAR SIR: I want to thank you for putting us on the mailing list for the *California Highways and Public Works* magazine. It is certainly an outstanding portrayal of your rapidly expanding street and highway programs.

The September-October issue arrived just in time to be displayed at our municipal open house, which we held November 4-6, 1954.

Very truly yours,
SID W. PATTERSON, Commissioner
Streets and Public Property

Orinda Crossroads

First Link of Oakland-Walnut Creek Job for Traffic Relief

By D. M. YOUNG, Resident Engineer

WORK WAS started September 21, 1953, by Fredrickson & Watson and M & K Corporation on construction of one and two-tenths miles of six-lane freeway along Mount Diablo Boulevard together with undercrossing and interchange ramps at the Orinda Crossroads.

This project, scheduled for completion early next year, will be the first link of the Oakland-Walnut Creek freeway, ultimately designed to overcome a congested traffic situation brought on by the rapid housing growth in the southeast section of Contra Costa County.

The Crossroads as part of the "Tunnel Strip," has been a well-known junction for numerous years. Formerly known as Bryant, the Crossroads is now the center of a community boasting 10,000 population. Protected from fog by the Eastbay hills, sprawling among semiwooded slopes, Orinda provides country living for metropolitan workers.

First Broadway Tunnel

Contra Costa County's first road ordinance, enacted in 1852, required all males 18 to 45 years of age to contribute five days road work per year. Road work then consisted of building and maintaining wooden bridges and filling ruts left indented by wagons and carriages. The first Broadway Tunnel, constructed of wooden beams and timber lining in 1897, remained in service until completion of the new low level tunnel in 1937. On April 1, 1931, Mount Diablo Boulevard, consisting of an 18-foot concrete pavement, became Route 75 (Sign Route 24) of the State Highway System by act of State Legislature.

In 1936, realignment, new gradients and widening to three lanes of asphalt pavement was done. Subsequently during the 1940's, Highway 24 was widened to four lanes from Oakland to



Orinda Crossroads, then known as Bryant, as it appeared in 1910

Walnut Creek and channelization with signals was introduced at the Orinda Crossroads.

Traffic Volume Increases

Traffic volume through the Crossroads increased from approximately 3,500 vehicles per day in 1931 to over 14,000 in 1941. During the war years, the vehicular count declined to less than 11,000 per day, effected by both gasoline rationing and curtailment of automobile manufacture. Lifting of these bans caused a rapid and steady increase in traffic which reached approximately 23,000 vehicles per day in 1947. There was little gain in traffic volume then until 1949 when the large building boom of the area projected a rising increase so that the volume is now approaching 37,000 vehicles per day.

The existing four-lane highway with the signalized intersection presents a serious bottleneck to commuters. During the evening peak hour period, traffic from the bay area approaches the intersection at the approximate rate of 1,500 vehicles per hour per lane. Since this volume greatly exceeds the capacity of the signalized intersection there results a long back-up of vehicles and an undesirable delay to the commuters, particularly in the evening peak period.

Delay of morning traffic is somewhat less, due to a lighter but longer peak period. Traffic accidents or slow moving trucks during the peak periods cause further traffic backlogs and added loss of vehicular time reaching momentous proportions.

Traffic slowdown is also accentuated by the commuters taking keen interest in work progress during their daily drive through the project.



How the Orinda Cloverleaf will look when completed early in 1955. Carleton Moore, staff artist for the "Oakland Tribune," has, from careful study of construction plans, superimposed the interchange on an aerial photograph.

Traffic Handling Problem

As the alignment of the new freeway corresponds in general with that of the existing highway, routing of the large volume of traffic during construction creates quite a problem. Planning of the project included six stages of traffic patterns. Spot construction is prevalent on both sides of the existing highway with temporary connections being made so that traffic may use the completed portions as detours. Placing of temporary signals is being done to accommodate cross traffic during construction of the final half of the underpass structure.

The big Orinda slide of December, 1950, which closed State Highway 24

for several days was brought to mind when a deep culvert excavation removed support from an adjacent hillside and precipitated its movement towards the highway. Quick action by the contractor's crew in bulldozing earth back into the trench succeeded in containing the movement to negligible proportions and prevented disastrous consequences to the several residences.

Orinda Road Undercrossing

A reinforced concrete box girder bridge composed of two adjacent structures, each of one span 91 feet in length, supported by reinforced concrete abutments on steel piles, will pro-

vide six lanes divided for east-west freeway traffic over four-lane north-south traffic. Right-turn movements follow basically the diamond pattern and encompass two cloverleaf quadrants for left turning traffic onto the freeway. Left turning off the freeway will be accomplished by use of the right turn off-ramps then making a left turn to merge with the undercrossing traffic.

The freeway geometrical section consists of six 12-foot lanes separated by a 40-foot division and having 8-foot outside shoulders. Provision is also made for a future 8-lane highway with 16-foot division of both freeway and bridge.

The freeway structural section consists of eight inches of portland cement concrete on 12 inches of imported sub-base of which the top four inches is cement treated. Shoulders consist of three inches of plant-mixed surfacing on six inches of crusher run base all on 10 inches of imported subbase material.

The crossroad and ramps consist of three inches of plant-mixed surfacing on six inches of cement treated base all on eight inches of imported subbase material.

The work is under the general supervision of Assistant State Highway Engineer B. W. Booker, with the author as resident engineer and W. C. Names as the Bridge Department representative of the project.

FORMOSA WANTS MAGAZINE

CHICAGO, ILLINOIS

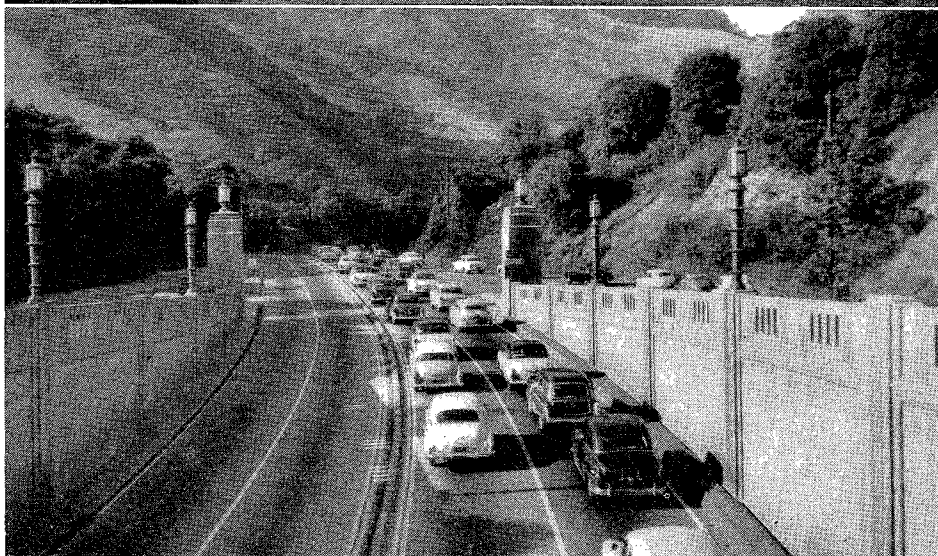
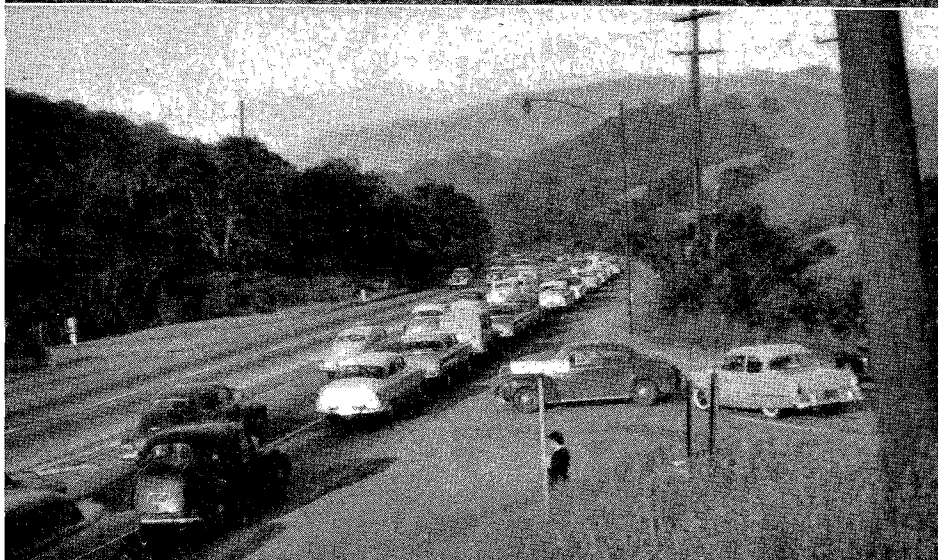
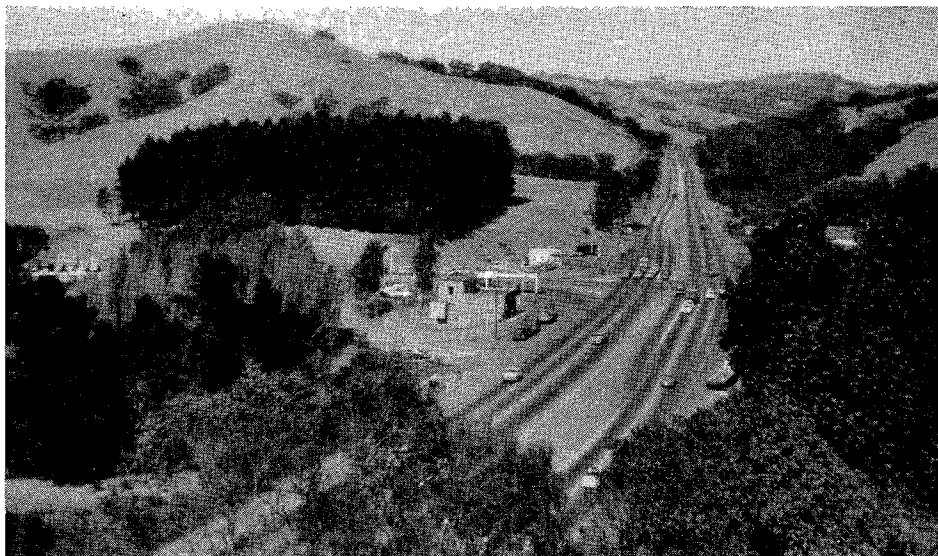
MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: Please accept my sincerest thanks for your very kind letter about a month ago. It is really very kind and nice of you to promise to send a free copy of your highway magazine to my friend in Formosa, Mr. Chen-Teng Lui of the Taiwan Highway Bureau.

Having worked for the Illinois State Highway Division, I have read your magazines very frequently at my office. Our bureau chief, Mr. George F. Hagenauer, has also a copy from you. I sincerely believe that your publication is the best among all the highway magazines throughout this Country. Therefore, I am very happy to know that my friend, Mr. Lui, can have such an excellent opportunity to have a copy for his office. I believe that he and his fellow-workers will be greatly improved through the instructions and actual experiences that you have carefully analyzed and collected for your magazine. This is, of course, one of the best ways you have helped us directly in the highway construction in my native country, China.

Very sincerely yours,

THADDEUS YANG



UPPER: The Orinda Crossroads in September, 1953, prior to construction. CENTER: Morning traffic back-up one mile east of the Orinda Crossroad signal, May, 1954. LOWER: Afternoon traffic back-up two miles west of the Orinda Crossroad signal, May, 1954, showing east portal of Broadway Tunnel.

COME ON OVER

BOURNEMOUTH, ENGLAND

DEAR MR. ADAMS: I am delighted with *California Highways and Public Works*.

In September, 1953, I went to the United States for a month in connection with the fall meeting of the Acoustical Society of America at Cleveland, Ohio, followed by a lecture tour including St. Louis and Boston and places in between traveling by road but not, alas, to California.

My companion, however, was John Webster of the Navy Electronics Lab. in San Diego. When I expressed delight in such marvels as the Pennsylvania Turnpike, the Lincoln and Holland Tunnels and the George Washington Bridge, he insisted that California had bigger and better marvels, and he has since sent me several copies of your journal.

I read every page with the greatest of pleasure, especially as I can feel that it is produced by real enthusiasts, who evidently share my delight in the glorious achievements of highway engineering that are so typically American. I have formed a determination to go and see it all myself and see how the Bayshore Freeway is getting on and to have a look at the Richmond-San Rafael Bridge.

Yours sincerely,

WALTER LAWRENCE
Signal Research and Development
Establishment, England

WE THANK YOU

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: We always enjoy reading your fine magazine, *California Highways and Public Works*, and we find the engineering material in your September-October issue very impressive.

I wish to express our appreciation to you and your staff.

Sincerely yours,
KENNETH B. BARNES, *Editor*

BIGGEST KILLER

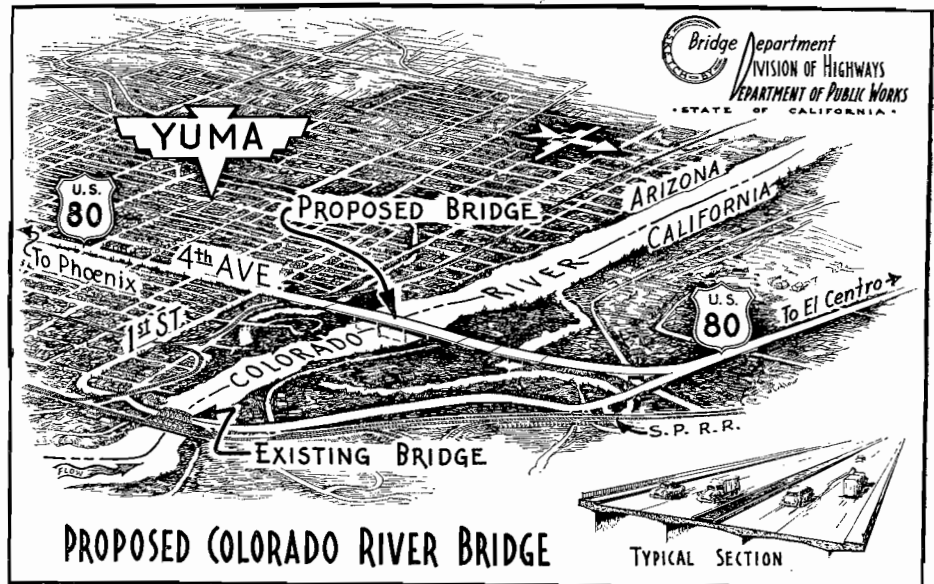
Motor vehicle accidents are still the biggest single killer of children from 1 to 14 years of age.

JOINT VENTURE — NEW COLORADO RIVER SPAN

The Division of Highways will open bids in Los Angeles on December 2d for construction of a bridge across the Colorado River on US Highway 80 which will connect Winterhaven, Imperial County, and Yuma, Arizona, and for which California and Arizona have budgeted a total of \$1,600,000.

budgeted \$800,000 to cover this State's share of the construction cost.

Although a new bridge is required to meet traffic conditions, it is proposed to keep the existing bridge in service as "Business Route 80." It also will serve the Indian School on the California side of the river.



The two states will share equally in the cost of the bridge, which will be built under the supervision of the California Division of Highways. In other contracts, Arizona will construct the approach to the bridge on its side of the river and California will build almost a mile of new highway from Winterhaven to the bridge.

On the Arizona side, the bridge will connect with an extension of Fourth Street in Yuma.

The new bridge, to be located about half a mile downstream from the present crossing, will be about 837 feet long, of riveted steel plate girder construction. There will be five spans, and a reinforced concrete deck supported by reinforced concrete abutments and piers, with steel pile foundations.

Two 28-foot roadways, separated by a median strip almost six feet wide, will be provided for four-lane traffic. There also will be a five-foot sidewalk. The California Highway Commission has

The present bridge is one way for trucks and busses and is posted for a speed limit of five miles an hour for vehicles of more than 10 tons in weight. Average daily traffic volume is 6,000 vehicles, about one-fifth of them commercial.

The California Division of Highways expects to advertise soon for bids on the construction of a four-lane divided highway to take US 80 on the new line from Winterhaven to the new bridge. Funds in the amount of \$455,000 have been budgeted for the work. The route for this section of highway was adopted last May. It curves southwesterly of the present highway and is almost a third of a mile shorter.

TRY COURTESY WITH PEDESTRIANS

Try a little courtesy with pedestrians. You don't have to force them back on the sidewalk when they have a right to cross or oblige them to jump to avoid your bumper.

Traffic Count

Shows for 1954 an Increase
Of 5.75 Percent Over That of 1953

By G. T. McCOY, State Highway Engineer

THE ANNUAL state-wide traffic count taken on Sunday and Monday, July 18 and 19, 1954, shows an increase of 5.75 percent over the previous annual count of July, 1953. This gain is not general as evidenced by the fact that interstate travel showed a decrease. The count increase is due primarily to the high volumes of traffic induced by the expanding mileage of freeways, particularly in the Los Angeles and San Francisco areas of the State.

Freight Vehicles Show Greatest Increase

Monthly traffic counts again show freight vehicles increasing at a substantially faster rate than passenger vehicles. Also, for the third straight year, Sunday traffic increases are markedly less than those for weekday traffic. These factors point to the diminishing influence of pleasure travel in the over-all traffic picture.

Covered 16-hour Period

No change was made from the regular procedure of previous years in the manner of taking the count. Actual recording covers the 16-hour period from 6 a.m. to 10 p.m. for both Sunday and Monday, totals being shown for each hour. At selected representative stations, counts are also continued for the entire 24-hour period and are extended to record each of the seven days of the week. Traffic is segregated into the following vehicle classifications: California passenger cars, out-of-state passenger cars, busses, pickups, two-axle com-

SITTIN' AND COUNTIN'

Equipped with clickers, chart and code,
Here I sit by the side of the road—
I mean by the side of the highway,
For once each year, in mid-July
We count the cars as they roll by,
So the State will know where the taxes go
On the heavier traveled highways.

Busses and trucks and passenger cars,
Two-axle, three-axle— oh, my stars—
What are those three-cornered concrete things
Like coffins on edge, in pairs or strings
Of three or more, just what are they?
Some off-breed truck, in cement gray,
Cruising along on the highway?

Big semi's and panels and pickups
A jalopy that seems to have hiccups,
And coming up slowly beside her,
Like a giant tall-legged spider,
A yellow johemi is creeping along,
And where on the chart does it belong?
And where on the crowded highway?

A cement truck goes whirling by,
Mixing its contents on the fly,
A flat-bed truck with tail-end flags,
And a "foreign" car that gaily drags
A trailer packed with beds and bags
That like a jointed beetle wags
Itself along the highway.

Tractors and trailers and foreign jobs,
Tankers and oil-trucks roar by in mobs;
Four-axle, five-axle— big dual tires—
Sigh on the road like singing wires—
As I count with clickers, chart and code
Sitting alone by the side of the road—
Or I mean by the side of the highway.

—MARION S. SCHERMERHORN
San Bernardino

mercial units, three-axle units, four-axle units, five-axle units, and six-or-more-axle units.

Minor Changes Necessary

Each year some minor changes in the census become necessary, such as the relocation, addition, or discontinuance of individual stations; but in every instance these are excluded in determining comparison with the previous year, only those stations that were identical during the years 1953 and 1954 being taken into consideration.

These comparisons for the various route groups are as follows:

PERCENT GAIN OR LOSS FOR 1954 COUNT AS COMPARED WITH 1953

| | Sunday | Monday |
|-------------------------------------|--------|--------|
| All routes..... | +3.35 | +6.15 |
| Main north and south routes..... | +5.57 | +7.40 |
| Interstate connec- tions | -2.98 | -1.35 |
| Laterals bet. in- land and coast | +1.13 | +5.26 |
| Recreational routes | +2.28 | +7.02 |

The gain or loss of traffic volume for State Highway Routes 1 to 80, inclusive, which constitute the basis for the foregoing summary, is shown in the follow tabulation:

| Route | Termini | 1954—Percent gain or loss | | | |
|--|---------|---------------------------|------|--------|------|
| | | Sunday | | Monday | |
| | | Gain | Loss | Gain | Loss |
| 1. Sausalito-Oregon line..... | | 2.81 | | 9.44 | |
| 2. Mexico line-San Francisco..... | | 15.60 | | 14.32 | |
| 3. Sacramento-Oregon line..... | | 0.59 | | 2.19 | |
| 4. Los Angeles-Sacramento..... | | 3.76 | | 4.68 | |
| 5. Santa Cruz-Junction Rt. 65 near Mokelumne Hill..... | | | 3.19 | | 3.25 |
| 6. Napa-Sacramento via Winters..... | | | 3.41 | 6.23 | |

| Route | Termini | 1954—Percent gain or loss | | | |
|--|---------|---------------------------|-------|--------|-------|
| | | Sunday | | Monday | |
| | | Gain | Loss | Gain | Loss |
| 7. Crockett-Red Bluff | | 4.00 | | 2.11 | |
| 8. Ignacio-Cordelia via Napa | | | 2.22 | 5.11 | |
| 9. Rt. 2 near Montalvo-San Bernardino | | | 4.14 | 2.59 | |
| 10. Rt. 2 at San Lucas-Sequoia National Park | | | 1.44 | 2.97 | |
| 11. Rt. 75 near Antioch-Nevada line via Placerville | | 1.01 | | 1.17 | |
| 12. San Diego-El Centro | | 7.27 | | 2.94 | |
| 13. Rt. 4 at Salida-Rt. 23 at Sonora Junction | | 0.21 | | 6.91 | |
| 14. Albany-Martinez | | | 1.67 | | 1.41 |
| 15. Rt. 1 near Calpella-Rt. 37 near Cisco | | 6.77 | | 11.94 | |
| 16. Hopland-Lakeport | | 4.45 | | | 1.84 |
| 17. Rt. 3 at Roseville-Rt. 15, Nevada City | | | 3.18 | | 4.84 |
| 18. Rt. 4 at Merced-Yosemite National Park | | | 8.80 | 8.36 | |
| 19. Rt. 2 at Fullerton-Rt. 26 at Beaumont | | | 2.93 | 0.34 | |
| 20. Rt. 1 near Arcata-Rt. 83 at Park boundary | | 2.74 | | 4.34 | |
| 21. Rt. 3 near Richvale-Rt. 29 near Chilcoot via Quincy | | | 7.41 | 4.36 | |
| 22. Rt. 56, Castroville-Rt. 32 via Hollister | | 1.81 | | 6.43 | |
| 23. Rt. 4 at Tunnel Sta.-Rt. 11, Alpine Junction | | 3.52 | | 9.88 | |
| 24. Rt. 4 near Lodi-Nevada state line | | | 5.15 | 0.99 | |
| 25. Rt. 37 at Colfax-Rt. 83 near Sattley | | | 3.42 | 2.69 | |
| 26. Los Angeles-Mexico via San Bernardino | | 7.73 | | 14.27 | |
| 27. El Centro-Yuma | | | 8.44 | | 11.86 |
| 28. Redding-Nevada line via Alturas | | | 9.20 | 15.26 | |
| 29. Peanut-Nevada line near Purdy's | | | 9.10 | 4.63 | |
| 31. Colton-Nevada state line | | | 1.93 | 1.07 | |
| 32. Rt. 56, Watsonville-Rt. 4 near Califa | | | 1.98 | 0.34 | |
| 33. Rt. 56 near Cambria-Rt. 4 near Famoso | | | 8.14 | | 1.16 |
| 34. Rt. 4 at Galt-Rt. 23 at Pickett's Junction | | 0.34 | | 4.44 | |
| 35. Rt. 1 at Alton-Rt. 20 at Douglas City | | 5.44 | | 2.04 | |
| 37. Auburn-Truckee | | | 7.38 | | 4.77 |
| 38. Rt. 11 at Mays-Nevada line via Truckee River | | 7.31 | | 19.34 | |
| 39. Rt. 38 at Tahoe City-Nevada state line | | 30.53 | | 29.50 | |
| 40. Rt. 13 near Montezuma-Rt. 76 at Benton | | 28.30 | | 26.19 | |
| 41. Rt. 5 near Tracy-Kings River Canyon via Fresno | | 7.71 | | 10.01 | |
| 42. Redwood Park-Los Gatos | | | 12.40 | | 0.89 |
| 43. Rt. 60 at Newport Beach-Rt. 31 near Victorville | | 1.68 | | 7.06 | |
| 44. Boulder Creek-Redwood Park | | | 2.49 | 13.98 | |
| 45. Rt. 7, Willows-Rt. 3 near Biggs | | 0.11 | | | 6.73 |
| 46. Rt. 1 near Klamath-Rt. 3 near Cray | | | 13.75 | | 3.56 |
| 47. Rt. 7, Orland-Rt. 29 near Morgan | | | 5.73 | | 2.74 |
| 48. Rt. 1 N. of Cloverdale-Rt. 56 near Albion | | | 5.08 | 9.61 | |
| 49. Napa-Rt. 15 near Sweet Hollow Summit | | 3.66 | | 7.42 | |
| 50. Sacramento-Rt. 15 near Willbur Springs | | | 1.27 | 2.15 | |
| 51. Rt. 8 at Shellville-Sebastopol | | 9.08 | | 19.93 | |
| 52. Alto-Tiburon | | 0.44 | | 16.36 | |
| 53. Rt. 7 at Fairfield-Rt. 4 near Lodi via Rio Vista | | 4.15 | | | 0.07 |
| 54. Rt. 11 at Perkins-Rt. 65 at Central House | | 1.06 | | 3.86 | |
| 55. Rt. 5 near Glenwood-San Francisco | | 8.77 | | 2.19 | |
| 56. Rt. 2 at Las Cruces-Rt. 1 near Fernbridge | | 0.57 | | 6.45 | |
| 57. Rt. 2 near Santa Maria-Rt. 23 near Freeman via Bakersfield | | | 2.83 | | 0.26 |
| 58. Rt. 2 near Santa Margarita-Arizona line near Topock via Mojave and Barstow | | | 3.87 | | 5.06 |
| 59. Rt. 4 at Gorman-Rt. 43 at Lake Arrowhead | | 8.76 | | 12.56 | |
| 60. Rt. 2 at Serra-Rt. 2 at El Rio | | | 5.26 | | 3.32 |
| 61. Rt. 4 S. of Glendale-Rt. 59 near Phelan | | 16.59 | | 5.56 | |
| 62. Rt. 171 near Buena Park-Rt. 61 near Crystal Lake | | 23.40 | | 15.28 | |
| 63. Big Pine-Nevada state line | | | 35.14 | | 21.91 |
| 64. Rt. 2 at San Juan Capistrano-Blythe | | | 7.88 | | 7.37 |
| 65. Rt. 18 near Mariposa-Auburn | | 4.13 | | 8.96 | |
| 66. Rt. 5 near Mossdale-Rt. 13 near Oakdale | | | 5.38 | 1.99 | |
| 67. Pajaro River-Rt. 2 near San Benito River Bridge | | 7.84 | | 9.94 | |
| 68. San Jose-San Francisco | | 10.16 | | 13.94 | |
| 69. Rt. 5 at Warm Springs-Rt. 1, San Rafael | | 6.50 | | 6.46 | |
| 70. Ukiah-Talmage | | | 6.46 | 9.26 | |
| 71. Crescent City-Oregon line | | 12.71 | | | 5.02 |
| 72. Weed-Oregon line | | 1.26 | | 3.61 | |
| 73. Rt. 29 near Johnstonville-Oregon line | | 5.60 | | 11.38 | |
| 74. Napa Wye-Cordelia via Vallejo and Benicia | | | 1.90 | | 4.00 |
| 75. Oakland-Junction Rt. 65 at Altaville | | | 3.00 | 2.71 | |
| 76. Rt. 125 at Shaw Ave.-Nevada state line near Benton | | 8.93 | | 8.02 | |
| 77. San Diego-Los Angeles via Pomona | | 2.07 | | | 1.59 |
| 78. Rt. 12 near Descanso-Rt. 19 near March Field | | 1.43 | | | 6.34 |
| 79. Rt. 2, Ventura-Rt. 4 at Castaic | | 0.77 | | 1.77 | |
| 80. Rt. 51, Rincon Creek-Rt. 2 near Zaca | | 10.74 | | 9.08 | |

Herbert R. Robinson

Herbert R. "Bert" Robinson of the Division of Highways will retire at the end of the year, bringing to an end 34 years of service with the State, all of it with the District IV office.

Bert came to work for the division as a member of a survey party in Marin County on April 15, 1920. For the past several years he has been assigned to construction projects in the Santa Cruz area, where he has done location and survey work.

Bert was born in Bryson City, North Carolina, and attended grade and high school at Conconully, Washington. From 1911 to 1917 he worked for various private companies including two years as rodman and chainman on the Kittle Valley Railroad survey in British Columbia.

During World War I he served with the U. S. Army Artillery, coming to California in 1920 after he received his discharge.

After retirement, Bert intends to live at his home at 222 San Lorenzo Avenue in Felton.

THIS LETTER IS APPRECIATED

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: This is to express the appreciation of the people in this community interested in highways for the fine article on the "Development of Historic US 50" in the September-October issue of *California Highways and Public Works*. Also I wish to add my appreciation for the article on page 22 on the opening of the Monitor Pass route on Highway 89 in Alpine and Mono Counties. This highway will ultimately be of great importance to Amador County and the Lake Tahoe region of El Dorado County.

Please accept my congratulations on the colored cover picture of Strawberry and Lovers Leap on US Highway 50. It is a fine piece of work.

Very sincerely yours,

SWIFT BERRY
State Senator

NEW RIGHT-OF-WAY GROUP FORMED

The third group of right-of-way men in California to become affiliated with the American Right-of-Way Association was officially recognized in San Diego when the San Diego Club Affiliate of Los Angeles Chapter No. 1 was granted its charter at an inaugural dinner meeting attended by members of the Los Angeles chapter and many prominent San Diegans before an audience of 140 men.

to operate locally through the aid of the chapter in furnishing speakers and educational seminars."

Balfour Gives Address

In accepting the charter on behalf of the club, Webb added that he "hoped that our experience and the pattern that has been established will be helpful toward the formation of other club affiliates where needed."



Left to right: Chapter President Dexter D. MacBride, Club Chairman John C. Webb, National Chairman Frank C. Balfour

In presenting the charter to its newly elected chairman, John C. Webb, Supervising Right-of-Way Agent of the Division of Highways in District XI, President Dexter MacBride, Senior Right-of-Way Agent for the Division of Highways in District VII, outlined the purposes of the club affiliate.

"There are many members," said MacBride, "who reside too far from the chapter headquarters to attend meetings regularly, and enjoy the benefits of the association's educational program. The club affiliate, with relatively few members, is able

National Chairman Frank C. Balfour, Chief Right-of-Way Agent for the Division of Highways, gave an address on "The Aims and Policies of the American Right-of-Way Association."

"If we desire to maintain professional status, obviously we must operate as professional men," said Balfour. He urged the members to abandon the time worn practice of "horsetrading" in negotiations for the purchase of right of way and to base offers on sound prenegotiation appraisals made

by capable and thoroughly trained men.

"The very foundation on which the American Right-of-Way Association was created and exists is *education*," continued Balfour. "Better education of our land acquisition members to the end that they are better equipped to serve their employers, and at the same time to more efficiently and honestly protect the property owners who are affected by our operations.

"As of this date, there is not a single university or college in the United States that gives a full four-year course to properly educate and train young men to accept positions in the right-of-way profession.

Educational Program

"The only educational program that is being carried on in this Nation to train and assist right-of-way men so that they can better serve the taxpayers or the stockholders of the organizations they represent is by the American Right-of-Way Association and this condition exists notwithstanding the fact that public and quasi-public right of way and land acquisition men are confronted during the calendar year 1954 with a program of acquiring lands and rights in lands that will exceed 7 billion dollars in expenditures.

"A tremendous amount of the taxpayers' and stockholders' money is being spent and will continue to be spent for land acquisition in our State, and we in the American Right-of-Way Association cannot and will not, in fairness to our principals who are planning these vast improvements, or to the affected property owners, entrust the expenditure of this huge sum of money to inexperienced or untrained personnel.

"We must realize that inefficiency or incompetency to the extent of only 10 percent would, in the California State Highway Right-of-Way Department alone, represent a loss of 10 million dollars to our taxpayers during the current year."

Elected Officers

Other elected officers of the club are V. L. Larson, Right of Way Supervisor of The Pacific Telephone & Telegraph Company, Vice Chairman,

... Continued on page 57

Cost Index

Downward Trend Breaks as Highway Construction Costs on Rise

By RICHARD H. WILSON, Assistant State Highway Engineer; H. C. McCARTY, Office Engineer; JOHN D. GALLAGHER, Assistant Office Engineer

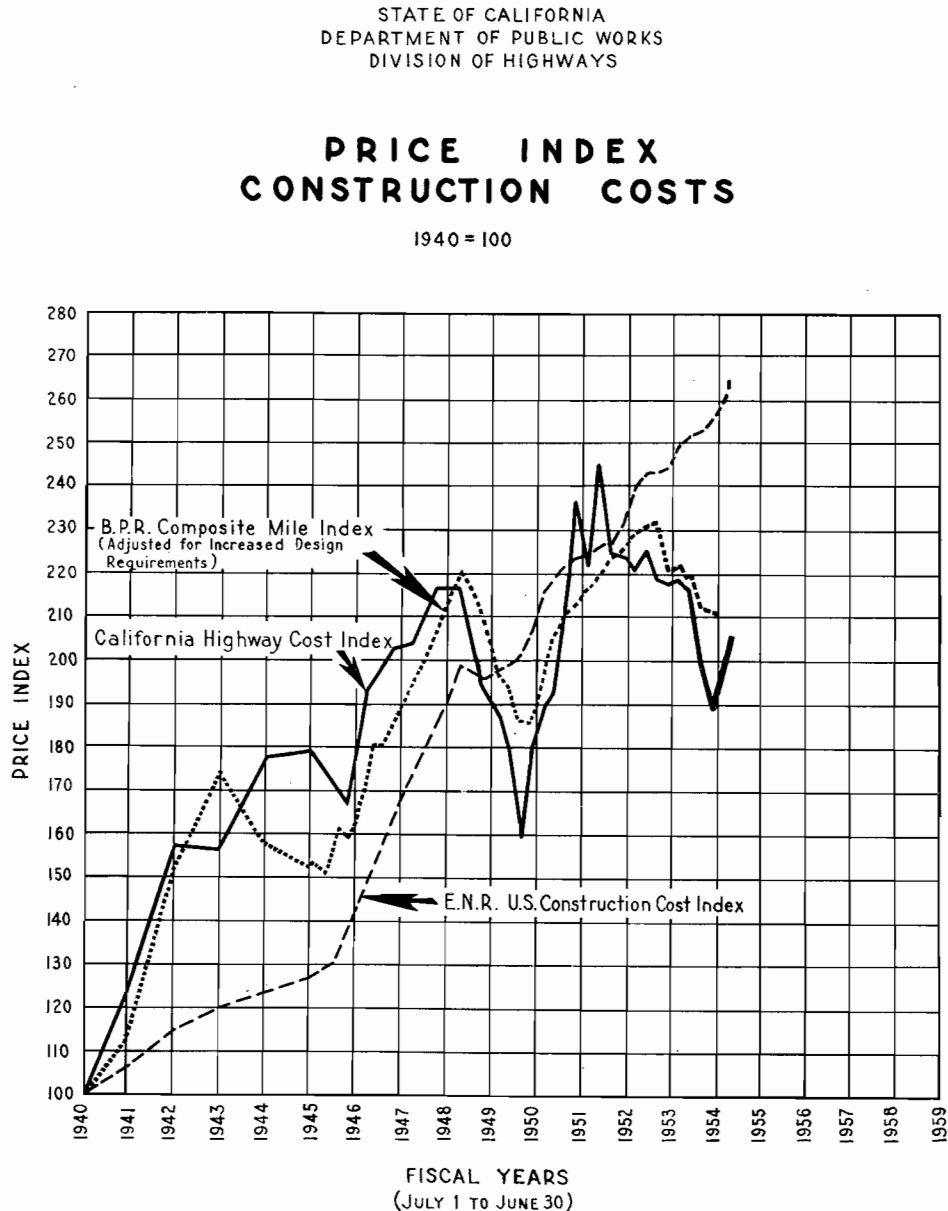
THE ANTICIPATED break of the general downward trend in highway construction costs in California, which has been in progress since the fourth quarter of 1951, was apparently reached during the third quarter of 1954.

The upswing is indicated by a rise of 9.9 percent in the California Highway Construction Cost Index over the second quarter. Computation of the index showed it to be at 207.8 (1940 = 100) for the months of July, August and September, a rise of 18.8 index points over the 189.0 for April, May and June. The third quarter index is 4.2 percent over that of the first quarter of the year, but is 4.8 percent below the fourth quarter of 1953. It still is 15.3 percent under the 245.4 for the fourth quarter of 1951, which was the highest point in Division of Highways history. However, it is 29.9 percent above the first quarter of 1950, which was the low point prior to the Korean outbreak.

The accompanying tabulation shows the California Highway Construction Cost Index by years from 1940 to 1949 and by quarters from 1950 to 1954.

THE CALIFORNIA HIGHWAY CONSTRUCTION COST INDEX

| Year | Cost Index |
|--------------------|------------|
| 1940 | 100.0 |
| 1941 | 125.0 |
| 1942 | 157.5 |
| 1943 | 156.4 |
| 1944 | 177.8 |
| 1945 | 179.5 |
| 1946 | 179.7 |
| 1947 | 203.3 |
| 1948 | 216.6 |
| 1949 | 190.7 |
| 1950 (1st quarter) | 160.6 |
| 1950 (2d quarter) | 180.0 |
| 1950 (3d quarter) | 189.2 |
| 1950 (4th quarter) | 194.8 |
| 1951 (1st quarter) | 215.4 |
| 1951 (2d quarter) | 238.3 |
| 1951 (3d quarter) | 221.9 |
| 1951 (4th quarter) | 245.4 |



| | | | |
|--------------------|-------|--------------------|-------|
| 1952 (1st quarter) | 224.8 | 1954 (1st quarter) | 199.4 |
| 1952 (2d quarter) | 224.4 | 1954 (2d quarter) | 189.0 |
| 1952 (3d quarter) | 221.2 | 1954 (3d quarter) | 207.8 |
| 1952 (4th quarter) | 226.2 | | |
| 1953 (1st quarter) | 218.3 | | |
| 1953 (2d quarter) | 217.5 | | |
| 1953 (3d quarter) | 218.0 | | |
| 1953 (4th quarter) | 216.7 | | |

As previously reported, the decline in highway construction prices which has been general since the end of 1951 largely has been the result of keen competition among bidders and has

occurred in spite of continuing increases in labor costs resulting from wage boosts and extended fringe benefits. It seems apparent that with the upturn of bid prices on California highway construction, as indicated by the 9.9 percent rise in the index during the third quarter of 1954, the balance of factors which affect bid prices has swung from control by competition to control by increased payments to labor.

It is believed, however, that excellent competition will continue, which coupled with continuing improvements in production through mechanical means will hold the rise in check. The effect of the proposed large federal highway building program would probably tend toward an upward trend in prices.

The accompanying tabulation of average contract unit prices for the eight items on which the California Highway Construction Cost Index is based shows such unit prices by years and quarters since 1940. From this tabulation it will be noted that during the

third quarter of 1954 the average unit prices for six of the eight items showed increases, only the average unit prices of untreated rock base and portland cement concrete pavement declined, the other six all showed increases.

The largest increase was in structural steel which jumped 42.1 percent, nearly 5 cents a pound. While this increase in the price of structural steel is in some degree the result of rising labor costs catching up with bid prices, much of the high jump may be attributed to the fact that during the second quarter seven state highway contracts were awarded for work in the San Francisco and Los Angeles metropolitan areas which involved unusually large quantities of steel. The total quantity of structural steel in contracts awarded during the second quarter of 1954 was approximately 15,000,000 pounds. For the third quarter it was less than 4,000,000 pounds. Undoubtedly these differences in volume accounted for much of the difference in the average unit prices for this item—\$0.162 per pound

in the third quarter as compared to \$0.114 per pound in the second quarter.

However, aside from the item of structural steel, while during the last several quarters contractors have been submitting lower prices in the face of increased labor costs, these increased costs have piled up to the point of counterbalancing the factor of competition.

Roadway excavation rose 13.2 percent during the third quarter, plant-mixed surfacing went up 9.1 percent, structural concrete increased 5.2 percent and bar steel 2.2 percent. While asphalt concrete pavement rose 35.1 percent the quantity placed during the quarter was insufficient to carry much weight in the over-all rise of the index. It is interesting to note that the two items which dropped involve large quantities of rock and both dropped by approximately the same amount 11.5 percent for untreated crushed rock and 11.6 percent for portland cement concrete pavement.

The accompanying chart compares the California Highway Construction Cost Index with the U. S. Bureau of Public Roads Composite Mile Index and the Engineering News-Record Construction Cost Index, all reduced to the base of 1940 = 100. The Bureau of Public Roads Composite Mile Index at 211.0 for the second quarter of 1954 was still following closely on a national basis the California Index. The Engineering News-Record Index, which includes all classes of construction on a nation-wide basis, continued during the third quarter its rise, from 255.8 to 264.9 (up 3.6 percent). The large percentage of building construction included in this latter index is apparently responsible for the differences between it and the two road construction cost indexes.

While highway construction prices in California made a sharp upturn during the third quarter it is thought that the trend will be to level off with a much slower rate of rise during the next few quarters.

EMPLOYMENT

Total employment in American automotive manufacturing plants reached 920,000 during 1953, according to the National Automobile Club.

CALIFORNIA DIVISION OF HIGHWAYS—AVERAGE CONTRACT PRICES

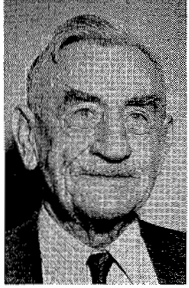
| | Roadway excavation, Per cu. yd. | Crusher run base, Per ton | Plant mix surfacing, Per ton | Asphalt concrete pavement, Per ton | PCC pavement, Per cu. yd. | PCC structures, Per cu. yd. | Bar reinforcing steel, Per lb. | Structural steel, Per lb. |
|------------------|---------------------------------|---------------------------|------------------------------|------------------------------------|---------------------------|-----------------------------|--------------------------------|---------------------------|
| 1940 | \$0.22 | \$1.54 | \$2.19 | \$2.97 | \$7.68 | \$18.33 | \$0.040 | \$0.083 |
| 1941 | 0.26 | 2.31 | 2.84 | 3.18 | 7.54 | 23.31 | 0.053 | 0.107 |
| 1942 | 0.35 | 2.81 | 4.02 | 4.16 | 9.62 | 29.48 | 0.073 | 0.103 |
| 1943 | 0.42 | 2.26 | 3.71 | 4.76 | 11.48 | 31.76 | 0.059 | 0.080 |
| 1944 | 0.50 | 2.45 | 4.10 | 4.50 | 10.46 | 31.99 | 0.054 | 0.132 |
| 1945 | 0.51 | 2.42 | 4.20 | 4.88 | 10.90 | 37.20 | 0.059 | 0.102 |
| 1946 | 0.41 | 2.45 | 4.00 | 4.68 | 9.48 | 37.38 | 0.060 | 0.099 |
| 1947 | 0.46 | 2.42 | 4.32 | 5.38 | 12.38 | 48.44 | 0.080 | 0.138 |
| 1948 | 0.55 | 2.43 | 4.30 | 5.38 | 13.04 | 49.86 | 0.092 | 0.126 |
| 1949 | 0.49 | 2.67 | 4.67 | 4.64 | 12.28 | 48.67 | 0.096 | 0.117 |
| 1st quarter 1950 | 0.34 | 2.22 | 3.65 | 3.74 | 10.86 | 40.15 | 0.077 | 0.081 |
| 2d quarter 1950 | 0.40 | 2.13 | 4.48 | 3.74 | 10.86 | 43.03 | 0.080 | 0.105 |
| 3d quarter 1950 | 0.41 | 2.32 | 4.25 | 5.50 | 10.91 | 44.34 | 0.093 | 0.131 |
| 4th quarter 1950 | 0.42 | 2.81 | 4.64 | 4.61 | 12.55 | 43.18 | 0.098 | 0.120 |
| 1st quarter 1951 | 0.45 | 3.07 | 4.06 | 5.22 | 11.71 | 46.38 | 0.103 | 0.206 |
| 2d quarter 1951 | 0.63 | 3.88 | 4.56 | 4.63 | 12.93 | 51.50 | 0.105 | 0.166 |
| 3d quarter 1951 | 0.56 | 2.88 | 4.59 | 3.90 | 12.41 | 46.14 | 0.107 | 0.165 |
| 4th quarter 1951 | 0.66 | 2.91 | 5.66 | 4.89 | 12.71 | 49.38 | 0.105 | 0.169 |
| 1st quarter 1952 | 0.56 | 3.25 | 4.88 | 4.77 | 14.25 | 47.46 | 0.094 | 0.152 |
| 2d quarter 1952 | 0.53 | 3.19 | 5.29 | 4.13 | 14.20 | 49.12 | 0.091 | 0.143 |
| 3d quarter 1952 | 0.55 | 2.61 | 5.49 | 4.60 | 12.80 | 48.21 | 0.094 | 0.132 |
| 4th quarter 1952 | 0.66 | 2.68 | 4.97 | ----- | 12.53 | 48.45 | 0.094 | 0.128 |
| 1st quarter 1953 | 0.45 | *2.48 | 5.27 | 4.46 | 12.47 | 53.19 | 0.098 | 0.150 |
| 2d quarter 1953 | 0.50 | 2.07 | 5.38 | 4.59 | 13.06 | 52.68 | 0.091 | 0.132 |
| 3d quarter 1953 | 0.54 | 2.15 | 5.30 | 4.82 | 13.78 | 49.23 | 0.092 | 0.129 |
| 4th quarter 1953 | 0.48 | 2.11 | 4.74 | 4.47 | 14.77 | 53.41 | 0.105 | 0.139 |
| 1st quarter 1954 | 0.45 | 2.28 | 4.23 | 4.78 | 14.89 | 47.52 | 0.092 | 0.126 |
| 2d quarter 1954 | 0.38 | 2.09 | 4.29 | 5.18 | 14.28 | 47.12 | 0.093 | 0.114 |
| 3d quarter 1954 | 0.43 | 1.85 | 4.68 | 7.00 | 12.63 | 49.59 | 0.095 | 0.162 |

* Untreated rock base substituted for crusher run base at this point.

SAN MATEO AND DUMBARTON BRIDGE APPROACH PROBLEM

By R. H. "BARNEY" BARNWELL

Upon my reassignment to the Right of Way Engineering Section in June, 1952, Ed Hovde approached me with his arms full of maps, documents, instruments, preliminary reports and photostats. He laid them on the table, and said with a sardonic grin, "They're stinkers; make record maps." It did not take long for me to find that he was not fooling.



R. H. BARNWELL

For the San Mateo Bridge, some 50 deeds, agreements, documents, indentures, photostatic prints, microfilm enlargements of more deeds and so on had to be matched, rearranged and studied. Most of them indicated some encumbrance upon the title to our right of way. One deed, with the early date of September 19, 1867, had something to say about levees, on the Alameda side, part of which is now occupied by the east approach near the Mt. Eden Landing Road. Another conveyed a 50-foot easement to the Southern Pacific Company for railroad purposes from the present Southern Pacific Depot in San Mateo extending northerly to the Bayshore, crossing our right of way near the northeast corner of Shore View Tract No. 10 in San Mateo. The portion across the highway is still held by the company. The portions to the north and south of our right of way have been returned to the appropriate owners, heirs or assigns.

Guano Monument

Nearly all the documents describing land along the west approach refer to a U. S. C. and G. S. triangulation monument on Little Coyote Point at the Toll Plaza, which monument is called "Guano." The San Mateo County Ordinance No. 352, dated July 11, 1927, granting the franchise

R. H. Barnwell, who retired from his position as Associate Highway Engineer in District IV on July 1, 1954, performed an outstanding job on his last assignment with the Division of Highways. This work involved a determination of the right of way which was obtained by the State through the acquisition of the San Mateo and Dumbarton Bridges, together with their approaches.

While work of this type is highly technical from an engineering and legal standpoint, the unique references to many of the sidelights which Mr. Barnwell encountered make his article highly interesting to the layman as well as to professional readers.

and authorizing the construction and operation of the bridges goes so far as to fix the position of "Guano" by citing its latitude and longitude to the nearest 0.001 second of arc. The Coast Survey has incorporated it into the California Coordinate System with published Y and X coordinates to 0.01 of a foot. "Guano" is a very valuable point since it marks the control for the right of way from both directions and also marks the center line of the bridge, as built. It has been checked by triangulation of recent years and found to be exactly where it was originally placed.

Tide Lands Survey

The ordinance also mentioned the cost of the seven-mile bridge at the sum of \$7,500,000 and an annual maintenance and operating expense of exactly \$340,000. Upon these figures the original toll schedules were based. The list of items included everything from motorcycles at 20 cents up through tractors, autos, stagecoaches, trucks, and includes a "wagon of a 10-ton capacity" at \$1.

In many of the documents, frequent references are made to Tide Lands Surveys. An intensive study of this

subject was required which took me into the archives of the official records of both counties; into the San Francisco City Law Library, and to the Office of the State Land Commission in Sacramento. The personnel of each office was very helpful and generous with photostatic copies of the 30 Tide Lands Surveys Records needed.

Earliest Document

The earliest document found was dated 1856 describing as a 40-acre piece the southeast quarter of the northeast quarter of Section 23, T. 4 S., R. 4 W.; and naming it the S. & O. L. (Swamp and Overflow Land) Survey No. 10. It is recorded in Book 1 of Patents, page 184, San Mateo County Records.

In another deed, one reference proved to be very entertaining. The "call" in the description was, "thence N. 41,908', E., a distance of 5,772.5 feet more or less to the westerly boundary line of Tide Land Survey No. 87, Alameda County Surveys." By virtue of the distance given, that line, when plotted, showed up just east of the lift span and along the easterly edge of the deep water channel two miles and more into San Mateo County. That sent me hotfooting it to the Alameda County Surveyor's Office. A search placed T. L/S. No. 87 about two miles north of our right of way in Alameda County. In the Land Office in Sacramento, it was found that the deed "call" was in error. It should have read, "Tide Land Location No. 87 (formerly Tide Land Survey No. 127).

County Line Wanders

About the turn of the century many of the Tideland Surveys were changed in name to Tide Land Locations with a different number assigned. We also learned that the "peripatetic" Alameda-San Mateo county line had wandered back and forth across the Bay several times during

the last 80 years or so, finally coming to rest at its present position.

To get the picture of these various T. L. L., T. L. S., and S. and O. I. Surveys, a navigator's chart of San Francisco Bay—Southern Part—published by the U. S. C. and G. S. was secured. Upon this chart is shown in feet the depth to Bay bottom below mean lower low water; the deep water channel extending southeasterly into the mouth of the Guadalupe River, east of Palo Alto; and other topography, such as the two bridges. When the Tideland Surveys, etc., were plotted on the chart, the picture was surprising; practically all of the Bay bottom, even that below mean lower low water through which Routes 105 and 107 pass, was privately owned, except the 1¼ miles on Route 105, and the 1,500 feet on Route 107 across the deep water channel.

Low Tide Lands

The veiled implication that a great deal of the Bay bottom below mean lower low water might be owned unethically should not disturb any one's blood pressure. The water is so shallow that thousands of acres are useless for navigation for vessels with a draft greater than that of a small tugboat. At low tide, if the Bay bottom was solid, a man could walk for a mile and a half northwest from the Toll Plaza and not get his shoulders wet; in fact he could walk from the shore line near the east end of the San Mateo Bridge for five miles westerly to the curve in the bridge with his head always out of water.

On the other hand, the ingenuity of industry has been converting this otherwise useless vast area to society's benefit. Table salt is one very useful by-product, and portland cement is another. There are millions of tons of oyster shells in the muds of the Bay from which the cement is made. This means tax revenue to the counties from the land and income tax to the Federal Government from the manufactured products; therefore, the status quo should be maintained. Oysters were also harvested for many years until the pollution of the Bay waters rendered them unfit for food.

No, I don't own any stock in the salt or cement or oyster companies.

References

If you want more information about the Tide Land and Swamp and Overflow Lands Surveys, plan to spend a couple or three days (maybe more) in the San Francisco Law Library. Get Volume I of the Political Code of California of 1872, annotated, page 642, to use as a starting point, from whence you will wander through a maze of lawsuits and wind up with the answer, in general, that "tideland is that portion of a shore line that is periodically covered and uncovered by the waters of the ocean or a bay between mean higher high tide and mean lower low tide."

In *Randall vs. Caleb*, 32 Cal. 354, about 1860, the judge said, "Land periodically covered and uncovered by ordinary tides—." I haven't yet found a statutory definition of "tidelands"—maybe I haven't looked in the right book.

Let's take a look at T. 4 S., R. 3 W., M. D. B. & M. Our survey parties have done some excellent transbay triangulation and other surveying on the two bridges and adjoining highways, tying them together and reducing the data to the California Coordinate System. They also tied in the NE. corner monument of this township (in Alameda County) which has only one other corner monumented, the SW. in San Mateo County. Of the 36 sections in the township, only seven touch land and none are entirely on land. These two acceptable corners are not six miles apart along the cardinal bearings, being short by several hundred feet.

Monumented Section

There is another monumented section corner in the next township west, namely: the SE. corner of Sec. 23, T. 4 S., R. 4 W. This is an excellent point so far as it pertains to the land around it, southerly of the west approach in San Mateo County. It is also out of position with respect to the northeast corner of T. 4 S., R. 3 W., by about the same amount in the same direction.

Inasmuch as the Tide Land Surveys, Tide Land Locations and Swamp and

Overflow Land Surveys are tied to land controls on opposite sides of the deep water channel, it seems reasonable that the adjustments can be made at those section corners that lie along the channel, near the center. This would continue the use of bearings and lengths of the various surveys along E. W. and N. S. lines, full miles or fractions thereof as written into the original descriptions.

The subdivision of this township is not yet concluded. It is understood, of course, that these boundary lines are purely theoretical, for paper use only. The water is too deep at high tide to set up a transit—just imagine chaining out a mile in 7 to 10 feet of water with a six-knot tidal current running across the line! Some good surveyors might get their feet wet.

Bearings Selected

To start the arithmetic from San Mateo toward Alameda County, it was first necessary to select a bearing. I had a choice of six along Third Avenue, and seven after getting around the first curve at the northeast end thereof. The decision to use the bearing of the State Highway Overhead Structure at Third Avenue and Bayshore seemed logical, as it would avoid a bearing equation, so it was adopted even though it differs somewhat from the bearings in pertinent deeds.

True bearings and adjusted ground distances were used, several traverses were run between the limits of the project before winding up inside the right of way. Once we landed clear out behind old Mrs. Jones' chicken coop; however, we finally came up with a good answer, and, strangely enough, without violating too severely the original descriptions of any of the individual parcels. In one case, two abutting parcels refused to "abut" by about 12 feet, and in another case the center lines of two parcels refused to collide headon—tried to by-pass each other by several feet; but slight adjustments rectified these conditions.

During the solving of this problem, a profound discovery was made; namely, that by using the proper bearing and the correct functions multiplied by the correct distances by

properly handling the calculator, a correct answer resulted!!!! Nearly six months was required to make the record map; it *was* "a stinker," but an interesting one, comprising 18 plates.

Dumbarton Bridge and Approaches

This is Route SM-Ala-107-B, A, 6½ miles long, from Willow Road at the Southern Pacific Railroad right of way, Palo Alto, to Jarvis Road near Newark in Alameda County. It was purchased by the State in September, 1951, along with the San Mateo Bridge.

The characteristics of this project were quite different from the San Mateo Bridge R/W. The parcels were described by "leaps and mounds," as an old prospector friend of mine in Arizona once said. Most troublesome was the reduction to the California Coordinate System.

The franchise was granted under authority of San Mateo County Ordinance No. 330, dated 11/20/24, which also authorized the construction and the operation of the bridge; it also fixed the original tolls. There were no wagons of "10-ton capacity" listed, but some of the items for which tolls are collected were as follows: telephone message, ½ cent; telegraph messages, 1 cent; each 100 gallons of water, 1 cent; and 5 cents for each barrel of 42 gallons of oil. Many other items included wagons, autos, trucks, tricycles, motorcycles, etc. Exempt from paying tolls were "any persons going to or from a funeral, school, performing maintenance labor or attending a military parade or court of law he is required to attend as a witness in a criminal case."

There were several "gimmicks" in the right of way. The most puzzling was the 3,200 feet beginning at the northern Southern Pacific right-of-way line at the west end of the private road. The only document on record was a "Notice of Pendency of Action," which means that the land owners were going to be sued in condemnation for the right of way. The parcel desired for the roadway purposes was accurately described and was very nearly what the State now desires, even though it was written 25 years before the State made the

purchase. The suit was never consummated.

There is an unrecorded agreement between the landowners and the bridge company, having a very casual description, such as: "* * * and extending in a uniform width of 200 feet northeasterly to a connection with a right of way granted by the Spring Valley Water Company to the bridge company, etc." The road was built clear outside of that one at one place.

Easement Granted

Meanwhile the Spring Valley Water Company had granted an easement in the shape of a parallelogram across its 100-foot right of way that is about 0.300 feet to the north of the railroad and across our right of way.

This easement fitted perfectly into the description of the "Notice to Condemn."

A couple of years later, the bridge company decided that the east half of this parallelogram was in the wrong place, so they prevailed upon the water company to trade it for a similar shaped and sized piece on the west side of the road. We found the piece that was on the east side, but is now on the west side, belongs to the east side. An effort is now being made to trade the piece that was on the east side and is now on the west side for a similar piece on the east side.

Condemnation Suit

This all happened in San Mateo County. The Alameda County side is quite different. The bridge company brought suit condemning the entire right of way from the east bridge end to Jarvis Road, describing the entire strip by metes and bounds. There were no references in any of the documents about the position of the center line of the right of way in relation to the center line of the roadway, and considerable difficulty was encountered along the easterly couple of thousand feet trying to make our survey line fit the right-of-way description.

I learned that the Resident Engineer on the construction of the bridge and roadway, a Mr. Frank M. Cortelyou, is now in Kansas City conducting his

own consulting engineering practice. A letter to him got us some very helpful information, showing where the traveled way had been built. Its center line differed from the right-of-way center line by as much as 15 feet in places. Very shortly thereafter the record map had reached the checking stage—12 plates. It was a puzzling but interesting study.

In passing I can't help commenting a little about one deed that played a small part in this study, namely: the Spring Valley Water Company's deed to the City and County of San Francisco in 1930; this is a neat little book of 127 pages and averaging some 500 words per page. It covered about 100 parcels of land, easements, water rights, etc. One parcel contained 19,000 acres, the description of which contained some 7,000 words and would probably require 50 right-of-way traverse sheets to calculate!

RIGHT-OF-WAY GROUP

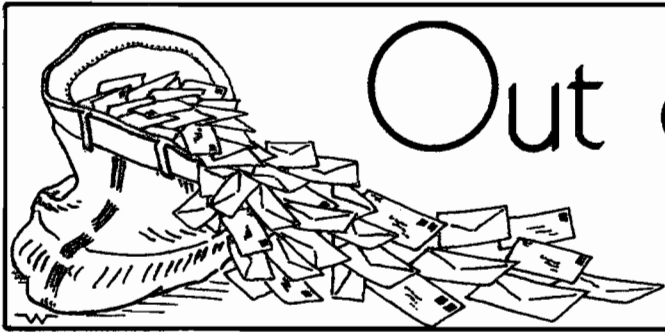
Continued from page 52 . . .

and John G. McGregor, Vice President of the Union Title Insurance and Trust Company, Secretary-Treasurer.

Honored guests attending the meeting included S. V. Cortelyou, Assistant State Highway Engineer, retired; E. E. Wallace, District Engineer, Division of Highways, District XI, San Diego; Judge L. N. Turrentine, Presiding Judge of the Superior Court of San Diego County; James A. Robbins, chairman of the Board of Supervisors, San Diego County; E. W. Blom, Assistant City Manager, San Diego; E. D. Sherwin, President, San Diego Gas & Electric Company; Lawrence T. Cooper, Assistant Vice President, The Pacific Telephone and Telegraph Company, Los Angeles; Commander E. G. Dobbins, Executive Officer, District Public Works Office, Eleventh Naval District; and Dr. Charles Landon, Dean of Business Affairs, San Diego State College.

TRUCK TRANSPORTATION

Truck transportation creates employment directly for some 6,260,000 people in the United States, according to the National Automobile Club.



Out of the Mail Bag

FROM A PLANNING DIRECTOR

SAN LEANDRO, CALIF.

MR. KENNETH C. ADAMS, *Editor*

DEAR SIR: I have found that *California Highways and Public Works* has been highly informative and a thoroughly enjoyable publication to read. I look forward to receiving it every two months.

Let me emphasize the value that this office places upon your publication. We find that it provides an excellent opportunity to keep in touch with the tremendous growth of our highway system in California.

Very truly yours,

GEORGE R. VOLKER
Planning Director
San Leandro

GRADUALLY CATCHING UP

THE UNION METAL MANUFACTURING CO.
Canton 5, Ohio

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: Your fine publication is read with interest each month by me and several others in our company who are familiar with California highways and are personal friends of many of those in that organization.

In addition to having a sizable manufacturing plant at Los Angeles, several of us are in California each year and have the pleasure of traveling over the excellent highways that you have built. We are anticipating more pleasure when you are finally able to catch up with the expressways needed for the millions of cars that travel them.

Sincerely yours,

W. A. PORTERFIELD
Vice President
In Charge of Sales Promotion

GOING TO ISRAEL

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: I have been on your mailing list to receive the *California Highways* magazine since 1953. I read your publication with great interest while I was going to school at the University of California at Berkeley, and later, while I was a civil engineer with the Division of Highways, State of Illinois.

I now return to my home country, Israel, where I am going to assume a position with the Division of Highways there.

I will appreciate it very much if I could remain on your mailing list, and continue to receive this wonderful and interesting publication at my home address in Israel: 9 Joseph Haglili St., Ramat-Gau, Israel.

You may be assured that all copies received will be read with interest and with a searching eye to all the new developments in the highways field.

Yours very truly,

UN FRIDMAN

NEW BOOSTER

CENTRAL MANUFACTURING DISTRICT, INC.
Los Angeles 58

MR. KENNETH C. ADAMS, *Editor*

DEAR MR. ADAMS: I have just had the opportunity of seeing an issue of *California Highways and Public Works* and have thoroughly enjoyed reading it. It is one of the most interesting magazines of this type that has found its way across my desk.

If it is not inconsistent with your policies, it would be greatly appreciated if you could arrange to have this magazine sent regularly to our vice president, as I am sure it will from time to time contain articles of particular interest to our organization.

Very truly yours,

E. H. FARRAR, Sales Manager

TWO LETTERS OF PRAISE

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Inyo National Forest

November 1, 1954

MR. MILTON HARRIS

California Division of Highways
Bishop, California

DEAR MR. HARRIS: Please accept our thanks for the fine job your men from the Division of Highways did in helping to control the fire at Lee Vining on October 23d.

While we were unable to learn the names of all the men of your organization who helped out, we did note Chet Squires, Cliff Donnelly and Chuck Carter doing fine work.

Such help in time of need goes a long way to keep many of such fires from running wild and doing greater damage.

Very truly yours,

W. S. DAVIS
Forest Supervisor

LEE VINING VOLUNTEER FIRE DEPARTMENT
Lee Vining, California

November 3, 1954

MR. MILT HARRIS, *District Engineer*
State Division of Highways
Bishop, California

DEAR SIR: The use of personnel and equipment from District IX was greatly appreciated in helping us control and put out the fire in the Lee Vining Canyon area.

Chet Squires was in particular of great assistance to us in operating a bulldozer at great personal risk to himself. Roy Dondero also helped us a great deal; also Fred Wadley, Cliff Donnelly, and Frank Nolan.

Sincerely,

VICTOR PARANICK
President

McCoy Becomes the President of A.A.S.H.O.

At its fortieth annual convention held in Seattle the American Association of State Highway Officials elected George T. McCoy, California State Highway Engineer as its president. McCoy, who has been first vice president of the association during the past year, succeeds A. E. Johnson of Arkansas.

McCoy has been Chief of the Division of Highways since January 4, 1943. He was named to the post of State Highway Engineer by the late Charles H. Purcell when Governor Earl Warren appointed Purcell State Director of Public Works.

Born in Milton, Oregon, September 12, 1889, McCoy was raised on cattle ranches in the Northwest and from early youth herded cattle and horses on the range. He graduated from Whitman College in Walla Walla, Washington, and later went east to Columbia University, New York City, where he completed a course in civil engineering in 1915.

Worked in Northwest

Meanwhile, in 1908, he joined the engineering staff of the United States General Land Office on work in the Cascade Mountains which included an irrigation project near the junction of the Snake and Columbia Rivers.

After his studies at Columbia University, McCoy was employed as assistant engineer on the great Catskill Aqueduct, which supplies New York City with water. His work was in bridge and dam construction and highway relocation in connection with the \$300,000,000 project.

Returning to the Northwest, McCoy turned to highway engineering. He worked for the U. S. Bureau of Public Roads and the states of North Dakota, Idaho and Washington. Of the total of 10 years he spent in the State Highway Department of Washington, the last six, ending in 1927, were as Assistant State Highway Engineer.

Came to California

McCoy came to California in 1927 as Assistant Office Engineer in the Di-

vision of Highways. In the following year, when Purcell was appointed State Highway Engineer, McCoy became his administrative assistant. In 1933 he was advanced to the position of Assistant State Highway Engineer, becoming State Highway Engineer 10 years later.

Through active participation in the work of the American Association of State Highway Officials, McCoy achieved a wide reputation in the highway engineering field and is frequently consulted on problems of nation-wide scope. During the past year he has served as First Vice President of A. A. S. H. O., and also as a member of its Executive Committee and Chairman of the subcommittee on Highway Finance.

Commission Honors McCoy

At its meeting in San Francisco on November 17, the California Highway Commission adopted the following resolution:

WHEREAS, Mr. George T. McCoy, State Highway Engineer, has been elected and installed as the President of the American Association of State Highway Officials; and

WHEREAS, Mr. McCoy, by his long and effective service to this association, and by his elevation to this high office has brought honor and prestige not only to himself but also to the Department of Public Works and the Division of Highways of the State of California; now, therefore, be it

Resolved, That we, the members of the California Highway Commission, do hereby extend to him our congratulations and express our pleasure and appreciation that this association has recognized his ability and chosen him as its leaders for the ensuing year; be it further

Resolved, That this resolution be spread upon the minutes of this meeting of the California Highway Commission, and that an engrossed copy thereof be delivered to Mr. McCoy as a token of our esteem and appreciation of him as an executive, an engineer, a man, and a friend.

STEPPING STONES

Continued from page 31 . . .

necessitated by the change of alignment was subcontracted to the Los Gatos Construction Company. Approximately 80,000 cubic yards of clean sand of the type sold commercially as plaster or concrete sand, were excavated and placed in the embankment. The compaction of this material was obtained by ponding.

The sandy material was difficult to restrain within the proposed slope limits since it shifted laterally under the load of the heavy earthmoving equipment. Stakes set in the embankment after the completion of each five-foot layer indicated that the fill was too wide and the succeeding layer was stepped in to conform to the correct slope line. As this resulted in a series of narrow benches which invited erosion of the slopes the sides of the fills were struck off with a 90-pound rail about 25 feet long operated from the top of the fill by a Hyster crane.

Fill Stabilization

At one location on the project the new road was paralleled by a small creek sufficiently close to endanger the stability of the fill. Since the creek was confined within a deep gorge a channel change was unfeasible so a 48-inch reinforced concrete pipe 200 feet long was placed in the creek bed, and the embankment construction was extended over the creek and pipe.

At another location the proximity of the same creek did not allow sufficient space for a fill to be constructed. A rubble masonry wall, constructed from slabs broken from the old concrete pavement, was built for a length of 100 feet paralleling the center line at a distance of 17 feet. The wall varied from 8 to 10 feet in height including a 1-foot 6-inch parapet.

The eighth project of the county's FAS highway improvement program is the replacing of the Hester Creek Bridge on the old Soquel-San Jose Road with a box culvert and embankment, involving realignment of 0.303 miles of road. The planning and designing is now complete and the project has been submitted for advertising.

State Highway Contracts Awarded

AUGUST, 1954, AWARDS

Alameda County—US 50—At the intersection of Foothill Blvd. with Carolyn St., at 159th Ave., about 2.0 miles southeast of San Leandro. Construct a left storage lane of plant-mixed surfacing and penetration treatment on untreated rock base. Awarded. O. C. Jones & Sons, \$4,706.

Alameda County—US 50—In the vicinity of the San Francisco-Oakland Bay Bridge Toll Plaza, in the City of Oakland. Construct a sand fill embankment and place riprap slope protection, 1.0 miles. Awarded Hydraulic Dredging Co., Ltd., \$703,361.55.

Alameda County—Eastshore Freeway—On Eastshore Freeway between Market St. and 11th St. Construct a portion of a bridge with reinforced concrete spans on reinforced concrete abutments and bents and construct a reinforced concrete pedestrian undercrossing, perform roadwork consisting of construction of graded roadbeds and placement of pavement and surfacing with plant-mixed surfacing, completion of construction to be performed under a future contract, 0.8 mile. Awarded Fredrickson & Watson Const. Co. and M & K Corp., \$1,659,774.50.

Alameda, Contra Costa, Marin, Sonoma Counties—At various locations—Apply seal coat to existing surfacing, 15.5 miles. Awarded J. Henry Harris, \$21,996.40.

Del Norte County—US 101—Between Elk Valley Rd. and north city limits of Crescent City (portions). Scarify and reshape the existing roadbed, place imported base material, construct cement treated base, place plant-mixed surfacing and apply a seal coat and construct reinforced concrete drainage structures, 0.5 mile. Awarded Paul E. Woof, \$36,249.

Fresno County—Between Teilman Ave. and Princeton Ave., in the City of Fresno. Furnish and install highway lighting systems at eight locations. Awarded Robinson Electric, \$36,010.05.

Fresno, Kings, Tulare and Kern Counties—At various locations. Apply seal coats to the existing surfacing, 63.1 miles. Awarded Rand Construction Co., \$68,042.50.

Humboldt County—US 101—On Main St. between 13th St. and Eighth St. Adjust three drainage structures, remove sections of concrete pavement and nine inches of material thereunder, place portland cement concrete pavement on imported base material and surface with plant-mixed surfacing, 0.1 mile. Awarded Paul E. Woof, \$6,940.

Humboldt County—US 101—Between 0.3 mile south of south city limits of Arcata and 17th St. Reshape the existing shoulders and apply penetration treatment and place plant-mixed surfacing on the existing traveled way, 1.1 miles. Awarded Mercer Fraser Co. and Mercer Fraser Gas Co., Inc., \$13,642.

Imperial County—US 99—Between 1 mile west of Brawley and Trifolium Canal in Westmorland. Grade the existing shoulders, backfill with imported subbase material and imported base material, place plant-mixed surfacing over the existing surfacing and new shoulders and apply seal coats, 12.9 miles. Awarded Fredrickson & Kasler, \$333,333.32.

Inyo County—FAS 1184—Across Owens River, about 4 miles north of Bishop. Construct a reinforced concrete bridge. Awarded Friant Construction Co., \$34,629.25.

Kings County—SR 41—At the north fork of Kings River Overflow about 6 miles north of Lemoore. Replace a timber bridge with a reinforced concrete culvert and grade and apply bituminous surface treatment to the detour. Awarded Gene Richards, Inc., \$14,092.

Los Angeles County—Between Gower St. and Hollywood Blvd. in the City of Los Angeles. Prepare and plant roadside areas, 0.4 mile. Awarded Floyd Matthews Co., \$17,171.62.

Los Angeles County—Between Fremont Ave. and Walnut Grove Ave. (portions). Prepare and plant roadside areas, 0.9 mile. Awarded Stephan L. Vistica, \$66,480.35.

Los Angeles County—SR 138—Between 2 miles east of Neenach School and US 6 (portions). Construct a graded roadbed and place imported base material, a selected material from roadway excavation, apply a bituminous surface treatment; widen and resurface the intersection at US 6 with plant-mixed surfacing; apply seal coats to the surfaced roadbeds; and install drainage facilities, 6 miles. Awarded Lowe & Watson, \$251,166.20.

Los Angeles County—At the intersections of Mayall St. and Tupper St. with Sepulveda Blvd., in the City of Los Angeles; construct median openings and channelization at two intersections. Awarded Schroeder & Co., \$7,302.

Los Angeles County—On Manchester Blvd. between Greville Ave. and Prairie Ave., in Inglewood, widen the existing roadbed with cement treated base on imported subbase material; placing plant-mixed surfacing over the existing pavement and widen roadbed; reconstructing an existing traffic signal system and installing an intersection lighting system at the intersection of Manchester Blvd. and Prairie Ave., 0.8 mile. Awarded Griffith & Co., \$90,562.

Los Angeles, Ventura, and Orange Counties—At various locations. Apply seal coat to the existing surfacing, 53.8 miles. Awarded, Geiser Const. Co., \$71,893.

Marin County—US 101—At Richardson Bay about 5 miles north of San Francisco. Place embankment and grade and surface a four-lane detour with plant-mixed surfacing, install highway lighting and illuminated signs and construct a reinforced concrete bridge at Richardson Bay Bridge and Overhead, 1.0 mile. Awarded The Duncanson-Harrelson Co. and Pacific Bridge Co., \$3,017,427.

Marin County—At Mt. Tamalpais State Park, between Pan Toll Junction and West Peak. Apply bituminous surface treatment and seal coat to the existing roadway, 2.7 miles. Awarded Paul E. Woof, \$14,495.

Mariposa County—FAS 963—On Bootjack Rd. from Mormon Bar to 1 mile easterly. Construct a graded roadbed and surface with plant-mixed surfacing on cement treated base, 0.9 mile. Awarded R. E. Maxwell, \$2,747.

Mono County—SR 108—Between Pickel Meadows and junction US 395, about 17 miles north of Bridgeport. Widen the existing roadbed and surface with road-mixed surfacing on untreated rock base, 5 miles. Awarded Pyramid Construction Co., \$97,716.

Napa County—SR 37—Between 2.1 miles east of the Sonoma County line and 2.2 miles east of the Carneros School. Construct a graded roadbed, place plant-mixed surfacing on untreated rock base and existing pavement and apply seal coats, and construct a reinforced concrete bridge across Carneros Creek, 2.7 miles. Awarded Arthur B. Siri, Inc., \$378,742.90.

Nevada County—SR 20—At three intersections in and near Nevada City. Place untreated rock base and plant-mixed surfacing on portions of the existing roadway and apply penetration treatment to portions of the shoulders. Awarded John G. Mehren, \$7,462.50.

Orange and Los Angeles Counties—On La Habra Rd., between Grand Ave. and 0.2 mile south of Imperial Hwy. Construct a graded roadbed placing imported subbase material and plant-mixed surfacing on untreated rock base, apply seal coats and construct a reinforced concrete bridge over Coyote Creek, 2.9 miles. Awarded Cox Bros. Const. Co., \$231,933.60.

Placer County—US 40—In the vicinity of Flood Rd., about 0.6 mile north of Auburn. Grade and surface a frontage road with plant-mixed surfacing. Awarded Lester L. Rice & Sons, \$8,280.

Placer County—FAS 767—Across North Fork American River, between SR 65 and 0.44 mile east, about 3 miles northeast of Auburn. Construct a steel bridge with reinforced concrete deck and grade approaches, placing untreated rock base and surfacing with road-mixed surfacing, 0.4 mile. Awarded James B. Allen, \$206,828.

Plumas County—FAS 1200—Across Hamilton Branch, about 0.5 mile east of Lake Almanor. Construct a reinforced concrete and steel bridge. Awarded J. B. Allen, \$119,437.

Sacramento County—At the intersection of Rt. 98 with C St., and at the junction of Rt. 98 with Rt. 3. Furnish and install highway lighting and illuminated sign systems. Awarded Reliable Elevator Works, \$36,766.

San Bernardino County—At the intersection of I St. with Third St. in Colton. Install complete in place a full traffic-actuated signal system and highway lighting. Awarded Drury Electric Co., \$9,955.

San Bernardino County—SR 18—Between Central Rd. and 1.3 miles east of Victorville. Apply bituminous surface treatment and seal coats, 6.9 miles. Awarded P & F Construction Co., \$24,838.50.

San Bernardino County—Rt. 188—Between Camp Seeley and Cedar Springs. Apply bituminous surface treatment to the existing roadbed, 7 miles. Awarded Lowe & Watson, \$19,924.

San Francisco County—SR 1—Golden Gate Bridge approach between the Toll Plaza and junction of SR 56. Widen the roadbed placing untreated rock base and portland cement concrete base and surface with plant-mixed surfacing on existing pavement, and widen the two existing reinforced concrete bridges at Lincoln Blvd. undercrossing and Marina approach overcrossing, 0.5 mile. Awarded The Lowrie Paving Co., Inc., \$265,531.40.

San Joaquin, Calaveras, Amador, Sacramento, Solano, Tuolumne, and Stanislaus Counties—At various locations. Apply seal coat to the existing surfacing, 59.7 miles. Awarded Claude C. Wood Co., \$54,198.

San Joaquin County—SR 4—At the intersection of Charter Way with Marengo Rd. in Stockton. Install highway lighting. Awarded R. Gould & Son, \$2,525.

San Mateo County—Eastshore Freeway—Between 1 mile and 1.9 miles south of the San Francisco-San Mateo County line. Construct a graded roadbed to provide a future four-lane divided roadway on new alignment, 0.9 mile. Awarded Guy F. Atkinson Co., \$1,288,816.

San Mateo County—Rt. 107—At Dry Creek in Woodside. Erect plate culvert extensions, construct reinforced portland cement concrete head walls and end walls and widen shoulder embankments. Awarded O. C. Jones & Sons, \$9,291.70.

Santa Barbara, San Luis Obispo and Monterey Counties—At various locations. Apply seal coat to the existing surfacing, 67.2 miles. Awarded Bickmore-Harper, Inc., and Contractors Equipment Rental Service, \$88,844.15.

Santa Clara, Santa Cruz, and San Mateo Counties—At various locations—Apply seal coats to the existing roadway, 26.1 miles. Awarded Granite Constr. Co., \$48,717.80.

Santa Clara County—SR 17—At the intersection of W. San Carlos St. with Wabash Ave.-Leland Ave. adjacent to the City of San Jose. Construct median lanes and install traffic signal system. Awarded Howard Electric, \$22,845.50.

Santa Clara County—At Main St., Los Gatos. Construction of a reinforced concrete bridge and culvert and a combination timber and structural steel bridge, which provides the Main St. Overcrossing, the Los Gatos Creek Culvert and the Main St. Detour Bridge, 0.3 mile. Awarded Carl N. Swenson Co., Inc., \$353,477.50.

Shasta County—US 99—Between Clear Creek and Hill St. in Redding. Apply seal coats, 4.2 miles. Awarded Donald Graves, \$9,220.

Shasta County—US 99—Across Dog Creek, about 27.5 miles north of the north city limits of Redding. Construct a reinforced concrete bridge. Awarded B. J. Ukropina, T. P. Polich, Steve Kral and J. R. Ukropina, \$737,020.

Siskiyou County—US 99—Between Dunsmuir and Big Canyon. Apply seal coat to the traveled way and

shoulder areas and road connections, 4.2 miles. Awarded Morgan Construction Co., \$22,239.

Siskiyou County—FAS 1166—Between SR 3 and Four Corners, about 7.2 miles east of Grenada. Shape the existing roadway and place plant-mixed surfacing, 7.8 miles. Awarded Rice Brothers, Inc., \$118,505.

Solano County—Between Arroyo Grande and Pismo Beach—Grade roadbeds, place selected material and imported base material, construct cement treated subgrade and base and surface with portland cement concrete pavement and plant-mixed surfacing and construct five reinforced concrete bridges; providing a four-lane divided highway with Brisco Rd. Undercrossing, Oak Park Overcrossing, Pismo Oaks Overcrossing, Pismo Overheads, and the Villa Creek Bridge, all on new alignment, 3.5 miles. Awarded Madonna Construction Co., \$1,598,111.05.

Stanislaus County—SR 33—At Puerto Creek Bridge, about 2.7 miles north of Patterson. Remove the existing concrete bridge railing, replacing with corrugated metal bridge railing and construct metal plate guard railing along the approaches to the bridge. Awarded H. Sykes, \$2,838.30.

Sutter County—FAS 926—Between Sacramento county line and 1 mile south of Striplin Rd. Construct cement treated base, place plant-mixed surfacing on the traveled way, construct shoulders of imported base material and apply penetration treatment, 7.8 miles. Awarded Baldwin Contracting Co., Inc., \$115,169.90.

Tehama County—SR 36—Between junction Rt. 3 and Paynes Creek Bridge (portions). Place plant-mixed surfacing on cement treated base, 7.2 miles. Awarded Rice Brothers, Inc., \$184,433.10.

Trinity County—FAS 1089—Between Costa Ranch and 1.9 miles east, about 8 miles northeasterly of Weaverville. Construct a graded roadbed and install drainage facilities, 1.9 miles. Awarded M. W. Brown, \$67,371.

Tulare County—Between west city limits of Tulare and D St. in Tulare. Apply bituminous surface treatment to the existing shoulders. Awarded Irv. Guinn, \$3,243.

Yolo County—SR 90—Between 2.7 miles and 6.7 miles north of Madison. Construct a graded roadbed and place plant-mixed surfacing on cement treated base and untreated rock base and construct a reinforced concrete bridge, 4.1 miles. Awarded Fredrickson Bros., \$333,110.10.

SEPTEMBER, 1954, AWARDS

Alameda County—On E. 14th St. between Durant Ave. and 46th Ave. in the City of Oakland. Plane the existing asphalt concrete pavement with a heater planer device, excavate and replace failed areas and place plant-mixed surfacing over the existing pavement, 3.7 miles. Awarded to Independent Constr. Co., \$109,692.

Alameda and San Joaquin Counties—US 50—Between 2 miles east of Redmond Overhead and the west city limits of Tracy (4 locations). Install highway lighting systems at one highway interchange, two road intersections, and at the Southern Pacific Railroad Crossing. Awarded to Collins Electrical Co., \$13,258.

Alpine County—FAS 960—Between Springmeyer Ranch and SR 24 at Payneville. Construct a graded roadbed and surface with road-mixed surfacing on imported base material, 2.7 miles. Awarded to Claude C. Wood, \$80,545.54.

Amador County—SR 88—Between Pine Grove and Cooks Station (portions). Place plant-mixed surfacing on the existing pavement and apply seal coat, 11.5 miles. Awarded to Granite Construction Co., \$113,240.

Butte County—SR 45—Between 0.2 mile east of Cherokee Canal and junction of US 99-E. Place imported subbase material, plant-mixed surfacing on cement treated base and apply seal coat on existing roadway, 2.7 miles. Awarded to Baldwin Contracting Co., \$83,195.70.

Butte County—FAS 1169—Between Oroville-Quincy Hwy. and US 40 Alt. (at Acacia Ave.). Construct graded roadbed by placing imported subbase material, untreated rock base, surface with plant-mixed surfacing, apply penetration treatment and seal coat to shoulders and construct traffic islands and concrete curbs, 0.7 mile. Awarded to Baldwin Contracting Co., \$53,445.37.

Colusa County—SR 45—Between 3.2 miles and 1.8 miles south of Grimes. Widen the existing roadbed with imported base material and apply seal coat. 1.4 miles. Awarded to Lester L. Rice & Sons, \$8,393.

Del Norte County—US 101—Between 14.3 miles and 23.8 miles northeast of Crescent City, along the Smith River (portions). Construct graded roadbed, place plant-mixed surfacing on imported base material and construct grouted imported rock slope protection; construct a channel of portland cement concrete, 0.5 mile. Awarded to Arthur B. Siri, Inc., \$58,354.50.

Fresno County—FAS 815—Across Central Canal and Fowler Switch Canal, between Calwa and Sanger. Construct two reinforced concrete bridges. Awarded to Kaweah Construction Co., \$30,607.98.

Humboldt County—US 101—At 1.5 miles north of Miranda. Remove three redwood trees and widen the roadbed, placing imported base material on the widened area and surface with plant-mixed surfacing. Awarded to Paul E. Woof, \$9,488.50.

Humboldt County—US 101—About 15.3 miles north of Garberville; about 8.5 miles south of Scotia; and in Rockefeller Grove State Park, about 4.1 miles west of Dyerville. Make minor grade and line changes, surface the graded areas with plant-mixed surfacing or penetration treatment and construct pile bent jetty and light stone riprap bank protection, restoring the roadway embankments. Awarded to Mercer, Fraser Co. and Mercer, Fraser Gas Co., Inc., \$97,520.

Humboldt County—US 101—At Redwood Creek Bridge in the Town of Orick. Reinforce an existing concrete pile bent on the Redwood Creek Bridge. Awarded to John W. S. Petersen, \$2,440.

Humboldt County—FAS 501—At Ryan Slough. Construct a reinforced concrete and a timber bridge, and grade the approach roadways, placing plant-mixed surfacing on cement treated base and existing surfacing, 0.5 mile. Awarded to Mercer, Fraser Co. and Mercer, Fraser Gas Co., \$95,965.75.

Humboldt County—FAS 969—Between 1.4 miles northwesterly of the north city limits of Arcata and US 101 near Mad River. Construct a graded roadbed and place plant-mixed surfacing on imported base material and apply seal coats, 1.3 miles. Awarded to Mercer, Fraser Co. and Mercer, Fraser Gas Co., \$67,263.

Imperial and Riverside Counties—US 99 and US 60, 70—Between Trifolium Canal and 1 mile north of Oasis, and between 8.4 miles east of junction US 99 and 7.9 miles west of Black Butte. Construct metal plate guard railing. Awarded to Milleman-Soosey & Jackson, \$32,414.50.

Inyo County—US 395—At new State Highway District Office on S. Main St. Develop and plant surrounding areas and construct portland cement concrete curbs and sidewalks, drives and parking areas to be paved with road-mixed surfacing. Awarded to K. E. C. Company, \$23,446.75.

Kern and Mono Counties—SR 58, 23 and 95—At various locations. Construct guard railing. Awarded to Fredericksen & Kasler, \$15,400.

Kern County—SR 212—Between 0.9 mile west of Naval Ordnance Test Station Gate and 1.4 miles east of Ridgecrest. Widen the existing roadway by constructing graded roadbeds and placing plant-mixed surfacing on cement treated base, 4.3 miles. Awarded to Basich Bros., \$110,196.50.

Kern County—SR 178—Between east city limits of Bakersfield and Horace Mann Ave. Grade the north gutter and pave with plant-mixed surfacing on cement treated base, 1.2 miles. Awarded to Griffith Company, \$20,988.75.

Kern County—SR 142—At Isabella Reservoir. Grade road approaches and parking area and apply a bituminous surface treatment. Awarded to Phoenix Construction Co., Inc., \$3,904.

Lake County—SR 20—About ½ mile east of Upper Lake. Grade and surface with plant-mixed surfacing the existing roadway and replace existing bridge by constructing a reinforced concrete bridge. Awarded to Walter H. Lindeman, \$12,425.

Lake County—FAS 1039—Between SR 49 at Lower Lake and 1.2 miles westerly. Construct a graded roadbed, place imported subbase material and imported base material, and apply seal coat, 1.2 miles. Awarded to Melvin W. Oldham & Harold P. Hastings, \$34,081.10.

Los Angeles County—On the Ramona Freeway between Rosemead Blvd. and the San Gabriel River.

Completion of this contract will provide a four-lane divided highway with separation structures all on new alignment. The road work consists of grading and surfacing with portland cement concrete over imported base material. Reinforced concrete bridge construction at: Eaton Wash-Frontage Rd.; Eaton Wash; Eaton Wash-Pacific Electric Railway; Baldwin Ave. Undercrossing and Underpass; Eaton Wash-Baldwin Ave. Retaining Walls; Baldwin Ave. Undercrossing and Underpass Pump Plant; Gibson Overhead; Rio Hondo Bridge; Rio Hondo Maintenance Undercrossing; Lexington Ave. Undercrossing; Tyler Ave. Undercrossing; Utah Ave. Pedestrian Undercrossing; Meeker Rd. Undercrossing; Exline Ave. On-Ramp Undercrossing; Cogswell Rd. Undercrossing; Durfee Rd. Undercrossing; Garvey Ave. Off-ramp Undercrossing; and structural steel bridge construction at: Peck Rd. Undercrossing; Rt. 26-77 Separation; E. El Monte Overhead, 3.9 miles. Awarded to Peter Kiewit Sons Co., \$5,960,241.70.

Los Angeles County—Alt. US 101—Between west city limits of Torrance and Hawthorne Ave. Widen the existing roadbed and surface with plant-mixed surfacing on cement treated base to provide a four-lane divided highway, 2.4 miles. Awarded to J. E. Haddock, \$148,388.50.

Los Angeles County—On Sepulveda Freeway—Between Kiel St. and Ovada Pl. Graded roadways, frontage roads and ramps, surfaced with plant-mixed surfacing on untreated rock base and reinforced concrete bridges at: Sunset Blvd.-Sepulveda Blvd. Separation, Sunset On-ramp. Awarded to George W. Peterson & Jack W. Baker, \$722,657.60.

Los Angeles County—In and adjacent to the Cities of Monterey Park and Montebello on Pomona Blvd. between Hillview Ave. and Wilcox Ave. Install and modify traffic signal systems and highway lighting at six locations. Awarded to Electric & Machinery Service, \$32,296.

Mariposa County—SR 140—Between 6.3 miles and 4.2 miles west of Mariposa. Widen existing cuts, excavate border trenches, and place plant-mixed surfacing on untreated rock base and existing surfacing, 2.1 miles. Awarded to R. E. Maxwell, Jr., \$130,367.75.

Mendocino County—Access Road—Between Garcia River and 3.8 miles easterly. Scarify and reshape existing roadbed, apply seal coat and prime coat, 3.8 miles. Awarded to Arthur B. Siri, Inc., \$14,338.

Merced County—FAS Rts. 555 and 1057—On Plainsburg Rd. between SR 140 and on Le Grand Rd. between Plainsburg Rd. and US 99. Construct graded roadbed and place plant-mixed surfacing on untreated rock base and existing pavement, 7.7 miles. Awarded to M. J. Ruddy & Son, \$218,134.45.

Modoc County—FAS 1192—Between N Canal and Oregon state line, near Kandra Railroad Station. Scarify and reshape the existing roadbed and surface with plant-mixed surfacing, 12 miles. Awarded to Donald Graves, \$172,092.

Napa County—FAS 607—Between 0.5 mile north of Soda Canyon Rd. and Oak Knoll Ave., on Silverado Trail. Construct a graded roadbed, place imported borrow and untreated rock base, and apply seal coat, 0.7 mile. Awarded to Albert J. Snodgrass, \$30,458.30.

Nevada County—SR 49—Between Uren St. and near northwest city limits of Nevada City. Prepare and plant roadside area for erosion control. 1 mile. Awarded to Justice-Dunn Co., \$6,128.50.

Orange County—Alt. US 101—Between the north city limits and the south city limits in the City of Newport Beach, on the Pacific Coast Hwy. Widen the roadbed and surface with plant-mixed surfacing on untreated rock base, reconstruct the existing traffic signal systems and intersection lighting and install a traffic signal interconnect conduit, 1.4 miles. Awarded to Cox Bros. Constr. Co., \$265,535.

Orange County—SR 175—Between Cypress Ave. and Rt. 43 near the City of Fullerton (portions). Grading, placing imported subbase material and untreated rock base, surfacing with plant-mixed surfacing and constructing bridges at Rt. 175/43 separation and at N. Olive Underpass, to provide a four-lane divided highway together with interchange roadways, accelerating and decelerating lanes and frontage roadway, 4.0 miles. Awarded to Ukropina-Polich-Kral, \$1,061,539.

Placer County—US 40—Between 1 mile west of Applegate and Heather Glen. Grade roadbeds and

place plant-mixed surfacing on cement treated base, to provide a four-lane divided highway, and grade and surface detour roads and road connections, 2.7 miles. Awarded to Piombo Construction Co., \$623,573.25.

Riverside County—US 95—At the D Canal and at the C Canal. Construct a graded roadbed, place imported base material and surface with road-mixed surfacing and construct two reinforced concrete bridges at C Canal and at D Canal, 0.9 mile. Awarded to Silberberger Constructors, Inc., & J. B. Stringfellow, \$129,385.15.

San Bernardino and Riverside Counties—At various locations. Apply seal coats to the existing surfacing, 54.9 miles. Awarded to Match Bros., \$61,211.

San Bernardino County—US 70, 99—At Archibald Ave. and Etiwanda Ave. Construct a graded roadbed for two traffic interchanges and place plant-mixed surfacing on imported base material and existing surfacing and construct two steel bridges at Archibald Ave. Overcrossing and at Etiwanda Ave. Overcrossing and widen the bridge at the Etiwanda Wash. Awarded to W. F. Maxwell, \$497,872.70.

San Diego County—US 101—Between Mexican border and 13th St. in National City. Install complete in place highway lighting at seven locations. Awarded to Ets-Hokin & Galvan, \$28,659.

San Diego County—US 80—Between 0.4 mile east of Alpin and Descanso Junction (portions). Place plant-mixed surfacing over the existing surfacing and apply seal coats, 1.8 miles. Awarded to Daley Corp., \$34,301.25.

San Diego County—SR 67—Between Palm Ave. and Fourth St. in the City of La Mesa. Place plant-mixed surfacing on the existing roadway, 0.2 mile. Awarded to Daley Corp., \$1,788.

San Francisco and Alameda Counties—On lower deck of the San Francisco-Oakland Bay Bridge. Construct colored lamp traffic control system. Awarded to Chas. A. Langlais Co., \$505,570.45.

San Joaquin County—FAS 901—On Elliot Rd., across Mokelumne River and Mokelumne Overflow near Lockeford. Construct a structural steel and reinforced concrete bridge across the Mokelumne River and a reinforced concrete slab bridge across the Mokelumne Overflow, 1.3 miles. Awarded to Brighton Sand & Gravel and R. M. Skamnes, \$174,329.95.

San Luis Obispo County—SR 125—Between Salinas River near Atascadero and 3.1 miles easterly. Apply penetration treatment to the existing surfacing, 3.1 miles. Awarded to Valley Paving and Constructing Co., \$997.50.

San Luis Obispo County—FAS 681—Between 0.6 mile and 3.5 miles east of Arroyo Grande, on Upper Arroyo Grande Rd. Construct a graded roadbed, place selected material and imported base material and place plant-mixed surfacing, 2.9 miles. Awarded to L. E. Webb Construction Co., Inc., \$105,528.10.

San Mateo County—Bayshore Freeway—At Milbrae Ave. and at San Bruno Rd. Clean and paint two steel bridges. Awarded to George C. Punton, \$18,190.

Santa Barbara County—US 101—Between 1 mile north of summit and ½ mile south of Santa Ynez River. Construct six reinforced concrete bridges and construct graded roadbeds and pave with portland cement concrete on cement treated subgrade and plant-mixed surfacing on cement treated base, to provide a four-lane divided roadway with frontage roads and crossovers, 4.1 miles. Awarded to B. J. Ukropina, T. P. Polich, Steve Kral, John R. Ukropina and Madonna Construction Co., \$1,923,764.

Santa Barbara County—US 101—Between 1 mile east of Orella and 1 mile west of Refugio. Place plant-mixed surfacing on existing pavement and shoulders, and apply seal coats, 2.8 miles. Awarded to A. J. Diani Construction Co., \$47,223.

Santa Cruz County—SR 1—Between north city limits of Santa Cruz and the San Mateo County line. Construct reinforced concrete drainage structures. Awarded to Granite Construction Co., \$13,527.20.

Sierra County—FAS 524—Between 2.5 miles and 0.5 mile west of Loyalton. Place plant-mixed surfacing on existing base, 2 miles. Awarded to Munn & Perkins, \$22,455.

Siskiyou County—US 99—At Four Intersections in North Dunsmuir. Install complete in place highway lighting systems. Awarded to Hall-Sloat Electric Co., Inc., \$7,956.

Solano County—SR 7, 74 and 90—On State Highway Rt. 7 at the intersections of Rts. 74 and 90, Tennessee St., Magazine St., Buss St., Georgia St. and White Sulphur Springs Rd. Install complete in place highway lighting at two locations, advance flashing beacons at two locations, semiautomated traffic signal systems at five intersections with over-all master control by a traffic-actuated cycle and offset selector mechanism and revision of one two-phase traffic-actuated signal system to a three-phase traffic-actuated signal system. Awarded to Hall Sloat Electric Co., Inc., \$46,484.

Solano, San Joaquin, Stanislaus, Merced and Mariposa Counties—At various locations. Apply seal coats to the existing surfacing, 48.7 miles. Awarded to Granite Construction Co., \$48,749.50.

Solano County—SR 48—Across Napa River at Vallejo. Reconstruct the existing timber trestle bridge with new stringers and caps and stubbing pile bents with new materials. Awarded to Healy-Tibbitts Construction Co., \$29,320.

Solano County—FAS 1109—Between US 40 and west city limits of Dixon. Construct graded roadbed with imported subbase material and place plant-mixed surfacing on untreated rock base, 1.4 miles. Awarded to Fredrickson Bros., \$69,860.20.

Sonoma and Solano Counties—SR 48—Across Sonoma Creek about 10 miles west of Vallejo. Reconstruct an existing timber trestle bridge. Awarded to Morison Const. Co. and T. Schwartz, \$14,960.

Sonoma County—SR 12—Between 0.16 mile north of Warfield Station and Stuart Creek. Place imported borrow and untreated rock base, surface with plant-mixed surfacing and apply seal coats and penetration treatment, 0.23 mile. Awarded to Allied Paving, \$15,807.

Sonoma County—FAS 777—On Bay Hwy. between 3.5 and 5.7 miles westerly of Valley Ford. Construct graded roadbed, place imported base material on processed selected material, seal coat and penetration treatment, partially on new alignment, 2.2 miles. Awarded to Huntington Bros., \$170,000.

Stanislaus County—US 99—Between Hatch Rd. and Modesto. Grade a four-lane divided highway and surface with plant-mixed surfacing on untreated rock base and existing pavement and widen the existing steel bridge, 1.8 miles. Awarded to Granite Construction Co., \$635,014.

Stanislaus County—FAS 1209 and 1210—Between US 99 and Geer Rd. on Keyes Rd.; between north city limits of Turlock and Santa Fe Ave., on the Turlock-Denair Rd. Widen the existing roadbed and place plant-mixed surfacing on untreated rock base; seal coat and penetration treatment are to be applied to the shoulders, 6.6 miles. Awarded to Standard Materials, Inc., \$136,829.25.

Tehama County—SR 36—Across South Fork Cottonwood Creek about 15 miles west of Red Bluff. Construct two supplementary steel bents on reinforced concrete footings for the end steel beam spans of an existing bridge. Awarded to R. E. Hertel, \$2,147.50.

Tulare County—FAS 1130—On Cairns Ave., between FAS 1134 about 4 miles west of Strathmore and junction of SR 134. Construct a graded roadbed and place imported base material, cement treated base, and plant-mixed surfacing, 5 miles. Awarded to Baldwin Contracting Co., \$171,926.12.

OCTOBER, 1954, AWARDS

Alameda and San Mateo Counties—On six locations on the Eastshore and Bayshore Freeways. Maintenance buildings to be constructed. Awarded to Bos Construction Co., \$13,089.20.

Alameda County—In the City of Oakland at the intersections of Fifth and Sixth Streets between Oak and Jackson Streets. Modifying traffic signal systems. Awarded to Hall Sloat Electric Co., Inc., \$3,380.

Alameda County—In the City of Berkeley on Ashby Avenue between Ninth Street and San Pablo Avenue. Widening of existing pavement, 0.1 mile. Awarded to Ransome Co., \$8,404.

Glenn County—In City of Willows at the intersections of Tehama Street. Traffic signals and highway lighting. Awarded to L. H. Leonardi Const. Co., \$17,091.

Humboldt County—At Richardson Grove State Park. Place imported borrow and road-mixed surfacing and apply a seal coat to portions of the existing

road and install metal pipe culverts. Awarded to Paul E. Woof, \$6,417.50.

Kern County—SR 142—Between Beardsley Avenue about one mile north of the north city limits of Bakersfield and 0.6 mile north of China Grade Loop, 2.2 miles. Construct graded roadbed, place plant-mixed surfacing on cement treated base, and existing pavement and widen existing reinforced concrete bridge; install traffic signal systems and highway lighting. Awarded to Dicco, Inc., \$288,682.25.

Lassen County—Between 9.5 miles north of Secret Valley and Ravendale. To be graded and surfaced with plant-mixed surfacing on untreated rock base, 7.3 miles. Awarded to Harns Bros., \$406,339.68.

Los Angeles County—On Hollywood Freeway between Barham Boulevard and Cahuenga Boulevard in the City of Los Angeles. Developing and planting of roadside and median area. Awarded to K. E. C. Co., \$73,507.24.

Orange County—At Huntington Beach State Park and at Doheny Beach State Park. Parking areas to be surfaced with plant-mixed surfacing on untreated rock base. Awarded to Sully-Miller Contracting Co., \$13,400.43.

Riverside County—US 60—At Wineville Underpass about 8 miles southeast of Ontario. Plant-mixed surfacing, 0.3 mile. Awarded to George Herz & Co., \$2,208.50.

Riverside County—US 60, 70, 99—Between 22d Street in Banning and one-half mile east of Banning. Four bridges and embankments are to be constructed and bridge sites to be graded. Awarded to J. A. Thompson & Son, \$258,995.

Riverside and San Bernardino Counties—At various locations. Plant-mixed surfacing to be placed on existing roadway, 9.6 miles. Awarded to Herz Paving Co., \$53,937.25.

San Bernardino County—US 91—Between State Street and one mile south of Verdemont Underpass. Bituminous surface treatment to be applied to shoulders, 3.2 miles. Awarded to Match Bros., \$11,805.

San Diego County—In the City of San Diego, at the intersections of Rosecrans Street with Midway Drive and with Camino Del Rio-Frontier Street. Modification of traffic signal system and highway lighting and installation, construction of channelization. Awarded to California Electric Works, \$29,204.35.

San Joaquin County—SR 88—Across Mokelumne River, near Clements. Portions of the existing bridge to be redecked. Awarded to C. C. Gildersleeve, \$3,580.20.

San Mateo County—On the Bayshore Freeway between South San Francisco and San Francisco. Plant-mixed surfacing to be placed on existing pavement, 2.3 miles. Awarded to L. C. Smith Co., Inc., \$59,921.

Santa Clara County—At the intersection of El Camino Real with Page Mill Road in the City of Palo Alto. Traffic signal systems and highway lighting to be furnished and installed. Awarded to Howard Electric Co., \$8,225.

Shasta County—US 99—In and near the City of Redding at Ellis Street and at California Street. Grade and surface with plant-mixed surfacing on untreated rock base, 0.1 mile. Awarded to Fredrickson & Watson Const. Co., \$15,444.44.

Sonoma County—SR 12—Between Rincon Creek and Kenwood, 5.5 miles. To be surfaced with plant-mixed surfacing. Awarded to Arthur B. Siri, Inc., \$114,071.20.

Stanislaus County—US 99—Between Faith Road and Ceres Main Canal, 1.3 miles. Frontage road to be graded and paved with plant-mixed surfacing on untreated rock base. Awarded to Standard Materials, Inc., \$66,928.65.

Tulare County—US 99—Between Kern county line and one-half mile north of Earlimart, 8 miles. To be graded and paved with Portland cement concrete and plant-mixed surfacing, and five bridges to be constructed. Awarded to Gordon H. Ball & San Ramon Valley Land Co., \$1,791,255.30.

Tulare County—At the Visalia Airport interchange. Construct graded roadbeds, place Portland cement concrete pavement on cement treated subgrade, place plant-mixed surfacing on untreated rock base, apply seal coat and install highway lighting and illuminated sign systems, 3.2 miles. Awarded to Guy F. Atkinson, \$610,151.45.

Tuolumne County—Between Sign Route 108 and Stanislaus county line, Keystone La Grande Road,

12.6 miles. To be surfaced with untreated rock base and penetration treatment applied thereto. Awarded to Clyde W. Wood & Sons, Inc., \$106,080.

Ventura County—On Hueneme Road between Wood Road and Laguna Road, 2.2 miles. To be surfaced with plant-mixed surfacing on untreated rock base. Awarded to Fredrickson & Watson Const. Co., \$88,444.

Yolo County—Across Cache Creek about five miles north of Woodland. Reinforced concrete girder bridge. Awarded to Lord & Bishop, Inc., \$118,230.

Yuba County—US 99E—Between Olivenhurst and Marysville. Portion of a four-lane divided highway to be graded and surfaced with plant-mixed surfacing on cement treated base. Approach ramps to be constructed and four bridges to be constructed. Awarded to Granite Construction Co., \$583,303.

ROAD BOND ISSUE

Continued from page 29 . . .

miles are still unchanged except for widening strips or new wearing surfaces. Approximately 18 of the 78 miles to be improved in the new \$10,-250,000 bond issue will be roadways constructed by the earlier bond program, and in several locations, the old pavement will serve as a partial base for the new. The fact that the new roads will cost about five and one-half times as much per mile as those constructed 30 years ago reflects the change in character of traffic and its consequent demand for wider lanes and shoulders, heavier pavements and bases, better alignments and sight distances, as well as the decrease in the value of the construction dollar.

The fact remains that the first bond issue road improvement program was and still is one of the best investments ever made by a county, and it is the goal of Road Commissioner Victor W. Sauer and his staff to make the present program give an equal return in value.

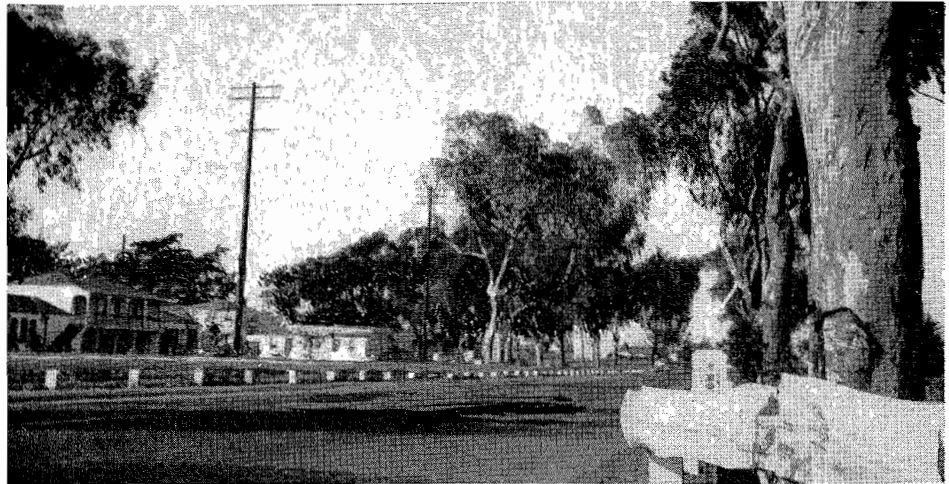
Fred P. Carner of the County Highway Department Construction Division staff was resident engineer, and O. E. Elliott was superintendent for the contractor on this latest FAS bond issue project.

FOLLOW THE LEADER

Drivers who can resist the passion to pass the car ahead find it a good policy to follow an intelligent pace setter. Within limits, they let the other fellow do their thinking. This practice requires staying far enough behind for safety and watching for signals.

GUARD RAILING

Continued from page 24 . . .



But for this guard rail auto would have struck tree

sult of a southbound vehicle continuing its curved path beyond a 2,400-foot radius curve and striking a tree on the west side of the highway where no railing was installed. The other fatality, during the after period, occurred when a southbound vehicle in the four-lane undivided portion of this highway crossed the northbound lanes, entered the adjacent railroad

right of way and struck a tree behind the guard railing.

It is most gratifying that no fatalities have resulted from collision of vehicles with the guard railing. At locations where a vehicle would have struck a tree had not guard railing been in place, it is almost certain that the severity of the accident would have been much greater.

GRADE SEPARATIONS

Continued from page 6 . . .

financing of grade separations, their interests conflict. Responsible highway officials cannot properly approve use of highway funds to pay railroad obligations and the railroad officials cannot be expected to approve contributions to the construction of highways in excess of their legal obligation.

In the nature of the situation therefore, the necessity for referring apportionment of cost of a grade separation to a neutral commission is almost self-evident. The major problem confronting the highways with respect to construction of grade separations therefore, is to eliminate the delays incident to our present procedure. This can perhaps be accomplished by a law providing for the advancement of funds by the State for the initial cost of construction and then having the railroad's contribution adjudicated at a later date.

A CHAMPION

Continued from page 30 . . .

to previous years when they were inclined to be formal and stiff.

Started Lifting in High School

Tommy's interest in weight lifting began while he was still in high school. In 1948, the year of his graduation, and 1949, when he was attending Sacramento Junior College, he took part in several local weight-lifting contests. In 1950 and 1951 he participated in the national weight-lifting competitions, placing second on both occasions.

In 1951 he came to work for the Division of Highways, but left shortly afterward to serve two years with the Army, including overseas duty in Germany. He was granted a temporary leave of absence from the Army so that he could take part in the 1952 Olympic games in Finland. He returned to his job with the State after his discharge from the armed forces last year.

A total of more than 6 billion dollars will be spent on highway improvement and highway construction in the United States during 1954, predicts the National Automobile Club.

HIGHWAY EXPENDITURES

Approximately 30,000,000 people, or 45 percent of all people employed in the United States today, make daily use of their cars in traveling to and from the job or on the job itself.

30,000,000 USED CARS IN WORK

all over the State. support among department employees

action to see that the program was given the widest possible notice and Committee would immediately take Department of Public Works Safety

Durkee told the Governor that the accidents could be materially reduced.

campaigns so that the toll of traffic for adherence to basic safety principles before, during and following the

State in a responsible capacity. For 25 years, Herb served the

important assignment was his most recent. As head of a design section involved in a wide scope of projects, most of which required immediate completion, his talents in aggressive approach were invaluable.

While Tex, as he was affectionately called, served mainly in the field, in construction as well as in related activities, perhaps his most

money and, while witnessing the acceptance of these license holders by Director of Public Works Frank B.

Durkee and Director of Finance John M. Peirce, he stated that "S-D Day" is an opportunity and challenge for all citizens in every walk of life. He

urged that motorists and pedestrians, alike, accept personal responsibility for adherence to basic safety principles before, during and following the

campaigns so that the toll of traffic accidents could be materially reduced.

Durkee told the Governor that the Department of Public Works Safety Committee would immediately take

action to see that the program was given the widest possible notice and support among department employees

all over the State.

Wednesday, December 15, 1954, has been proclaimed as "Safe Driving Day" by President Eisenhower, when individuals and organizations all over the Nation will join in a common effort to prevent death or injuries on our roads, streets and highways.

In California, the kick-off for the campaign among state employees took place at the November 29th meeting of the Governor's Council, when the head of each state agency received a set of gold-plated license frames bearing the inscription "Drive Safely."

The presentation was made by Les Schwimley, a director of the Northern California Motor Car Dealers Association, and B. J. Audette, President of the Beaumont Organization, the manufacturer of the special frames.

Governor Goodwin J. Knight took a leading part in the Sacramento ceremony and, while witnessing the acceptance of these license holders by Director of Public Works Frank B.

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urged that motorists and pedestrians, alike, accept personal responsibility for adherence to basic safety principles before, during and following the

campaigns so that the toll of traffic accidents could be materially reduced.

A total of 8,600 pedestrians were killed and another 165,000 were injured in traffic accidents in the United States during 1953.

PEDESTRIANS KILLED AND INJURED

Beyond the limits of his profession, Herbert Lea Moses dug deeply into the field of human relations.

In his high concept of our responsibilities toward each other, he was ever in search of a means to make this life a better one for all.

leave of absence. two and one-half year military

As a member of a construction battalion he served in the South Pacific, returning to Highways after a

During World War II, he was loaned for six months to the Housing Authority, and completing this assignment, joined the U. S. Navy.

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**In Memoriam
HERBERT LEA MOSES**

To the many friends of Herbert Lea Moses throughout the Division of Highways, we regretfully bring the announcement of his death. Apparently in good health on Sunday, November 7, 1954, he was stricken suddenly.

Herbert Moses was born in New York City, July 12, 1907. Educated in Southern California, he joined the Division of Highways late in January, 1929, as a junior engineering aid assigned to a location survey party. He progressed through the grades in the highway engineering classification, and, becoming a registered civil engineer, was appointed to the associate grade late in 1952.

While Tex, as he was affectionately called, served mainly in the field, in construction as well as in related activities, perhaps his most important assignment was his most recent. As head of a design section involved in a wide scope of projects, most of which required immediate completion, his talents in aggressive approach were invaluable.

For 25 years, Herb served the State in a responsible capacity. Brief interludes in his career in District IV have occurred. In 1932 he returned to Southern California for a six months' stay in District IX.

During World War II, he was loaned for six months to the Housing Authority, and completing this assignment, joined the U. S. Navy. As a member of a construction battalion he served in the South Pacific, returning to Highways after a

leave of absence. two and one-half year military

California Highways

Bob HOFFMAN
Vice Pres., Weightlifting Comm.
A. A. U. of U. S., Coach
American Olympic Team

Clarence H. JOHNSON
President, Weightlifting Comm.
A. A. U. of U. S., Vice Pres.
Int'l W/L Federation

Sincerely yours,

Thank you again for your consideration.

We are proud to have Tommy as a member of our team. His conduct off the weightlifting platform as well as in competition reflects great credit to our Country.

The sacrificed a sure first place in the middleweight class to lift in the light heavyweight division, to better our chance of regaining the team title for the United States.

Tommy, this year, has been placed on the most vital position on our team. The Russians dominate the light classes and the Americans in the heavier ones. The outcome of the team championships, which we lost to the Russians for the first time last year, depends on the result of the light heavyweight class. Although Tommy will be the lightest man in this class he is the only American who can compete against the Russians on equal terms.

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GENTLEMEN: We wish to express our sincere appreciation for allowing Tommy Kono a leave of absence from his duties in your department so he may have the opportunity to compete in the 1954 World's Weightlifting Championships here in Vienna, Austria.

Before and after the championships help further cement European-American relations. In reality Tommy Kono is a goodwill ambassador as well as an athlete.

Mr. Frank M. Reynolds
Engineer and
Assistant State Highway

Mr. Chas. E. Waite
PRAISE FOR TOMMY

GOODWIN J. KNIGHT

Governor of California

FRANK B. DURKEE . . . Director of Public Works

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