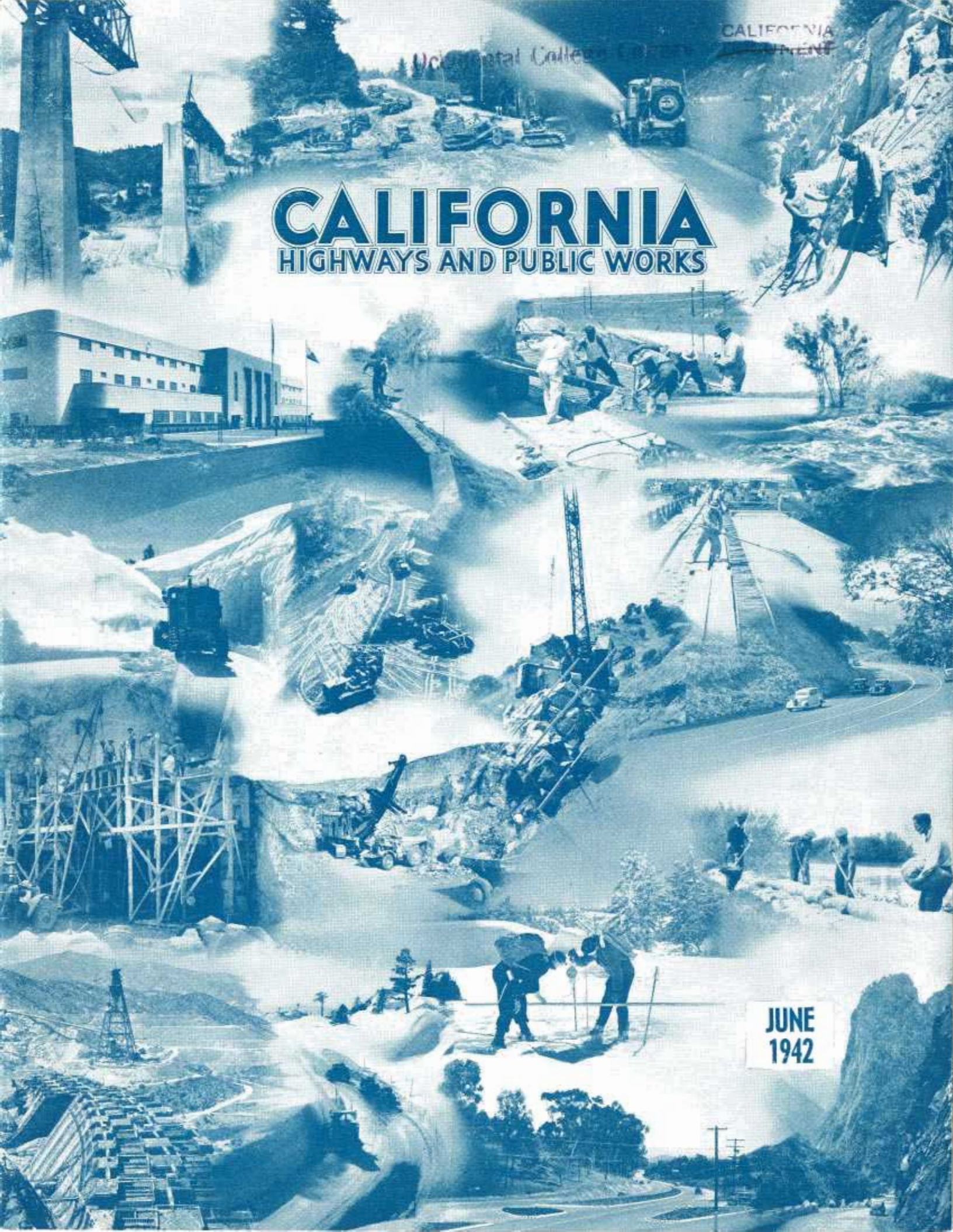


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Department of Public Works

CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



JUNE
1942

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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

FRANK W. CLARK, Director C. H. PURCELL, State Highway Engineer J. W. HOWE, Editor K. C. ADAMS, Associate Editor

Published for information of department members and citizens of California. Editors of newspapers and others are privileged to use matter contained herein. Cuts will be gladly loaned upon request. Address communications to California Highways and Public Works, P. O. Box 1499, Sacramento, California

Vol. 20

JUNE, 1942

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Tolls on Carquinez and Antioch Bridges Again Reduced by State to 25 Cent Rate for Passenger Cars

ON June 1 motorists began enjoying a 25-cent passenger automobile toll on the Carquinez and Antioch bridges, State-owned toll spans.

Three reductions in vehicular charges on these two bridges were approved by the California Toll Bridge Authority at a special meeting called by Governor Culbert L. Olson and held in Sacramento on May 14th.

Lowering of the tolls was in line with Governor Olson's declared policy of giving motorists full benefit of increasing business on the Carquinez and Antioch spans.

The new rate for automobiles, ambulances, hearses, taxis and light delivery automobiles is 25 cents instead of 30 cents. This is the same toll charged on the San Francisco-Oakland Bay Bridge.

NAVY BUSES BENEFIT

Lowered tolls for buses operated by or for the United States Navy on regular schedules transporting Federal employees to and from their places of employment on Mare Island are now 75 cents instead of \$1.

Monthly commutation books for passenger automobiles now cost \$10 instead of \$10.75.

The new rates for automobiles and commutation books on the Carquinez Bridge apply to the Antioch Bridge. This span already had a 75-cent toll for Navy buses.

REVENUES EXCEED NEEDS

The bond issue for acquisition of the Carquinez and Antioch bridges was \$5,943,000. Since September 16, 1940, the revenues from these spans have exceeded the amount required for bond retirement by more than \$1,000,000.

Rates for trucks and other commercial vehicles using the Carquinez and Antioch bridges have been reduced twice since the State purchased these spans.

Carquinez and Antioch Bridge Statistics

Bridges Purchased... September 16, 1940
Revenues to

April 30, 1942—
Carquinez Bridge... \$2,595,847.51
Antioch Bridge... 173,902.76

Total Revenue	\$2,769,750.27
Expenses Other Than Bond Interest	\$362,678.70
Interest on Bonds	\$223,736.25
Excess of Revenue Over Expenses	\$2,183,335.32
Improvements	\$79,740.34
Total Bond Retirement	\$895,000.00
Bonds Outstanding	\$5,048,000.00
Bonds Originally Issued	\$5,943,000.00
Balance on Hand—Cash and Receivables	*\$1,560,207.60
Motor Vehicle Traffic	7,122,707
Vehicular Toll Revenues	\$2,764,466.49
Rents and Miscellaneous Income	\$5,283.78

TOLL REDUCTIONS

September 16, 1940... From 45¢ to 30¢
5¢ for each passenger abolished
May 14, 1942... From 30¢ to 25¢

*Includes \$351,612.62 cash acquired at time of purchase.

and the travel to and from the Mare Island and Vallejo areas," Clark said, "that Governor Olson, as Chairman of the California Toll Bridge Authority, felt that the public should have the benefit of the steadily growing business.

TOLL COLLECTORS INCREASED

"The income from the Carquinez Bridge has mounted to the point where we have ample funds to care for all extra expenses not anticipated in 1940 that have been occasioned by the increased traffic. There is reason to believe that the Carquinez and Antioch bridges will be toll-free considerably before April, 1948, the date when the privately-owned franchises for these structures which the State purchased would have expired.

"Increased business on the Carquinez Bridge has made necessary the employment of more toll collectors and the owners of the bridge bonds have been requested by the Authority to approve of the necessary increase in the operating and revolving fund to provide for the additional operating costs. Bond holders are expected to approve the action of the Authority because it is in line with the best interests of themselves and the general public.

"The excellent financial condition of the Carquinez Bridge is conclusive proof of what efficient public ownership and operation of such a utility can accomplish. The same sort of proof has been established by the Antioch Bridge and, of course, by the San Francisco-Oakland Bay Bridge."

LEGISLATURE CREATED AUTHORITY

The California Toll Bridge Authority was created by the Legislature in 1929, under an act which states it is the declared policy of the State of California to acquire and own all toll bridges situated upon or along any part of the highways of the State with the end in view of ultimately eliminating all toll charges thereon. The act setting up the Authority

The reductions ordered by the Toll Bridge Authority were recommended by Director of Public Works Frank W. Clark, who is Secretary of the Authority.

"Revenues on the Carquinez Bridge have been so greatly increased by the additional traffic resulting from the toll reduction of September, 1940,



Photo Courtesy of Sacramento Union

Photo of Carquinez Bridge on May 21, 1927 when President Coolidge pressed a button in Washington and opened it to 50,000 cars of the vintage of sixteen years ago and prior which crossed it that day

provides that the members shall consist of the Governor, Lieutenant Governor, Director of the Department of Public Works, Director of the Department of Finance, and the Chairman of the Highway Commission.

The first act of this new agency was to launch construction of the San Francisco-Oakland Bay Bridge, which was completed and opened to traffic on October 12, 1936.

As late as January 1939, when Governor Olson took office, a toll of 50 cents per car was being charged on the Bay Bridge. The legal constituency of the Toll Bridge Authority places this agency under control of the Governor immediately upon his inauguration.

GOVERNOR ACTED TO CUT TOLLS

In May of 1939, less than five months after he became Governor and Chairman of the Authority, Governor Olson consulted with Jesse Jones,

chairman of the Federal Reconstruction Finance Corporation, in an effort to arrange for reductions of tolls on the San Francisco Bay Bridge.

After correspondence and telephone conversations with Jones, Governor Olson dispatched Director of Public Works Clark to Washington to follow up the negotiations. These were so successful that on June 15th, of the same year, tolls for automobiles were reduced from 50 to 40 cents.

The reduction of tolls had an immediate effect on the stimulation of traffic, which in turn made possible further cuts. On January 1, 1940, tolls were established at 35 cents. On May 25th of the same year, they were cut to 30 cents, and only shortly thereafter, on July 1st, were reduced to the present charge of 25 cents. Not only have toll costs to motorists been cut, but other charges for the use of the bridge, including freight rates, have been materially decreased.

Despite the fact that the Legislature, in passing the Toll Bridge Authority Act in 1929, had declared it to be the policy of the State to own all toll bridges located on its highways, and that same body in 1937 had given specific approval to the acquisition, by purchase or by eminent domain of the Carquinez and Antioch bridges, no effective steps had been taken by the previous administration toward that end.

Extortionate tolls on these bridges had for years discouraged traffic over important highways. Prior to 1938 the toll charged on the Carquinez span had been 60 cents per car plus 10 cents per passenger. In that year, the State Railroad Commission had on its own motion investigated and ordered a reduction in charges to 45 cents per car and 5 cents per passenger.

The Toll Bridge Authority, under the leadership of Governor Olson,

(Continued on page 15)

Speed Restrictions and Group Riding Urged by Traffic Advisory Committee

ONE of California's most important war efforts—conservation of vital war transportation—is steadily gaining momentum under the Direction of Governor Olson.

The State Highway Traffic Advisory Committee appointed by the Governor at the request of Secretary of War Stimson is completing its organization to carry out the duties assigned to it by the traffic advisory committee to the War Department and Joseph B. Eastman, Director of the Office of Defense Transportation.

Californians must conserve automobile tires or, according to Director Eastman's emphatic warning, the Federal Government will be compelled to take drastic action other than gas rationing to curb the unessential use of private cars.

The State committee is composed of James M. Carter, Director of the Department of Motor Vehicles, Chairman; State Highway Engineer C. H. Purcell; Larry Barrett, Chairman of the Highway Commission; and E. Raymond Cato, Chief of the Highway Patrol.

VICKREY EXECUTIVE SECRETARY

Through the cooperation of Director of Public Works Frank W. Clark, full time services of J. W. Vickrey, Traffic and Safety Engineer of the Division of Highways as Executive Secretary, have been made available to the State committee. Vickrey has been empowered to draft any State department personnel he may require for his organization.

The Traffic Advisory Committee met in Los Angeles on June 1st to map out the details for calling upon State agencies for necessary technical and clerical assistants. Justus F. Craemer, president, and Commissioners Rich and Saehse of the Railroad Commission; Dr. Walter F. Dexter, Director of Education; W. D. McIntosh, Southern Area Manager, Council of Defense; F. B. Lessman, U. S. Public Roads Administration; Attorney General Earl Warren; Director of Agriculture W. J. Cecil and Russell E. Berkly, W. P. A., represented their respective agencies.

Speed is the essence of Vickrey's job. With the Nation's supply of rubber rapidly diminishing, Governor Olson has informed the committee that no time can be wasted in attaining the committee's objects, which are:

(a) To prolong the life of all rubber-borne transportation facilities now in use.

(b) Maximum use of mass transportation facilities.

FIVE METHODS PROPOSED

The methods by which it is hoped this goal will be achieved are:

1. Systematic staggering of store, office, industrial and school hours.
2. Planned neighborhood group riding to and from stores, offices, industries and schools based on common destination.

Group Riding Plan Essential Says Nelson

Everything depends upon production and transportation is a vital factor in the war production program. There must be no breakdown in the Nation's transportation facilities.

The plan for group riding and staggered hours should have the whole-hearted cooperation of every American who uses an automobile. It is the simplest and most workable plan yet advanced for conservation of such facilities.

DONALD M. NELSON
Chief, War Production Board

3. Regulation of street and highway traffic, to make possible more safe and efficient use of vehicles.

4. Securing compliance with 40 mile per hour speed proclamations issued by the President and the Governor.

5. Encouragement of individuals, groups and agencies to use any additional methods to conserve vital war transportation.

Director Eastman has requested the mayors of all cities of 10,000 or more population to immediately appoint a local administrator, whose duty it shall be to organize his com-

munity for the work outlined by the Office of Defense Transportation. In a letter to all the mayors involved, Vickrey wrote:

LETTER TO MAYORS

"It is requested that you advise this committee of the name of the local administrator and the members of the War Transportation Committee of your city so that direct contact can be made with them by the personnel of this committee assigned for that purpose in order that an early start may be made toward carrying out the great task that has been assigned to the State and local organizations."

It will be the policy of the Highway Traffic Advisory Committee to work through the city administrator within their geographical jurisdictions; to coordinate adjacent jurisdictions where such coordination is desirable from an objective standpoint, and to work directly with industries or groups isolated or remote from city jurisdiction.

The work of the committee will be:

1. To provide technical assistance in methods and procedure.
2. To stimulate initiative action and sustaining activity.
3. To furnish State-wide information through newspapers, radio, moving picture facilities, schools and clubs.
4. To act as a clearing house for exchange of ideas, methods and procedures that are effective.
5. To keep a record of progress made and comparative statistics on results attained.
6. To coordinate the work of all State departments concerned with war transportation through an official to be designated in all such departments to work with the committee and Executive Secretary to the end that the combined forces will be best coordinated to accomplish the objectives.
7. To set up the necessary organization through the assignment of personnel from other departments, it being recognized that there is personnel now employed in the several State departments already trained for any work the committee may be called upon to undertake and that there is neither time to train new personnel nor an available source from which to draw untrained personnel.

Vickrey has established an administrative organization in Sacramento.

(Continued on page 20)

Interesting Trends in Wartime Highway Traffic Shown by Survey

By H. L. KILE, Assistant Traffic and Safety Engineer

I NTERESTING trends in wartime highway traffic are revealed in a survey recently completed by the Division of Highways.

The passenger vehicle volume has declined steadily since the first of the year while the traffic of freight vehicles during the first four months of 1942 was 20 per cent more than for the same period last year.

The Division of Highways has long endeavored to keep itself accurately and currently informed regarding the main element of transportation—the traffic that must be served, how much, what kind, its locale, what it does, when, how, and the many corollaries to such questions.

While these questions are at all times of the most vital interest to the highway engineer, and in a somewhat less conscious degree to the public generally, this matter of highway traffic at the moment is of peculiar interest and importance to each and every one of us.

CHARTS REVEAL CHANGES

Aware of this widespread interest, the Traffic and Safety Department has prepared the accompanying charts which graphically show some of the more salient features of what is taking place on our highways as revealed by the actual record of observed facts.

Chart No. 1 presents the record of speed characteristics during three periods: First, the speed pattern which was being followed prior to the enactment in 1941 of legislation increasing the maximum prima facie speed limit from 45 to 55 miles per hour; second, the speed of traffic in the period which followed this change in the upper speed limit; and finally, the situation at present after several months under wartime conditions which have brought increasing changes to all of our normal peacetime activities.

The speed curves shown on the chart are based upon actual observa-

tions taken at a large number of locations throughout the entire State Highway System, and are identical for all of the periods.

SPEED PATTERN CHANGES

The places chosen for checking were at points on the highways where no legal restriction zones existed and where it could be assumed that the traffic speed would reflect normal driving habits. While the chart is self-revealing, since all of us become more or less surfeited with chart reading it may be of interest to make brief written comment.

Cooperation Needed to Conserve Rubber

The rubber situation becomes more serious daily. Therefore it is essential that the Nation's present supply of tires be made to last many times longer than it normally would. The plan outlined by the Traffic Advisory Committee to the War Department makes it easy for war production workers and other members of the civilian population to cooperate with their Government by actively promoting such conservation. I am all for it.

LEON HENDERSON
Price Administrator

It will be noted that there is no essential difference between curves A and B, representing the periods before and after the increase of the maximum speed limit from 45 to 55 miles per hour. Some apprehension was expressed that the legal increase would result in generally higher speeds; however, as will be seen, the comparative checks, taken some months after the enactment went into effect, indicate quite definitely that

the motorist generally made little or no change in his driving speed.

"Average" and "Critical" speed remained practically the same. In fact, the changes were found to be so slight that to all intents and purposes the two curves are identical. It may be explained that as here used the "Critical" speed is that speed below which 85 per cent of all vehicles are found to be traveling.

MORE DRIVING UNDER 40

In marked contrast to the coincidence throughout the lengths of curves A and B, is the very clear departure of the present speed pattern from that which was found to exist in November, 1941. The differences in "Average" and "Critical" speeds are respectively 4 and 5.1 miles per hour. These decreases, while definitely appreciable, may to the casual reader appear less significant than they really are when more carefully reviewed.

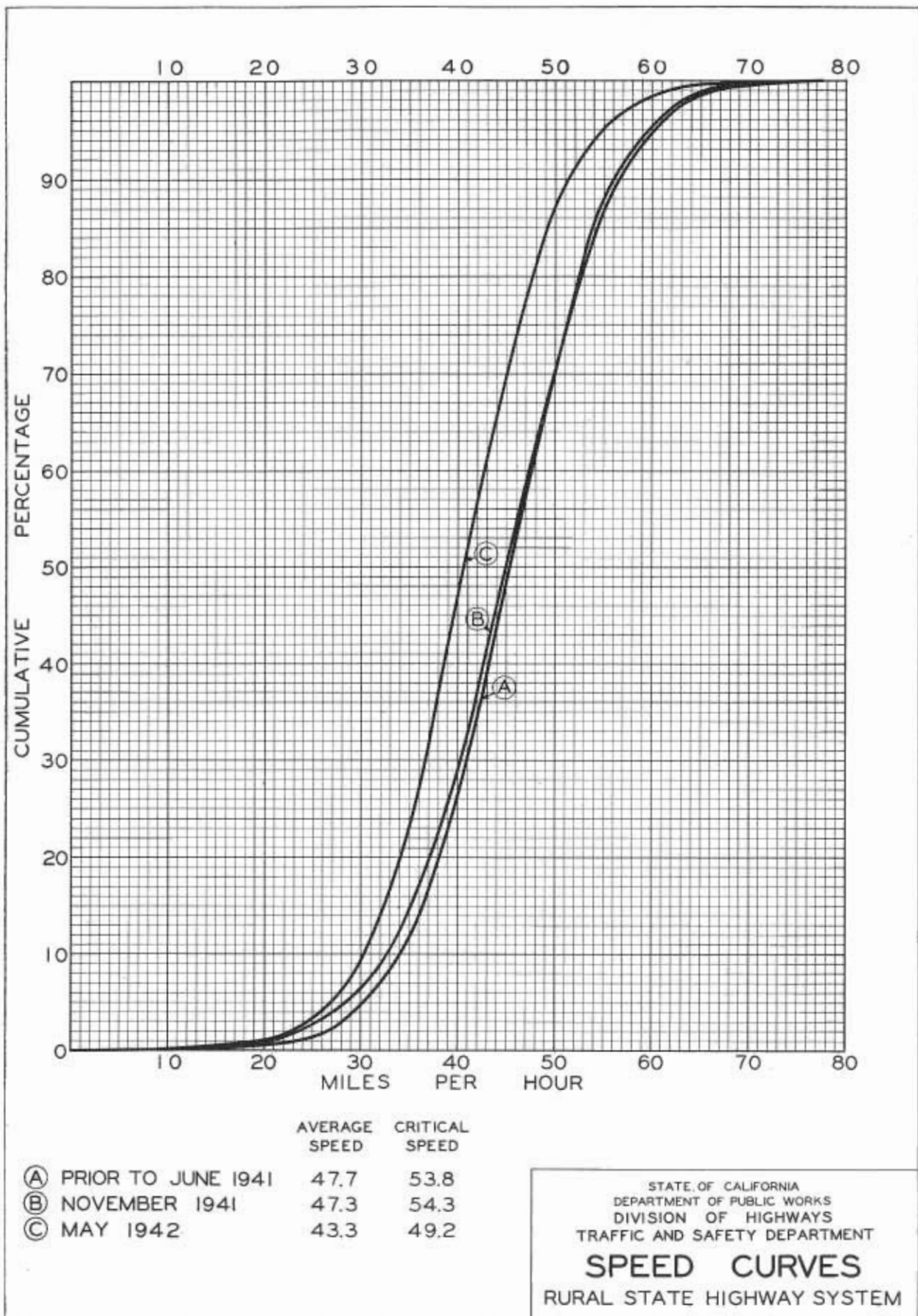
Obviously there is always a considerable percentage of motor traffic which travels in the lower speed brackets regardless of what the maximum permissible speed may be.

It will be noted that in November, 1941, approximately 29 per cent of all vehicles were found to be traveling under 40 miles per hour, leaving 71 per cent moving in excess of that speed. In May of this year we found that only 52 per cent are now going over 40, a reduction of 19 per cent of all vehicles.

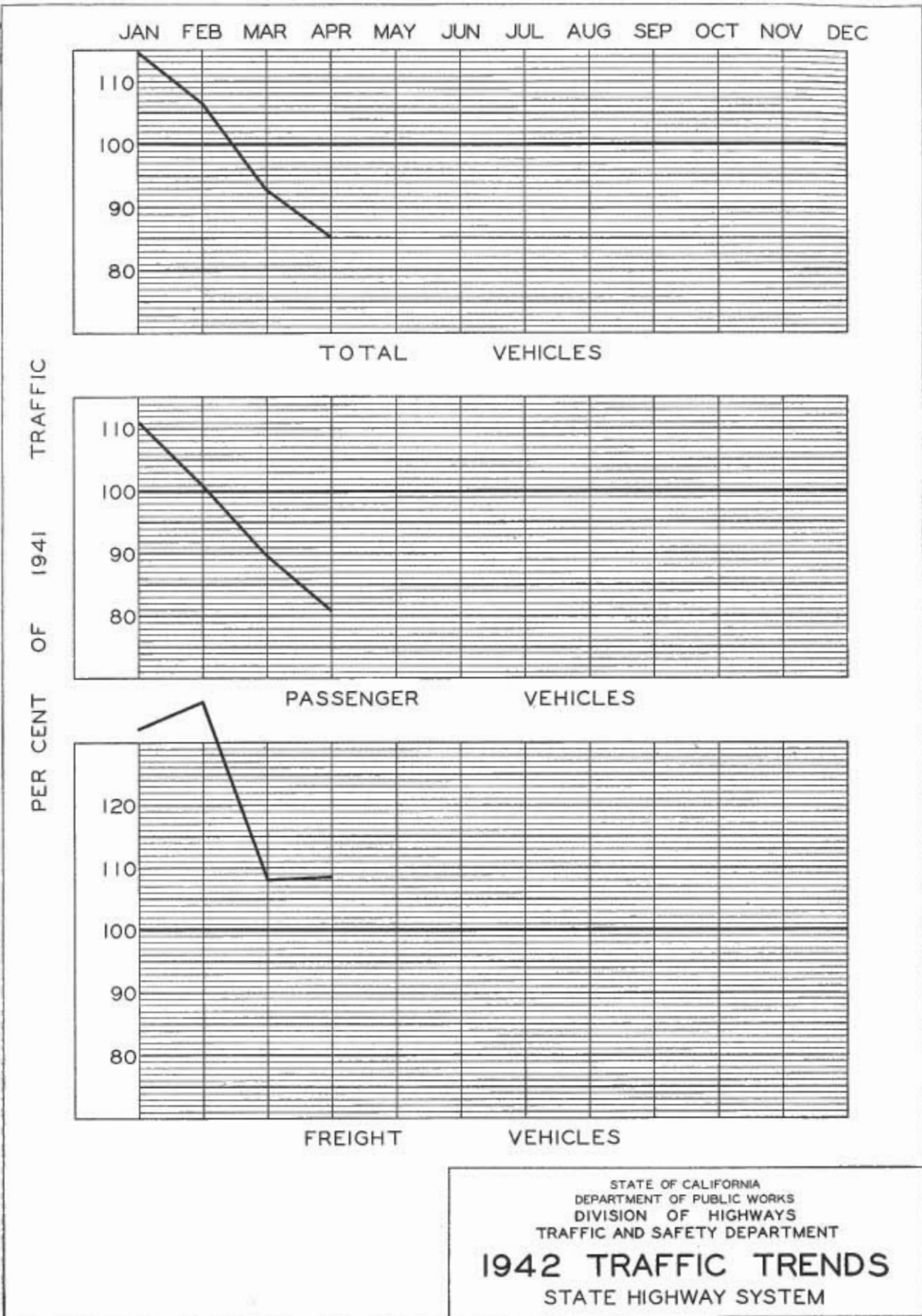
When we consider only the percentages of the total which were found to be above 40 in November, 1941, the present check indicates that approximately 27 per cent of the drivers have dropped their speed to below 40.

The change of speed in the upper brackets, which of course is the only place where such change was sought or desired, is even more marked when

(Continued on page 7)



The curves A, B and C on this chart show highway speed pattern changes from June 1941 at 45 m.p.h. limit to November at 55 miles limit and after Pearl Harbor as explained in the accompanying article



This chart shows a decrease in total highway traffic volume from an all-time peak in 1941. In April 1942 passenger vehicles decreased 19 per cent and freight vehicles increased 8½ per cent over April 1941

we consider the 45 miles per hour group. Here we find that in November, 1941, exactly half of all vehicles recorded were above 45. Our May check shows that this percentage has declined to 30 per cent, showing that 60 per cent of all who formerly drove above 45 have now cut their speed to less than 45.

OTHER TRAFFIC TRENDS

The significance of these changes or the implications which may or may not be drawn from these or other comparisons of the charted curves, are wholly outside this present article, which is limited to the simple presentation of observed field data.

In Chart No. 2 are shown other traffic trends, in many respects of equal or greater interest than the question of traffic speed. Here are depicted the changes in traffic volume, both overall and by further breakdown into passenger-carrying vehicles and freight-carrying vehicles. The figures in all instances represent total traffic including both civilian and military. The comparisons made are between 1941 and 1942 and necessarily can at present cover only a four-month period.

One point to be emphasized in considering this chart is that 1941 traffic is shown as 100 per cent, which might, unless attention is called to the matter, be casually accepted as "normal." But 1941 can not on any basis be considered as a normal year for highway traffic in California. In volume both for passenger and freight vehicles the State Highway System in California in 1941 carried an all-time peak, being approximately 9 per cent over 1940 traffic and 19 per cent more than that of 1939, prior to the effect of the marked impetus in all activities brought about by the present world emergency.

LOWER TRAFFIC VOLUME

It is to be noted that the passenger vehicle volume, which at the start of the year was well above the like period in 1941, has steadily declined until at the last recording it was 19 per cent under that of April, 1941. Taken as a unit, the total passenger vehicle traffic for the first four months of 1942 is 5 per cent under the like period for 1941.

The record with respect to trucks and trailers presents a different picture. Freight traffic in January was 32 per cent above January, 1941.

This percentage increased to over 36 in February, declined to 8 per cent in March, and rose in April to almost 9 per cent. For the four-month period our highways in 1942 have carried over 20 per cent more freight vehicles than during the same four months in 1941.

What direction trends may take in the immediate or distant future must to a large measure be a matter of mere conjecture, for all readers are acutely aware of the many wholly unpredictable conditions which may at any time compel a radical change in present habits or practices.

U.S. Advisory Staff Directs Cooperation

The Highway Traffic Advisory Committee to the War Department under the chairmanship of the Commissioner of Public Roads, Thos. H. MacDonald, has accepted the Nation-wide responsibility for the execution of the war transportation conservation plan. A fulltime staff has been assembled in Washington and this staff, reinforced by experienced personnel in the several States, including those from the Highway Planning Survey, are available to assist the State and local administrations.

JOSEPH B. EASTMAN
Director, Office of
Defense Transportation

INTERESTING AND INFORMATIVE

Long Beach, Calif.

California Highways
and Public Works,
Sacramento, California.

Gentlemen:

I have been cognizant of your fine publication for many months through occasional copies which I see at friends and business offices which I frequent.

I feel your method of informing citizens of the work of your department is both comprehensive and instructive.

I am a native son and travel extensively throughout the State, so really enjoy the improvements and safety factors.

Will you please place my name on your mailing list.

Yours very truly,

NORMAN H. OLGIE,
Aeronautics Instructor,
Long Beach Public Schools.

Need of After-War Planning Stressed by Thos. H. MacDonald

"IT IS apparent that the requirements for the procurement of needed materials and equipment for the entire field of automotive transportation are now, and for a long time to come will remain, largely subject to the restrictions and limitations necessarily imposed on the national economy by the war effort," says Thomas H. MacDonald, Commissioner of Public Roads, in April American Highways. "It is confidently expected that the more intensive use of existing motor vehicle equipment and highway facilities, coupled with the enforced postponement of much needed replacement for an indefinite period, will build up a latent reservoir of needed production after the war.

"Planning for the future peace, therefore, must of necessity be a part of our all-out war program.

"Foremost on the 'shelf' of public works to be made available in the future, not alone in response to pent-up needs but by reason of long-standing neglect, is the type of project concerned with urban redevelopment and housing. Conditions resulting from rapid changes incident to modern industrial development and in methods of transportation have been permitted to lapse.

"Problems of traffic congestion, of the lack of coordination of all transportation, of inadequate parking space for motor vehicles, of over-dense populations and needed recreational areas, have not been frankly met in the past, can not be adequately dealt with in the present emergency, but will have to be faced in the future.

"The need for the extensive re-planning and rebuilding of our American cities and towns will require the combined efforts of our several administrative agencies of Federal, State and local government together with the maximum aid of private enterprise. It is to be hoped that such rebuilding may be the result of rationalization of our needs rather than the result of the wholesale devastation that is war.

Long Beach Traffic Circle Improvement Eliminates Bad Intersection Bottleneck

By W. L. WELCH, Assistant District Office Engineer

COMPLETION of reconstruction work on the Long Beach Traffic Circle at the intersection of State Highway Routes 60 and 168 east of Long Beach, at a cost of \$31,262, and acceptance of the work by Frank W. Clark, Director of Public Works, on April 30, 1942, has eliminated another bottleneck between the defense worker and his job in one of the most vital industrial areas of southern California.

The original Traffic Circle, one of the first of its kind in the State, was constructed under the supervision of the Division of Highways in 1934. Although at that time it was considered a great forward step in handling traffic, increased speeds and further advancement in the science of providing for unimpeded traffic flow, coupled with the tremendous increase in population and consequent traffic densities in this area, had made it totally inadequate for present day needs.

BASIC DESIGN SOUND

That the basic design was sound has been proven by the ease and economy with which this facility was altered, and by the increased ease and speed with which traffic now negotiates the improved traffic circle.

The original conception of the Traffic Circle contemplated six entering highways; of which only three were constructed, and permitted unlimited access to the Circle itself from roadside businesses as they might develop. Through cooperative agreements between the State and the property owners, the Los Angeles County Regional Planning Commission, and the Planning Commission of the City of Long Beach, neither Pacific Coast Highway (State Street) nor Hathaway Avenue will be extended east of and northwesterly of the Inner Traffic Circle, and all access to property abutting the present circle will be obtained by way of an outer circle con-

structed by the City of Long Beach and the County of Los Angeles. This outer circle consists of 30-foot x 3-inch plant-mixed surfacing on an 80-foot right of way.

In reconstructing the inner Traffic Circle it was not found necessary to increase the diameter. By altering the superelevation and by increasing the radii of the curb returns at the entrances to the circle, it has been possible to double the entering speeds. Traffic islands placed in the proper position in the various entering throats channelize the traffic and prevent collisions between vehicles already in the circle and those entering it. Ample distance is provided for cars to weave into the desired lanes.

INCREASED SUPERELEVATION

Increased superelevation was provided by placing asphalt concrete varying from a minimum of 0.17 feet to whatever depth was required to obtain the necessary amount of superelevation. Where new pavement was necessary due to increasing the radii of curb returns at the entrances, an asphalt concrete surface on a Portland cement concrete base was constructed. New curbs and gutters were built around the outer periphery of the circle, and all traffic islands were curb. Both Lakewood Boulevard and Pacific Coast Highway (State Street), Routes 168 and 60, have a 4-foot positive central division strip for some distance northerly and westerly of the Traffic Circle, thus further reducing possibilities of conflict.

The Traffic Circle is illuminated by three floodlights, positioned so that there is no glare at any time into the eyes of approaching drivers. Flashing beacons and ruby reflectors give additional warning to the driver at island points and other places of possible conflict. On Pacific Coast Highway (State Street), Lakewood Boulevard, and Hathaway Avenue neon signs placed approximately 500 feet

from the circle proper advise the approaching motorists of its proximity.

HIGH TRAFFIC COUNT

The acquisition of the right of way for the outer circle and ingress and egress rights to the inner circle presented a very interesting right of way problem.

On the inner circle adjoining property owners had rights of ingress and egress to their properties, but the traffic was fast-moving and presented a hazard in its use. Several meetings of the adjoining property owners were held and it was finally agreed that they would all enter into a cooperative agreement by donating the necessary land and rights of ingress and egress to the inner circle if an outer circle were constructed on which they could locate their various businesses. With the safety and facility of use of the new improvement these owners have expressed their gratification of this new improvement to the district and feel that this improvement will develop the area considerably.

Storm waters approaching the circle from the north and west are carried under the pavement and through the circle by means of a concrete lined open ditch discharging into a reinforced concrete box culvert near the Hathaway Avenue entrance. The area within the inner curbs has been planted with trees and shrubs by the Park Department, City of Long Beach.

Traffic counts taken last July indicate a maximum of 34,384, 27,500, and 19,897 vehicles on Hathaway Avenue, Pacific Coast Highway, and Lakewood Boulevard, respectively. Due to expansion of various defense activities in this area, vehicle use of the Traffic Circle has undoubtedly increased, and the ease and rapidity with which this increased traffic is now handled is a glowing testimonial to the soundness of the original design and to the recent alterations which have been made at this location.



Views of reconstructed traffic circle at intersections of State Street, Lakewood Boulevard and Hathaway Avenue in Long Beach which now consists of a circle within a circle. At top—channelization at State Street entrance. Below—Hathaway Avenue approach



Many large, beautiful trees were saved in construction of the division strip on new 4-lane highway section through Visalia

New Divided Highway Completed on State Highway Through Visalia City Limits

VISALIA, county seat of Tulare County, celebrated on May 15th the opening of a short section of new State highway within the city limits. Officials of the State, city, county, and auto clubs enjoyed with a group of Tulare County citizens, the ceremony marking the completion of this highway construction, which now affords a safe and direct routing of traffic at Visalia.

The project begins at the westerly city limits on State Sign Route No. 198 and follows easterly along Mineral King Avenue to its intersection with Conyar Street, a total distance of some 3,800 feet.

The improvement widened an existing street, replacing an oiled road with an asphalt concrete pavement.

The four-inch base for the pavement was a blended sand, plant-mixed with RC-4. Below this had been placed a layer of sandy imported borrow of sufficient depth to insure proper support, over an adverse soil. On this base an asphalt concrete pavement was laid.

Together with a previously completed Division of Highways contract to the west, this project has made a decided improvement in the routing of traffic to and through Visalia.

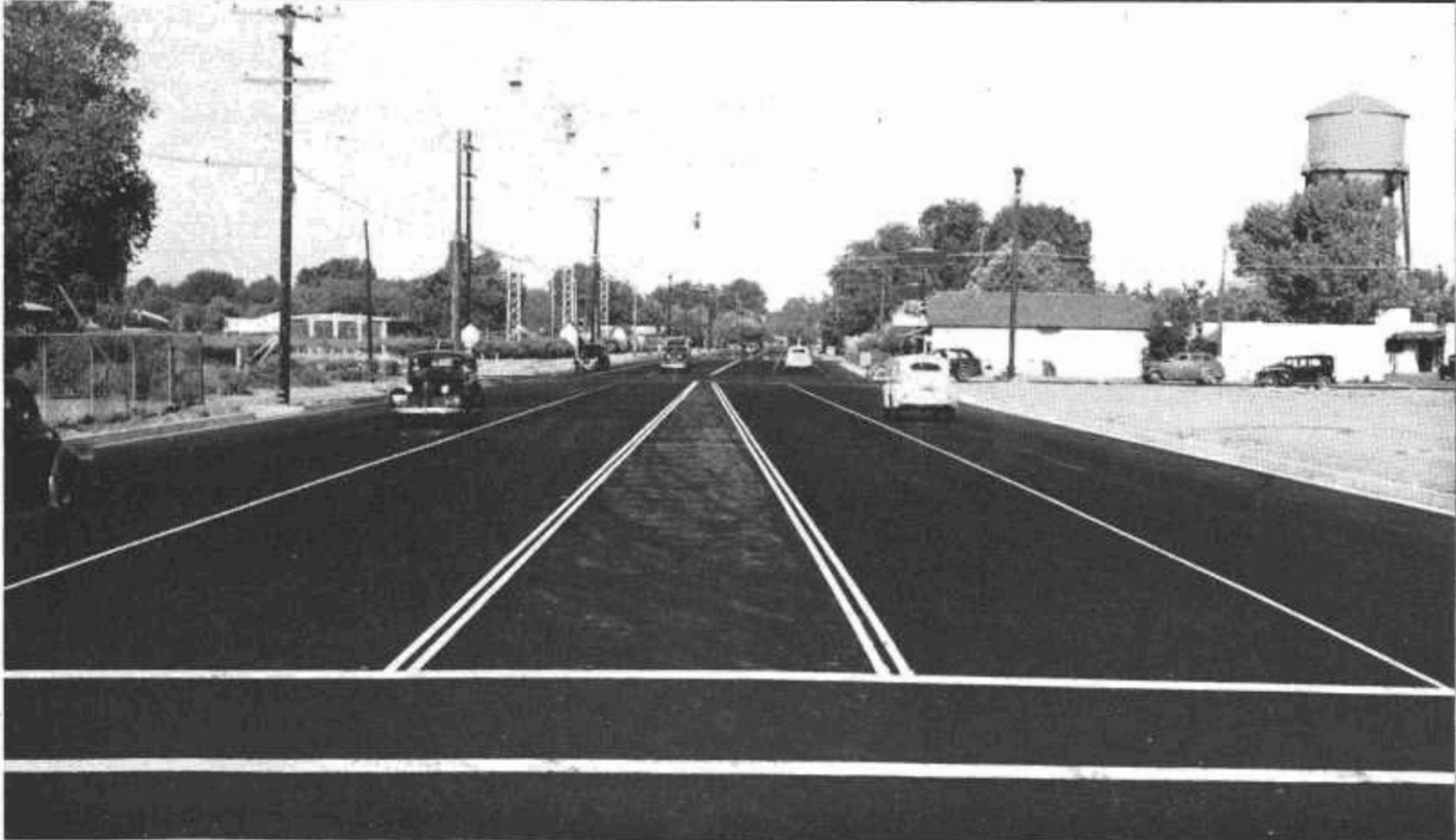
Through the easterly portion of the project where private building is further advanced than in the westerly part, an undivided street section was used. This portion was surfaced as elsewhere, with asphalt concrete and is 64 feet wide between curbs.

The improvement to the west of this project was of the four-lane divided highway type and for the westerly portion of the new contract a divided highway construction was used. The width between curbs in this portion is 37 feet for the northerly roadway and 31 feet for the southerly one.

Central islands 10 feet wide are outlined by concrete curbs. Many large, beautiful oaks are protected by the central island separations, add to the beauty of this approach to Visalia, located on the rich delta of the Kaweah at the approach to Sequoia National Park.

The project is designed to bypass the central business section of Visalia,

(Continued on page 18)



Top—Wide, curbed central island separates the new 4-lane section from the existing road on Mineral King Avenue in Visalia.
Below—View of the easterly section of the improvement. The full street width is 64 feet between curbs

Funds Voted to Repair 200 Miles of Highways Damaged by Heavy Traffic

URGENT requirements of the Division of Highways for funds to immediately repair and resurface highways which have been damaged by heavy wartime traffic were recognized by the California Highway Commission at its meeting in Sacramento on May 27th. The commission allocated \$1,517,650 for the purpose.

The commission approved a list of necessary repair jobs on 17 highways in northern and southern California which were submitted by T. H. Dennis, Maintenance Engineer of the Division of Highways. Eight of these are on the strategic network in the north—three on the primary, and five on

the secondary highway systems. Two are on nonstrategic highways on the north primary system and four on the north secondary system. The remaining three projects are on nonstrategic roads on the south secondary system.

Commenting on the action of the commission, Director of Public Works Frank W. Clark said:

"It is the desire of the Highway Commission and the Department of Public Works to cooperate 100 per cent with the Army and the Public Roads Administration in highway construction during the war emergency. Therefore we are devoting all-out time and attention to work ur-

gently required by the Army and Navy.

"However, the Division of Highways will proceed with the purchase of rights-of-way for all budgeted projects and making the necessary surveys and plans in order that when the war is ended California will be in a position to immediately launch the building of highway projects which must now be postponed if we are to give all-out effort to the War Defense Program. Under this policy there will be no delay after the emergency in starting a huge highway construction program. It is probable the commission will have to make other revisions of the budget as the war goes on."

Summary of Proposed Projects for Restoration and Repair of Surfacing Including Incidental Work on Shoulders

STRATEGIC NETWORK

Primary North			Estimated cost
Location of work	Miles	Description of work	
II-Las-29-B—Between Coppervale and Susanville.....	12.26	Restore base and replace surfacing.....	\$131,000
III-Yol-7-BC—Cache Creek to Bretona.....	5.15	Restore base and surfacing.....	62,000
IV-SM-68-SM,C,Bmt—North City Limits Redwood City to Fifth Street, San Mateo.....	6.43	Level and restore surfacing.....	170,000
Total Primary North (Strategic network).....			\$363,000

STRATEGIC NETWORK

Secondary North			
	Miles	Description of work	Estimated cost
II-Sis-72-BC—Between Cougar and Dorris.....	35.15	Restore base and replace surfacing.....	\$156,500
IV-CC-106-A—From Route 14 to ¼ Mi. West Christie Underpass.....	3.60	Restore surfacing.....	75,000
IV-SCI-32-BC—From Route 22 to Pacheco Creek.....	7.40	Restore surfacing.....	47,300
X-Mer-32-C—Los Banos to Madera Co. Line.....	13.70	Restore base and replace surfacing.....	140,000
VI-Mad-32-A—From Merced County Line to Califa.....	15.70	Restore base and replace surfacing.....	60,000
Total Secondary North (Strategic).....			\$478,800

NONSTRATEGIC HIGHWAYS

Primary North			
	Miles	Description of work	Estimated cost
II-Sha-28-AB—From Route 3 to Montgomery Cr.	20.50	Restore base and surfacing.....	\$73,400
III-Yol-7-A—Winters Wye to Willow Slough.....	5.87	Restore base and surfacing.....	70,000
Total Primary North (on Nonstrategic highways)...			\$143,400
Secondary North			
	Miles	Description of work	Estimated cost
III-Pla,Nev-38-BC,A—Tahoe City to Route 37.....	10.0	Restore base and surfacing.....	\$136,000
III-Sac-98-A—Sacramento to Route 3.....	5.15	Restore surfacing.....	68,000
VI-Fre,Kin-10-EF,BC—From Oil King School to Hanford...	31.0	Restore and repair pavement and shoulders.....	140,000
X-Mer-41-C—Fresno Co. Line to Route 32.....	4.25	Restore base and surfacing.....	30,000
Total Secondary North.....			\$374,000
Secondary South			
	Miles	Description of work	Estimated cost
V-SB-56-ABCD—Las Cruces to Orcutt.....	14.70	Restore surfacing and shoulders.....	\$84,300
VI-Tul-134-AB—From 7.0 Mi. West of Tulare to Lindsay...	4.50	Restoration and repair surfacing.....	31,000
XI-Imp-202-A—From Seeley to Mt. Signal.....	4.40	Restore and repair surfacing and shoulders.....	43,150
Total Secondary South (Nonstrategic).....			\$158,450
Total mileage.....		199.76	

¹ This includes \$20,000 already allocated for grading and drainage which it is now proposed to apply to surface repair.

Highway Picture As It Looks Today Changed by Drastic War-time Conditions

Representing State Highway Engineer C. H. Purcell, Senior Highway Engineer John G. Meyer addressed the convention of the Supervisors Association in Los Angeles on May 21st on the subject "EFFECT OF WAR EMERGENCY ON HIGHWAYS." Mr. Meyer presented a comprehensive view of the highway picture as it looks today under drastic changes compelled by war-time conditions.

By JOHN G. MEYER, Senior Highway Engineer

VARIOUS guesses were made about a year ago on the probable effect of the Defense Program on highway construction and maintenance. Like most pre-war guesses they were too little. The Nation's all out war effort is having and will have a much more drastic effect on State, county and city road building than was ever anticipated.

The budget of the State Highway Department was made April, 1940, for the period July, 1941, to June 30, 1943. Rapidly rising costs, plus required partial adjustments to a defense effort necessitated budget revision in November, 1941. On the basis of this revision the budget included major construction in an amount of approximately \$38,000,000.

In addition to this regular work we were authorized to survey and prepare plans and specifications for approximately \$45,000,000 worth of access roads serving the many Naval and Army camps, cantonments, air field and other military establishments as well as war industrial plants and raw material sources. More recently the Division has been called upon to prepare engineering data in connection with construction of a substantial program of flight strips on airfields adjacent to roads.

ADVANCE PLANNING

The foresight in authorizing preparation of these plans was fortunate, because we are able to immediately proceed with construction as the funds are made available by the Federal Government. Consequently, a very substantial part of the access road program in the State area is now under construction or completed. When and if the Government provides the funds, we will be able to complete

the access and flight strip program in the State.

We find, following Pearl Harbor, the highway picture changing rapidly due to some six factors as follows:

1. Increasing costs
2. Material scarcities
3. The Access Road Program
4. Highway Revenue decrease
5. Increased Highway Maintenance costs
6. Greater emphasis on Defense Highways

The rise in price of materials, wages, and other factors has increased construction costs probably in the neighborhood of 30 per cent over 1940 costs. Along the same lines we are getting fewer and fewer bids on State highway work. The road contractors are pretty well tied up in airport, dock and cantonment construction. How long this status will continue is difficult to anticipate.

QUESTION OF PRIORITIES

To mention material scarcities brings up the question of priorities which is a headache in itself. Somebody defined priorities as the right to ask for something you can't get anyway. However, unless you have a priority rating it is almost impossible to construct anything today. Sugar, car and tire rationing has brought home to the layman public the seriousness of material scarcities. Priorities are to the road constructing agency, the engineer and contractor what rationing is to the public, except that road builders have been faced with priorities since July of 1941.

Because the work happens to be roadway construction, doesn't mean that a high priority or any priority

is granted. The project must be a defense road improvement before any priority is assigned. The priorities assigned to defense road jobs are not sufficiently high usually to guarantee the construction of work requiring steel. Consequently, we must defer work requiring substantial amounts of steel. In some cases we can substitute other materials. For some time we have been revising our designs to eliminate those hard-to-get materials. Some of our bridges are going to look rather weird.

It should not be overlooked that the use of these substitute materials in the interest of the war effort are not economical as a rule. This type of construction may cost 10 per cent to 50 per cent more than in the business-as-usual days. Considerable additional engineering effort is required in designing with such substitute materials.

WAR PRODUCTION BOARD RULES

Many of you perhaps have heard of the latest order of the War Production Board called L-41 which forbids any construction to start unless it was started before April 9, 1942, unless it is for maintenance and repair, or is for less than \$5,000 or has a priority rating and a few more things. However, after having that order just long enough to barely digest it, we received another called L-41-600 which permits State Highway Departments and counties and cities to proceed with roadwork provided no priority assistance is required or the steel and metal products are on hand or ordered before May 8, 1942.

If your project qualifies under this order you may proceed with the project but you must submit a report to

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Legislators Inspect Central Valley Project Units and State Water Plan Sites

MANY of the diversified and intricate water problems of the San Joaquin Valley were seen at first hand by the Joint Legislative Interim Committee on Water Problems during an inspection tour of the valley, May 11 to 17, 1942.

Starting from Stockton the committee made a tour of all of the San Joaquin Valley units of the Central Valley Project and inspected units of the proposed State Water Plan. Noon and evening meetings were held daily so that the water problems of various communities could be presented to the committee by local interests.

Units of the State Water Plan inspected were the proposed Ione dam site on Dry Creek; Pardee reservoir on Mokelumne River; Melones reservoir on the Stanislaus River; Don Pedro reservoir on the Tuolumne River; Exchequer reservoir on the Merced River and Pine Flat reservoir site on the Kings River.

Under the plan of ultimate development of the water resources in California prepared by the State Division of Water Resources and adopted by the State Legislature in 1941, several of the existing dams will be replaced with larger structures providing additional water for irrigation and additional flood control protection.

Features of the Central Valley Project inspected were the proposed

route of the Delta-Mendota Canal; Friant Dam, which is more than 99 per cent completed; construction work on the Madera Canal and the proposed line of the 160-mile long Friant-Kern Canal.

In Kings County the committee saw at first hand the damage caused when flood waters topped levees in the Tulare Lake basin and destroyed large acreages of crops that were ready for harvest. A portion of a day was also spent viewing the so-called West Side Lands—a strip of fertile lands approximately 100 miles long and varying in width from 15 to 25 miles in western Kern, Kings and Fresno counties which are now without water. Under the State Water Plan these lands would be served by the Mendota West Side Pumping System which would take an imported supply of water from the Sacramento River at Mendota Pool on the San Joaquin River.

LOCAL MEETINGS HELD

Meetings were held in Stockton, Angels Camp, Modesto, Merced, Fresno, at Friant Dam, Visalia, Hanford, Porterville, and Bakersfield, at each of which local water problems were presented by the local interests and discussed.

At the Bakersfield meeting the committee unanimously passed a resolution urging the Federal Government

to complete at the earliest possible time construction of the San Joaquin Valley units of the Central Valley Project, the Antioch steam electric plant and the Shasta-Antioch transmission line.

The committee's final meeting was held in Barstow, on May 17th, when flood control problems on the Mojave River were presented and discussed.

MEMBERS ON THE TOUR

Members of the committee on the tour were Senator B. S. Crittenden, Chairman, Stockton; Senator Chas. H. Deuel, Chico; Senator Ed Fletcher, San Diego; Senator Robert W. Kenny, Los Angeles; Senator R. R. Cunningham, Hanford; Assemblyman Rodney L. Turner, Vice Chairman, Delano; Assemblyman Clyde A. Watson, Orange; Assemblyman Gordon H. Garland, Exeter; Assemblyman Seth Millington, Gridley. Technical assistance was given the committee by State Engineer Edward Hyatt; H. M. Crooker, Resident Engineer, Division of Water Resources, Fresno; R. S. Calland, Division Engineer, U. S. Bureau of Reclamation, Sacramento; R. B. Williams, Construction Engineer, Friant Division, U. S. Bureau of Reclamation; H. W. Boetzkes, Corps of Engineers, U. S. War Department, Sacramento, and Colonel A. M. Barton, Chief Engineer of the State Reclamation Board.

FUNDS FOR CENTRAL VALLEY PROJECT TRANSMISSION LINE AND ANTIOCH STEAM PLANT RESTORED BY SENATE

The Interior Department Supply Bill carrying an appropriation of \$39,019,000 for construction work on the Central Valley Project in the fiscal year 1943 will be considered by a conference committee of both houses early this month.

Earlier action by the House Appropriations Committee in eliminating all funds for construction of the Shasta transmission line and the Antioch steam plant was reversed when the Senate approved the recommendation of the Senate Appropriations Committee setting up \$3,723,000 for transmission line construction and \$200,000 for surveys and plans for the steam plant. In addition the Senate Appropriations Committee added \$250,000 to the \$1,000,000 ear-marked for the Friant-Kern and Madera canals.

Representatives of the Water Project Authority appeared before both House and Senate committees and vigorously supported appropriations for both the irrigation and power features of the Central Valley Project as set up in the President's Budget.

Following action by the Interior Subcommittee of the House Appropriations Committee eliminating funds for the transmission line and Antioch steam-electric plant, President Roosevelt personally addressed a letter to Senator Carl Hayden, Chairman of the Interior Subcommittee of the Senate Appropriations Committee pointing out the importance of these funds.

Governor Culbert L. Olson actively entered the fight for restoration of the funds as did George Sehlmeier, Master of the State Grange, who made a trip to Washington to appear before the Senate Appropriations Committee in support of the Central Valley Project appropriations. Many cities and organizations throughout the Central Valley passed resolutions and wired their Washington representatives urging that adequate funds be provided, not only for the irrigation features of the project, but for the transmission line and steam-electric plant at Antioch as well.

Opposition to power features came from Pacific Gas & Electric Company representatives with statements before both Houses.



The Joint Legislative Interim Committee on Water Problems is shown here at Friant Dam, which is nearly complete. From left to right are: Executive Secretary Frank Reed; Senator Fletcher, San Diego; Assemblymen Millington, Gridley, and Watson, Orange; Senators Myhand, Merced, and Kenny, Los Angeles; State Engineer Edward Hyatt; Senator Crittenden, Stockton, Chairman; Mrs. Elizabeth Eyre, Secretary; Assemblyman Turner, Delano, Vice Chairman; Senators Cunningham, Hanford, and Deuel, Chico; R. S. Calland, District Engineer, U. S. Bureau of Reclamation and R. B. Williams, Construction Engineer.

Tolls on Carquinez and Antioch Bridges Reduced

(Continued from page 2)

considered that even this moderately reduced toll represented an unjustified tribute levied against users of the Carquinez span and determined to start proceedings for its acquisition, as well as that of the Antioch structure, owned by the same company and on which tolls were equally exorbitant.

Early in 1940 Governor Olson requested Director Clark to investigate the feasibility of purchasing these bridges. As a result of Mr. Clark's negotiations with the bridge owners and the bond issue involved the State received \$350,000 in cash held by the American Toll Bridge Company and became owner of the spans on September 16, 1940, at a cost of \$5,943,000.

Tolls were immediately cut in half. The old rate of 45 cents per car plus 5 cents per passenger was reduced to 30 cents per car with a limit of four passengers. On May 14, 1942, Governor Olson called the Authority into special session in Sacramento and

Carquinez Bridge History

Last month, on May 21st, the Carquinez Bridge entered the sixteenth year of its existence. Since its opening on May 21, 1927, to April 30, 1942, the span had carried a total of 25,969,796 vehicles.

During the 13 years and four months, from 1927, to September 16, 1940, that it was operated under private ownership by the American Toll Bridge Company, Carquinez Bridge carried 18,847,089 vehicles.

Under State ownership, from September 16, 1940, to April 30, 1942, a period of 19 months, Carquinez Bridge had a traffic count of 7,122,707 vehicles.

The average monthly traffic count under private operation was 117,794 vehicles. Under public ownership and the reduction of tolls, the average number of vehicles using the bridge to April 30th, last, was 374,879 vehicles.

Fifteen years ago, more than 75,000 persons gathered at Carquinez Bridge to celebrate its official opening to the motoring public. In Washington, President Calvin Coolidge pressed an electric button which opened the span to the first of 50,000 motorists who crossed it that first day.

It was an auspicious occasion for more than one reason. While the dedication ceremonies were in progress word was flashed that Charles Lindbergh had landed in Paris, completing his trans-oceanic flight.

Carquinez tolls for passenger cars was reduced to 25 cents.

"The excellent financial condition of the San Francisco-Oakland Bay Bridge," said Director Clark, "is conclusive proof of what efficient public ownership and operation of such a utility can accomplish. The same sort of proof is established by records of the Carquinez and Antioch bridges, which show that since their acquisition by the State on September 16, 1940, the revenues of these spans have exceeded bond issue requirements by more than one million dollars."

Study of Evaporation in South Completed

In southern California where local water supplies are insufficient to cover the needs, the loss of water through evaporation is of great importance.

To establish definite data on the rate of evaporation a seven year study has been made at the Baldwin Park cooperative station. Results of these studies have been compiled and issued in a report just completed by the United States Department of Agriculture.



View of divided road at northerly approach to new and old bridges over Kern River on State Route 142

Four-Lane Divided Highway and Bridge Provided for Traffic North of Bakersfield

By E. T. SCOTT, District Engineer

BAKERSFIELD, Kern County, at the southern end of the San Joaquin Valley, is an important travel center for traffic from Los Angeles and San Francisco via U. S. 99 and from the East via U. S. 466.

From the mines, cattle ranges, and the potato and cotton fields in this region, products are processed or shipped at Bakersfield in annually increasing quantities. However, now, as for years past, oil is a very important product.

The development, distribution and refining of oil necessitates the movement of many loads of pipe, oil well drilling tools, materials for derricks and supplies and tools for foundries, refineries, and repair shops.

An important share of the traffic around the busy center of Bakersfield, flows north over Chester Avenue, Kern River Bridge and through the community of Oildale. Over 14,000

vehicles, in 16 hours pass over this bridge in summer as verified by the last two years traffic counts.

In the past this heavy traffic has trundled along North Chester Avenue over a rough broken pavement, from the north city limits of Bakersfield, around sharp, angular turns at the approaches of the Kern River and thence through the congested streets of Oildale. The old bridge built in 1912 was much too narrow for two-way traffic.

Since December, 1940, three contracts have each contributed to the improvement so urgently needed by this highway traffic.

The first contract covered the construction of new bridges across Kern River and Beardsley Canal.

The new Kern River Bridge is of composite steel and concrete stringer construction. A reinforced concrete deck covers 22 spans of 61 feet and

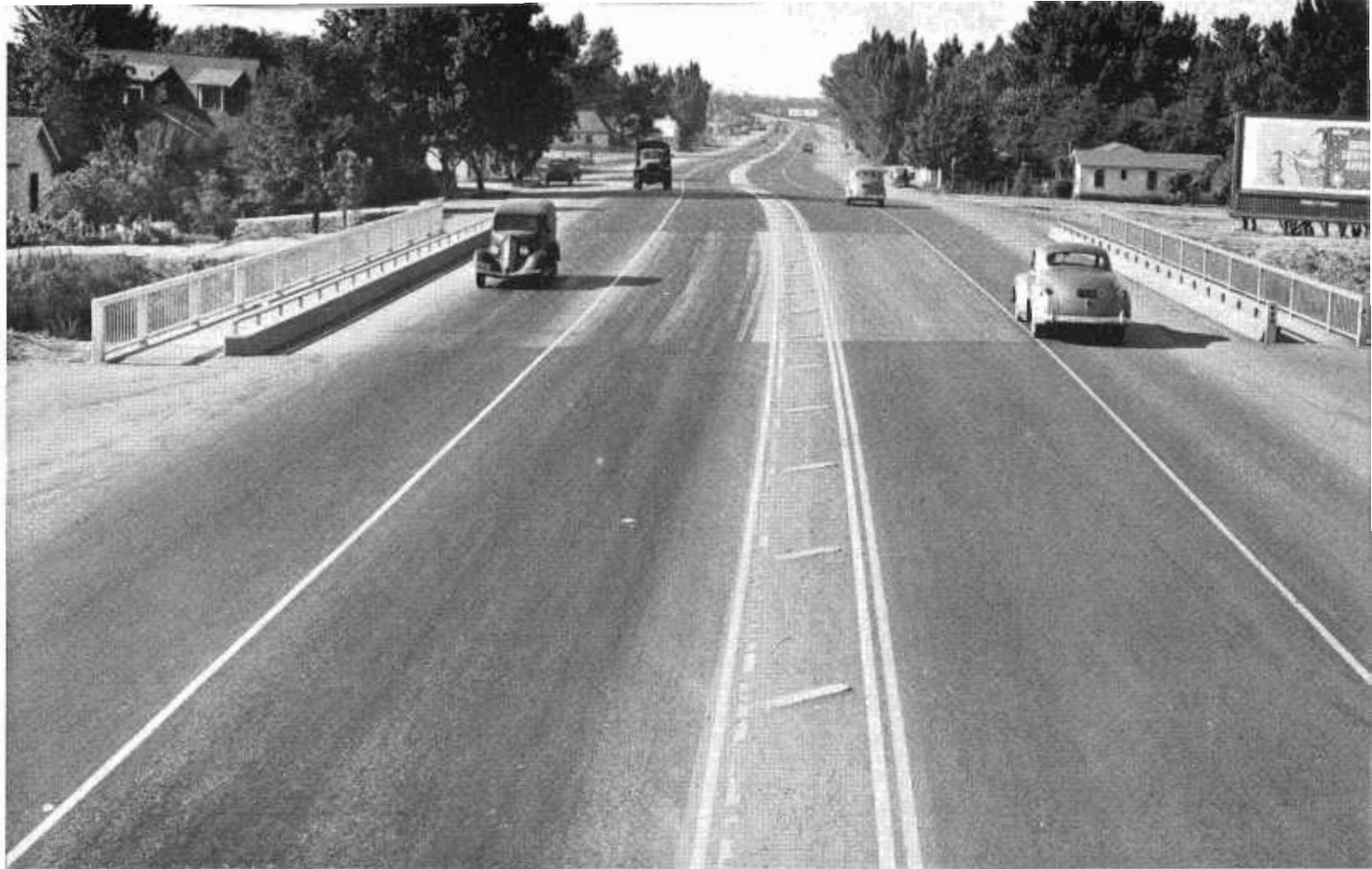
two cantilever end spans of 16 feet. It rests on concrete piers and piles. There is a 5-foot sidewalk and 26 feet of clear roadway width. The cost per square foot of total area was only \$4.50.

During construction, traffic used the old bridge with no unusual inconvenience to themselves or the contractor.

The new bridge, of simple but beautiful lines, now comfortably carries the south-bound traffic while the old bridge with realigned and repaved approaches serves the north-bound traveler.

The second and third contracts covered the construction of a four-lane highway, divided, built at an elevated grade to provide proper drainage. They included extensions to Levee Canal Bridge and a pedestrian underpass at the "Standard School" in Oildale. As a whole there is now as-

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At top—New 4-lane highway north of Bakersfield looking across Beardsley Canal Bridge. Bottom—View on North Chester Avenue at entrance to county fair ground seen at right of picture

Franz R. Sachse Resigns to Join Army Air Corps as a Second Lieutenant

RELINQUISHING a post he had filled so capably as to win the respect and admiration of the executives and employees of all divisions of the Department of Public Works, Franz R. Sachse has resigned as Assistant Director of Public Works to accept a commission as second lieutenant in the United States Army Air Force.

Appointed Assistant Director on February 6, 1940, Lieutenant Sachse established a record for efficiency which makes the vacancy created by his resignation to enter the armed forces of his country a difficult one for Director of Public Works Frank W. Clark to fill.

Born April 29, 1910, in San Francisco, Lieutenant Sachse was educated in the grammar schools of Berkeley, Oakland and San Anselmo. He attended high school in Los Angeles and Pasadena and then entered Stanford, graduating with an A.B. degree in 1931. He received an LL.B. degree from the same university in 1933 and was admitted to the Bar in 1934. He engaged in the private practice of law in Los Angeles from 1934 to the date of his appointment as Assistant Director of Public Works.

Lieutenant Sachse was tendered a farewell dinner at the Del Paso



FRANZ R. SACHSE

Country Club by his associates in the Department of Public Works on the eve of his departure to report for duty.

Mrs. Sachse and children will remain in Sacramento until the end of this school term and will then go to the Sachse family ranch at Fallbrook, San Diego County.

Visalia Highway Completed

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using a very direct route. This avoids further congestion of the busy Main Street and develops an ideal truck road from which tourist and business traffic can easily turn off into any section of the city, while in a similar way, the city traffic feeds into the trunk road. The principle of a trunk road serving both city and tourist traffic, was never more nicely demonstrated.

At the official opening ceremony, Mayor Pierce Gannon spoke briefly and introduced Iener W. Nielsen, member of the State Highway Commission, who after complimenting the city and the contractor upon their accomplishment, accepted the work on

behalf of the State Division of Highways. Mrs. George France, wife of the contractor, and a resident of Visalia, cut the ribbon, thus formally opening the road to traffic.

The project, completed May 15th, and costing approximately \$65,500 was financed in part, from Visalia's share of gas tax moneys, divided among cities as "quarter cent funds," in proportion to the population of each community. The remainder of the cost was borne by the State Division of Highways as their share of the cooperative project.

George France of Visalia, was the contractor and City Engineer N. A. Huth represented the municipality. P. A. Boulton was Acting Resident Engineer for the State. The State and city cooperated as needed.

Four-Lane Divided Highway and Bridge

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sured a measure of safety and convenience to traffic, long needed and fervently desired.

Central islands, of variable width and design in accordance with needs, separate the two roadways. Side slopes are generally 5 per cent. These and the gutters are surfaced with 2 inches of road-mix surface treatment. Easy access is afforded to commercial establishments along the streets.

From Levee Canal northerly the paving consisted of asphalt concrete base, leveling course and surface, separated by islands or dividing areas guarded by raised bars and double stripes. Each paved roadway accommodated two traffic lanes.

From the Levee Canal southerly the paving on each side included a base of rolled, 3-sack concrete, while asphalt concrete was used to surface the whole paved area of the two roadways, on either side of dirt filled separating islands outlined by concrete curbs.

On this last contract the rolled concrete base proved very satisfactory. Following is a brief description of the methods used:

A coarsely graded 1½-inch maximum sized aggregate was obtained by blending accurately from two bins about 43 per cent of material passing No. 4 sieve with 57 per cent of material retained on No. 4. The water added at the central mixing plant was controlled through frequent tests of moisture in the untreated material. The resultant total water varied from 6½ to 7 per cent and was maintained slightly below the amount which would cause quaking or displacement under the roller.

The desired moisture content is indicated in the laboratory, when a slight amount of free water appears on the specimen, when subjected to standard moulding pressure. While this moisture content appears high in comparison to that used in 6-sack concrete, it is actually less than is used in the driest of ordinary 3-sack concrete mixes.

The mixed concrete was deposited from trucks, through a spreader box; then spread to a uniform depth over the entire width of the strip, by means

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Highway Picture As Changed by Imperative War-time Conditions

(Continued from page 13)

the Public Roads Administration, through the State Highway Department, on or before the tenth of the next month. This report must show the estimated materials you will use and be prepared on form PR-46. This form may be obtained from the Public Roads Administration or the State Highway Department.

If you do not qualify under L-41 or L-41-600 or you need priority assistance you may request a "Begin Construction Permit" or a priority rating from the Public Roads Administration through the State Highway Department. The application required is practically the same in each case.

ONLY ESSENTIAL WORK

Instructions on preparation may be obtained from the Public Roads Administration or the District Engineers of the State Highway Department. The application should be transmitted to the Division of Highways District Engineers. However, as will be mentioned later, there is little use applying for priority ratings and probably "Begin Construction Permits" unless the work is a required defense road project or absolutely essential to the civilian welfare. Furthermore, you will need to revise your construction designs to eliminate critical material unless such materials are indispensable.

It may be seen from these requirements that the Public Roads Administration is endeavoring to help our roadbuilding agencies wherever possible. This seems proper as the P. R. A. is the logical representative of the four outstanding roadbuilding agencies of the day, i.e. the cities, the supervisors, the State Highway Department and the Federal Public Roads Administration.

While on the subject of W. P. B. orders there is another one, issued as an amendment to a previous order M-21. This new amendment says you can't get any unfabricated steel products without priority except for maintenance and repair. Neither can you today obtain priority ratings for or delivery of road building equipment.

Today finds lumber frozen at the mills and after June 1st a permit will

be required in order to obtain railroad tank car shipments. Amendment No. 2 to preference rating order P-19e states, in effect, that road construction priority ratings can not be used to obtain form lumber and falsework, drill steel and tools. This order as now written will drastically affect bridge and culvert construction whether on defense roads or not.

There are a lot more W. P. B. orders that affect road work in general all of which emphasizes the fact that the material picture will not permit anything but defense highway construction and maintenance. Even maintenance will be hampered because delivery of required equipment can not be obtained.

One of the other factors mentioned as affecting the highway picture today is the access road program. As already mentioned, this program is under way. It is expected that more of this work will be financed by the Federal Government. This work has practically engaged our entire engi-

neering forces for some time. Necessarily then, we have had to postpone preparation of plans on other regular budgeted work. It has also made necessary certain financial adjustment because State highway funds were required in certain cases for right of way, engineering and certain nonparticipating costs.

Military traffic and hauling to defense establishments is causing considerable damage to our highways. It is estimated that this heavy traffic has damaged our roads to the extent of about \$3,000,000 to date. Furthermore, a large part of this damage has occurred on roads that are not part of the so-called Federal designated Defense Highway System. Also, if we are not able to proceed with construction because of war impingements, further heavy maintenance will be required.

CERTIFICATION REQUIRED

The defense road classification includes the access roads and the strategic network. The strategic network is the main trunk lines designated by the Federal Government over which troop movements may occur. This network is secondary in importance to the access roads.

The strategic network improvements are financed by State funds entirely or in combination with Federal funds. Before Federal funds can be expended, the Secretaries of War or Navy must certify that the project is a defense job. In order to obtain this certification it is necessary to show that the existing road is a critical deficiency of the strategic network. This certification is also required to obtain priority on a job where no Federal money is involved.

We have been unable to ascertain the yardstick by which the Army and Federal Government selects the projects that will be certified. We file on the project and may hear in three weeks or three months that it is certified and we can proceed with construction or the application is denied.

Although faced with these conditions and a rapidly changing picture, the Division of Highways has been able to place under way major projects included in the current budget in the amount of about \$15,000,000.

Road Builders Pledge All-out Co-operation

All-out co-operation with America's victory effort was pledged by the American Road Builders' Association at its recent Defense Highway Congress in Memphis, Tenn. Another resolution reaffirmed the association's stand in support of the contract system as the best method for road construction. Alabama Highway Director Chris J. Sherlock was formally installed as ARBA president at the Victory Banquet held at the Peabody hotel.

Retiring President Hal G. Sours, Ohio director of highways, addressed the banquet, stressing the need for a post-war road program. The association presented Mr. Sours with a U. S. defense bond in recognition of his services during his two years as president.

Guest speaker was John L. Rogers, director, division of motor transport, Office of Defense Transportation, who discussed the role of highway transportation in the national emergency. Tennessee Congressman Clifford Davis served as toastmaster and introduced distinguished banquet guests.

Indispensability of motor transportation to defense was stressed in the address of G. Donald Kennedy, Michigan State Highway Commissioner and American Association of State Highway Officials president.

Highway Bids And Awards for May 1942

ALAMEDA AND CONTRA COSTA COUNTIES — Between El Cerrito Hill Overhead in Albany and the intersection of Cutting Blvd. and 7th Street in Richmond, about 4.9 miles, the portion on Potrero and Hermann Avenues to be graded and the entire project to be paved with asphalt concrete. District IV. Union Paving Co., San Francisco, \$351,745; A. G. Raisch, San Francisco, \$357,659; Macco Construction Co., Clearwater, \$376,557; Chas. L. Harney, San Francisco, \$436,392; Marshall S. Hanrahan, Redwood City, 476-061. Contract awarded to Piazza and Huntley, San Jose, \$337,457.

CONTRA COSTA COUNTY — Between San Pablo Creek bridge and Oleum, about 7.0 miles to be widened with crusher run base, Portland cement concrete and asphalt concrete. District IV, Route 14, Section A, Pin., Her., B. Contract awarded to Lee J. Immel, Berkeley, \$149,375.

CONTRA COSTA COUNTY — City of Richmond, on 14th & 15th Sts., about 1.2 miles to be graded and paved with Portland cement concrete, asphalt concrete and crusher run base. District IV. Peter Sorensen, Redwood City, \$99,757; Lee J. Immel, Berkeley, \$103,625. Contract awarded to Healey-Moore Co., Oakland, \$99,404.

MENDOCINO AND LAKE COUNTIES — At various locations about 8.3 miles in length, existing gravel base to be widened, additional blanket of gravel base to be placed and armor coat to be constructed. District I, Routes 15, 49, 89. E. A. Forde, San Anselmo, \$74,307; Beerman & Jones, Sonoma, \$77,089. Contract awarded to Harold Smith, St. Helena, \$64,604.

MONTEREY COUNTY — Between Quinado Canyon and King City, about 8.5 miles to be graded and surfaced with cement treated base and plant-mixed surfacing, and a timber bridge to be constructed over Pine Creek. District V. United Concrete Pipe Corp. and A. S. Vinnell Co., Los Angeles, \$556,690; Earl W. Heple and Parish Bros., San Jose, \$581,161. Contract awarded to Basich Bros., Torrance, \$495,755.

ORANGE COUNTY — Between Lincoln Avenue and Orangethorpe Avenue about 2.0 miles to be graded and surfaced with asphalt concrete on cement treated base. District VII, Route 171, Section B. Griffith Co., Los Angeles, \$128,821; Vido Kovacevich, South Gate, \$141,845. Contract awarded to Oswald Bros., Los Angeles, \$114,950.

SACRAMENTO COUNTY — Bridge across Sacramento River at Isleton and a bridge across Steamboat Slough about five and seven-tenths miles north of Walnut Grove, to be redecked. District III, Route 11, Sections D, E. Holdener Construction Co., Sacramento, \$13,104; Lord and Bishop, Sacramento, \$13,340; C. C. Gildersleeve, Colusa, \$14,498. Contract awarded to M. A. Jenkins, Sacramento, \$12,342.

SACRAMENTO COUNTY — Between Mills and Mather Field, about 1.3 miles to be graded and surfaced with plant-mixed surfacing on gravel base. District III, Hemstreet and Bell, Marysville, \$63,752; N. M. Ball Sons, Berkeley, \$62,705. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$60,816.

SAN DIEGO COUNTY — On Pacific Highway between Torrey Pines and Del Mar, about 3.6 miles to be widened and paved with Portland cement concrete and asphalt concrete pavements. District XI, Route 2, Section S.D., A. Griffith Co., Los Angeles, \$240,533; R. E. Hazard & Sons, San Diego, \$253,510; V. R. Dennis Const.

Four-Lane Divided Highway and Bridge

(Continued from page 18)

of a motor grader and compacted by first wheel rolling with a very heavy truck, followed by double rolling with a 13-ton tandem roller.

It was then bladed to remove irregularities and double rolled by the tandem. After lightly sprinkling, when needed, the truck rolled it again to knit or seal the surface, in order that the emulsion cure, applied by hand spray immediately thereafter, would easily cover and prevent drying and scuffing of the surface.

The heavy truck loaded with a large water filled tank gave a total load of 37,000 lbs. or a load of 24,600 lbs. on the four rear wheels.

This extreme load, applied through pneumatic tires and supplemented by the smooth roller, while unusual, and not specified, yet proved an ideal treatment for the material, which depends, for density and strength upon the prompt application of a heavy roller, with pneumatic tires preferred for the first rolling. Cores, taken from the completed base showed compressive strengths, averaging over 1800 pounds per square inch.

The project, as a whole, included the following contracts, with their associated personnel, as indicated below:

Contract of A. Teichert and Son, contractor, and A. K. Gilbert, resident engineer. Approximate cost, \$192,200.

Contract of Griffith Company with D. G. Evans, resident engineer and W. M. Nett, assistant in charge. Approximate cost, \$95,808.

Contract of Griffith Company with D. G. Evans, resident engineer and W. M. Nett, assistant in charge. Approximate cost, \$66,870.

A SHEET OF IRON a hundred thousandth of a millimeter thick is as transparent as glass.

Co., San Diego, \$259,587; Daley Corp., San Diego, \$264,565. Contract awarded to Oswald Bros., Los Angeles, \$231,395.

SOLANO COUNTY — In the city of Vallejo, various city streets and extensions, a total length of about 0.7 mile, to be surfaced with plant-mixed surfacing on crusher run base. District X. A. J. Clausen, Berkeley, \$19,849; A. G. Raisch, San Francisco, \$20,360. Contract awarded to E. A. Forde, San Anselmo, \$19,143.

Speed Restrictions and Group Riding

(Continued from page 3)

At the Los Angeles meeting Vickrey and Joseph Mattson, representative of the Office of Defense Transportation, instructed the field workers in the fundamental principles of the Eastman Program.

At the conclusion of the meeting, Secretary Vickrey announced that for the purposes of administration, the State would be divided into six areas or districts with headquarters in San Francisco, Los Angeles, San Diego, San Bernardino, Fresno, and Sacramento. Offices of the Division of Highways will be utilized in these respective cities as administrative headquarters for the committee.

The areas were arranged geographically to follow the lines of highway patrol districts so that patrol district inspectors will be in a position to carry on the program and to utilize the men in their respective districts for the work. The district traffic engineer in each area will serve as the contact and coordinating official. The field workers were instructed to return to their respective districts, make a survey of existing conditions, and proceed immediately with plans for carrying out the program.

Great stress was also placed at all of the sessions on the fact that the plan is an attempt to solve a very serious problem by democratic processes. Several speakers, among them Carter, the Chairman, State Engineer Purcell and Railroad Commissioner Richard Sachse, gave the warning that should voluntary measures fail, the Federal Government is prepared to take more drastic steps. Several speakers quoted statistics produced by the Office of Price Administration and from other sources, proving irrefutably that there will be no rubber whatever for private passenger cars for a long time and that the entire supply will be needed for military and essential civilian uses.

Within the next few weeks several district meetings are planned throughout the State for a further explanation of the plan. Meanwhile, a State-wide campaign of publicity will be carried on to acquaint the public with the necessity of conserving their cars and their tires.

State of California
CULBERT L. OLSON, Governor

Department of Public Works

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

FRANK W. CLARK, Director of Public Works

FRANZ R. SACHSE, Assistant Director

MORGAN KEATON, Deputy Director

CALIFORNIA HIGHWAY COMMISSION

LAWRENCE BARRETT, Chairman, San Francisco
LEONER W. NIELSEN, Fresno
AMERIGO BOZZANI, Los Angeles
BERT L. VAUGHN, Jacumba
L. G. HITCHCOCK, Santa Rosa

DIVISION OF WATER RESOURCES

EDWARD HYATT, State Engineer, Chief of Division
A. D. EDMONSTON, Deputy in Charge Water
Resources Investigation
HAROLD CONKLING, Deputy in Charge Water Rights
G. H. JONES, Flood Control and Reclamation
GORDON ZANDER, Adjudication, Water Distribution
MARK S. EDSON, Hydraulic Engineer Water Rights
SPENCER BURROUGHS, Attorney
GEORGE T. GUNSTON, Administrative Assistant

DIVISION OF HIGHWAYS

C. H. PURCELL, State Highway Engineer
G. T. McCOY, Assistant State Highway Engineer
J. G. STANDLEY, Principal Assistant Engineer
R. H. WILSON, Office Engineer
T. E. STANTON, Materials and Research Engineer
FRED J. GRUMM, Engineer of Surveys and Plans
R. M. GILLIS, Construction Engineer
T. H. DENNIS, Maintenance Engineer
F. W. PANHORST, Bridge Engineer
I. V. CAMPBELL, Engineer of City and Cooperative Projects
R. H. STALNAKER, Equipment Engineer
J. W. VICKREY, Traffic and Safety Engineer
E. R. HIGGINS, Comptroller

DISTRICT ENGINEERS

E. R. GREEN, District I, Eureka
F. W. HASELWOOD, District II, Redding
CHARLES H. WHITMORE, District III, Marysville
JNO. H. SKEGGS, District IV, San Francisco
L. H. GIBSON, District V, San Luis Obispo
E. T. SCOTT, District VI, Fresno
S. V. CORTELYOU, District VII, Los Angeles
E. Q. SULLIVAN, District VIII, San Bernardino
S. W. LOWDEN (Acting), District IX, Bishop
PAUL O. HARDING, District X, Stockton
E. E. WALLACE, District XI, San Diego
HOWARD C. WOOD, Acting Bridge Engineer, San Francisco-
Oakland Bay, Carquinez, and Antioch Bridges

DIVISION OF ARCHITECTURE

ANSON BOYD, State Architect
W. K. DANIELS, Assistant State Architect
P. T. POAGE, Assistant State Architect

HEADQUARTERS

H. W. DeHAVEN, Supervising Architectural Draftsman
D. C. WILLETT, Supervising Structural Engineer
CARLETON PIERSON, Supervising Specification Writer
J. W. DUTTON, Principal Engineer, General Construction
W. H. ROCKINGHAM, Principal Mechanical and Electrical
Engineer
C. E. BERG, Supervising Estimator of Building Construction

DIVISION OF CONTRACTS AND RIGHTS OF WAY

C. C. CARLETON, Chief
FRANK B. DURKEE, Attorney
C. R. MONTGOMERY, Attorney
ROBERT E. REED, Attorney
FRANCIS J. CARR, Attorney

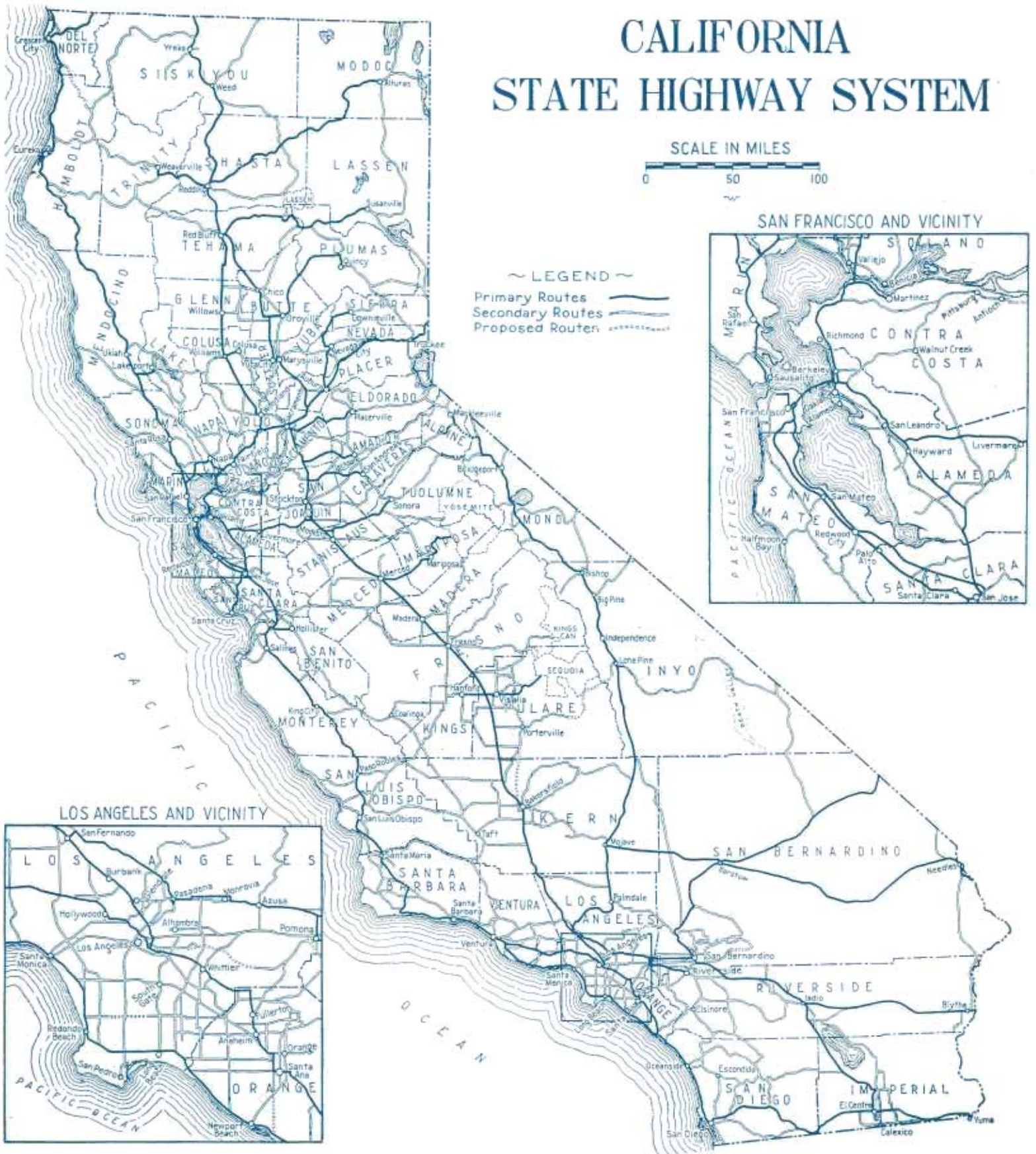


CALIFORNIA STATE HIGHWAY SYSTEM

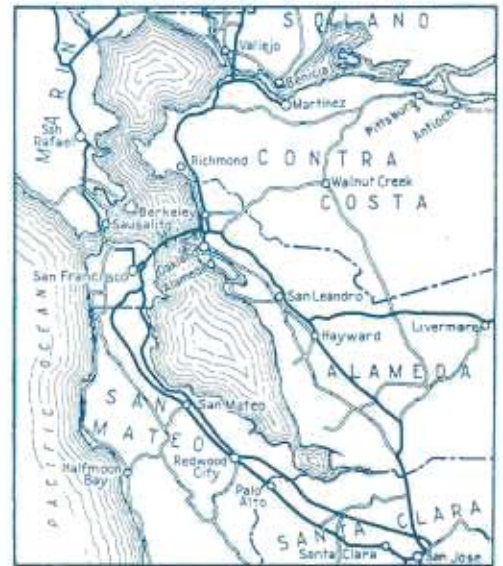
SCALE IN MILES



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



SAN FRANCISCO AND VICINITY



LOS ANGELES AND VICINITY

