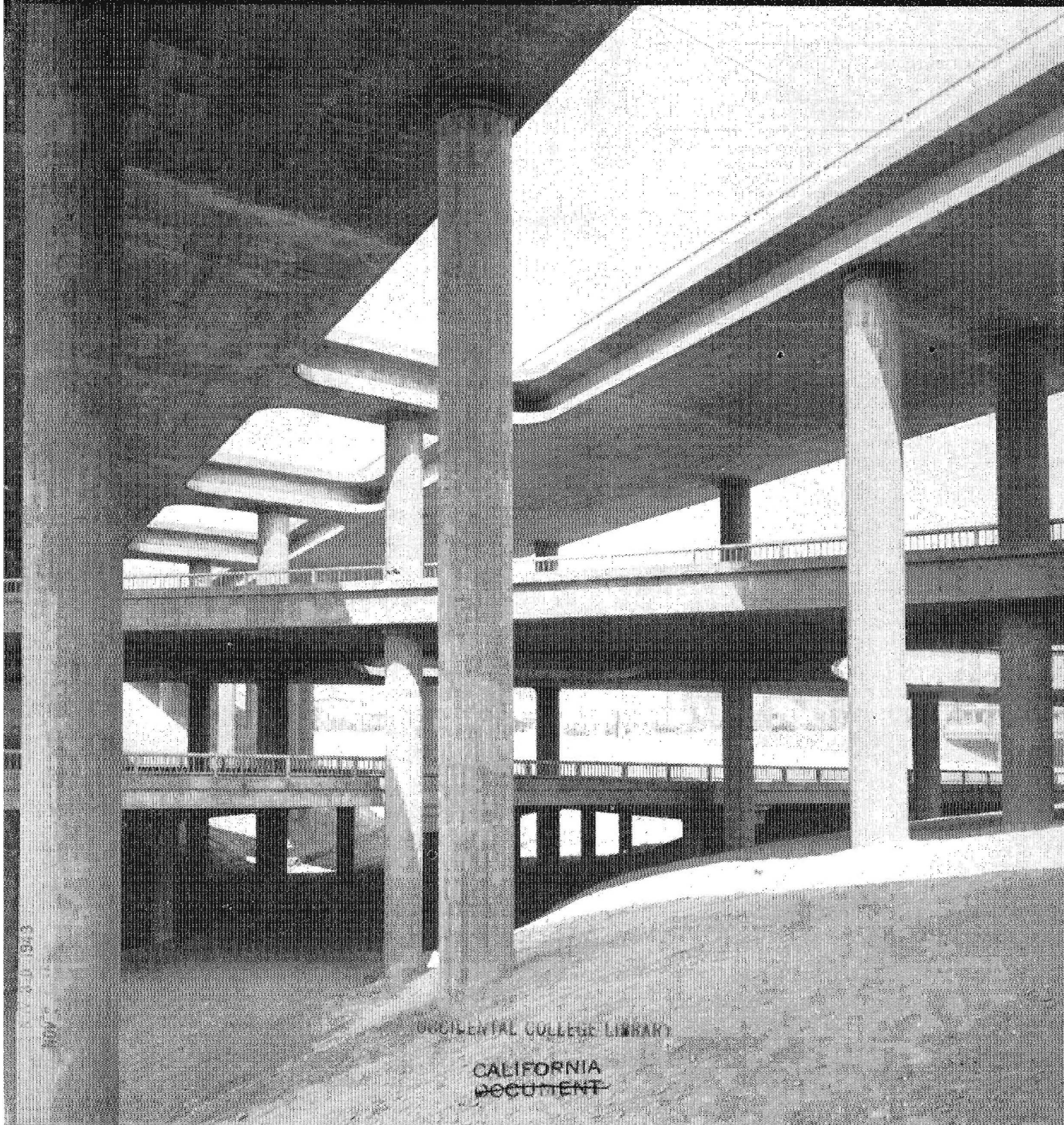


# CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



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SEPTEMBER-OCTOBER 1949

# California Highways and Public Works

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

CHARLES H. PURCELL  
Director

GEORGE T. McCOY  
State Highway Engineer

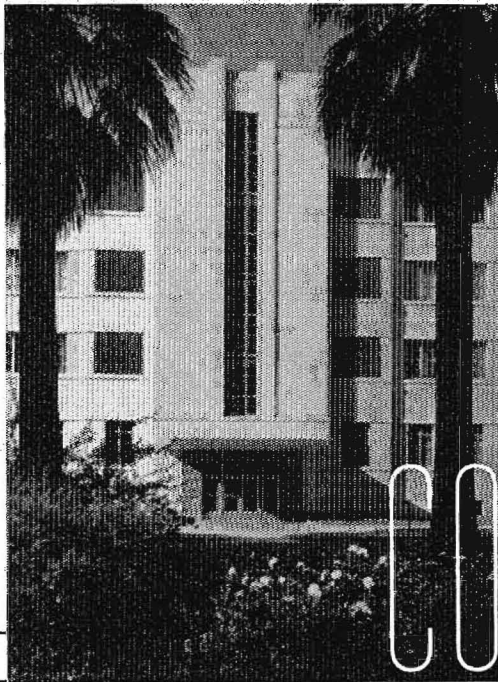
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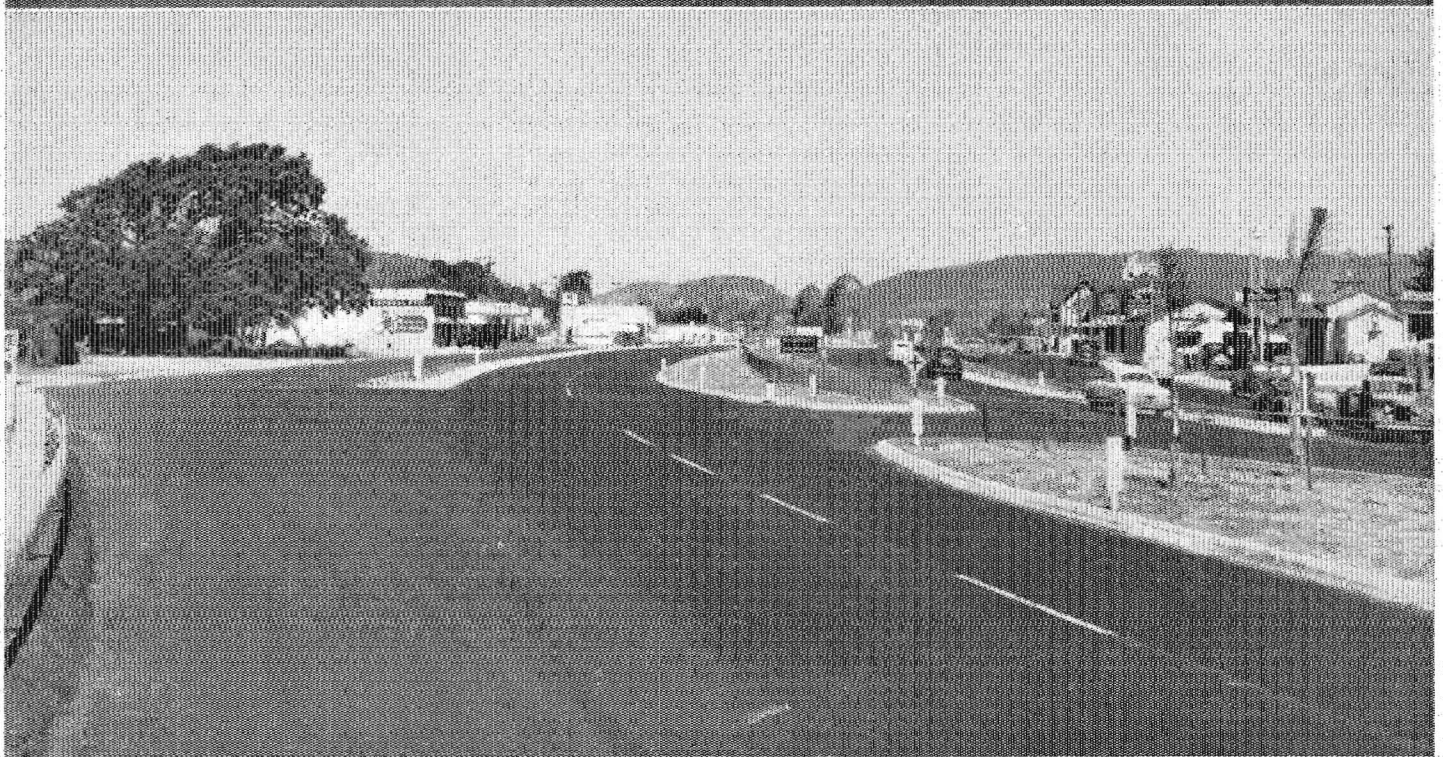
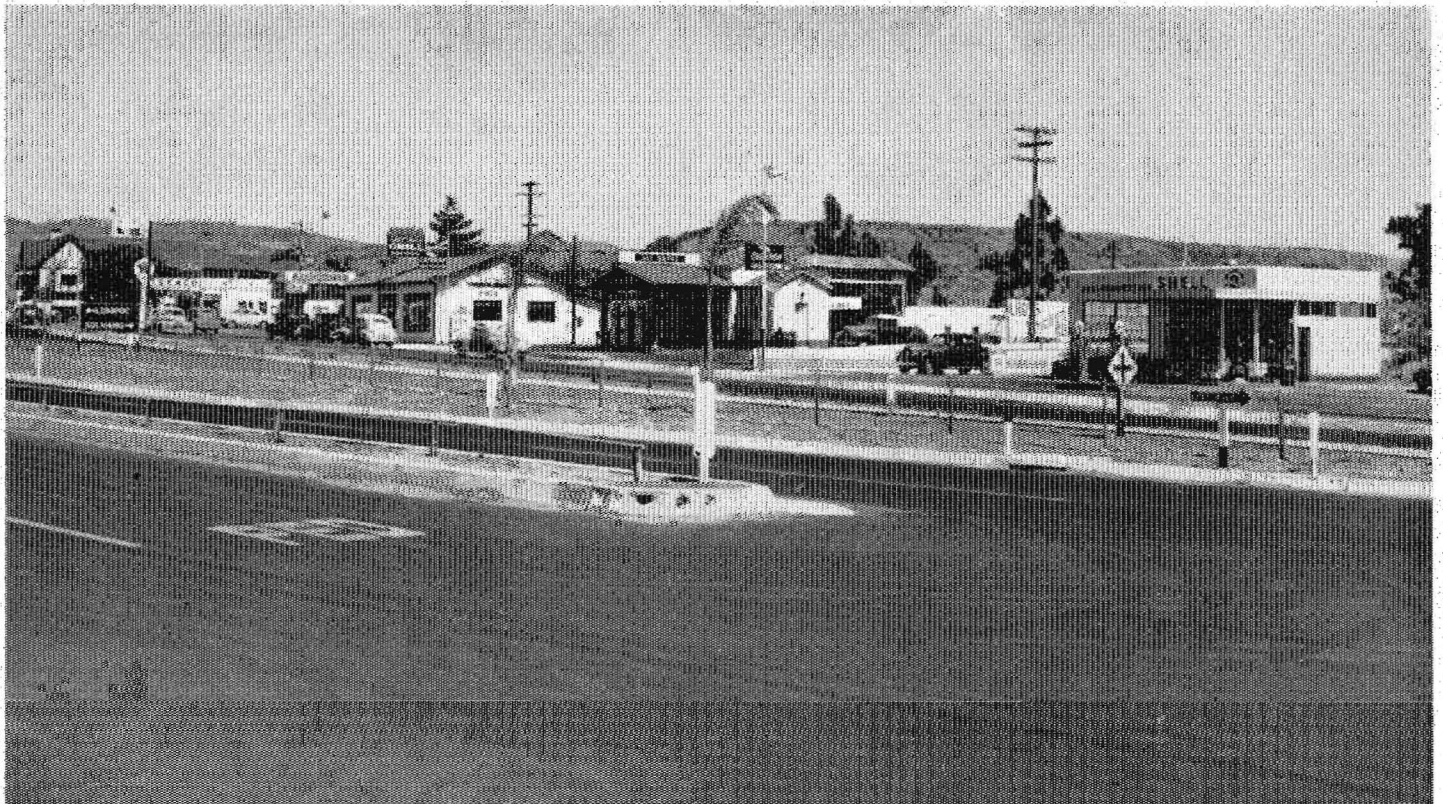


Public Works Building  
Twelfth and N Streets  
Sacramento

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UPPER—In first block of east outer highway, Buellton, motorists have a wide choice of service stations. LOWER—Buellton today. All visible buildings except the inn proper were moved back or altered to provide this broad new boulevard

parkway where young plants and palms have been installed along with a built-in sprinkler system, and today's clean-cut orderliness of the town in general.

That Buellton's property values have risen is indicated by several recent sales where frontage on the new outer highways sold at prices approximating

\$5,000 and \$7,000 an acre, the same being land which only two years ago was valued at \$500 to \$700 an acre or even less. Sales of smaller parcels on

the outer highways, consummated prior to completion of the project, indicated similar advances, ranging from increases of five to ten times in value.

#### **Business Increases**

That Buellton's business potentials have been increased is attested by letters from several leading business men, as quoted

off for the restaurant and after eating, decide to stay at the motel next door."

"We've seen heavy traffic here on two different big holiday weekends, but not so much as a scratched fender. Don't let anyone tell you outer highways aren't safe."

"We picked this location because it is on an outer highway. We think we'd be

"casual" trade again will tend to become more evenly distributed between the two big cities as motorists begin to realize that to obtain required meals, services, or accommodations they must turn off on outer highways or through the limited access openings of existing facilities.



*New outer highway location of Andersen's Valley Inn permits safe and leisurely parking*

in accompanying columns, and by the following typical comments from other merchants and property owners:

"Our customers tell us they like the outer highway arrangement. They can get off the main line more safely and find it easier to park and shop."

"Once on the safety of an outer highway, the motorist can drive along leisurely and select the motel or restaurant he wants with greater care."

"The advantage for an auto court is that it can be on, yet at the same time off, the highway. Even the short distance between the outer highway and the through-traffic lanes can make a difference to the motorist who's looking for a quiet place."

"Outer highway businesses help each other. A through-bound motorist turns off for gas and may see a restaurant next door that appeals to him. Or he may turn

doing less business if we were located on a main highway."

#### **Casual Trade**

It is only fair to note that, although favorable comments such as the foregoing are in overwhelming majority, several service station owners report that outer highway gas and oil business is not up to expectations as yet. This does not involve credit card customers, who continue to seek out their respective stations, but the cash or "casual" trade. However, it is agreed in many quarters that business of such nature may be in a transition period, pending completion of four-laning between San Francisco and Los Angeles and, as that time draws inexorably nearer, the

Fortunately, however, this theoretical dislocation of the normal proportion of business has not been felt by all service stations nor by the large majority of Buellton merchants, whose reactions to the business potential of the outer highway system are invariably favorable.

#### **Mr. Andersen's Letter**

Of particular interest are the comments of Robert T. Andersen, of the Valley Inn and split pea soup fame, as shown in a letter recently received from him and reproduced here in its entirety. As the result of a quarter-century of service, the name Andersen's, Buellton, and split pea soup are virtually synonymous to many thousands of



HAP-PEA & PEA-WEE  
SPLITTING PEAS

# ANDERSEN'S

*Original* HOME OF SPLIT PEA SOUP

*The Valley Inn*

BUELLTON, CALIFORNIA

August 19, 1949

SANTA YNEZ  
PHONE 251

Mr. G. T. McCoy,  
State Highway Engineer,  
Division of Highways,  
Sacramento, California.

Dear Sir:

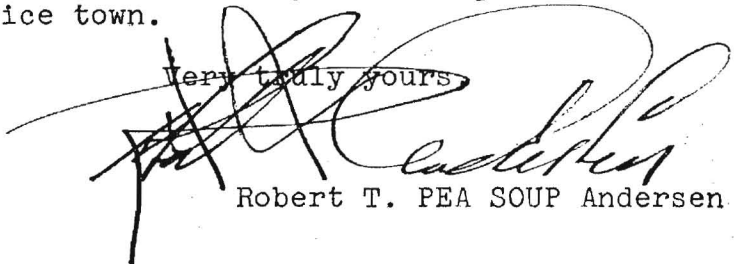
Here at ANDERSEN'S, a highway establishment that annually serves more than 250,000 motorists with its nationally-famous split pea soup and other food specialties, we felt that the Division of Highways would appreciate learning our strong endorsement of the new Buellton Freeway and outer highway system completed here in May of this year.

This endorsement is based on our actual business experience, as an outer highway hotel and restaurant, during the first peak-traffic summer season since completion of the local highway project. As 98% of our clientele is transient and arrives by automobile, a serious safety hazard was created in past years by our guests cutting in and out of the traffic stream without order or regulation. Now they can turn off the Freeway at any one of three fixed intersections to get on the outer highways for safe, unhurried patronizing of our restaurant and other establishments rendering needed highway services.

We also feel we are drawing additional new business from the fact that the wider sight angle created by the set-back has enhanced the advertising value of all the business frontage on the broad new boulevard.

We believe that, due to the new outer highway arrangement, the future highway business life of Buellton as a Service Town, and Andersen's as a roadside restaurant and hotel, is well assured. The business people of Buellton thus owe to the Division of Highways and the motorists that travel them an obligation to ever improve and increase the highway services we are offering. In doing so Buellton will not only be repaying a debt but will be fully realizing its tremendous potential as a Service town.

Very truly yours

  
Robert T. PEA SOUP Andersen

RTA:LD

travelers. This nationally known establishment comprises a hotel, restaurant, cocktail lounge, wine and souvenir shop, and adjacent parking areas, all now located on the East Outer Highway, sometimes fondly referred to as Pea Soup Alley.

Mr. Andersen's letter brings out several points that are well worth noting

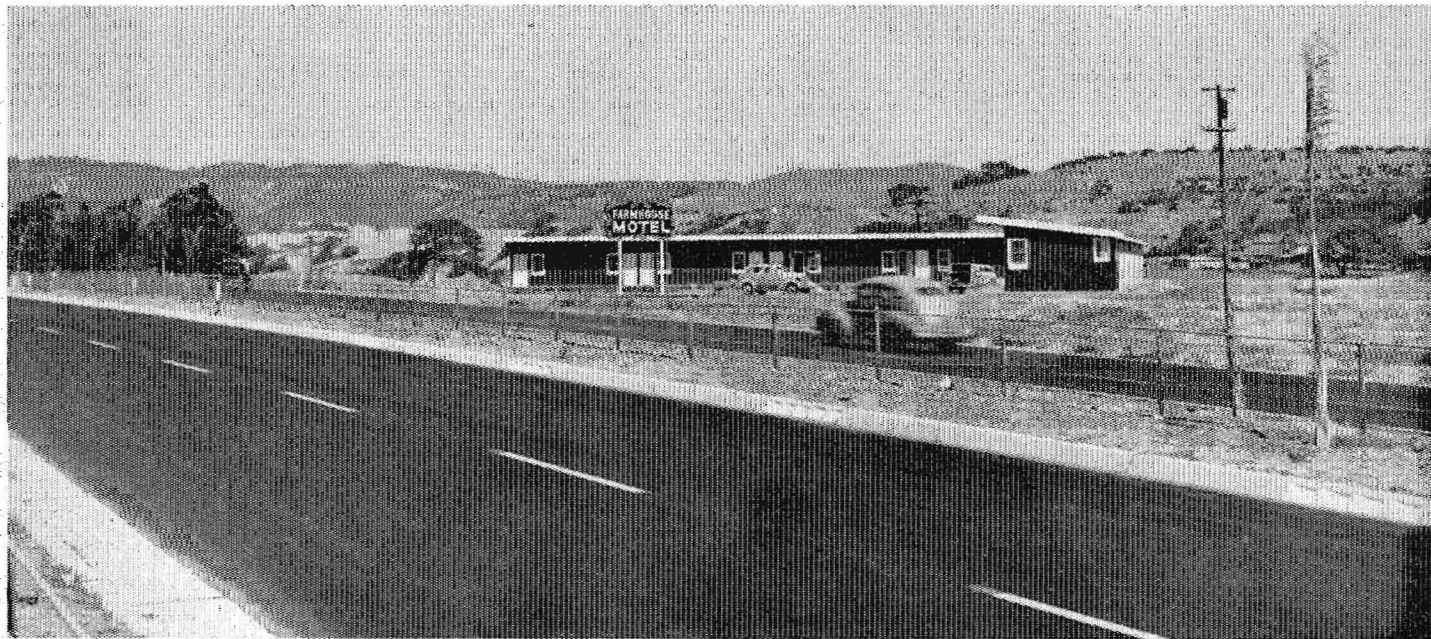
in connection with outer highway location. With one, of course, we are already familiar, namely the safety factor involved where patrons' cars no longer are cutting in and out of the main streams of travel with collision danger both to themselves and to through-traffic, but now turn off at fixed and carefully engineered points

from where they may proceed leisurely up and down the outer highways, taking their time in parking or selecting a restaurant, motel, service station, or other facility.

#### Advertising Value

The other point is that the advertising value of all outer highway locations

UPPER—New Farmhouse Motel represents a \$45,000 investment. LOWER—The \$50,000 Casa Santa Ynez is rapidly nearing completion



**CASA SANTA YNEZ**  
BUELLTON, CALIF.

August 26, 1949

*Mr. G. T. McCoy*  
*State Highway Engineer*  
*Division of Highways*  
*Sacramento, California*

DEAR SIR: In line with recent conversations as to my selection of a site for the de luxe motel to be known as Casa Santa Ynez, a primary requisite was a good location on a new and modern highway. In this study I was aided by reference to library copies of "California Highways and Public Works" illustrating trends in highway design and business frontages. At the same time I made a careful examination of various sites from San Mateo south to Carpinteria, especially in areas where new highways were in and fairly permanent.

The more I checked the better I liked the Buellton arrangement with its main lanes of through-traffic and its outer service roads. It offered the advantage of fronting my motel on a major highway, with the added advantage of a secondary highway where guests could safely park and leave their cars or travel back and forth between restaurants and shops without getting back in the major lanes of traffic. That safety factor alone was, in my opinion, very important. In addition I liked the fact that my motel would be 75 to 100 feet back from through-traffic, which helps eliminate considerable noise.

I also find that properties fronting on this type highway arrangement show an immediate increase in value, as already evidenced in the Buellton area.

Yours very truly,

LEON A. ROESER  
Owner-Manager  
Casa Santa Ynez

has been increased due to the fact that advertising signs may be seen a much greater distance away than on the old, narrower, conventional highway. Mr. Andersen has done more than merely theorize here; he has marked his already well-known establishment with five different types of signs; a large one indicating the restaurant as the original home of split pea soup, a smaller one indicating the entrance to the Valley Inn, a large illuminated cocktail glass to advertise the bar facilities, oversize "INN" signs on the upper stories of the hotel itself, and topping it all off on the roof with a bigger-than-life depiction of the famous Hap-Pea and Pea-Wea splitting peas. Other merchants have been quick to recognize this increased advertising value of outer highway locations and many new signs are appearing in town.

**New De Luxe Motels**

Two of the largest new businesses to enter Buellton since completion of the highway improvement are the Casa Santa Ynez and The Farmhouse, both de luxe motels whose owners gave considerable study to U. S. 101 locations before selecting the Buellton outer highways as ideal sites. Casa Santa Ynez, owned by Mr. Leon Roeser, is a 12-unit enterprise located on an outer highway corner just one block north of the U. S. 101 intersection with State Route 150 and representing an investment of \$50,000. Mr. Cameron Duncan's 14-unit Farmhouse motel is one block further north in a similar location and represents a new investment of \$45,000. Buellton's East Outer Highway has not as yet been completed through this block, although right of way has been acquired and construction will begin within the next few months. Mr. Duncan selected this property knowing that it would be an outer highway location and, although presently fronting on the main lanes of traffic, he is anxious for completion of the work that will convert it to a full-fledged outer highway site for the reasons indicated in his accompanying letter.

The Farmhouse was scheduled for operation approximately September 1st of this year and the Casa Santa Ynez

**FARMHOUSE MOTEL**  
BUELLTON, CALIFORNIA

August 15, 1949

*Mr. L. H. Gibson, Dist. Engineer*  
*Division of Highways*  
*San Luis Obispo, Calif.*

DEAR SIR: We have recently purchased a building site in Buellton on the new outer highway, on which we are now completing a motel at a cost of approximately \$45,000. This should indicate the confidence we have in this type of highway planning.

After considering several other locations, we decided that Buellton with its outer highways should make a natural stopping point for motel, restaurant, and service station trade. And as the motorists become more accustomed to this type of highway, they will appreciate the safety with which they can leisurely make their stops, free from the pressure of the heavy traffic of the main highway.

I hope the time will come when all business on major highways will be confined entirely to the outer highway locations.

Very truly yours,

CAMERON H. DUNCAN  
Farmhouse Motel  
Buellton, Calif.

for approximately October 1st. In addition to the distinction and architectural interest both these first-rate establishments will bring to Buellton, nearby enterprises such as certain service stations, cafes, and the drug store expect to enjoy increased patronage as a result of the overnight guests who will be attracted to Buellton, in addition to those already patronizing the Valley Inn and such well-established motels as Mac's Auto Court, Brus' Auto Court, and Daily's Buellton Motel.

**Buellton's Good Fortune**

Not all present bottleneck towns may, of course, be destined to share





UPPER—This view (Courtesy Santa Ynez Valley News) looking northward shows the old narrow pavement of U. S. 101 passing through Buellton. All improvements visible in this picture have since been relocated to make way for the present freeway. LOWER—Showing change from old, narrow highway to a new freeway

Buellton's good fortune, as many are chiefly farm centers, resorts, railheads, or local trade and industrial centers which are not strategically located and not especially catering to nor supported by highway business. That many such bottlenecking or "slow-down" towns

inevitably will be by-passed by arterial highways is a situation that will continue to be necessitated by progressive highway practices based on the safety and convenience of through-traffic and the principle of roads being located in accordance with the greatest pub-

lic good and the least private injury.

For those towns, however, that will come to be located on broad new freeways, Buellton the Service Town now stands as a shining example of the modern highway community of tomorrow.



# New Budget

Highway Commission Sets Up Funds  
For Fiscal Year July 1, 1950, to June 30, 1951

MAJOR CONSTRUCTION projects on the State Highway System provided for in the 1950-51 Fiscal Year budget of the California Highway Commission aggregate, including construction engineering for the fiscal year, \$61,702,000.

The 1949-50 budget currently in operation totaled \$69,703,000.

In addition, the commission budgeted \$20,784,200 to be used for the acquisition of rights of way for projects contemplated in the 1951-52 program.

Fifty-three of the 58 counties in California are included in the new budget.

The funds appropriated still reflect increased highway revenues made possible by the Collier-Burns Act of 1947, sponsored by Governor Earl Warren. However, estimated revenues for the 1950-51 Fiscal Year are \$4,200,000 less than estimated revenues for the 1949-50 Fiscal Year.

## Divided North and South

Proposed expenditures and obligations to be incurred for construction of state highways during the next budget year—July 1, 1950, to June 30, 1951—will be divided between the northern and southern counties according to law. Allocations to the northern county group, including construction, engineering, right of way, operation, maintenance and insurance on the San Francisco-Oakland Bay Bridge, minor improvement and betterment and contingencies, total \$43,501,950; the southern county group is allocated \$53,169,050.

In the larger counties of the State, estimated expenditures are set up as follows: Alameda, \$9,780,600; San Francisco, \$7,088,400; and Los Angeles, \$27,800,000.

Major allocations in the 11 highway districts include:

### District I

District 1—Del Norte County, grade and structures on U. S. 101 from Smith River Bridge to one-quarter mile north of Winton Corners, \$537,600. Surfacing

of U. S. 101 from Klamath River Bridge to Wilson Creek (portions) 6.6 miles in length, \$315,800. Humboldt County, surfacing 3.8 miles of U. S. 101 from 0.5 mile south of Stone Lagoon Summit to 1 mile south of Orick being graded under a 1949-50 contract, \$341,600. Humboldt-Trinity Counties, grade and surface portions of U. S. 299 from Willow Creek to Whites Bar, \$336,000.

### District II

District 2—Modoc County, grade and surface 9.7 miles of U. S. 299 from Toms Creek to Cedarville, \$398,700; Shasta County, grade, surface and structures on U. S. 99 from Anderson to Redding, 8.3 miles, \$470,400; Siskiyou County, grade portions and surface 8 miles of U. S. 99 from Spring Hill to Weed, \$616,000. Tehama County, surface portions and widen structures on U. S. 99W between Glenn County Line and Proberta, \$599,200.

### District III

District 3—El Dorado County, grade and surface 2 miles of U. S. 50 from Railroad Crossing to Five Mile Terrace, \$408,800; Sacramento County, substructure for a bridge across American River near Elvas, \$985,600. This is the first unit of the over-all program for improvement of highway facilities into the City of Sacramento. Yolo County, grade and structures on 4.1 miles of U. S. 40 from Yolo Causeway to Tower Bridge, \$1,041,600.

### District IV

District 4—Alameda County, grade, pave and structures on 5.8 miles of U. S. 50 from 1½ miles west of Livermore to Hopyard Road, \$1,237,600. Alameda County, grade, pave and structures on Eastshore Freeway from Lewelling Boulevard to 0.1 mile north of the south city limits of Oakland, 3.8 miles, \$4,524,800. Alameda County, bridge and approaches at Bay Farm Island, \$1,570,200. Marin County, grade, surface and structures on U. S. 101 from Ignacio

to Forbes Overhead, \$1,120,000. San Francisco, structures on U. S. 101 from Bayshore Freeway to South Van Ness Avenue in the City of San Francisco, \$1,120,000. San Francisco, structures and ramps on Bayshore Freeway from 25th Street to Bryant Street in San Francisco, \$1,114,400. Sonoma County, surface portions of U. S. 101 for a net length of 10 miles from Cloverdale to 2 miles north of Santa Rosa, \$412,100.

### District V

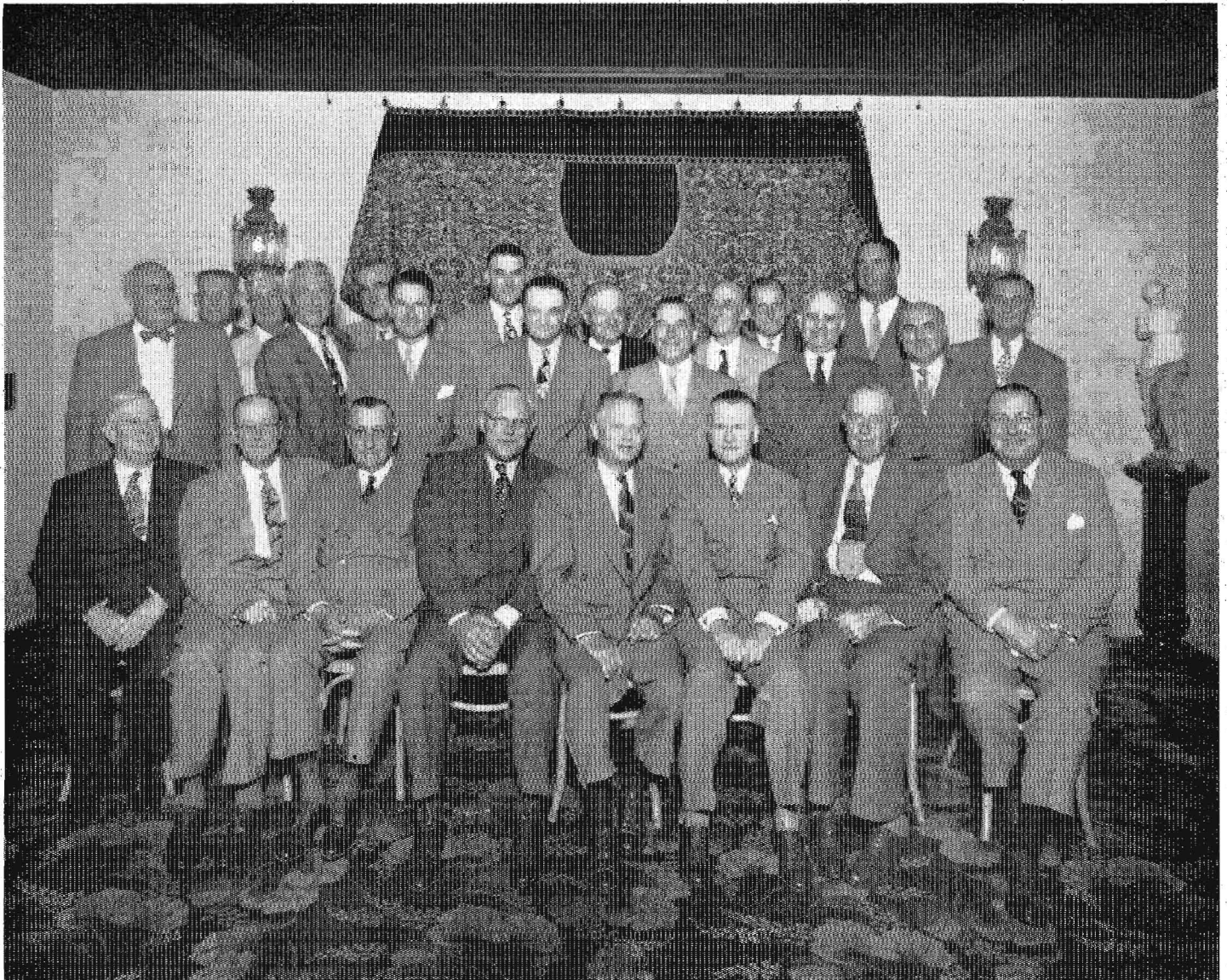
District 5—Monterey County, grade and surface 2.2 miles of U. S. 101 from Spence Underpass to 2 miles south of Salinas, \$352,800. San Benito County, grade and surface 9.4 miles of State Routes 22 and 119 from Hollister to Santa Clara county line, \$644,000. San Luis Obispo County, grade surface and structures on 4.1 miles of U. S. 101 from Atascadero to 1 mile south of Templeton, \$1,064,000. Santa Barbara County, grade and surface 3.1 miles of U. S. 101 from 0.5 mile north of Las Cruces to 1 mile north of Summit, \$980,000.

### District VI

District 6—Madera County, grade, pave and structures on U. S. 99 from 1½ miles north of Madera to 0.3 mile north of Dry Creek, a length of 3.3 miles, \$576,800. Kern County, grade, pave and structures on 5 miles of U. S. 99 from Los Angeles county line to Fort Tejon, \$1,232,000. Tulare County, grade and structures on portions of U. S. 99 from Tulare Airport to Tagus, \$1,176,000.

### District VII

District 7—Los Angeles County, grade and pave portions and erect structures on Hollywood Parkway from Alameda to Highland, U. S. 101, \$6,138,700. Los Angeles, grade, pave and structures on Santa Ana Parkway from Eastman to La Verne, \$2,348,600. Los Angeles, grade and structures on Santa Ana Parkway from Eastland to Lakewood, \$2,912,000. Los Angeles, grade, pave, and structures on U. S. 99



Prior to making up its 1950-51 Budget, the California Highway Commission held many hearings throughout the State. One of the last of these was at the Sutter Club in Sacramento on August 17th, when the commissioners and highway engineers met with officials of the California State Chamber of Commerce. At that time, Neil Petree, Chairman of the State Highway Committee of the Chamber, submitted 250 proposed projects on the State Highway System for consideration by the committee. This photo of the meeting shows: SEATED, left to right Highway Commissioners James A. Guthrie, Charles T. Leigh, Homer P. Brown, F. Walter Sandelin, Harrison R. Baker; State-wide Highway Committee Chairman Neil Petree; Highway Commissioner Chester H. Warlow; North Coast Highway Committee Chairman Frank W. Luttrell. STANDING, left to right Central Coast Highway Committee Vice Chairman Claude T. Faw, Central Valley Highway Committee Vice Chairman Jack P. Spaenower, Central Valley Highway Committee Chairman Alex F. Ross, Southern California Project's Study Committee Chairman Ernest E. East, State Highway Engineer George T. McCoy, State-wide Highway Committee Vice Chairman Martel Wilson, Sacramento Valley Highway Committee Vice Chairman Florence W. Tarr, Central Coast Highway Committee Chairman Dr. E. J. Leach, Sacramento Valley Highway Committee Chairman Swift Berry, San Joaquin Valley Highway Committee Chairman George J. Tschumy, Sacramento Valley Regional Council Vice President George G. Pollock, Assistant State Highway Engineer J. W. Vickery, Deputy Director of Public Works Frank B. Durkee, San Joaquin Valley Highway Committee Vice Chairman Charles Ehrhorn, Highway Commission Secretary George W. Savage, Deputy State Highway Engineer Fred J. Grumm

from 2½ miles south of junction of Sign Route 138 to Kern county line, \$1,456,000. Los Angeles, grade, pave, and structures on portions of the Harbor Parkway from Adobe Street to Olympic Boulevard, \$2,413,600. Orange County, grade and surface 5.5 miles of U. S. 101 Alternate from Myrtle Avenue in Laguna Beach to the south city limits of Newport Beach,

\$520,800. Ventura County, grade, pave, and structure, Santa Clara River Bridge through Montalvo, \$448,000.

#### District VIII

District 8—Orange and Riverside Counties, grade, surface, and structures on portions of Sign Route 18, the Santa Ana Canyon, length 6.2 miles between 1.4 miles west of Orange county line

to Corona, \$616,000. Riverside County, widen and surface 2.6 miles of Sign Route 18 through City of Corona, \$420,000. San Bernardino County, grade, surface, and structures on City Creek Road, Sign Route 18 and State Route 207, from 1.3 miles west of Running Springs to Running Springs, \$672,000.

... Continued on page 32

# Coast Highway

Interesting Details of Story of Reconstruction in Ventura County

By SPENCER V. CORTELYOU, Assistant State Highway Engineer\*

ON JULY 29, 1949, the Clyde W. Wood Inc. contract for the improvement of the 1.2-mile section of coast highway (U. S. 101) in Ventura County between Sealcliff and Mussel Shoal was completed and accepted. This is the project covering which construction details were discussed by Mr. F. B. Cressy, Assistant District Engineer, in the January-February, 1949, issue of *California Highways and Public Works*.

In addition to providing for a four-lane divided limited access freeway, the contract with a total allotment of \$1,041,700, included the placing of approximately 63,000 tons of heavy stone and 19,000 cubic yards of shore protection gravel to protect the highway embankment from destructive ocean surf action. This particular project is an interesting example of how state highway reconstruction designs have had to be developed to meet changing conditions.

In 1912 when this highway route became a part of the State Highway System, a timber pile trestle with a roadway 16 feet wide was under construction at this location as a cooperative project by the counties of Ventura and Santa Barbara. This trestle, or "causeway" as it was locally called,

\* Mr. Cortelyou prepared this article before his retirement on October 1, 1949.

was immediately adjacent to the Southern Pacific Railroad embankment, and during high tides the waves passed under the timber causeway and splashed against rip-rap fill slopes of the railroad embankment.

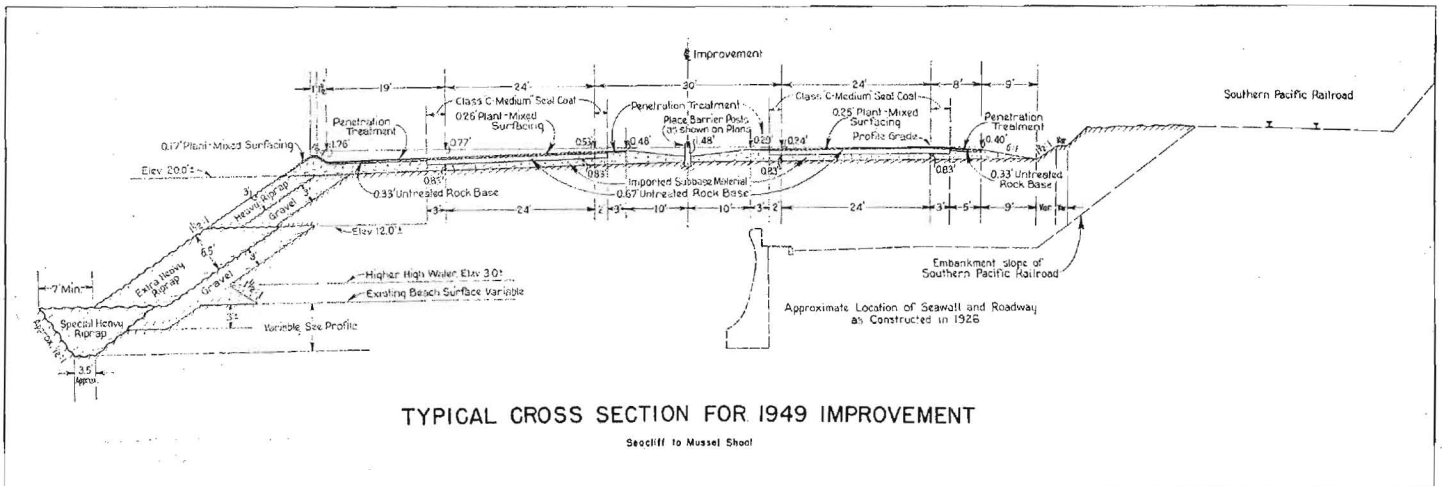
When heavy seas were running, as occurred several times a year, the occupants of automobiles on the causeway were in danger of a severe drenching when combers broke viciously over the deck of the trestle rather than flowing quietly under it. The swaying of the timber causeway and the rolling waves were reported to have given motorists some of the dubious sensations of an ocean going trip. However, for many years the old timber causeway did yeoman service in taking care of the main-line automobile and truck traffic between Los Angeles and San Francisco, and coastal cities in between.

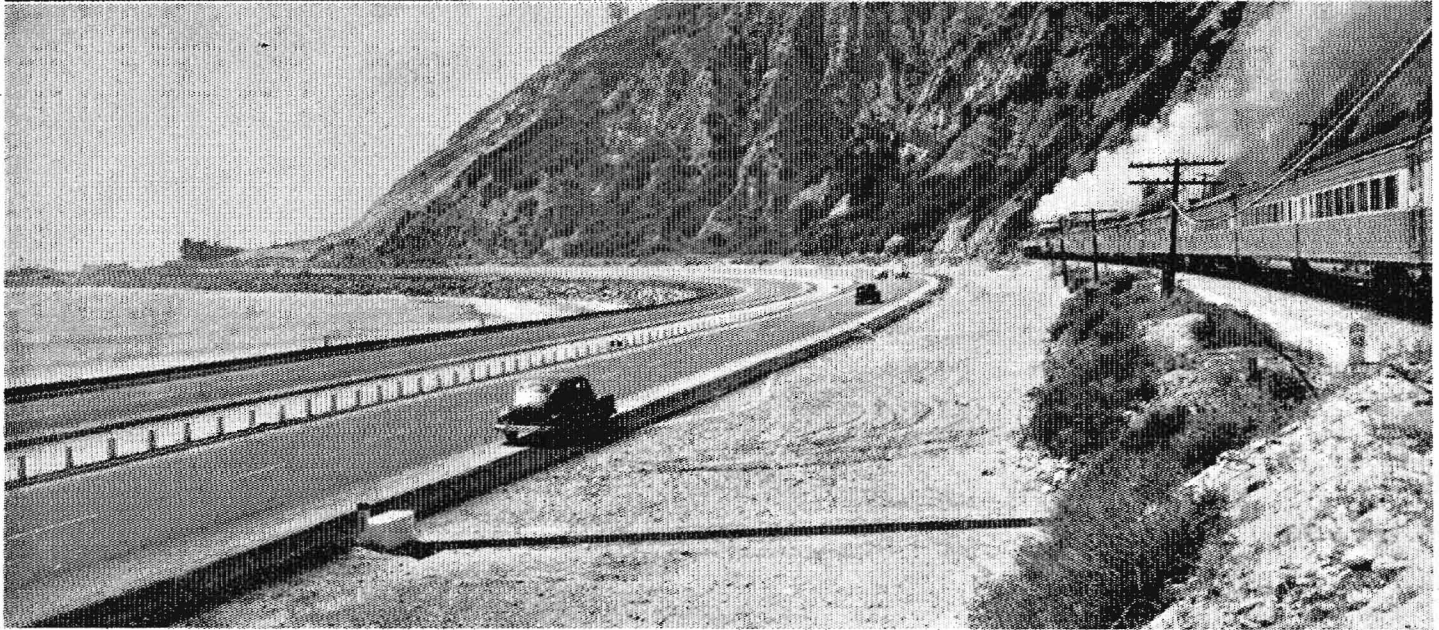
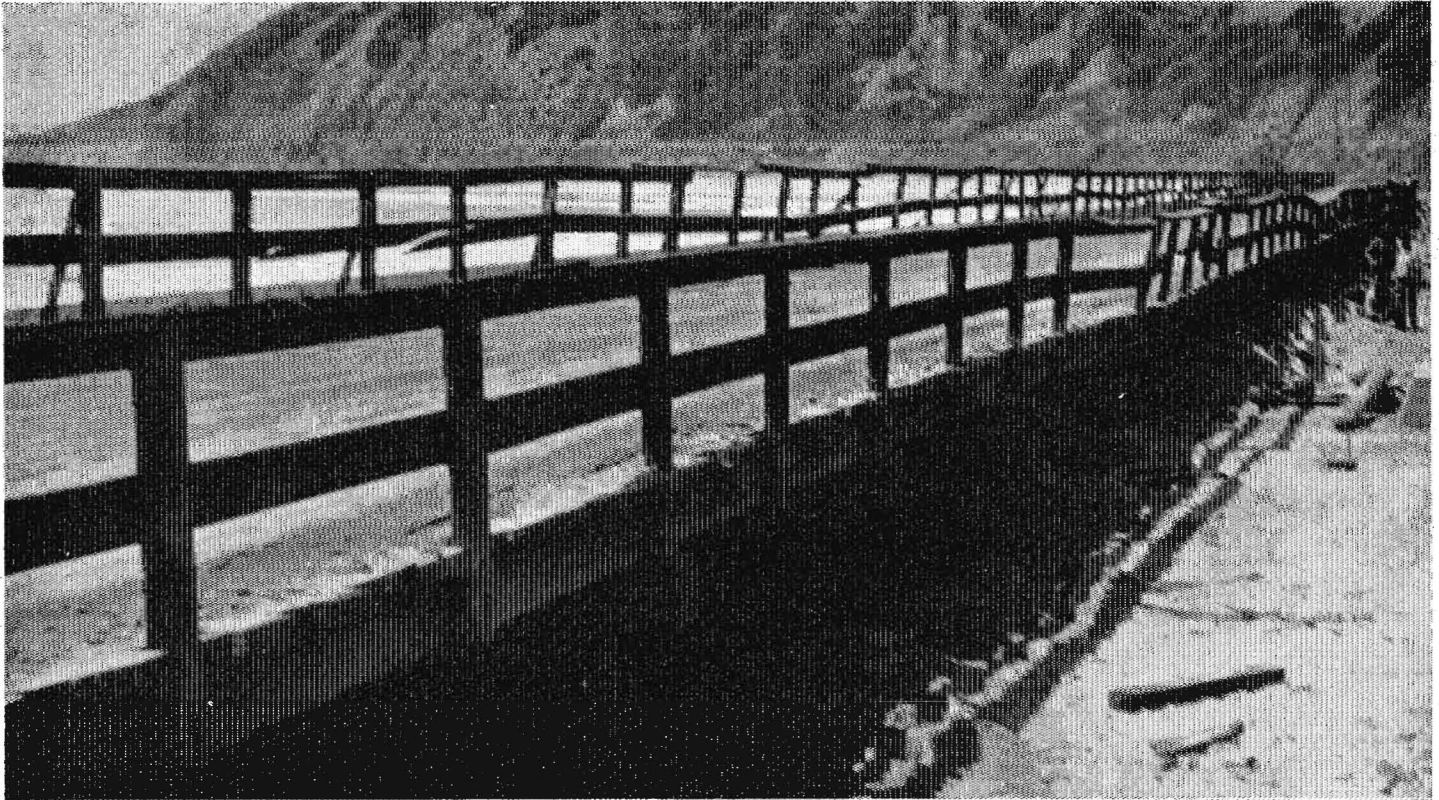
As the causeway year after year was required to withstand heavy surf action, and the pounding of increasing automobile traffic and heavy trucks, it became necessary to replace the timber trestle with a reinforced concrete sea wall, earth embankment and concrete paving. This construction was completed in 1926 by contractor J. F. Knapp and provided a 30-foot width of Portland cement concrete pavement behind the sea wall. The accompanying photograph taken in 1926 shows the causeway just before it was demolished.

This sea wall and pavement construction served traffic well for many years until change of use of the mesa land above the railroad occurred. Previously the mesa land on the top of the bluffs along the railroad was in brush, trees and native vegetation which held back the topsoil. As the years passed, more and more of the property owners cleared away the native growth and started farming operations. Storms and heavy rainfalls usually occurred right at the time when the mesa lands were in a plowed condition, and large volumes of slippery topsoil were washed down the bluff, through the railroad culverts, and over the roadway of the state highway.

## Highway Inundated

The grade of the railroad being several feet above the grade of the state highway, there was ample culvert capacity so that the debris from the bluffs passed under the railroad and through the railroad culverts without doing any damage to the railroad. But the culverts under the state highway because of restricted headroom had to be on a flatter grade, and at times of severe run-off the highway culverts silted up and debris was deposited on the pavement. This situation is well illustrated by the accompanying photographs. As will be noted, some of





UPPER—Photograph taken early in 1926 looking northwesterly toward Mussel Shoal, showing the old timber causeway just before it was dismantled. LOWER—Photograph from approximately same location, taken August, 1949, showing completed construction of four-lane divided highway

the photographs showing storm damage were taken in 1934 and some in 1941.

It was during the year of 1941 that plans were started to alleviate the bad conditions that had developed which were frequently making it necessary that this important state highway be closed to traffic, some times for days

at a time. The war prevented reconstruction for several years and it was not until 1948 that plans were completed and the contract let to carry out reconstruction to correct the inadequacies of this 1.2-mile stretch of state highway.

The typical section sketch accompanying this article indicates the gen-

eral type of improvement which was carried out in 1948 and 1949. Here again changed conditions caused by property owners in making private developments had to be taken into account in arriving at the reconstruction design.

One of the photographs accompanying this article shows the long

timber trestle pier that had been erected by an oil company in order to drill wells and produce petroleum from under the ocean. This timber trestle pier has been acting as a groyne in the entrapment of sand and the building up of beach in front of the sea wall. The construction of this pier had another effect besides building up a buffer strip of beach along the state highway, in that the intensity of wave action was greatly reduced. The operation of this pier in the building up of sand beach and the cutting down of wave action made it possible for the

Division of Highways to work out an economical design for widening the roadway and placing adequate rip-rapped slope protection 100 feet and more oceanward from the old sea wall.

The typical section indicates the relation between the old sea wall and the new shore protection work, and also shows how improvements could be made in the drainage installations so that silting up of highway culverts could be avoided in the future.

The newly improved highway culverts have been very carefully designed so that material carried in

suspension and debris of various kinds that come to the state culverts in the storm water flow from culverts under the railroad will have the velocity of flow maintained uniform, so that there will be no tendency for deposition to occur. It is only when there is a decrease in the velocity flow in culverts that deposition of suspended material occurs, the culverts become plugged and trouble results. With the new system of culvert construction under the highway there should be no more need for closing the highway to traffic when storms occur, as has

*UPPER—View looking northwesterly from Seacliff, showing storm damage of October 18, 1934. LOWER—View looking northwesterly from approximately same location, taken August, 1949, showing completed four-lane divided highway*





UPPER—View southeasterly looking toward Seacliff oil wells, showing storm damage March 1, 1941. CENTER—Looking southeasterly toward Seacliff oil wells, showing storm damage of October 18, 1934. LOWER—View from approximately same location, taken August, 1949, showing completed four-lane divided highway

happened many times in the past. On this contract Stanley Wood was Project Manager for Clyde W. Wood,

Inc. A. W. Carr was Resident Engineer for the State Division of Highways, District VII. The construction was

under the general supervision of District Engineer W. L. Fahey and Assistant District Engineer F. B. Cressy.

# Bidding Procedure

*Timely Advice to Contractors  
On Submitting Proposals*

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

**M**OST CONTRACTORS have become thoroughly familiar with bidding procedures of the Division of Highways. However, many new contractors have entered the field since the war, and numerous requests have been received for copies of an article which appeared in the November-December, 1943, issue of this magazine which outlined bidding procedure, with special emphasis on mistakes frequently made by bidders. As the earlier article is no longer available, the information is repeated here with some additions and revisions.

## **Policy of Division**

It is the policy of the Division of Highways to perform all construction work by contract. The few exceptions are emergency projects due to damage by storms, floods, slides, or other disasters; four prison labor projects; and occasional small projects where the nature of the work, such as the remoteness of the project, scattered locations and indeterminate quantities, carrying of exceptionally heavy traffic through construction operations and accompanying public responsibility, an undeterminable amount of preparatory work, the specialized character of the work, such as traffic stripes and signs, or other factors demonstrate definitely that the work is not adaptable to or attractive as a contract. Even on some projects under the above categories bids have been taken, but the prices were so high that the State was compelled to perform the work by day labor; such instances have confirmed the judgment of the State Highway Engineer and the Director of Public Works in selecting relatively few projects for construction by day labor.

For the protection of the State and its interests the procedure of bidding is governed by various legal provisions, rules and regulations.

The Division of Highways makes every effort to obtain as many legitimate bids as possible on every project in order to secure maximum competition and resultant lower prices and a greater amount of severely needed highway improvements for the motorists who pay for them.

## **Requirements**

One basic requirement for a contractor operating in California is that he be properly licensed by the Contractors' State License Board. Another basic requirement to bid on state highway projects is the establishment of a prequalification rating in accordance with state statutes.

Failure to secure a license, of course, precludes operation in this state as a contractor. Many contractors, however, are negligent in renewing their licenses during the 30-day renewal period preceding July 1st of each year. On several occasions this negligence has resulted in the required rejection by the Department of Public Works of otherwise acceptable bids for proposed highway construction.

Another oversight which has cost several contractors the award of state highway contracts is a change in the status of a firm without notifying the Contractors' License Board of the change. Such instances include a change in the partners of a copartnership, or of an individual taking in a partner. In one or two instances a corporation has been dissolved and members of the firm have continued to operate under the old name but as a copartnership, without securing a new license. Similarly two or more contractors desiring to bid on a project as a joint venture frequently neglect to secure a joint-venture license.

## **One Common Frailty**

One trouble-causing frailty which seems to apply only to contractors

operating as individuals is the practice of using varying forms of a firm name. These contractors either cannot decide upon a name style under which they wish to operate or they forget the style which they have previously used. To be perfectly safe, names appearing on the license, on the prequalification statement and as the signature on the proposal should agree in all details.

Another matter which has resulted in the rejection of bids is the classification of licenses. Reproduced on another page is a letter sent to all prospective bidders in an effort to prevent the loss of any further bids due to faulty license classification.

When two or more contractors joint venture on a contract, the joint venture license must be secured from the Contractors' License Board prior to the submission of the bid.

## **Prequalification Statements**

The State Contract Act requires that all bidders on projects under the jurisdiction of the Department of Public Works estimated to cost more than \$15,000 must be prequalified. This is accomplished by submission of a "Contractor's Statement of Experience and Financial Condition." These forms are furnished by the Division of Highways upon request. In order to bid on projects estimated to cost more than \$50,000, the statement must be accompanied by the affidavit of a certified public accountant or a registered public accountant.

Prequalification statements filed with the Division of Highways, the Division of Architecture, or the Division of Water Resources are used interchangeably among the divisions, so that filing of only one statement with a division of the Department of Public Works is necessary.

If two or more contractors desire to submit a joint venture bid on a project,



each contractor must be prequalified, and an affidavit of joint venture must be submitted in order to secure a proposal form. The form of affidavit required is furnished by the Division of Highways upon request.

#### **Some Disappointments**

Many contractors have been disappointed in not being permitted to submit a bid on some particular project because their prequalification statement has expired or there is not sufficient time between the filing of their statement and the date of bid opening. As it requires some study on behalf of both auditors and engineers to arrive at a bid rating for a prospective bidder, the State requires that prequalification statements be filed at least five days prior to the date of opening bids on any project for which a bidder wishes to submit a proposal. The Division of Highways notifies prequalified contractors by mail of the expiration date of the prequalification in ample time for them to prepare and submit a new statement before the current one expires.

#### **District Advertisements**

A few small projects, estimated to cost \$15,000 or less, are advertised through the district offices of the Division of Highways, and requests for plans and proposal forms should be addressed to the district office through which the project is advertised, as shown in the "Notice to Contractors."

#### **Headquarters Procedure**

The great majority of projects are advertised through Headquarters Office in Sacramento. Requests for plans and proposal forms should be addressed to Mr. G. T. McCoy, State Highway Engineer, P. O. Box 1499, Sacramento, California. Requests should be submitted in writing, as far in advance of bid opening as possible, with a statement of the value of incomplete work on going contracts, whether with the Division of Highways or with others. Special forms are supplied for this purpose. A prospective bidder may avoid receiving unwanted plans if he will definitely state in his request that he does not wish to secure the plans if the estimated cost of the project exceeds his prequalification rating and a proposal form cannot be sent for bidding purposes.

Plans are sold only in complete sets; it has been found to be impractical to break up sets into various classifications of work, due to the many cross references to other portions of the plans and resulting chances for error.

#### **Plans and Proposal Forms**

Plans and proposal forms are sent out by the Division of Highways as soon as received from the blueprint room and the State Printer. Notices to contractors are sent out as far in advance as possible, so that there may be some delay between the time the request is sent in and the plans and proposal form are received. This is mentioned to allay the fears of prospective bidders who may think that their request has gone astray when the plans and proposal form are not received immediately.

Proposal forms are numbered serially and must be submitted only by the bidder to whom issued; they are not exchangeable among bidders. If a contractor has secured a proposal form in his own name and then decides to submit a bid as a joint venture, he must submit an affidavit of joint venture and secure a new proposal form or written approval to submit the previously issued proposal form as a joint venture bid.

Incidentally, the Division of Highways sometimes receives requests for the estimated cost of advertised projects and also for a list of prospective bidders who have taken out proposal forms. It is against the policy of the Division of Highways to give out this information. Without going into the various factors involved, it may be said that many years of experience in handling thousands of contracts have demonstrated that giving out such information is not in the best interests of fair, competitive bidding.

#### **Most Frequent Mistake**

In the course of many years of bid opening it has been observed that the greatest number of mistakes and errors made by bidders occur in the body of the proposal and on the proposal signature page.

The most frequent mistake appears to be that of incorrectly writing the words of a unit price bid on some item. Requirements stipulate that in discrepancies between words and figures, the

words shall prevail. This type of mistake can be attributed only to lack of care in preparation of the bid, for writing a unit bid price in words is not more difficult than writing in words the amount of a check.

The writing of fractions of a cent seems to cause considerable difficulty, particularly when written as a decimal. Bidders frequently write the decimal in terms of dollars but use the word "cents" or in terms of cents and use the word "dollars." This mistake changes the value of the unit price bid and often runs the extension into fantastic figures.

Omission of the words "dollars" or "cents" in writing in the unit bid price frequently leads to an ambiguity as to the intent of the bidder and makes interpretation difficult.

On another page there appear typical examples of mistakes which have occurred in filling out proposal forms.

#### **Causes for Disqualification**

Alteration of the text of items or qualification of the special provisions are sometimes cause for disqualification of a bid. Comparison of bids submitted for state highway work must be made entirely on the basis of the terms of the special provisions and a bid submitted upon any other basis is not comparable to the bids submitted on the special provisions as they are written and therefore cannot be considered.

Bidders sometimes attach a letter to their proposals setting forth qualification of one or more items. If the proposal refers to this letter or the letter states that the bid is submitted subject to qualifying terms, the attorneys for the department have ruled that the bid is thereby qualified and cannot be considered.

Nor can incomplete bids be given consideration. Bidders unfamiliar with state highway practice sometimes will submit proposals on only certain items, neglecting to bid on the entire proposed work. As the Division of Highways is interested only in contracting for the entire project as set forth in the special provisions such proposals are of no value.

In several instances bidders have detached the special provisions from the proposal and submitted only the sheets showing the unit bid prices and signature page. As the special provi-

**SOME OBSERVED MISTAKES IN BIDS**

| Item | Approximate Quantity | Item with Unit Price Written in Words   | Unit Price    | Total             |
|------|----------------------|---|---------------|-------------------|
| 6    | 176                  | Thousand feet board measure redwood timber, dense structural grade in place at<br><u>Twenty-eight cents</u><br>..... per thousand feet board measure. | <u>\$0.28</u> | <u>\$4,928.00</u> |

*Be sure the bid price conforms to the stated unit of measurement!* Units of measurement are fully stated in words in the proposal form. Bids have been received with a unit price per foot board measure when the proposal form clearly stated that the unit is per thousand feet board measure. As shown above, the actual bid for the item is \$49.28, which must be used in totaling the bid. Remember that the following requirement follows the proposal form:

In case of a discrepancy between words and figures, the words shall prevail.

Sometimes, probably through a moment of absentmindedness, or through haste, an item is filled in as follows:

|   |         |   |               |                   |
|---|---------|---|---------------|-------------------|
| 9 | 152,000 | Pounds bar reinforcing steel in place at<br><u>Five dollars</u><br>..... per pound. | <u>\$0.05</u> | <u>\$7,600.00</u> |
|---|---------|---|---------------|-------------------|

The sad part of the above story is that the item is actually bid at \$760,000, which must be used in computing the total. Such bids are seldom low.

Apparently some contractors figure their bids and then copy them into the proposal form. Sometimes something like the following happens:

|    |     |   |               |                 |
|----|-----|---|---------------|-----------------|
| 25 | 220 | Lineal feet raised bars in place at<br><u>Eight cents</u><br>..... per lineal foot. | <u>\$0.80</u> | <u>\$176.00</u> |
|----|-----|---|---------------|-----------------|

Actually the bid is \$17.60. The item in the illustration is small, but it could happen on a big one. Check the words carefully and don't leave off the "Y."

Sometimes a bidder will go down the line with the total bid in all the spaces:

|   |       |   |                             |                             |
|---|-------|---|-----------------------------|-----------------------------|
| 7 | 3,240 | Lineal feet removing and resetting bridge railing at<br><u>Nine thousand seven hundred and twenty dollars</u><br>..... per lineal foot. | <u>\$9,720<sup>00</sup></u> | <u>\$9,720<sup>00</sup></u> |
|---|-------|---|-----------------------------|-----------------------------|

This usually involves a new bidder accustomed to bidding on a lump sum basis and unfamiliar with unit price bidding procedure. The official bid total on the above item is \$31,492,800.00, which has little chance of getting in the money.

The moral is: Be sure the figured bid price corresponds to the stated unit of measurement, and then be sure the price is written in the proposal form correctly. *Remember that the words must be right.*

sions are an integral part of both the proposal and contract such detached bids are incomplete and cannot be considered.

Bidders occasionally get their proposals into difficulty by filling in the items in the contract form instead of the proposal form. The contract form is placed in the back of the special provisions and proposal booklet so that the contract will be a complete document at the time of award. It also shows the bidder just what the form of contract will be, should he be low bidder and the contract be awarded to him.

Proposals submitted for proposed state highway work may be classed as legal documents and as such it is necessary that they be properly signed by the bidder so that there may be no question as to their validity.

#### **Incomplete Signatures**

An unsigned proposal obviously cannot be given consideration, even though the name of the intended bidder appears elsewhere in the proposal. In accepting a proposal for consideration the State must be in a position where the bidder cannot disclaim the authenticity of the proposal and in the case of an unsigned bid, the bidder might readily claim that it was delivered in error and that he had no intention of bidding.

One difficulty which frequently occurs is that of an incomplete signature. This may happen when the firm name appears on the space provided for the signature but there is no signature of an officer, in the case of a corporation; of one of the partners in the case of a copartnership; or the principal in the case of an individual. The reverse of this error likewise occurs. The signature of a partner, the principal or an official may be signed without the firm name appearing as part of the signature. These omissions always raise a question as to the validity of the proposal.

#### **Bids Invalidated**

Another signature irregularity which crops up from time to time is that of a proposal signed by a person other than the principal and for whom a power of attorney has not been filed with the Division of Highways. While the fact of the granting of a power of attorney may be established after bids

are opened, the lack of it at the time of opening always casts a shadow on the authenticity of the proposal.

A joint venture proposal must show the correct names of the bidders involved. The affidavit of joint venture, which must have been previously submitted and approved, provides that one member of the joint venture may sign for and bind all the members of the joint venture on the particular project involved.

It is desirable that the names of officials of corporations, members of copartnerships or interested parties be listed in the space provided therefor on the signature page.

As previously stated, the form of signature on the bid should agree with the form appearing on the contractor's license and on his prequalification statement.

#### **Bidder's Guaranty**

Another place where irregularities occur is in connection with the bidder's guaranty which accompanies the proposal.

As statutes require that all bids submitted for proposed state highway work be accompanied by a guaranty amounting to at least 10 percent of the amount bid in the form of cash, cashier's check, certified check or bidder's bond, a proposal submitted without such guaranty cannot, of course, be considered.

One of the chief difficulties in regard to the guaranty is that the amount is less than the required 10 percent. This mistake usually occurs when the bidder makes an arithmetical error in the extension or addition of his bid and, upon being checked, it is found that the total of the bid is greater than originally figured by the contractor. Attorneys for the department have ruled that the law in this instance is specific in the statement "at least 10 percent of the amount of the bid." Ten percent of the bid total is a definite amount and the guaranty cannot be less than this definite amount. The safest procedure is to submit the bond for 10 percent of the amount of the bid, as provided in the printed form, without writing in a limiting amount.

#### **Bidder's Bond Irregularities**

Other difficulties in connection with the guaranty seem to occur mostly in cases where bidder's bonds are sub-

mitted as the guarantee that the bidder will enter into a contract if it is awarded to him. The most frequent irregularity in this regard is that the bidder's bond is not on the form prescribed for state highway contracts. The state form varies from the commercial forms printed by surety companies in several respects, chiefly in that the commercial forms make no guaranty that the bidder will furnish a labor and material bond if the contract is awarded to him. There should be no reason for a surety company not using the prescribed state form as it is included in the proposal form booklet, and separate copies may be obtained from the office of the State Highway Engineer in Sacramento if required.

Bidders' bonds are frequently submitted which are not signed by the bidder himself, or the signature of surety is incomplete or not properly acknowledged. There also have been several instances where the notary's acknowledgment of the surety's signature was incomplete.

Once or twice in the history of bid opening for state highway work, a bidder, in submitting proposals on two or more projects on the same day, has mixed his 10 percent guaranty checks between the proposals, with the result that the check for one of the projects was insufficient. Similarly, proposals have been placed in the wrong envelope, with the result that the envelope was not opened until all bids had been read for the project for which the proposal was intended.

#### **Don't Use Special Delivery**

Another mistake is to send a proposal by special delivery mail to the Division of Highways in Sacramento. As the division has a private box in the post office which is opened at 2 o'clock p.m. on bid opening days, and special delivery mail is not placed in the box but held for call, the method only delays delivery instead of expediting it. It has happened that this very delay has resulted in a proposal being delivered too late for the opening. Proposals received too late are always returned to the bidder unopened.

Under the State Contract Act, the Department of Public Works is not empowered to relieve a bidder of his bid because of a mistake. If the low

... Continued on page 35

G. T. McCOY  
STATE HIGHWAY ENGINEER

EARL WARREN  
GOVERNOR OF CALIFORNIA

C. H. PURCELL  
DIRECTOR

STATE OF CALIFORNIA  
**Department of Public Works**  
SACRAMENTO

DIVISION OF HIGHWAYS  
PUBLIC WORKS BUILDING  
P. O. Box 1499  
SACRAMENTO 7

March 30, 1949

PLEASE REFER  
TO FILE NO.

000/JDG

To All Prospective Bidders on State Highway Construction:

Amendments to the Contractors License Law provide for the classification of licenses limiting the sphere of a contractor's activity to the particular type of work covered by his license.

Recent rulings by the Registrar of Contractors under these license classification regulations have deprived three low bidders of the award of highway contracts on the grounds that their general building license (B-1) did not authorize them to undertake highway or bridge construction.

Most highway work and all bridge construction requires a general engineering license (Class A). Construction of buildings and similar structures requires a general building license (B-1). Certain specialty licenses also are issued.

Are you properly licensed for the class of work on which you propose to bid? It is our understanding that no additional fees are charged for supplemental licenses.

In order to avoid losing the award of a contract because of the lack of a proper license, it is suggested that you check the validity of your license and all joint venture licenses which you may hold with the Registrar of Contractors before submitting further bids.

No bid will be considered unless the bidder is properly licensed at the time of bid opening.

G. T. McCOY  
State Highway Engineer

By *Richard H. Wilson*  
Richard H. Wilson  
Assistant State Highway Engineer

# Au Revoir

Spencer V. Cortelyou Concludes  
38 Years of Loyal State Service

A BARBECUE was held on October 1, 1949, at beautiful Brookside Park in the Arroyo Seco near Pasadena's famous Rose Bowl, in honor of Spencer V. Cortelyou, Assistant State Highway Engineer, in charge of District VII, including the metropolitan area of Los

veyor. The paths of Cortelyou's party and Skeggs' party frequently crossed and a friendship was established between these two leaders which has carried down through the years that they have been coworkers in the State Division of Highways organization.



S. V. CORTELYOU—1949

Angeles, upon the occasion of his retirement from state service. This event, attended by several hundred of his coworkers and employees in the State Department of Public Works, Division of Highways, honored Mr. Cortelyou upon the completion of over 38 years of continuous service dating back to February 1, 1912.

Before entering state service, Mr. Cortelyou was Chief of Survey Party with the Los Angeles County Road Department for three years, having as his instrument man the late George Jones, who for many years was county road commissioner. At that time, John H. Skeggs, now Assistant State Highway Engineer in charge of District IV that includes the metropolitan area of San Francisco, was Chief of Survey Party for the Los Angeles County Sur-

## Service in Philippines

Prior to working with Los Angeles County, Mr. Cortelyou spent five years in the Philippines as Provincial Supervisor and District Engineer for the Insular Department of Public Works. This was preceded by railroad experience with the old Los Angeles and Salt Lake Railroad following his graduation from the University of Nebraska in 1902.

At the university, "Red" Cortelyou, as he was then called, distinguished himself in athletics, particularly in

basketball and football, being a varsity member of his team for the full four years. He also played on the varsity baseball team for one season. He gained recognition equivalent to that of "All-American honors" in midwestern football circles although Walter Camp at that time considered only East Coast players in making his mythical selections. Old-timers still brag about the Nebraska team which was unscored upon in an entire season, and further brag that not a single first down was made all season around "Red" Cortelyou's right end position, although with his usual modesty Mr. Cortelyou gives most of the credit to the right tackle, John Westover.

## Started in 1912

Mr. Cortelyou is a charter member of the District VII organization, having started as principal assistant to Divi-

sion Engineer W. Lewis Clark on February 1, 1912. His name appears on the first pay roll for District VII, which at that time comprised the Counties of Los Angeles, Orange, Ventura, San Diego, Riverside, San Bernardino and Imperial. This pay roll consisted of 20 names and it is interesting to note that C. P. Montgomery and E. S. Gripper,



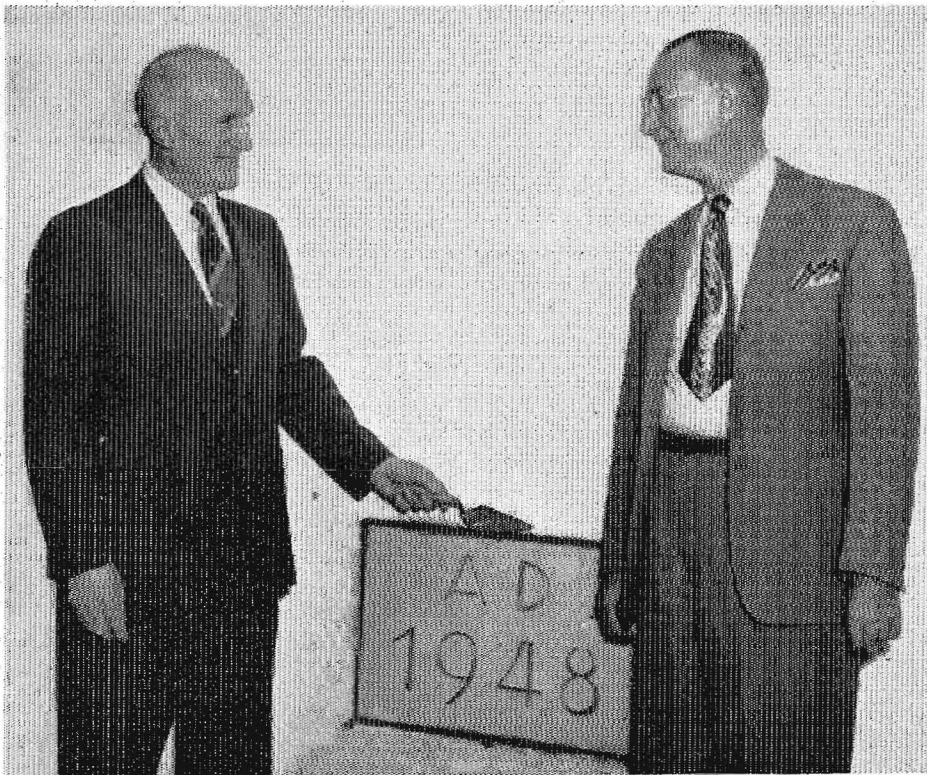
S. V. CORTELYOU—1912

whose names are on this pay roll, are still with the District VII staff. However, Mr. Gripper's retirement is now imminent, being chronicled elsewhere in this issue of *California Highways and Public Works*.

On July 1, 1915, when W. W. Patch took over as division engineer, he continued Mr. Cortelyou in his position as assistant division engineer. On January 1, 1924, Mr. Cortelyou was appointed division engineer, which title was shortly afterward changed to district engineer. Originally there were only seven divisions (districts) in the state highway organization, but in late 1923 the number was increased to 10, and District VIII, with E. Q. Sullivan as



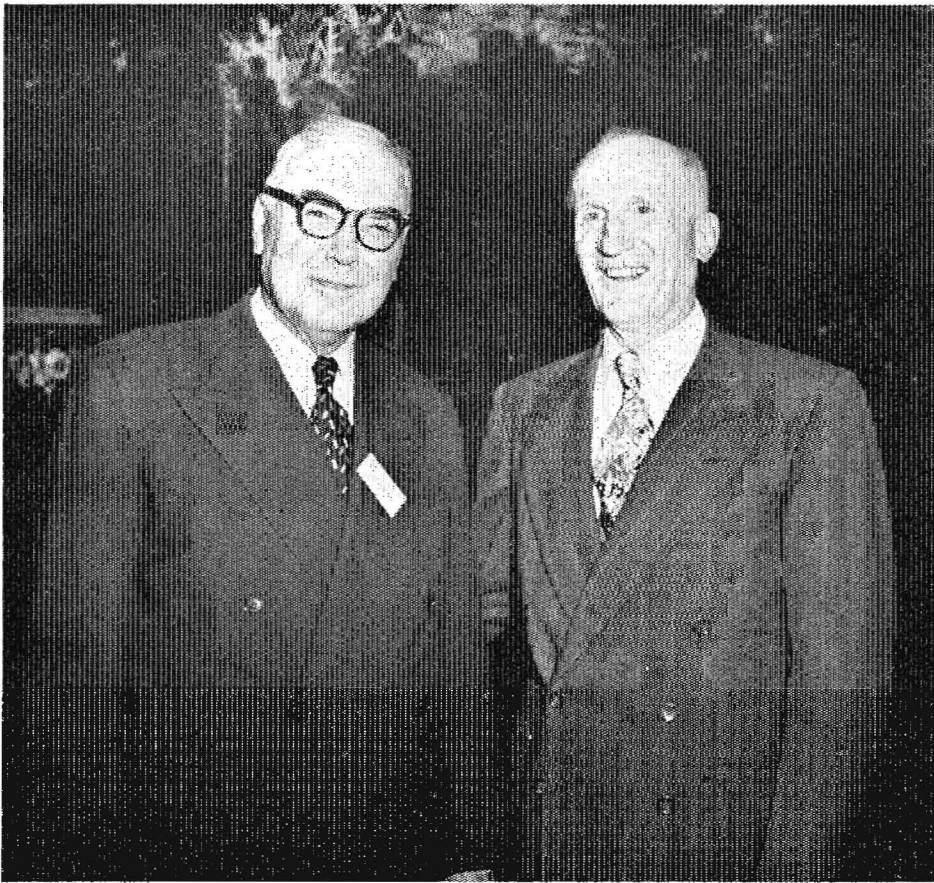
UPPER—New \$1,500,000 State Highway Building in Los Angeles. LOWER—Assistant State Highway Engineer S. V. Cortelyou, with trowel in hand, and Deputy State Highway Engineer Fred J. Grumm, at dedication of new structure



district engineer, was formed with headquarters at San Bernardino, taking over Riverside, Imperial and San Bernardino Counties. In 1933, when the Legislature greatly expanded the State Highway System and for the first time extended it through the incorporated cities of the State, there was further re-districting and District IX was formed, consisting of San Diego County from District VII, and Imperial County and a portion of Riverside County from District VIII. This left District VII with its present three counties of Ventura, Orange and Los Angeles, the latter being essentially metropolitan in character.

**Original Offices**

The original offices of Division VII in 1912 were in the old Union League Building at 215 West Seventh Street. The organization expanded rapidly, the



Director of Public Works Purcell, left, and S. V. Cortelyou

second move being to the Union League (now called Fashion League) Building at Second and Hill Streets. The next move was to the then called Associated Realty Building on the southwest corner of Sixth and Hill Streets. Early in 1931 the district offices were moved to the eighth floor of the then new State Building facing south on First Street between Broadway and Spring Streets in the Los Angeles Civic Center.

Prior to the last war, plans were discussed over a period of several years involving the construction of a new District VII office building, and construction was actually started in 1941 at the site of the present building, which was interrupted by the war. With the passage of the Collier-Burns Highway Bill by the Legislature in 1947, it was fortunate that as a part of the present property assembly for the new building, the State had purchased the eight-story "Spring and Second Building," for the expanding organization was required to occupy this old building's top seven floors and also to rent additional

space in the Wilcox Building across the street, in addition to retaining the eighth floor space in the State Building.

On the week end of August 20 to 22, 1949, District VII forces were again assembled under one roof in their own new building at 120 South Spring Street facing the Times - Mirror Building across the street. On August 26, 1949, Mr. Cortelyou placed the last mortar around the cornerstone after appropriate remarks by Deputy State Highway Engineer Fred J. Grumm in dedication of this modern five-story building designed by the State Division of Architecture to blend in with and become a part of the expanding Los Angeles Civic Center area.

Early efforts of Mr. Cortelyou were devoted to developing the rural state highways to which the system was then confined. Preliminary surveys for the Ridge Route through the Tehachapi Mountains connecting Los Angeles with San Joaquin Valley were started in 1912. The construction was completed in 1919 and was based on standards of design within the realm of financial possibility. It cut 50 miles off the best route on former traversable roads between Los Angeles and Bakersfield. This road proved to be of such

Reproduction of first pay roll for District VII, February 1, 1912, bearing names of Mr. Cortelyou and E. S. Gripper, both of whom are retiring, and C. P. Montgomery, who still is with District VII, Division of Highways

| RECORD OF PAY ROLL |                                  | DEPARTMENT OF ENGINEERING, CALIFORNIA HIGHWAY COMMISSION. |                    | DATE         | PAY PERIOD             |
|--------------------|----------------------------------|---|--------------------|--------------|------------------------|
| FROM DIVISION NO.  | NAME OF                          | FOR PERIOD BEGINNING                                      | ENDING             |              |                        |
| VII                | M. Purcell                       | February 1st 1912   | February 29th 1912 |              |                        |
|                    |                                  | (Signed) W. R. Purcell                                    | Clark              |              |                        |
| EMPLOYEES          |                                  |   |                    |              |                        |
| CLASSIFICATION     | NAME                             | RATE  | STATUS             | AMOUNT       | REMARKS                |
| Office             | W. Lewis Clark Dist. Engr.       | 1700  | 700                | 2500         |                        |
|                    | Spencer V. Cortelyou Prin. Asst. | 750   | 175                | 8750         |                        |
|                    | D. Blair Heywood S. Engr.        | 750   | 75                 | 5250         |                        |
|                    | Wm. D. Armstrong Draftsman       | 750   | 125                | 6250         |                        |
|                    | H. F. Allen                      | 750   | 100                | 5000         |                        |
| Survey Party #1    | Edwin D. Holter Chief            | 450   | 1250               |              | Paid on March Pay Roll |
|                    | E. C. East Instrument            | 450   | 100                | 5000         |                        |
|                    | J. D. Hart Rodman                | 450   | 65                 | 3250         | Paid on March Pay Roll |
|                    | J. J. Hawthorne                  | 450   | 60                 | 3000         |                        |
|                    | Geo. Little Cook                 | 450   | 150                | 6750         | Paid on March Pay Roll |
| Survey Party #2    | John C. Morr Chief               | 450   | 135                | 6250         |                        |
|                    | C. P. Montgomery Instrument      | 450   | 100                | 5000         |                        |
|                    | L. W. Cummings Rodman            | 450   | 65                 | 3250         |                        |
|                    | H. C. Barber, Jr.                | 450   | 65                 | 3250         |                        |
| Survey Party #3    | J. A. Barber Cook                | 450   | 150                | 6750         | Paid on March Pay Roll |
|                    | E. S. Gripper Chief              | 450   | 125                | 6250         |                        |
|                    | A. N. George Instrument          | 450   | 100                | 5000         |                        |
|                    | C. A. Beck Rodman                | 450   | 65                 | 3250         |                        |
|                    | W. Jennings                      | 450   | 70                 | 3500         |                        |
|                    | Clayton Belmont Cook             | 450   | 150                | 6750         | Paid on March Pay Roll |
|                    |                                  |   |                    | <b>Total</b> | <b>44009</b>           |

commercial importance that a reconnaissance survey for a much bolder location with minimum radius curves of 1,000 feet and saving an additional 10 miles of distance were started in 1927.

The popular favor with which this highway program was received was responsible for increased financing being provided by the Legislature which made possible the completion of its construction to three-lane width by 1933. This road has paid for itself many times over by the savings in cost of transportation, and the road is now being converted into a limited access freeway of four-lane divided construction throughout. Although this latest effort will not be completed for some two years, the plans were developed under Mr. Cortelyou's direction.

Concurrently with work upon the old original Ridge Route, surveys for the construction of a Coast Highway, State Highway Route 2, U. S. Route 101, were started in San Diego in 1912, and also in Los Angeles County. This route followed the coast rather closely

from San Diego to San Clemente, then struck inland through San Juan Capistrano to Santa Ana, thence into Los Angeles County and via Ventura Boulevard (as it has since become known) to a junction with the coast near Ventura, and continuing thence along the coast to Santa Barbara. It was developed first as a two-lane highway, but as with the Ridge Route it is presently being converted generally into a limited access freeway for rural portions, connecting with the full freeway projects through the metropolitan area.

#### U. S. 101 Alternate

In 1919 the Legislature, recognizing the need for an all-coast highway, authorized State Route 60 from San Clemente to a junction with Route 2 near Ventura. Most of this highway, U. S. 101 Alternate, has been developed to a four-lane width throughout under Mr. Cortelyou's direction. It has opened up the beach areas of Southern California to its present several millions

of citizens as no other road could have done.

Work upon the desert highways was not neglected in the early years. The "Old Plank Road," only eight feet in width between Brawley and Yuma, was built in 1914, and represented the first effort to provide a means of vehicular travel through the shifting sand dunes of the desert. Turnouts were provided at intervals for passing cars. This road has since been developed to high standards through the continuing efforts of District VIII and District XI. Other important rural routes developed by Mr. Cortelyou include State Highway Route 26 from Los Angeles to Pomona, and Foothill Boulevard (State Highway Route 9) from Pasadena to Claremont.

Since the inclusion of state highways in cities by the Legislature, there has been developed under Mr. Cortelyou's direction State Highway Route 168 (Rosemead and Lakewood Boulevards) to a four-lane divided highway throughout its entire length from

S. V. Cortelyou and Mrs. Cortelyou, right, with members of family and left to right, Director of Public Works C. H. Purcell, Highway Commissioner Harrison R. Baker, Assistant State Highway Engineer Paul O. Harding and State Highway Engineer Geo. T. McCoy





Pasadena to Long Beach. Additional lanes have been added to Manchester and Firestone Boulevards, State Highway Route 174, and to many other important sections of former city streets taken into the system. In fact there is hardly a major artery of travel in the southland that Mr. Cortelyou has not in some way or other had an important part in developing to its present-day standard.

#### Important Freeway Work

It is in the field of freeways for the metropolitan Los Angeles area, however, that Mr. Cortelyou's influence, personality, and leadership have been most effective. Early recognizing the inherent topographical features of the Arroyo Seco as favorable for developing a highway with freeway characteristics, Mr. Cortelyou played an important part in the location, design and construction of the Arroyo Seco Parkway to the end that this freeway was dedicated and opened to traffic on December 30, 1940, although the freeway law establishing regular and widespread legal authority for constructing freeways was passed by the Legislature just the year before. It was only by the splendid cooperation of officials and engineers of the Cities of Pasadena, South Pasadena and Los Angeles, and the State that this pioneer freeway for Southern California was made possible of fruition at such an early date in the absence of legal precedent to guide them.

The City of Los Angeles about this same time completed a city contract cooperatively financed by city, state and federal funds on the Cahuenga Freeway through Cahuenga Pass between Highland Avenue and Barham Boulevard. The splendid cooperative relationship between the Los Angeles City engineering staff and the staff of District VII of the Division of Highways in working out the mutual problems of both these pioneer efforts in freeway planning is a splendid tribute to Lloyd Aldrich and Spencer Cortelyou, the gentlemen heading these engineering organizations.

During the war years while the activities of the Division of Highways were confined to work of a military

... Continued on page 59

## Ned Gripper Retires After State Service Dating Back to 1912

Edward S. Gripper, known to everybody as "Ned," announced his retirement from state service on October 7, 1949. As he put it, he desired to be relieved of his official duties some years in advance of the compulsory retirement age so that he would be free to work on his own personal projects and travel around the country.

Ned Gripper's service with the State Division of Highways dates back to February 15, 1912, and his name appears as the Chief of Survey Party No. 3 on the first pay roll for Division VII for the month of February in the year 1912. A copy of this pay roll accompanies the story in this issue concerning the retirement of Mr. Spencer V. Cortelyou, Head of District VII, who was Ned Gripper's chief for so many years.

Ned Gripper's first assignment under Mr. Cortelyou in 1912 was to carry out the preliminary survey for the Coast Highway, starting at the city limits of San Diego and working northerly. Following the completion of this survey he then started the survey on the highway between San Diego and El Centro. When this work was completed he took an assignment on the old Ridge Route and saw this important state highway project developed from its inception to its completion.

Although Mr. Gripper's service with the State was not continuous, he did participate in all phases of the work, being at various times superintendent of day labor operations and resident engineer on important grading and paving jobs, obtaining a broad experience and knowledge of the district. In October, 1933, Ned was appointed by Mr. Cortelyou to be the District City and County Projects Engineer. In this position, which he held until the date of his retirement, he was in responsible charge of administering and coordinating the one-quarter-cent expenditures by cities from allocated state funds, and also for the Federal Aid Secondary Projects carried out by the counties. As the years passed, the number of cities in District VII increased



EDWARD S. GRIPPER

and at the time of his retirement Mr. Gripper had responsibility for administering the state funds for 64 cities.

Although his work with the State Division of Highways was of vital concern to him, Ned also has many outside interests and hobbies—minerals and mining, geology and gardening, hunting and fishing, and friends and family. His daughter, Eunice, and her husband, R. L. Pitzer, are now making their home in Arcadia. Ned's wife, Mrs. Ethel S. Gripper, being an artist of considerable distinction in her own right, quite naturally chose to have their permanent home in the famous Laguna Beach art colony. Their home "Atlasta" is on the corner of Scenic Drive and Second Street in South Laguna and they urge that their old friends in the Division of Highways stop in to see them as often as possible.

Commemorating Ned Gripper's retirement a decorative parchment scroll was presented to him as an expression of the esteem and best wishes on the part of his many friends, associates and fellow workers throughout the State.

# Loss to State

*T. H. Dennis, Who Built Up  
Maintenance Department, Quits*

ON OCTOBER 1, 1949, T. H. Dennis, Maintenance Engineer for the Division of Highways for the past 23 years, retired. His span of state service, beginning in 1912, took in practically the entire development period of the State Highway System.

On April 1, 1912, "Tom" Dennis, as he is known to a wide circle of friends throughout the State, began state work as an instrument man at San Luis Obispo in Division V under W. S. Caruthers. A few months later he was promoted to chief of party in Division

Assistant Engineer, and in 1923 to Principal Assistant Division Engineer. The work was reorganized in 1925 and Mr. Dennis took charge of maintenance activities in the division. On August 1, 1926, he was promoted by R. M. Morton, State Highway Engineer, to State Maintenance Engineer at Headquarters Office and continued in that capacity until his retirement.

#### **Career Began in 1906**

Mr. Dennis was born in Merrill, Wisconsin, and attended the schools of that city, going from there to Wisconsin University at Madison. He began his active engineering career in 1906 as an instrument man with the C. Y. R. & P. Railroad on railroad location in Mexico. In 1907, he moved to Oregon and worked for the P. R. & N. Railroad but shortly returned to the C. Y. R. & P. Railroad in Mexico for a few months. From July, 1908, to 1912, he was employed on railroad, logging, and river surveys and irrigation work with several concerns in Oregon and Washington, generally on engineering work.

While with Division III, Mr. Dennis was in charge of several grading and paving projects, mainly in Butte and El Dorado Counties. As Assistant Division Engineer, he was responsible for the preparation of plans for some 100 miles or more of highway improvement, including such locations as the section of U. S. 40 from Colfax east to Gold Run, and from Truckee to the Nevada state line through the Truckee River Canyon. This included heavy work of an advanced standard for that period in highway development.

#### **Bituminous Macadam Pavements**

In 1926, the highway maintenance work was changing. Traffic volumes and speeds had increased to such an extent that it was no longer possible to maintain the graveled and native soil surfaces by sprinkling as had been done to a great extent prior to that time. Highway engineers were turning to the

use of light road oils as dust palliatives and even for higher types of surface. Furthermore, the Legislature in the previous year had made it mandatory that the State take over maintenance of all state highways. Prior to that time, it had been the policy for the State to take over a highway for maintenance only after it had been improved from bond issue or other funds.

State Highway Engineer Morton, while with San Diego and San Joaquin Counties, had a wide experience



T. H. DENNIS—1949



T. H. DENNIS—1915

III, then with headquarters in Sacramento, and also under Mr. Caruthers, who had been transferred in the meantime. In 1912, he moved to Division I as resident engineer under F. G. Somner and continued in that division until 1917. Mr. Dennis then left state service for a time and was employed in Stanislaus County on the road improvement program of that county. In 1918, he returned to Division III as resident engineer and continued in that capacity until 1922, when he was promoted to

with bituminous macadam work under California conditions. He was interested in the development of an economical type of bituminous surface treatment for the state highways. The engineers in the Construction Department and Laboratory were also working on the problem, but responsibility for development of equipment, methods, and techniques for successful processing was largely with the Maintenance Department as maintenance forces were doing the actual work.

### Important Development

During 1926, some 190 miles of this type of work was undertaken and the work progressed until at the present time over 9,000 miles or some 66 percent of the total mileage in the State Highway System is of plant mix or less durable surface types. Of this total, over 2,300 miles has an oiled earth surface. No single development in highway work has been more important to the comfort, convenience, and economical use of the highways than this program.

One of the major annual programs of the maintenance forces is the oiling program, which involves bituminous surface treatment of some sort on about 2,000 miles of highways each season. While there are many in the organization who have been actively interested in both the improvement and maintenance programs, *Mr. Dennis has been in closer touch with the work on a state-wide basis perhaps more than anyone else, particularly in the early stages. A great deal of credit is due him personally in initiating improvements in equipment and methods followed in the work, and for the success that has been attained in this respect.*

### Maintenance Problem Increased

In 1934, the mileage in the State Highway System was practically doubled through legislative action. While this mileage consisted of the more important county roads, the maintenance had been sadly neglected during the depression years, especially in the less populous counties. Mr. Dennis inspected all of the roads in company with T. A. Bedford prior to the time they were to be adopted as state highways. In some cases this required inspection of two or more alternate routes where a choice of routes was involved. In arranging for their maintenance, it was necessary then to re-vamp the maintenance organization and rearrange the equipment setup to properly care for the added responsibilities. This was the type of assignment for which Mr. Dennis' ability in organizing and planning work especially fitted him.

More and more as time went on the proper functioning of the state highways as an operating unit required greater consideration for the safety and



Division of Highways survey party in El Dorado County in 1912. Left to right: Ray Evans, T. H. Dennis, Lester Johnson, Clark Hewitt, and Jerry Devine

convenience of traffic. This involved the adoption of programs for snow removal, traffic striping, improvements in the installation and maintenance of warning and directional signs and signals, and similar matters. Each of these programs is a specialized line of work and required detailed planning and study in the early stages.

### Standard Road Signing

Mr. Dennis was a member of the State Signing Committee from its inception and in that capacity was active in the development of standardized road signing. The use of reflectorized signs was begun about 1926. The size of letters and signs, the positioning of signs, etc., were matters that required study and experiment over a period of several years. Mr. Dennis was actively responsible until the Traffic Department under J. W. Vickrey was set up and assumed the detail for these matters.

The administration of policies relating to encroachments on highway rights of way and the movement of overloads is assigned the Maintenance Department. This work involves extensive contact with the public, not only as individuals but with representatives of utilities, city officials, and representatives of other organizations. The success attained in handling this assignment has been largely due to the firmness, tact, and spirit of fairness in which it has been administered.

### Foresees War Needs

During 1940 and 1941, foreseeing the probability that the United States would become involved in the World War, Mr. Dennis, with the full support of C. H. Purcell, then State Highway Engineer, and R. H. Stalnaker, then Equipment Engineer, consistently promoted the replacement of all possible maintenance equipment, as well as additional equipment for which a use could be foreseen. Provision was made, also, for tanks in which to store gasoline and bituminous materials, and for stockpiling critical items for repairs. An extensive program of surface repair work was also carried on during 1941.

During the war years, there was unremitting effort, also, to take advantage of every opportunity to secure essential materials and equipment. The foresight and energy exhibited by Mr. Dennis in regard to these matters meant a great deal to the State and aided the war effort. There is no question that, but for such foresighted action, the maintenance work would otherwise have been much more handicapped than was the case by the end of the war.

### Traffic Surveys

The taking and analysis of traffic counts and collection of statistical information concerning various related phases of highway work was under supervision of the Maintenance Depart-

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# New Lift Span

*Three Mile Slough Bridge  
Was Interesting Job*

By R. N. BRINK, Associate Bridge Engineer

RECENT CONSTRUCTION of a new vertical lift highway bridge across Three Mile Slough, about four miles south of Rio Vista in lower Sacramento County, on State Sign Route 24 adds a new landmark to this portion of the Delta region. The towers rise to a height of 155 feet above the water and are visible for many miles. Pleasing architectural characteristics are accentuated by the symmetry of design and use of steel H-sections for the main members.

The Three Mile Slough is probably more familiar to navigation interests than to others since it provides a short water route between the Sacramento

and San Joaquin Rivers at a point 15 miles upstream from their junction near Antioch.

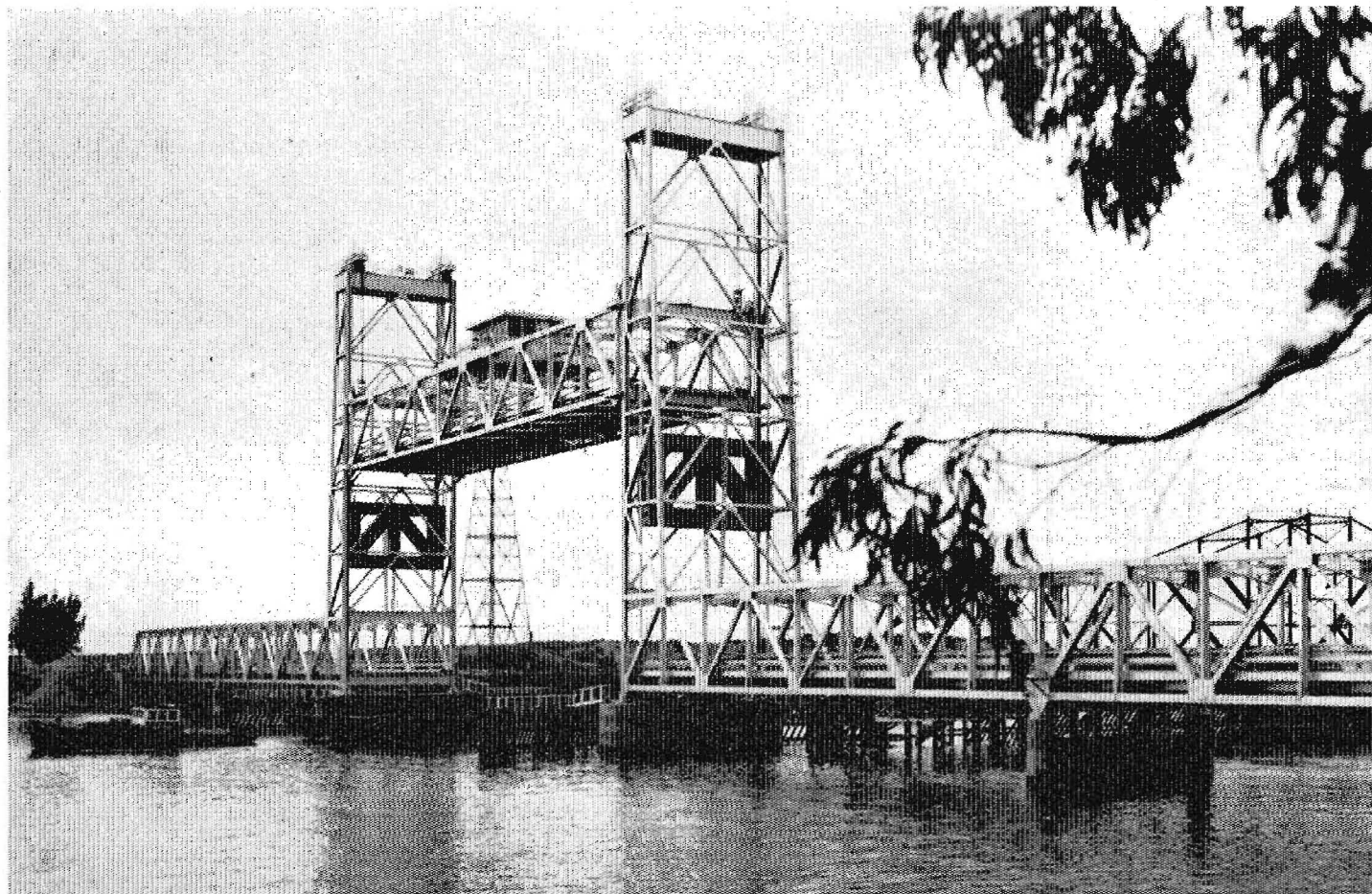
#### History of Old Bridge

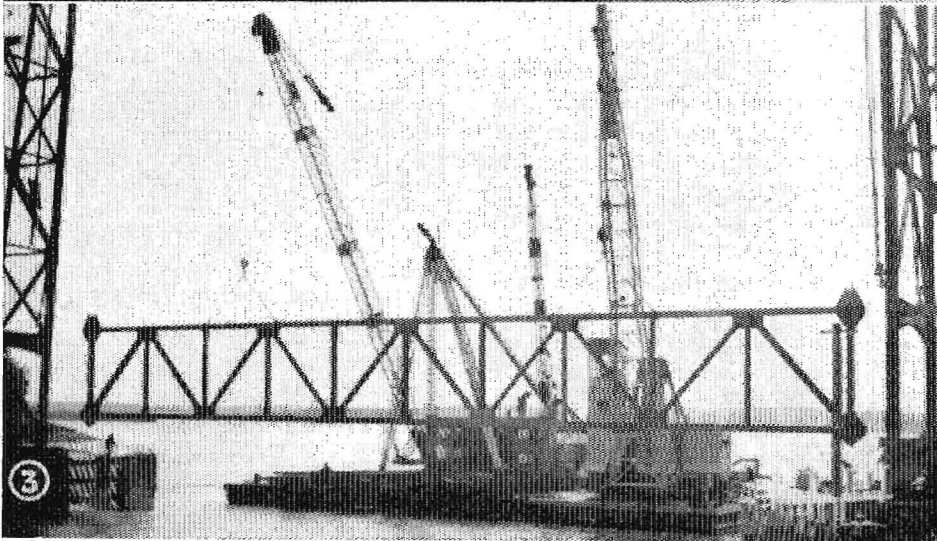
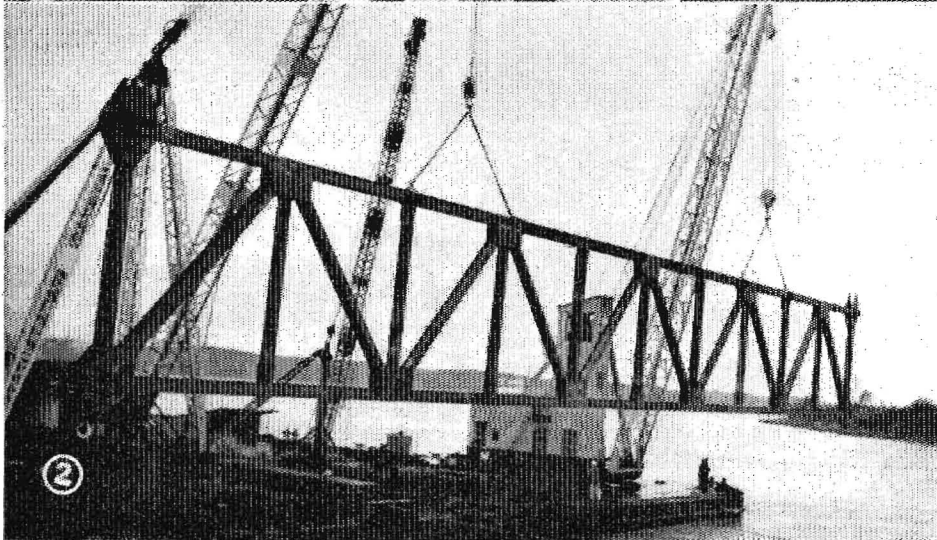
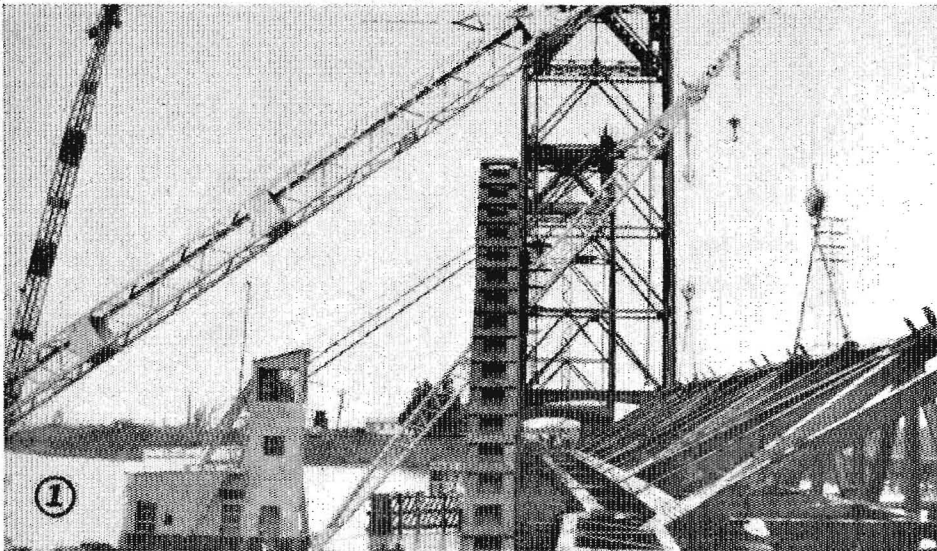
It is interesting to note the history of the old swing bridge which has served in its present location since 1927. It was originally constructed in 1906 across the Sacramento River about three miles downstream from Courtland and was moved to Three Mile Slough in 1927 to eliminate a ferry at this crossing. Plans are now being made by San Joaquin County to move the bridge again to a location across Middle River between Bacon Island and Lower Jones Tract which

is approximately 15 miles west of Stockton. A ferry now in use near this location will also be eliminated.

Construction of the new bridge at Three Mile Slough and two miles of road permits legal loads on the entire river road between Sacramento and the San Francisco Bay area. This will be of real value to the entire delta region, since all heavy trucks were previously obliged to detour approximately 50 miles to get around the old posted bridge. Other important features included elimination of three dangerous curves and provision of ample roadway width of 26 feet as compared to 18 feet on the old bridge.

*Looking northerly at downstream side of new Three Mile Slough bridge, with lift raised. The old bridge in the background will be removed by the county and re-erected at another location*



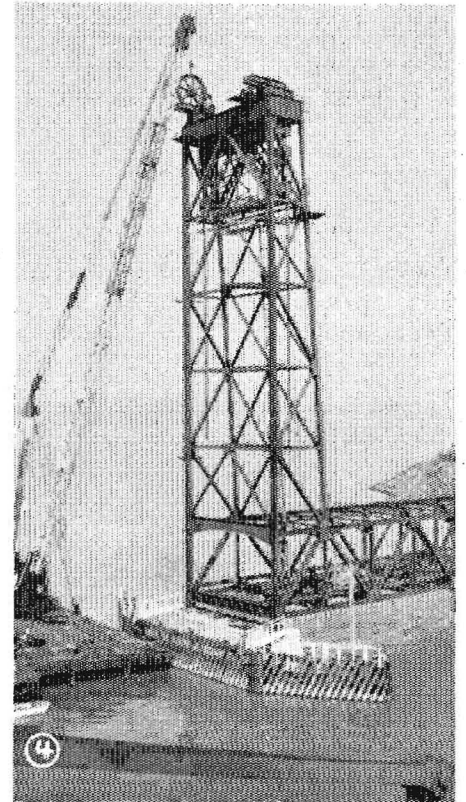


1—Picking up one-half of lift truss prior to carrying it around by barge and putting it in place. 2—Barge transporting one lift span truss to its position in the channel. 3—Placing truss in place in channel between lift towers

River traffic consists of a few derrick barges, dredgers and freighters, a

great many tugs and barges, and a considerable number of pleasure craft.

The height to which the bridge must be raised to accommodate most of the river traffic is only approximately 20 feet. With the vertical lift this will require a very few minutes, thereby saving considerable time delay to highway traffic over the full swing opening which was necessary with the old bridge. The maximum travel of the lift span is 97 feet, which will provide a vertical clearance of 100 feet above flood plane.



4—Erecting 10-foot diameter sheave on top of tower

The vertical lift span is 175 feet long which, allowing for protective fenders, provides a clear channel width of 150 feet. The entire length of the bridge is 749 feet four inches with a 26-foot roadway, two 3½-foot sidewalks and a vertical clearance of 15 feet.

Interesting features of construction included deep cofferdam work in connection with placing the concrete piers on timber piling, and the erection of the lift span in a manner which would minimize delay to river traffic during construction.

Cofferdams were 23 feet in diameter. Steel sheet piling was driven to a depth of 50 feet below water. Three 8-inch H-beams bent to proper radius served



Looking southerly along bridge. The new bridge roadway is 26 feet in width with two 3-foot 6-inch sidewalks

as walers which resisted both active and passive external pressures without the necessity for interior struts. This provided an unrestricted working area during the placing of concrete pier shafts above a 10-foot tremie seal. The bottom of the seal was 40 feet below water and was supported on timber piles which penetrated another 25 feet.

Photos 1, 2, and 3 show the method used to erect the lift span. The trusses, weighing 50 tons each, were assembled and riveted in a horizontal position on the south approach spans. Only 10 hours working time was required to place them in position and to erect sufficient lateral system to make them secure. A total period of 35 working days was required to complete the lift span to such an extent that it could be operated. The lift span weighs approximately 350 tons and is counterbalanced with two 175-ton concrete counterweights suspended by six 1 3/4-inch cables over a 10-foot diameter sheave at each corner of the lift span. Operation is accomplished by use of 3/8-inch uphaul and downhaul cables on four drums to which power is supplied by a 25-horsepower electric motor. The full 97-foot travel of the lift span may be made in 1 1/2 minutes.

One other interesting detail of construction was the use of a derrick barge having a steel boom 168 feet long for

erecting the towers and members on top of the towers. Photo 4 shows one of the 10-foot diameter counterweight sheaves being placed on the north tower. This sheave weighs approximately six tons. In this same picture the steel framework near the top of the tower was later encased in concrete to form a counterweight.

Normal winds of 20 to 25 miles per hour and often as high as 35 to 40 miles per hour prevail throughout this area during 90 percent of the time from May until September. These winds caused excessive whipping of all cables used in construction of this bridge and it became necessary to give special consideration to the installation of devices to dampen the vibration to prevent damage to the cables.

The bridge was built under two separate contracts, one for the superstructure and one for the substructure. The Johnson Western Company of Alameda was the contractor for the substructure and the Judson Pacific-Murphy Corporation of Emeryville was the contractor for the superstructure. C. A. Anderson was superintendent for the Johnson Western Company and Francis J. Murphy was the supervisor of bridge construction for the Judson Pacific-Murphy Corporation. The author was resident engineer for the Bridge Department.

## Swimmer Saves Stranded Dog At Shell Beach

They're still talking about a dog's curiosity and the courageous deed of a man down at Shell Beach.

An inquisitive stray Scotty terrier wandered too close last Monday afternoon to a 100-foot cliff that drops vertically into the sea, tumbling to the water where there's no shoreline and no way out but straight up.

Through his barking and pained whimpering, the nameless dog summoned the attention of beach residents and frantic efforts were started to rescue him in the face of the rising tide.

Deputy Sheriff Floyd E. Hardman arrived from nearby Pismo Beach to direct the volunteer rescue party.

But the real hero of the afternoon was a 29-year-old former air force bombardier, Thomas T. Dorsey, who lost an eye in the Africa campaign. He is now an engineer with the State Division of Highways here.

Before Hardman's party could launch its attempt, Dorsey had swum a half mile in the turbulent sea swirling around the rocky shore to reach the stranded dog, which was standing on a water-lapped ledge no larger than his body.

A rope was lowered from the top of the cliff and the Scottie was hauled to safety. Dorsey then made his own ascent, scaling the perilous heights with the aid of the same rope.

The dog, whose owner is not known, expressed his gratitude in a true canine manner. He wagged his tail slightly and then continued on his nomadic travels.

No one in Shell Beach has seen him since.—*San Luis Obispo Telegram Tribune*, August 19, 1949.

# Court Decision

Holds No Damage to Abutting Property  
 By Freeway Access Restrictions

By W. M. DOUGLASS, Associate Right of Way Agent

ONCE AGAIN the State's contention that access restriction along a freeway does not necessarily damage the market value of abutting property has been upheld by the jury in the case of the *People vs. Samuel Swanson, et al.*, Solano County Superior Court Case No. 21610, as to Parcel 26, C. M. Hartley, defendant.

In a recent superior court action in Solano County wherein the sole issue was the acquisition of access rights, the jury required less than 10 minutes' deliberation to reach the unanimous verdict that restriction of access resulted in no damage to the abutting property and therefore denied any award to the owner.

The property involved consists of an approximate 18-acre parcel, situated between Vacaville and Fairfield on State Highway Route 7 or U. S. Highway 40, and having 623 feet of highway frontage, with one 20-foot access opening. In accordance with modern freeway design, this section of road is being converted into a four-lane divided highway with access restricted. Within the immediate area, a major highway construction project now under way required, among other things, the acquisition of access rights along 87,500 feet of highway frontage, constituting some 86 separate owner-ships.

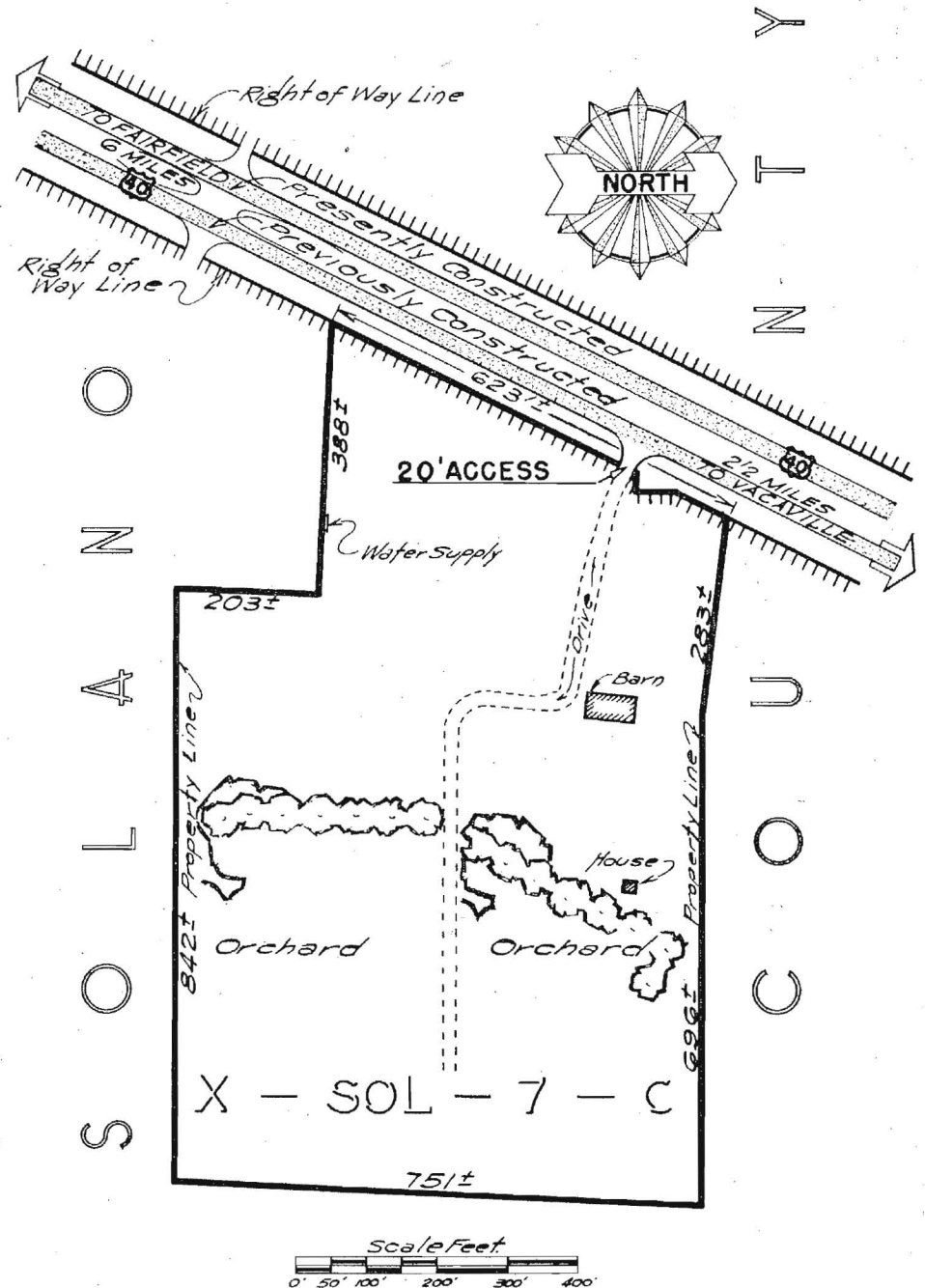
Under standard procedure used by the Division of Highways the allocation of access openings to each of the affected properties became the subject of thorough study. Restriction of present or potential use was avoided to the greatest degree consistent with reasonable safety requirements.

Following the allocation of openings in the light of this analysis, damage resulting from the taking of access rights was found to be only nominal in many instances. Settlement on this basis was successfully negotiated with the majority of the property owners concerned.

The opinion of the owner of the parcel under discussion did not agree, however, with the department's opinion that access damage to his holding was nominal with the result that it became necessary to engage in condemnation action in the superior court.

The accompanying sketch shows the position of the 18-acre parcel in relation to the freeway. The 20-foot access opening is located at the single 15-foot drive and approach which has adequately served the property for many years.

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# Service and Supply

Value of Stores Department  
Of Division of Highways

The following paper on the subject "Service and Supply" by Richard H. Wilson, Assistant State Highway Engineer of the California Division of Highways, was presented before the Maintenance Committee of the American Association of State Highway Officials at the association's annual meeting in San Antonio, Texas, in October.

IN ANY highway organization, large or small, there are many required services that make themselves noticed, are given casual consideration and then relegated to the closest department that can handle them or to the department that seems to be the least overloaded.

These services may be broadly divided into—

- a. Those that directly have a bearing on the building and/or maintenance of highways and
- b. Those that have an indirect bearing on the final result but are necessary in the conduct of the over-all program.

As an example of (a), it was formerly the duty of the locating engineer to procure or at least arrange for the procurement of rights of way as the location survey progressed. As improvements in the highway program developed into the principle of spending highway money in direct proportion to traffic, attention was directed more and more to highway development in the urban areas with a multitude of land parcels to be acquired. This, combined with the expansion of the rights of eminent domain and the purchase in fee of right of way gave rise to the necessity of a Right of Way Department with its right of way agents, legal and accounting functions.

#### Service to Public

This is a direct example of the subdivision of duties directly pertinent to highway construction. Other examples are equally obvious.

As for type (b), we still have with us and acquire almost daily, it seems, a multitude of duties that render a service to those who actually serve the public. They are generally started as small ideas which build up, dependent upon their worth and necessity. Farm-

ing these various functions out to the several operating departments engenders ill-will in taking on additional duties that seem to detract from daily operations and usually creates a situation where the function is sidetracked to a minor position and, though costing money, is administered in a haphazard manner. Every department has these functions, hence the theme of this paper is to suggest ways and means of providing a basket for their reception and giving them a place where they may be taken care of in a manner consonant with their importance. To this end we propose for your consideration the formation of a service and supply unit for each highway department.

#### Separate Unit

The size and scope of such a unit must necessarily be dependent upon the size and scope of operation of each individual state highway organization. Some may find it expedient to build around a purchasing agent, others may assign it to a position under the office engineer and still others, as we in California do, may find it to their benefit to form it into a separate unit in charge of a highway engineer cognizant of its importance in relation to the general highway program.

However it is placed, it seems certain that no one operating department can claim it for its own, but rather it becomes a mainstay of the administration unit wherein it can become of service to all other departments as you will soon see as we develop this theme.

#### FUNCTIONS

There is a distinct need for a "housekeeping detachment" much as was found to be required in the army. There it was found to be economical and a distinct advantage to have a group devoted entirely to providing

services that would not detract from the major work at hand of training troops for war. Why take the time of the trainees to build and maintain barracks; why put them in warehouses to stock and distribute material; why not have a specialist group to provide and maintain their transport? So it is with commercial enterprises and with highways.

In analyzing the functions of a service and supply organization it is difficult to differentiate between the relative importance of "service" and "supplies." The latter is more familiar to most of us and will be treated first.

#### Quantity Purchases

Supplies necessary to run an organization the size of even a small highway department range from pins to piling, from axes to xylene. If each individual unit of your department orders its supplies separately as needs arise, then some sort of a central ordering agency is called for. The majority of highway departments have already met this problem and have found that a central purchasing agent is at least the first step toward an answer.

However, in order to effect maximum economies, purchases should be made in quantity. This means warehouse space and in turn some sort of a distribution system. So far the problem is rather simple. It becomes more complicated as we look at the myriad of items that must be used and decide which to stock, and which to purchase as needs arise. The only answer to this problem is a coordinated history of past transactions projected into the future in conformance with economic trends, income, and all other factors that can be called upon or are available in each particular case.

It was found in California that the judgment of department heads was not



infallible in this respect largely because of their absence from direct responsibility in procurement and also because of an inability to coordinate the anticipated needs of the eleven districts in which the State is divided, the San Francisco-Oakland Bay Bridge, which operates in likeness to a highway district, the Equipment Department, the Laboratory, and Headquarters Office. Since our Stores Department began active operation in 1947, with all past purchase orders available for study, it has been found that reanalysis each time we reorder a stock item controls not only the minimum and maximum stock level of the item but also determines if it should be continued in stock and whether or not the item specifications should be rewritten or further research done as will be explained later in this paper. So much for stock.

#### **Warehouse Problem**

Warehousing space is always a \$64 question, but is one that should be firmly determined, not only from a space standpoint, but particularly from location convenient for service to all parts of the State at minimum transportation costs. This is the essence of warehouse location: Speed and cost. In California, a long and narrow state practically 800 miles in length as compared to an approximate width of 250 miles, it was found expedient to build and stock two warehouses—one in Los Angeles to serve the southern portion and one in Sacramento to take care of the north. Rail and truck facilities were given major consideration in picking these spots.

Warehouse space is usually thought of in terms of square feet, but with the advent of modern freight handling equipment, our concept must be in three dimensions. A fork lift and suitable pallets will enable a warehouse to be literally "cramped to the roof."

#### **Distribution**

Distribution from central storage to the user takes the highway supply chief into the realm of traffic management with its welter of tariffs and classifications. A good traffic manager working hand in glove with the purchasing agent will save his weight in gold. He should designate routings and type of carriers, determine classifica-

tion, and tariffs, and act as adviser on packaging and methods of storage so as to arrive at maximum efficiency.

An efficient, yet not top-heavy accounting section should complete the supply function. Inventory accounting can usually be resolved into an easy efficient chore by means of modern card systems. Bills payable and receivable are conducted in best commercial practices with particular attention being paid to promptness in payment—not only to obviate criticism of a public body (usually notoriously slow) but also to take advantage of the discounts which will ordinarily pay the salaries of accounting clerks.

Whether or not to make the supply section self-supporting depends on the financial school of thought existing within your organization. If you work on a budget system—as most state organizations do—then a sufficient markup should be attached to the price of each item so as to act as a revolving fund to replenish supplies as they are used and to pay for their handling, storage and distribution.

#### **Service and Supply Unit**

The service functions of a service and supply department are in an embryonic stage but capable of expansion as one's imagination and pocketbook allows. The rendering of service to the workers of a highway department should be the fundamental concept of this unit and must be headed by a personality devoted to this ideal—as most engineers are. That's their mission in life.

To enumerate the various services that could readily be administered by a service and supply unit would be almost impossible, but a few highlights which we in California have found helpful might indicate the way.

First of all, let us emphasize that a most fertile field for service is in the analyzation of very minor items.

Take, for instance, a plumb bob point. This is a tiny item, yet each manufacturer has a different size point, different length and different threads. Now, under the leadership of the U. S. Bureau of Standards, these points are to be standardized so as to be interchangeable and the California Division of Highways is proud to have been asked to help in this work.

#### **Savings**

Items such as this may be so small as to have escaped attention for years, yet one small saving in either time or money multiplied many times over, piles up into an impressive yearly total.

One of the first things to come to our attention when we set up our Service and Supply Department was that we had to contend with a tremendous number of prima donnas instead of highway engineers. Each individual believed that he knew tools, materials or other supplies better than even the manufacturers and certainly better than the calloused workmen who use these items every day. As a result, not only were a variety of brand names occupying deified positions, much to the pleasure of the lucky vendor, but a variety of items were being bought in small quantities so that everyone would be satisfied—recipient as well as vendor. However, the unlucky workman who received a tool not to his liking had his own ideas and as a result, long, heavy bladed, big handled shovels were being used in quantities that belied the activities of workmen on the road. He broke and threw away what he didn't like.

#### **Importance of Schools**

Now, the lowly "muck stick" seems hardly a tool to be investigated, but nevertheless a poll was conducted of the likes and dislikes of the actual users (superintendents and foremen were invited to keep away) and as a result, the laborers wrote their own specifications. As a result, new general specifications were written to cover shovel requirements, the Purchasing Agent has put them out to bid and vendors are bending every effort to furnish shovels that suit our men. You can well imagine what a morale building episode this was among our field men.

Stepping from maintenance tools to engineering supplies, we found that heretofore we had been buying survey stakes in twenty-six (26) different varieties at prices ranging from \$20 to \$60 per thousand. By standardizing on six (6) sizes which will fit all ordinary usage, being specific as to wood, finish and grading, and purchasing in million

... Continued on page 44

# Major Construction Projects in State Highway

Continued from page 9...

## District IX

District 9—Kern County, surface and repair shoulders on 23.8 miles (portions) of U. S. 6 from Los Angeles county line to Freeman, \$201,600. San Bernardino County, grade and surface portions for a net length of 15.1 miles on State Route 212 from Kern county line to 5.5 miles east of Salt Wells, \$179,200.

## District X

District 10—Amador County, grade and surface portions, 5 miles, on Sign Route 88, Carson Pass Highway, from Silver Lake to Alpine county line, \$246,400. Calaveras County, grade and surface portions of Sign Route 152, 6 Ebbetts Pass Highway, from Murphy's to Big Trees, \$336,000. Merced County, surface portions of Sign Routes 152, 6 miles, from Los Banos to San Joaquin River, \$224,000. Tuolumne County, grade, surface, and bridge on Sign

Route 108, Sonora Pass Highway, from Jamestown to Sonora, \$436,800.

## District XI

District 11—Imperial County, grade and surface portions of Sign Route 111, 10.7 miles, from Niland to Riverside county line, \$616,000. San Diego County, grade and structures on U. S. 80 from Alpine to Guatay, \$1,120,000. San Diego County, surface 12 miles of U. S. 395 from Miramar to Lake Hodges, \$425,600.

The complete budget follows:

| County           | Route          | Description   | Approximate mileage | Estimated cost, including engineering |
|------------------|----------------|---|---------------------|---------------------------------------|
| Alameda          | 5 (US 50)      | 1½ miles west of Livermore to Hopyard Road; grade, pave and structures  | 5.8                 | \$1,237,600                           |
| Alameda          | 69             | Lewelling Boulevard to 0.1 mile north of the South City Limits of Oakland; grade, pave and structures                       | 3.8                 | 4,524,800                             |
| Alameda          | 69             | South City Limits of Oakland to Fallon Street (portions); roadside planting   |                     | 112,000                               |
| Alameda          | 227            | Route 75 near Lake Temescal to Route 5 (portions); (Cooperative with JHD No. 26, State's Share); grade, pave and structures |                     | 336,000                               |
| Alameda          | 252            | Bay Farm Island; bridge and approaches  | 0.6                 | 1,570,200                             |
| Alameda          | Various        | Rights of Way on State Highway Routes   |                     | 2,000,000                             |
| Amador           | 34 (SR 88)     | Silver Lake to the Alpine County Line (portions); grade and surface   | 5.0                 | 246,400                               |
| Amador           | 65 (SR 49)     | North to South of Plymouth (portions); surface  | 1.0                 | 28,000                                |
| Amador           | 65 (SR 49)     | Jackson to the Calaveras County Line (portions); grade and surface  | 3.0                 | 33,600                                |
| Amador           | Various        | Rights of way on State Highway Routes   |                     | 4,300                                 |
| Butte            | 3 (US 99E)     | Chico to Tehama County Line (portions); widen structures  |                     | 263,200                               |
| Butte—Glenn      | 45             | Big Butte Creek; bridge and approaches  |                     | 129,900                               |
| Butte            | 45             | Biggs Road to Route 3 (portions); grade and surface   | 2.0                 | 36,900                                |
| Butte            | 87 (SR 24)     | 0.6 mile north of Yuba County Line to Union School (portions); grade and surface  | 7±                  | 196,000                               |
| Butte            | Various        | Rights of Way on State Highway Routes   |                     | 100,000                               |
| Calaveras        | 24 (SR 4)      | Murphy's to Big Trees (portions); grade and surface   | 8.0                 | 336,000                               |
| Calaveras        | Various        | Rights of Way on State Highway Routes   |                     | 5,300                                 |
| Contra Costa     | 69             | Rust Drain; culvert and fill  |                     | 56,000                                |
| Contra Costa     | 75 (SR 24)     | Walnut Creek to Concord (portions); surface and shoulders   | 3.0                 | 112,000                               |
| Contra Costa     | 75 (SR 4, 24)  | Port Chicago Road to Railroad Avenue in Pittsburg; pave   | 4.3                 | 515,200                               |
| Contra Costa     | Various        | Rights of Way on State Highway Routes   |                     | 155,000                               |
| Del Norte        | 1 (US 101)     | Klamath River Bridge to Wilson Creek (portions); surface  | 6.6                 | 315,800                               |
| Del Norte        | 71 (US 101)    | Smith River Bridge to ¼ mile north of Winton Corners; grade and structures  | 4.7                 | 537,600                               |
| Del Norte        | Various        | Rights of Way on State Highway Routes   |                     | 15,000                                |
| El Dorado        | 11 (US 50)     | Railroad Crossing to Five Mile Terrace; grade and surface   | 2±                  | 408,800                               |
| El Dorado        | 65 (SR 49)     | South Fork American River near Lotus; bridge and approaches   | 1±                  | 313,600                               |
| El Dorado        | Various        | Rights of Way on State Highway Routes   |                     | 75,000                                |
| Fresno           | 10 (SR 198)    | Monterey County Line to Coalinga (portions); grade, surface and structures  | 3.2                 | 296,800                               |
| Fresno           | 41 (SR 180)    | Kingsburg Canal; bridge and approaches  | 0.5                 | 67,200                                |
| Fresno           | Various        | Rights of Way on State Highway Routes   |                     | 31,500                                |
| Glenn—Butte      | 45             | Big Butte Creek; bridge and approaches  |                     | 129,900                               |
| Humboldt         | 1 (US 101)     | 0.5 mile south of Stone Lagoon Summit to one mile south of Orick; surface   | 3.8                 | 341,600                               |
| Humboldt         | 1 (US 101)     | One mile south of Orick to two miles south of Del Norte County Line (portions); surface                                     | 5.4                 | 274,400                               |
| Humboldt—Trinity | 20 (US 299)    | Willow Creek to White's Bar (portions); Prison labor; grade and surface   |                     | 336,000                               |
| Humboldt         | Various        | Rights of Way on State Highway Routes   |                     | 290,200                               |
| Imperial         | 27 (US 80)     | Midway Wells to the Colorado River (portions); surface  | 9.6                 | 116,400                               |
| Imperial         | 187 (SR 111)   | Holtville to Calipatria (portions); surface   | 7.5                 | 131,000                               |
| Imperial         | 187 (SR 111)   | New River at Brawley; bridge and approaches   | 0.6                 | 78,400                                |
| Imperial         | 187 (SR 111)   | Niland to Riverside County Line (portions); grade and surface   | 10.7                | 616,000                               |
| Imperial         | 198 (SR 78)    | San Felipe Creek; bridge and approaches   | 0.5                 | 224,000                               |
| Imperial         | 202 (SR 98)    | New River at Calexico; bridge and approaches  | 0.3                 | 76,100                                |
| Imperial         | Various        | Rights of Way on State Highway Routes   |                     | 5,000                                 |
| Inyo             | 23 (US 6, 395) | Aberdeen and Black Rock Curves (portions); grade and surface  | 1.0                 | 39,200                                |
| Inyo             | 23 (US 6, 395) | 3.1 miles south to 3.0 miles north of Little Lake (portions); grade and surface   | 3.4                 | 28,000                                |
| Kern             | 4 (US 99)      | Los Angeles County Line to Fort Tejon; grade, pave and structure  | 5.0                 | 1,232,000                             |
| Kern             | 23 (US 6)      | Los Angeles County Line to Freeman (portions); surface and shoulders  | 23.8                | 201,600                               |
| Kern             | 57 (SR 178)    | Maricopa to Route 4 (portions); surface   | 4.0                 | 67,200                                |
| Kern             | 141            | Kern Island Canal; widen two bridges  |                     | 56,000                                |

SR = State Sign Route

# Budget for 1950-51 Fiscal Year Total \$61,702,000

| County                  | Route                  | Description   | Approximate mileage | Estimated cost, including engineering |
|-------------------------|------------------------|---|---------------------|---------------------------------------|
| Kern                    | 142                    | Howling Gulch; grade, surface and culvert.  |                     | \$7,800                               |
| Kern                    | 145 (US 395)           | Searles Road to Rademacher (portions); grade and surface  | 3.2                 | 56,000                                |
| Kern                    | Various                | Rights of Way on State Highway Routes   |                     | 253,000                               |
| Kings                   | 125 (SR 41)            | 0.2 mile north to five miles north of Kettleman City (portions); surface                          | 4.8                 | 212,800                               |
| Kings                   | Various                | Rights of Way on State Highway Routes   |                     | 101,500                               |
| Lake                    | 15 (SR 20)             | ½ mile west to ¾ mile east of Tule Lake; grade, surface and structure                             | 1.3                 | 257,600                               |
| Los Angeles             | 2 (US 101)             | Hollywood Parkway—Alameda to Highland (portions); grade, pave and structures                      |                     | 6,138,700                             |
| Los Angeles             | 2 (US 101)             | Hollywood Parkway—Alameda to Western; erosion control and roadside planting                       | 5.0                 | 309,100                               |
| Los Angeles—<br>Ventura | 2 (US 101)             | 1.6± miles west of Malibu Junction to 1.0± mile west of Moorpark Road; grade, pave and structures | 6.9±                | 1,904,000                             |
| Los Angeles             | 2,166 (US 101)         | Santa Ana Parkway—Eastman to LaVerne (portions); grade, pave and structures                       | 1.3                 | 2,348,600                             |
| Los Angeles             | 2,166 (US 101)         | Santa Ana Parkway—Eastman to LaVerne; erosion control   | 1.3                 | 29,100                                |
| Los Angeles             | 4 (US 99)              | 2½ miles south of the Junction of Route 59 to the Kern County Line; grade, pave and structures    | 6.4                 | 1,456,000                             |
| Los Angeles             | 9                      | East City Limits of Pasadena to the west City Limits of Arcadia; grade, pave and structures       | 0.9                 | 140,000                               |
| Los Angeles             | 26 (US 70, 99)         | Ramona Parkway—Indiana Street to 0.2 mile east of Helen Drive; erosion control                    | 1.5                 | 39,200                                |
| Los Angeles             | 26 (US 70, 99)         | Ramona Parkway—0.2 mile east of Helen Drive to Hellman Avenue; grade, pave and structures         | 1.6                 | 1,757,200                             |
| Los Angeles             | 60 (US 101)            | Santa Fe Railroad Overhead to Figueroa Street (portions); surface                                 | 1.7                 | 50,400                                |
| Los Angeles             | 61 (SR 2)              | Angeles Crest Highway (portions), Prison labor; grade   |                     | 473,700                               |
| Los Angeles             | 158 (SR 7)             | Ohio Avenue to Bolas Street (portions); surface   | 1.3                 | 56,000                                |
| Los Angeles             | 158 (SR 7)             | Sepulveda Boulevard—Sunset Boulevard to Route 2 (portions); grade and surface                     | 7.6                 | 269,900                               |
| Los Angeles             | 164                    | Century Boulevard to Imperial Highway (portions); surface   | 1.1                 | 67,200                                |
| Los Angeles             | 165 (SR 11)            | Harbor Parkway—Adobe Street to Olympic Boulevard (portions); grade, pave and structures           | 2.2                 | 2,413,600                             |
| Los Angeles             | 165 (US 66)<br>(SR 11) | Avenue 50 to Marmion Way (portions); surface  | 1.2                 | 33,600                                |
| Los Angeles             | 165 (SR 11)            | Lomita Boulevard to Anaheim Street (portions); surface  | 1.3                 | 78,400                                |
| Los Angeles             | 166 (US 101)           | Santa Ana Parkway—Eastland to Lakewood (portions); grade and structures                           | 4.0                 | 2,912,000                             |
| Los Angeles             | 168                    | Garvey Avenue to Valley Boulevard; erosion control  | 1.4                 | 11,200                                |
| Los Angeles             | 173                    | Lemon Street to Boyle Avenue (portions); surface  | 0.7                 | 28,000                                |
| Los Angeles             | 174                    | East City Limits of Los Angeles to Calden Avenue (portions); surface                              | 1.4                 | 56,000                                |
| Los Angeles             | Various                | Rights of Way on State Highway Routes   |                     | 8,825,000                             |
| Madera                  | 4 (US 99)              | 1.5 miles north of Madera to 0.3 mile north of Dry Creek (portions); grade, pave and structure    | 3.3                 | 576,800                               |
| Madera                  | 32 (SR 152)            | Ash Slough Bridge and Berenda Slough Bridge; substructures  |                     | 56,000                                |
| Madera                  | Various                | Rights of Way on State Highway Routes   |                     | 51,500                                |
| Marin                   | 1 (US 101)             | Ignacio to Forbes Overhead (portions); grade, surface and structures                              | 4.8                 | 1,120,000                             |
| Marin—Sonoma            | 56 (SR 1)              | Route 56 in Marin and Sonoma Counties (portions); grade, surface and drainage                     |                     | 112,000                               |
| Mariposa—Merced         | 18 (SR 140)            | 1.6 miles west of the Mariposa County Line to Cathay Junction (portions); surface                 | 8.6                 | 240,800                               |
| Mariposa—<br>Tuolumne   | 110 (SR 132)           | Stanislaus County Line to Coulterville (portions); grade and surface                              | 3.0                 | 28,000                                |
| Mariposa                | Various                | Rights of Way on State Highway Routes   |                     | 1,100                                 |
| Mendocino               | 1 (US 101)             | Smith Street to Low Gap Road; grade, surface and widen structures                                 | 0.7                 | 313,600                               |
| Mendocino               | 43 (SR 28)             | Whitehall Creek Bridge and Burger Cattlepass; structures and approaches                           |                     | 29,100                                |
| Mendocino               | 56 (SR 1)              | Bacon Gulch to ½ mile north of Signal Port Creek; grade and surface                               | 0.8                 | 123,200                               |
| Mendocino               | 56 (SR 1)              | Maijo Pass Creek Bridge; strengthen and redeck  |                     | 28,000                                |
| Mendocino               | 56 (SR 1)              | Approaches to the Salmon Creek Bridge; grade and surface  | 1.0                 | 145,600                               |
| Mendocino               | Various                | Rights of Way on State Highway Routes   |                     | 5,000                                 |
| Merced—Stanislaus       | 4 (US 99)              | Atwater to Keyes (portions); roadside planting  |                     | 17,900                                |
| Merced—Mariposa         | 18 (SR 140)            | 1.6 miles west of the Mariposa County Line to Cathay Junction (portions); surface                 | 8.6                 | 240,800                               |
| Merced                  | 32 (SR 152)            | Los Banos to the San Joaquin River (portions); surface  | 6.0                 | 224,000                               |
| Merced                  | 122 (SR 140)           | San Joaquin River; bridge and approaches  |                     | 196,000                               |
| Merced                  | Various                | Rights of Way on State Highway Routes   |                     | 311,500                               |
| Modoc                   | 28 (US 299)            | Toms Creek to Cedarville (portions); grade and surface  | 9.7                 | 398,700                               |
| Modoc                   | 73 (US 395)            | Junction Route 28 to Oregon State Line, Prison labor; grade                                       | 33.8                | 336,000                               |
| Modoc                   | 73 (US 395)            | Junction Route 28 to Oregon State Line (portions); oiling   | 10.0                | 16,800                                |
| Modoc                   | Various                | Rights of Way on State Highway Routes   |                     | 20,000                                |
| Mono                    | 23 (US 395)            | Conway Summit to Bodie Road (portions); surface   | 6.4                 | 145,600                               |
| Mono                    | 95 (US 395)            | Junction of Route 23 to Topaz Lake (portions); surface and shoulders                              | 12.2                | 56,000                                |
| Mono                    | 111                    | Vicinity of Grant Lake to Junction of Route 23; grade and surface                                 | 2.6                 | 50,400                                |
| Mono                    | Various                | Rights of Way on State Highway Routes   |                     | 17,000                                |
| Monterey                | 2 (US 101)             | Spence Underpass to two miles south of Salinas; grade and surface                                 | 2.2                 | 352,800                               |
| Monterey                | 2 (US 101)             | Gonzales to Chualar (portions); surface   | 4.9                 | 156,800                               |
| Monterey                | 56 (SR 1)              | Villa Creek Bridge and Willow Creek Bridge; redeck  |                     | 106,400                               |
| Monterey                | Various                | Rights of Way on State Highway Routes   |                     | 1,000                                 |
| Napa                    | 49 (SR 29)             | 1.5 miles north of Calistoga to Lake County Line (portions); surface                              | 3±                  | 76,100                                |
| Napa                    | 49 (SR 28, 29)         | Lincoln Avenue in Calistoga; improve drainage   | 0.13                | 14,500                                |

SR = State Sign Route

| County           | Route                | Description   | Approximate mileage | Estimated cost, including engineering |
|------------------|----------------------|---|---------------------|---------------------------------------|
| Orange           | 2 (US 101)           | Valencia Ave. to mile 3.9 (portions); surface   | 2.1                 | \$95,200                              |
| Orange           | 43 (SR 18)           | Heim Avenue to Peralta School; erosion control  |                     | 26,800                                |
| Orange—Riverside | 43 (SR 18)           | 1.7 miles west of Orange County Line to Corona (portions); grade, surface and structure   | 6.5                 | 616,000                               |
| Orange           | 60 (US 101)          | Myrtle Avenue in Laguna Beach to the South City Limits of Newport Beach; grade and surface  | 5.5                 | 520,800                               |
| Orange           | 171                  | Route 60 to Route 174 (portions); grade and surface   | 12±                 | 224,000                               |
| Orange           | Various              | Rights of Way on State Highway Routes   |                     | 480,000                               |
| Placer           | 37 (US 40)           | One mile east of Auburn to one mile west of Applegate; surface  | 6.1                 | 235,200                               |
| Plumas           | 21 (SR 24, 89)       | Quincy High School Line Change; grade and surface   | 0.34                | 22,400                                |
| Plumas           | 29 (SR 36)           | Route 83 to east end of Causeway (portions); seal coat  | 4.5                 | 6,700                                 |
| Riverside        | 43 (US 91, SR 18)    | Through City of Corona (portions); widen and surface  | 2.6                 | 420,000                               |
| Riverside—Orange | 43 (US 91, SR 18)    | 1.7 miles west of the Orange County Line to Corona (portions); grade, surface and structures  | 6.5                 | 616,000                               |
| Riverside        | 64 (US 60, 70)       | Indio to Black Butte (portions); surface  | 14.5                | 170,200                               |
| Riverside        | Various              | Rights of Way on State Highway Routes   |                     | 100,000                               |
| Sacramento       | 98                   | At American River near Elvas Junction; bridge substructure  |                     | 985,600                               |
| Sacramento       | Various              | Rights of Way on State Highway Routes   |                     | 75,000                                |
| San Benito       | 22, 119 (SR 156, 25) | Hollister to the Santa Clara County Line; grade and surface   | 9.4                 | 644,000                               |
| San Benito       | Various              | Rights of Way on State Highway Routes   |                     | 1,000                                 |
| San Bernardino   | 9 (US 66)            | Santa Fe Railroad Separation at 5th & "I" Streets, in San Bernardino; grade separation (State's Share)                                  |                     | 336,000                               |
| San Bernardino   | 26 (US 70, 99)       | San Antonio Avenue to Corona Street, in Ontario (portions); surface   | 2.8                 | 78,400                                |
| San Bernardino   | 31 (US 91, 466)      | Manix to Cronise Lake (portions); surface   | 15.9                | 369,600                               |
| San Bernardino   | 190                  | "E" Street to the East City Limits of San Bernardino (portions); grade, surface and structure   | 1.8                 | 190,400                               |
| San Bernardino   | 190                  | North City Limits of Redlands to Route 26 and Orange Street to East City Limits of Redlands (portions); surface                         | 4.1                 | 56,000                                |
| San Bernardino   | 190                  | 0.1 mile west of Riverside Avenue to 0.1 mile west of Cajon Creek; grade and surface  | 1.1                 | 89,600                                |
| San Bernardino   | 207, 43              | 1.3 miles west of Running Springs to Running Springs; grade, surface and structures   | 1.7                 | 672,000                               |
| San Bernardino   | 212                  | Kern County Line to 5.5 miles east of Salt Wells (portions); grade and surface  | 15.1                | 179,200                               |
| San Bernardino   | Various              | Rights of Way on State Highway Routes   |                     | 275,000                               |
| San Diego        | 2 (US 101)           | 7th Street in National City to Mexican Border (portions); grade, pave and structures  | 0.7                 | 369,600                               |
| San Diego        | 2 (US 101)           | "16th" Street in National City to "G" Street in Chula Vista; erosion control  | 2.8                 | 22,400                                |
| San Diego        | 2 (US 101)           | Encinitas to Oceanside (portions); surface  | 3.3                 | 151,200                               |
| San Diego        | 12 (US 80)           | Alpine to Guatay (portions); Prison labor; grade and structures   | 11.0                | 1,120,000                             |
| San Diego        | 77 (US 395)          | Miramar to Lake Hodges; surface   | 12.0                | 425,600                               |
| San Diego        | 78 (SR 79)           | Boulder Creek; culvert and fill   | 0.5                 | 56,000                                |
| San Diego        | 78 (SR 79)           | Sevilla Creek; culvert and fill   | 0.3                 | 22,400                                |
| San Diego        | 195                  | Horne Street to Loma Alta Canyon Drive in Oceanside; surface and shoulders  | 0.8                 | 56,000                                |
| San Diego        | Various              | Rights of Way on State Highway Routes   |                     | 559,000                               |
| San Francisco    | 2 (US 101)           | Route 68 to South Van Ness Avenue in San Francisco; structures  |                     | 1,120,000                             |
| San Francisco    | 68 (US 101, Bypass)  | 25th Street to Bryant Street in San Francisco (portions); structures and ramps  |                     | 1,114,400                             |
| San Francisco    | Various              | Rights of Way on State Highway Routes   |                     | 4,854,000                             |
| San Joaquin      | 4, 5 (US 99, 50)     | Mariposa Road to the Calaveras River and "D" Street to Route 4; erosion control   |                     | 40,300                                |
| San Joaquin      | 53 (SR 12)           | Four miles east of Terminous; grade and surface   | 0.3                 | 33,600                                |
| San Joaquin      | 75 (SR 4)            | Branch of Mormon Slough and Lone Oak Creek Bridges; bridge improvement  |                     | 28,000                                |
| San Joaquin      | Various              | Rights of Way on State Highway Routes   |                     | 139,200                               |
| San Luis Obispo  | 2 (US 101)           | Atascadero to one mile south of Templeton; grade, surface and structures  | 4.1                 | 1,064,000                             |
| San Luis Obispo  | 33 (US 466)          | Route 125 to the Kern County Line (portions); surface   | 4.1                 | 140,000                               |
| San Luis Obispo  | 33 (SR 41)           | Black Mountain Creek; grade, surface and culvert  | 0.1                 | 15,600                                |
| San Luis Obispo  | 56 (SR 1)            | Cayucos to 0.6 mile north; grade, surface and structures  | 0.6                 | 162,400                               |
| San Luis Obispo  | 57 (SR 166)          | Second crossing to the third crossing of the Cuyama River; reconstruct four cattlepasses  |                     | 39,200                                |
| San Luis Obispo  | 125 (US 466)         | Morro Bay to 5 miles east of Route 56 (portions); grade and surface   | 1.3                 | 28,000                                |
| San Luis Obispo  | Various              | Rights of Way on State Highway Routes   |                     | 395,000                               |
| San Mateo        | 56 (SR 1)            | One mile south of Lobitos to ½ mile north of Lobitos (portions); grade and surface (Co-operative project with JHD No. 9, State's share) | 1.4                 | 168,000                               |
| Santa Barbara    | 2 (US 101)           | 0.5 mile north of Las Cruces to one mile north of Summit; grade and surface   | 3.1                 | 980,000                               |
| Santa Barbara    | 2 (US 101)           | Park Place to Rancheria Street, in Santa Barbara; erosion control   | 2.2                 | 50,400                                |
| Santa Barbara    | 57 (SR 166)          | Cuyama Maintenance Station to the San Luis Obispo County Line (portions); surface   | 3.0                 | 50,400                                |
| Santa Barbara    | Various              | Rights of Way on State Highway Routes   |                     | 554,500                               |
| Santa Clara      | 2 (US 101)           | Palo Alto to Sunnyvale (portions); grade and surface  | 5.6                 | 448,000                               |
| Santa Clara      | 2 (US 101)           | 3.3 miles south of San Jose to Madrone (portions); surface  | 5.8                 | 176,900                               |
| Santa Clara      | Various              | Rights of Way on State Highway Routes   |                     | 205,000                               |
| Santa Cruz       | 56 (SR 1)            | At Respeni Creek, two miles south of Davenport; grade, surface and structure (Cooperative project with JHD No. 9, State's share)        | 0.7                 | 70,500                                |
| Santa Cruz       | 56 (SR 1)            | Rob Roy Junction to Morrissey Avenue (portions); erosion control  | 7.7                 | 16,800                                |
| Santa Cruz       | 116 (SR 9)           | San Lorenzo Creek Bridges; construct abutments  |                     | 22,400                                |
| Shasta           | 3 (US 99)            | Anderson to Redding (portions); grade, surface and structures   | 8.3                 | 470,400                               |
| Shasta—Siskiyou  | 3 (US 99)            | Crespos to Spring Hill (portions); seal coat  | 36.2                | 61,600                                |

SR = State Sign Route

| County              | Route          | Description  | Approximate mileage | Estimated cost, including engineering |
|---------------------|----------------|--|---------------------|---------------------------------------|
| Shasta              | 20 (SR 44)     | Oak Run Creek Overflow Bridge; culvert and fill  | 0.2                 | \$16,800                              |
| Shasta              | Various        | Rights of Way on State Highway Routes  |                     | 78,500                                |
| Siskiyou—Shasta     | 3 (US 99)      | Crespos to Spring Hill (portions); seal coat   | 36.2                | 61,600                                |
| Siskiyou            | 3 (US 99)      | Spring Hill to Weed; grade portions and surface  | 8.0                 | 616,000                               |
| Siskiyou            | 3 (US 99)      | Camp Lowe to Bailey Hill; seal coat  | 7.8                 | 10,000                                |
| Siskiyou            | Various        | Rights of Way on State Highway Routes  |                     | 83,000                                |
| Solano              | 7 (US 40)      | Junction of County Road to Vacaville to 2.5 miles North (portions); surface                            | 2.0                 | 95,200                                |
| Solano              | 99             | Cache Slough Ferry; construct ramps  |                     | 47,000                                |
| Solano              | 208 (SR 48)    | Napa River Bridge; redeck bascule span   | 0.2                 | 28,000                                |
| Solano              | 208 (SR 48)    | White Slough; bridge and approaches  | 0.1                 | 84,000                                |
| Sonoma              | 1 (US 101)     | Cloverdale to two miles North of Santa Rosa (portions); surface  | 10.0                | 412,100                               |
| Sonoma              | 51 (SR 12)     | West City Limits to South City Limits of Sonoma (portions); grade and surface                          | 0.7                 | 49,200                                |
| Sonoma              | 51 (SR 12)     | Sonoma to Santa Rosa (portions); widen bridges   |                     | 61,600                                |
| Sonoma—Marin        | 56 (SR 1)      | Route 56 in Marin and Sonoma Counties (portions); grade, surface and drainage                          |                     | 112,000                               |
| Sonoma              | Various        | Rights of Way on State Highway Routes  |                     | 10,000                                |
| Stanislaus—Merced   | 4 (US 99)      | Atwater to Keyes (portions); roadside planting   |                     | 17,900                                |
| Stanislaus          | 13             | Junction of Route 109 to one mile east of Oakdale (portions); surface                                  | 11.4                | 263,200                               |
| Stanislaus          | 110 (SR 132)   | Modesto Irrigation District Canal No. 4; bridge and approaches   | 0.3                 | 33,600                                |
| Stanislaus          | Various        | Rights of Way on State Highway Routes  |                     | 105,600                               |
| Sutter              | 87 (SR 24)     | Tudor Road to Lincoln Road (portions); surface and shoulders   | 6 ±                 | 156,800                               |
| Sutter              | Various        | Rights of Way on State Highway Routes  |                     | 100,000                               |
| Tehama              | 3 (US 99E)     | Singer Creek; bridge and approaches  | 0.5                 | 76,100                                |
| Tehama              | 7 (US 99W)     | Glenn County Line to Proberta (portions); surface and widen structures                                 | 20.6                | 599,200                               |
| Trinity—Humboldt    | 20 (US 299)    | Willow Creek to White's Bar (portion); Prison labor; grade and surface                                 |                     | 336,000                               |
| Tulare              | 4, 134 (US 99) | Tulare Airport to Tagus (portions); grade and structures   | 8.0                 | 1,176,000                             |
| Tulare              | 10 (SR 198)    | Visalia to Venida Substation (portions); surface   | 8.1                 | 168,000                               |
| Tulare              | Various        | Rights of Way on State Highway Routes  |                     | 116,500                               |
| Tuolumne            | 13 (SR 49)     |  |                     |                                       |
|                     | 108            | Jamestown to Sonora; grade, surface and bridge   | 3.0                 | 436,800                               |
| Tuolumne            | 40 (SR 120)    | Slate Gulch (west of Big Oak Flat); grade and surface  | 0.2                 | 16,800                                |
| Tuolumne—Mariposa   | 110 (SR 132)   | Stanislaus County Line to Coulterville (portions); grade and surface                                   | 3.0                 | 28,000                                |
| Ventura—Los Angeles | 2 (US 101)     | 1.6 ± miles west of Malibu Junction to 1 ± mile west of Moorpark Road; grade, pave and structures      | 6.9 ±               | 1,904,000                             |
| Ventura             | 2 (US 101)     | Santa Clara River Bridge westerly through Montalvo; grade, pave and structure                          | 1.1                 | 448,000                               |
| Ventura             | 2 (US 101)     | East City Limits of Ventura to San Jon Road (portions); surface  | 1.5                 | 51,500                                |
| Ventura             | 2 (US 101)     | Montalvo to Ventura; erosion control   | 3.1                 | 12,300                                |
| Ventura             | 9 (SR 118)     | Route 79 to the Los Angeles County Line; widen six bridges and approaches                              |                     | 78,400                                |
| Ventura             | 138 (US 399)   | 0.3 mile north of Fairview Road to Junction of Matilija Hot Springs Road (portions); grade and surface | 2.5                 | 56,000                                |
| Ventura             | Various        | Rights of Way on State Highway Routes  |                     | 315,000                               |
| Yolo                | 6 (US 40)      |  |                     |                                       |
|                     | 99W)           | Yolo Causeway to Tower Bridge; grade and structures  | 4.1                 | 1,041,600                             |
| Yolo                | Various        | Rights of Way on State Highway Routes  |                     | 30,000                                |
| Yuba                | 87 (SR 24)     | Marysville to Butte County Line (portions); grade and surface  | 1 ±                 | 61,600                                |
| Yuba                | Various        | Rights of Way on State Highway Routes  |                     | 40,000                                |

SR = State Sign Route

## Bidding Procedure

Continued from page 17 . . .

bidder in such an instance refuses to enter into the contract and forfeits his bidder's security, the amount forfeited may be recovered only by bringing action in a court of competent jurisdiction in the county in which the bids were opened.

### State Contract Act

The following main points are quoted from the State Contract Act:

"The bidder shall establish to the satisfaction of the court that:

(a) A mistake was made.

(b) He gave the department written notice within five days after the opening of the bids of the mistake, specifying in the notice in detail how the mistake occurred.

(c) The mistake made the bid materially different than he intended it to be.

(d) The mistake was made in filling out the bid and not due to error in judgment or to carelessness in inspecting the site of the work, or in reading the plans or specifications."

In the interpretation of statutes and rules and regulations governing bidding, the Division of Highways has no desire to be hard-boiled or hyper-

technical. The desire is to secure the lowest responsible bid possible, but in fairness to the State and to other bidders, compliance with all legal technicalities must of necessity be observed. Many of these technical requirements are not of the division's making. The laws governing the licensing and pre-qualifying of contractors were enacted at the instance of the contractors themselves and the use of bidder's bonds for guaranties was promulgated by surety companies. The highway department exercises no control other than to make sure that the statutes are followed.

# Capitol Addition

*Brief History of Existing Building and Discussion of Improvement Work*

By MYER SAMUEL, Acting Construction Engineer, Division of Architecture

THE EXISTING State Capitol Building at Sacramento is typical of the massive construction of the 1861-1874 period during which it was built. A light steel-trussed dome 70 feet in diameter based on heavy circular brick walls and rising to a height of 215 feet above the foundation surmounts the main four-story structure which is about 80 feet high and occupies an area approximately 150 feet by 300 feet. Massive brick walls up to nine feet thick, brick arch floors, and groined ceilings at corridors and entries are characteristic of the main structure which contains the Legislative chambers, Governor's office and other important offices. Interesting features of the construction include inverted brick arches built integrally into the walls (evidently for load distribution purposes), heavy cast iron window frames and cast iron ornamentation.

## **San Jose First Capital**

At the Constitutional Convention at Monterey in 1849, San Jose was named as the meeting place for the first California Legislature which met later in the same year. Dissatisfied with San Jose, the meeting place was moved to Vallejo in 1851, thence to Sacramento in 1852. Severe floods the following year caused the removal of the capital to Benicia, but it was returned to Sacramento in 1854 and established in the Courthouse at Seventh and I Streets. Misfortune again followed in the form of a fire which destroyed the Courthouse, but it was rebuilt and rented to the State for \$12,000 a year.

In 1856, \$300,000 was voted to construct a Capitol Building on the site of the present City Plaza, the architect being Reuben Clark of San Francisco. A contract was awarded to Joseph Nougues and construction started only to be halted by the discovery that the bonds with which the contract was to be paid were in excess of the amount permitted by the Constitution. The

## **Changes In Highway Division Personnel**

Changes in personnel in the top levels of the Division of Highways made necessary by the retirement on October 1st of Assistant State Highway Engineer S. V. Cortelyou, Los Angeles, and T. H. Dennis, Maintenance Engineer, Sacramento, were announced by State Highway Engineer George T. McCoy.

District Engineer Paul O. Harding of the Los Angeles office, former district highway engineer at Stockton, succeeds Cortelyou.

District Engineer George F. Hellesoe, Eureka, has been transferred to Sacramento to take the post vacated by Dennis.

A. M. Nash, Engineer of Design, in Headquarters Office, Sacramento, is transferred to Eureka to succeed Hellesoe, and District Highway Engineer C. E. Waite, Stockton, replaces Nash.

Assistant District Engineer John G. Meyer, District V, San Luis Obispo, has taken over Waite's office as District Engineer in Stockton.

project was dropped and efforts were renewed to remove the capital from Sacramento.

In 1860 the Legislature appropriated \$500,000 for a building to be located on a site extending from L to N and from Tenth to Twelfth Streets. M. F. Butler of Sacramento was selected as architect by means of a competition, and Reuben Clark was appointed supervising architect, serving until his death in 1866 when he was succeeded by G. P. Cummings.

## **Capitol Started In 1861**

A contract for the foundation was awarded in 1861 to Michael Fennell for \$80,000, but he soon defaulted and a

new contract was entered into with Blake and Conner, and the cornerstone laid May 15, 1861. After serious flood losses, Blake & Conner also defaulted and the State continued the work on a day labor basis.

The original plans called for the entire exterior to be of granite, which was quarried near Folsom. The delivery of this material was so slow that at the end of six years only the basement story had been completed, and in order to hasten the progress the upper portion of the building was changed to brick covered with plaster, the cornice and ornamental parts being of cast iron. The brick used was manufactured by Walters and Bowers in their yard at Seventeenth and T streets.

## **Completed in 1874**

The building was occupied in 1869 at which time the interior was complete, but it was not until 1874 that the exterior was finished. Thus 13 years had passed since the laying of the cornerstone and a total of \$2,590,000 had been expended as compared with an original estimate of \$945,000.

Though the interior was extensively altered in 1906 and 1907, the exterior stands today essentially as when completed in 1874 and ranks highly with the architecture of its period throughout the United States.

## **Extension Work Begins**

On June 3, 1949, a contract was awarded by the Division of Architecture for the construction of foundations for a \$7,250,000 addition. Because it occupied a portion of the foundation area for the new addition, demolition of the existing semicircular wing on the east side of the Capitol was included in the foundation contract. But before demolition work could proceed on a massive scale it was necessary to reconstruct the adjoining wall and to transfer thereon the portion of the dome load formerly supported by the structural

system of the semicircular wing. It is with the problems involved in the wall reconstruction and with the demolition work itself that this article is primarily concerned.

Because none of the original drawings could be found it was necessary to perform exploratory work as a basis for planning the wall reconstruction. Though the extent of exploratory work was necessarily limited due to occupancy of the building, sufficient information was obtained to permit development of a plan which was followed throughout the reconstruction with surprisingly few changes. Figure 1 illustrates the original plan for wall reconstruction. As finally constructed the grade of the finished floor slab at elevation 27.25 was changed to 31.00; modifications were made in the planned reconstruction of the central portion of the second floor of the existing building due to nonexistence of metal beams as anticipated; and gunite buttresses were added between the existing second and fourth floors to stiffen the existing brick walls which were found to be in poorer condition than anticipated. The specified sequence of work as shown on Figure 1 was as follows:

**Sequence of Work**

1. Remove basement slabs locally and excavate for new wall footings. Openings in brick walls above are to be filled up at this time.
- Existing steel columns and beams supporting floor framing and elevator shaft walls shall be removed before constructing new wall and footing on north side.
2. Place new wall footings using quick setting cement.
3. Construct jack "bearing-pads" under existing second story brick walls as detailed.
4. Remove only that portion of existing first floor and first floor mezzanine at or interfering with the construction of new walls and floor slabs at this time.
5. Construct new concrete walls with accompanying floors, to height shown on detail, using quick-setting cement.
6. After concrete has attained 2,500-pound strength, place jacks in position. Application of loads to wall by jacking to be as directed by a representative of Division of Architecture.

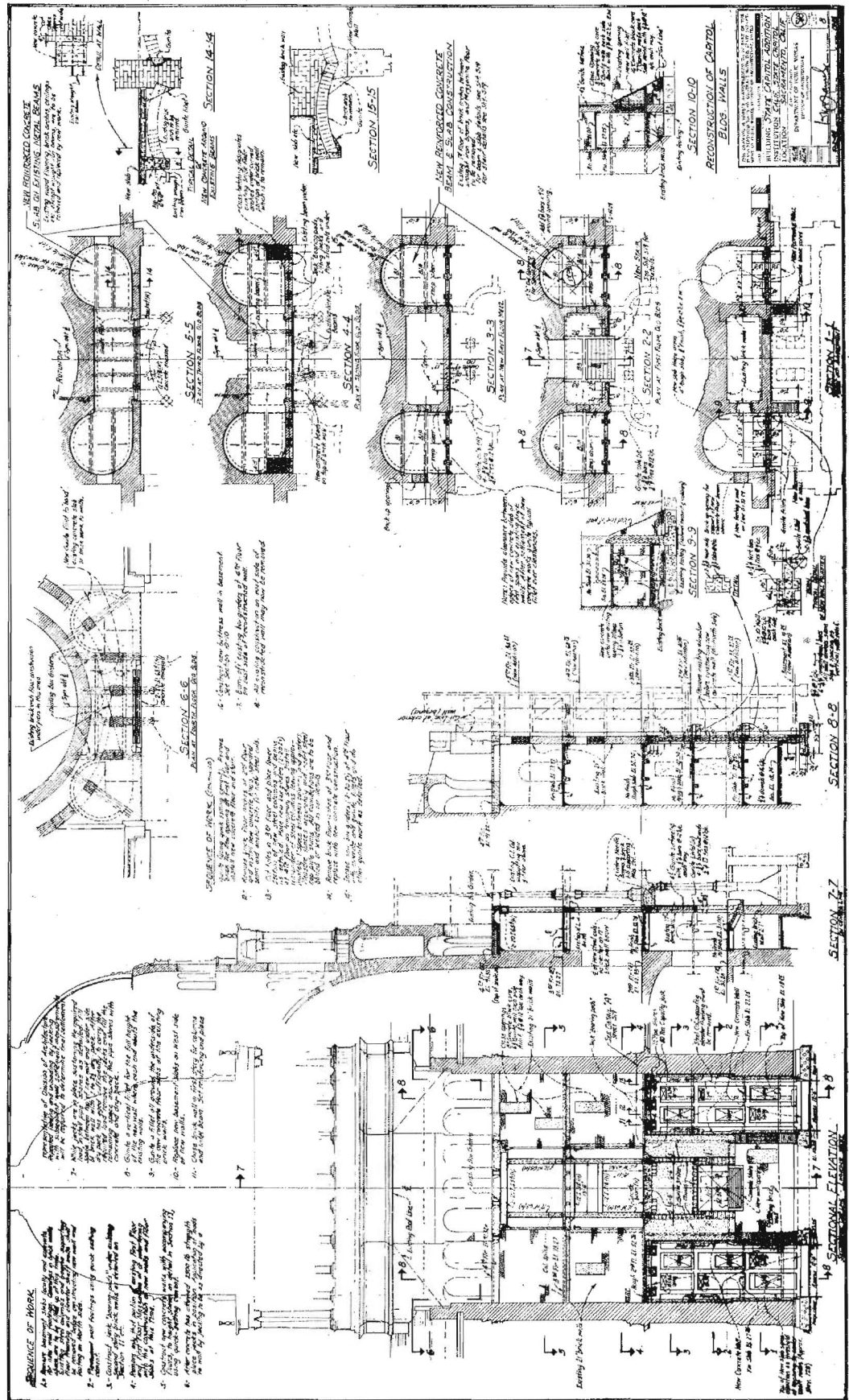


Figure 1

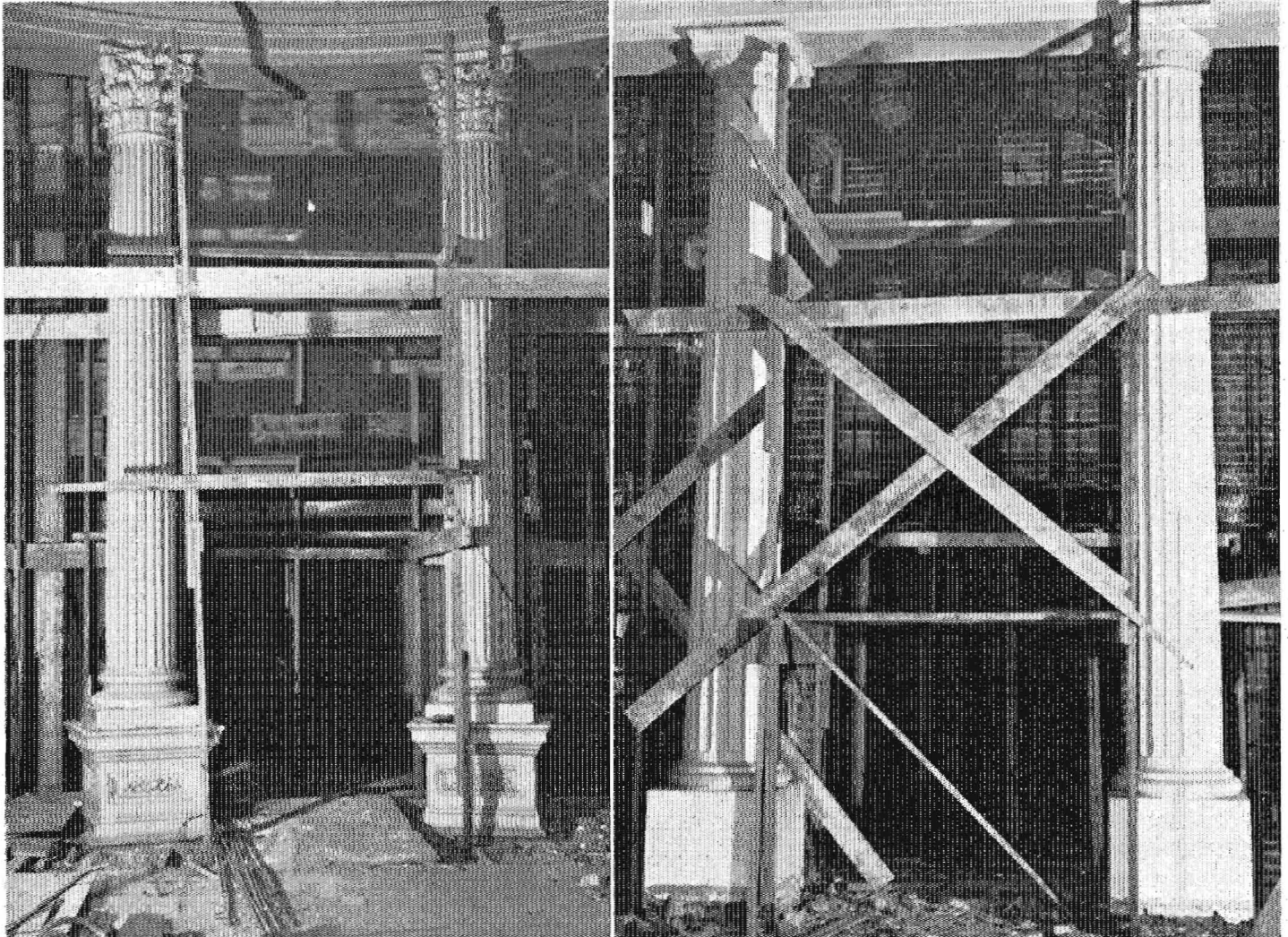
Repeated loading and unloading by jacking with subsequent wall settlement measurements will be required to determine final settlement.

7. While jacks are in place sustaining the required load, install pipe shores as detailed. Fill space between top of new wall and under side of brick wall with 1 to 2½ dry-pack. After dry-pack has aged sufficiently to

10. Replace new basement slabs on west side of new walls.
11. Chase brick wall in first story for columns and lintel beam. Set reinforcing and place gunite (using quick setting cement). Remove brick for new opening at first floor and install new concrete floor and stair.
12. Remove brick floor arches at second floor and install new concrete floors,

accurately and insert steel cap plate shims. All connections are to be bolted or welded as per details.

14. Remove brick floor arches at third floor and replace with new concrete construction.
15. Encase new box girders (2-20-inch I's) at fourth floor with concrete and gunite fillets and do other gunite work as detailed.



LEFT—Old cast iron columns on second floor of Capitol. New structural steel columns in the background are ready for guniting. RIGHT—Old cast iron columns on first floor of Capitol. Brick wall in background is ready for guniting

carry the required load, remove the jacks and fill the remaining space around the pipe shores with concrete and dry-pack.

8. Gunite a vertical fillet for the full height of the new wall where each end abuts the existing walls.
9. Gunite a fillet all around the underside of the new concrete floor slabs at the existing brick walls.

spandrel beam and anchor bolts for new steel columns.

13. Cut holes in third floor and place lower section of new steel columns and beams as detailed. Place new box girders (2-20-inch I's) at fourth floor on temporary shores. Install remainder of steel columns leaving approximately 1 inch space between columns and girders. Measure spaces

16. Construct new buttress wall in basement. See Section 10-10.
17. Burn off existing box girders at fourth floor on east side of reconstructed wall.
18. All existing construction on east side of reconstructed wall may now be removed.





*This is a view of reconstruction wall after removal of semicircular wing from the east side of the State Capitol Building*

### Jacking Operations

Referring to Section 7-7 of *Figure 1* it may be noted that a portion of the dome load is delivered at the fourth floor level to a series of box girders, the center two of which are supported at their outer ends by cast iron columns located within the semicircular wing. Other box girders, at the same level, are supported at their outer ends by existing 21-inch brick walls between the second and fourth floors. These walls, in turn, are supported by brick arches as shown on photograph entitled View of Reconstructed Wall After Removal of Semicircular Wing. The vertical components of the arch thrusts, towards the east-west centerline of the building, are delivered to a 17-inch brick wall to first floor level and thence by a 25-inch brick wall to the foundation.

The purpose of the jacking operations was to relieve the foundation of the central brick wall of a portion of its load by transfer to the new concrete side walls constructed under the existing 21-inch brick walls. This was done prior to erection of the new structural steel columns between the second and fourth floor levels which were designed to relieve the existing cast iron columns within the semicircular wing of their loads. The over-all engineering conception of the design was an endeavor to induce an essentially equalized soil pressure under both old and new foundations of the reconstructed wall. To facilitate accomplishment of this conception the design entailed the requirement that old and new construction be thoroughly knit together with gunite prior to transfer of column loads and before demolition on a massive scale was to be permitted.

### Gunite Operations

As an additional measure to insure lateral stability of the brick walls, existing brick arch floors were removed locally and replaced with reinforced concrete slabs as shown on *Figure 1*. These new floor slabs were then thoroughly bonded to the brick walls by means of a continuous gunite fillet. The 17-inch center brick wall was strengthened with a 4-inch thickness of reinforced gunite and two pilasters were also built up with gunite on the same face to



Strengthening center brick wall below second floor with gunite

act as stiffeners as well as for load bearing members for the new structural steel columns above.

For the jacking operations three hydraulic jacks of 50 tons capacity each were used. Loads were applied simultaneously at the three jacks in increments of 10 kips up to full capacity and then relieved by the same increments. Readings of settlement under loading and rebound when

relieved were taken at the foundation level by means of a surveyor's level. Similar note of vertical movements were taken at the top of the wall by means of fixed arm and pencil devised to record the movement directly on graph paper so that a continuous log of the operation could be maintained. The process of loading and unloading was repeated several times for each wall until it was established that the rebound prac-

tically equalled the settlement — the soil under the foundation virtually acting as a huge spring. The maximum settlement under the full load of 150 tons was only  $\frac{1}{8}$ -inch at the south wall and  $\frac{1}{4}$ -inch at the north wall. Permanent pipe shores were subsequently installed while the jacks were sustaining their loads.

All operations involved in the wall reconstruction were necessarily carried on in constricted areas and spaces making for extremely adverse construction conditions. Illustrative of the difficulties attending the work was one concrete pour, involving some 18 cubic yards, that required more than six hours to place.

#### Demolition Operations

Demolition operations were scheduled to commence on July 14th, but due to occupancy of the second floor by Legislative Counsel offices, did not actually get under way on a large scale until July 24th. Prior to that date the contractor was permitted to remove the roof, mezzanines, partitions, etc., in unoccupied portions of the wing as well as to perform such preparatory work in connection with the wall reconstruction as would not interfere with the activities of the Legislative Counsel.

When one considers the orderly confusion attending the average construction job and then simultaneously concentrates a demolition job involving heavy masonry and steel in the same area and then, for good measure, has to maintain an active legal office with all its attendant water, sewer, electric light and communication services literally in the center of the whole operation, he may gain some insight to the July 14th-24th period of the work.

Throughout this period and aside from contending with some dust and a great deal of noise together with occasional unscheduled vibrations which, no doubt, fell far short of a minor earthquake, the attorneys and their aides sat complacently rendering their opinions and writing the law. (Whether this is a tribute to the steadfastness of purpose of the legal profession or to the layman's faith in those who direct construction activities



View of fourth floor level, showing box girders at cut line

cannot be determined). In any event, by August 15th reconstruction of the wall was completed and two weeks later the semicircular wing was razed to the ground.

#### Interesting Discovery

One of the most interesting features of the existing construction disclosed during the demolition operations was the presence of charcoal packed into the heavy box girders. It is believed that this practice may have been followed in connection with heat treatment after fabrication but other theories have been advanced. Columns were generally heavy fluted cast iron

of exceptional density resembling the cast steel of today and were eagerly sought by local foundries. Beams were wrought iron and bore the imprint of the Phoenix Iron Co., Philadelphia and the patent date 1857.

Foundation investigations for the new addition were conducted by the Materials and Research Laboratory of the Division of Highways. Their borings indicated a 15-foot stratum of well consolidated clay-silt overlying coarse sand and gravel at elevation zero. The clay-silt stratum carried an overburden of sandy loam which had been im-



Tractor operating on fourth floor of Capitol during demolition operations

ported several years after completion of the original capitol building. This sand fill which was laid up in terraces is as much as 15 feet thick adjacent to the building. It may be of interest to note here that a number of brick cess-pools were uncovered when the sand overburden was stripped off the site. One of these was barrel-shaped, some 18 feet at maximum diameter and covered with a brick dome.

#### Foundation Problems

Because of the possibility of damage to the existing structure due to excessive vibration, employment of piling was considered inadvisable. Studies were therefore limited to foundation types dependent on the load bearing capacity of the clay-silt stratum, the surface of which was approximately at finished basement floor level. Results of laboratory tests indicated an allowable dead load bearing value of 2,000 p.s.f. exclusive of weight of footings. The conventional type of single column spread footings was early eliminated from further consideration primarily to avoid possibilities of unequal settlement. They would also interfere with the location of elevator pits as well as sewage and storm water sumps.

The choice then lay between a raft foundation covering the entire area and a grid type consisting of continuous footings in two directions centered on rows of columns. The raft foundation, while having many advantages, was found to be more costly than the grid type, particularly when it was found that the stability of the ground was such that forms were not necessary. Usually, foundations of this type are cast as inverted tee sections which are difficult to properly reinforce and require forming and backfill. Thus, the stability of the clay-silt soil was an important factor in type selection. The final section, as adopted, was generally trapezoidal in shape with sides formed against earth, hand-trimmed to a 7 on 1 slope.

#### Width of Footings

Due to the fact that column loads varied greatly, the width of footings were so proportioned that their combined reaction in each direction from the columns equaled the column loads. In plan, some of the footings were widened parallel to the centerline; others were flared. In general, footings

... Continued on page 60

## In Memoriam

### ARTHUR L. ENGER

The State Department of Public Works and the engineering and architectural professions mourn the death of Mr. Arthur L. Enger, Principal Structural Engineer in the Schoolhouse Section, Division of Architecture. Well known throughout the State, he was respected by all with whom he came in contact, especially those connected with the school construction industry.

"Ole" Enger particularly endeared himself to fellow employees and business associates because of his calm and kindly manner under the most trying circumstances.

Mr. Enger died at the age of 63 in his Sacramento home, September 5, 1949, after a lengthy illness. A native of Decorah, Iowa, he was graduated from the University of Illinois in 1911, receiving a Master's Degree in 1916. He began his career as a teacher, Brooklyn Tech. 1911-12; was Assistant Irrigation Engineer, Agricultural Experiment Station, University of Arizona 1912-17; practiced engineering and architecture in El Paso, Texas, and was Supervising Architect for El Paso Board of Education 1919-23. He started as Structural Engineer in Los Angeles City Building Department 1924-33, becoming Assistant Chief Structural Engineer.

Mr. Enger was with the Division of Architecture from 1933 to 1948. He has played an important part in guiding the California architectural, engineering and construction professions throughout the critical years of adjustment to new regulations and concepts in schoolhouse planning, design and construction.

The lasting effects of his efforts can only be fully appreciated by those who realize what great endeavors this pioneering of uncharted and difficult paths required.

During World War I, he was a captain in the Army and remained active in the reserves until retiring as a major in 1940.

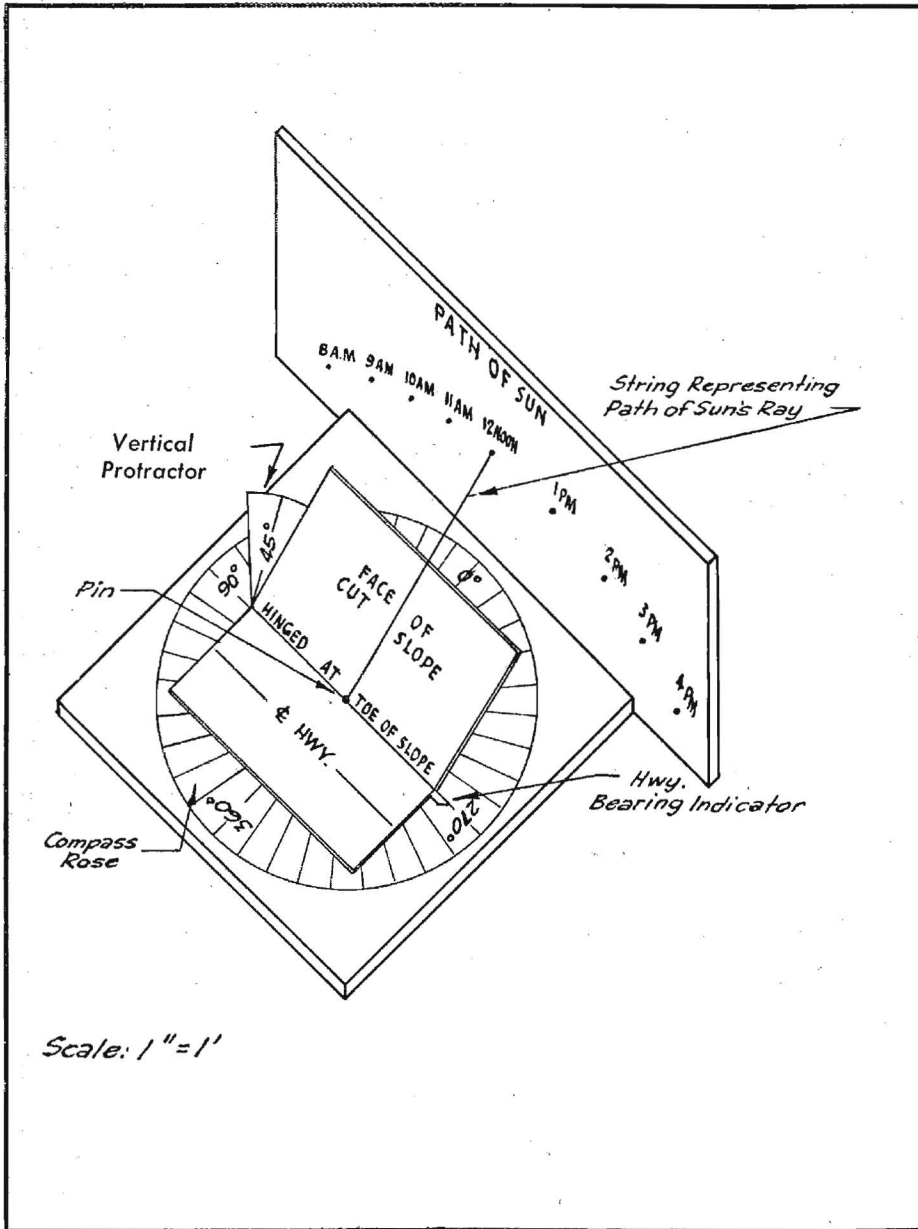
Mr. Enger leaves his wife, Mrs. Garth B. Enger; his daughter, Alice E. Enger, and his brothers, Melvin L. Enger, former dean of engineering at the University of Illinois, and Norval Enger of South Dakota.

# Sun Exposure Slope Determination

By J. H. CREED, Senior Highway Engineer

IN THE DESIGN of cut slopes for snow conditions, it is important to determine the duration of time that the roadbed will be exposed to the sun. To do this

the determination in a matter of seconds. The device consists of a hinged plate, the hinge line of which pivots on the center point of a full circle pro-



mathematically is a laborious process, involving as it does, all different bearings of line.

To solve the problem graphically, the District IX Design Department has developed a device which will make

the determination in a matter of seconds. The protractor is mounted on a board, at one end of which another board is set normal to the plane of the base board, and at right angles to the north-south line of the protractor. This board is high enough to intercept the

altitude of the sun at the winter solstice from the center point of the protractor, and long enough to intercept the east and west bearing of the sun at 8 a.m. and 4 p.m. from the same point.

The altitude and bearings of the sun are calculated for the declination of the winter solstice and the latitude of the place under consideration, and the points spotted on the vertical board with a protractor from the center point of the fixed protractor. Light plywood, masonite, or any thin, fairly stiff material can be used to make the device.

To make the slope determination, it is only necessary to orient the hinged board to the bearing of the line under consideration, run a string from the pivot point to the position of the sun for the hour desired, then raise the hinged end of the board until it touches the string. The vertical angle the board makes is the desired slope. This is measured with a small protractor, mounted on the end of the horizontal portion of the hinged board.

The only calculation to be made is the position of the sun, which must be done for the latitude of the project. This may be done to the nearest degree of latitude and declination with sufficient accuracy for the work at hand.

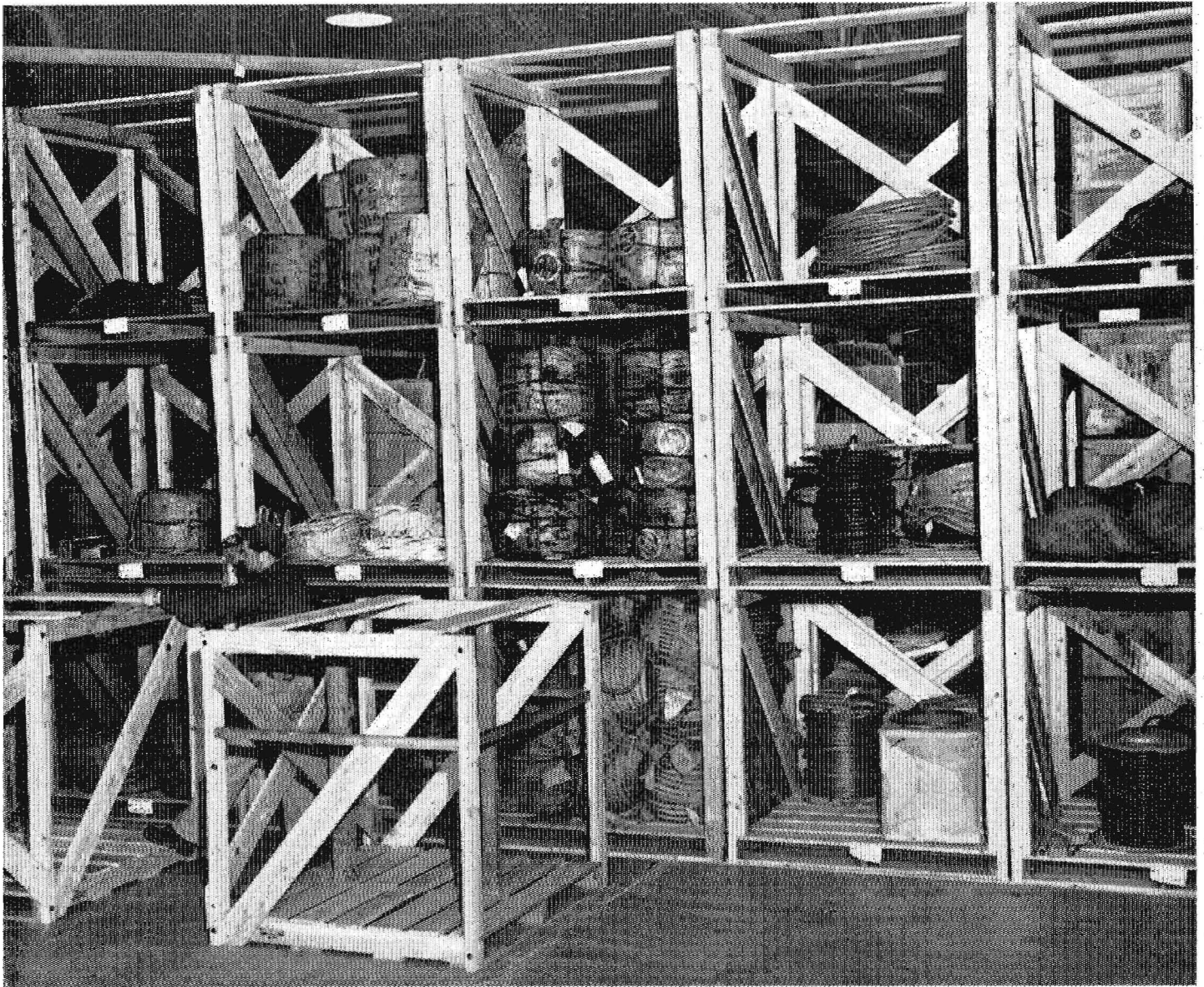
The device was developed under the direction of the writer by O. G. Compton, Chief Draftsman, ably assisted by R. A. Anderson and Frank Swan, who made the calculations and did most of the work. It was worked up primarily for the design of the Conway Summit relocation in Mono County, but will be very useful in any design where bad snow conditions are encountered.

## ON GUARD

"He is most free from danger who, even when safe, is on his guard," says an ancient Roman maxim. That is another way of saying "alertness avoids accidents."

## CHILDREN AT PLAY

School days are at hand. Watch out for children going to and from school and keep alert for children at play, urges the California State Automobile Association. Always cooperate with the School Safety Patrols on duty near schools to protect classmates from traffic hazards.



*This stockpiling in the Sacramento warehouse of the Division of Highways effects savings of thousands of dollars annually*

## Service and Supply

*Continued from page 31 . . .*

lots, we save approximately \$20,000 per year on this item alone.

### **Blueprint Paper**

Another example occurs to us in that we found that our blueprint and ammonia paper requirements were being carefully divided among the vendors, share and share alike. This was fine for the vendors, but inquiry revealed that commercial blueprinters were obtaining the same paper at least 10 percent below what the State was paying and the State was purchasing

several times the amount that the commercial firms were getting.

Steps were taken to write open specifications so that competition would ensue. After reading over all available specifications, both government and commercial, we came to the conclusion that there was nothing being used that defined what was needed to suit our needs. The Laboratory was contacted and it assigned a testing engineer to investigate the subject and in cooperation with manufacturers, devised new specifications with the result that clearness of print, sharpness, speed, shelf life, resistance to water, composition of paper stock

was thoroughly covered and a definite minimum standard set up.

The testing engineer had to coin several new descriptive phrases in the process, but his work paid off.

Translated into money values, bids were taken for a year's supply with eager competition, the differential was abolished between state and commercial buyers, and in addition, we saved \$2,400.

### **Steel Piling Stocked**

Leaving engineering supplies and entering the construction field, California has found that it pays to stock steel H piling at its warehouses. Let us assume that a bridge contract has

been awarded involving the use of steel piling. The day after the contract is awarded, the contractor can borrow the required piling from the State and commence driving, thus saving weeks or possibly months awaiting shipment. The contractor enters his order with a mill and the mill ships his order to our warehouse. The stockpile becomes renewed, the contractor saves time and money in getting his job started, yet the State is not in competition with private business.

In the light of the above experiences many other items have been examined or are scheduled for research, such as metallic tapes (results published in *California Highways and Public Works Magazine*—March-April, 1949), grader blades, bases for portable roadway signs, various hand tools, guard rail brackets, and pencils.

As an aid in developing these services it was found advantageous to set up various standardization committees to cooperate with other departments. For instance, one committee is working on roadside delineators and safety devices in connection with the Traffic Engineer and another committee is cooperating with the Equipment Department in standardizing expendable items used on automotive equipment. The Stores Department furnishes one member of each committee and performs the necessary clerical work, including the coordination of experimental work, both field and laboratory and the publication of results.

Specification writing and standardization of items are not all of the services that may be rendered by an alive service and supply department though that appears to be the most fertile ground at present. Another field appears to be the housing problem of the department, including acquisition of land (through the Right of Way Department), cooperation in design of quarters, maintenance of buildings, recording of data pertaining to quarters and pertinent accounting of machines, furniture and equipment used in the various buildings. The statistical features are of importance when shipments are made to outlying establishments from storehouses, when transfer or expansion of personnel is contemplated and when budgeting funds for administration.

Another field is coordination of

duplicating processes including filing and maintenance of archives. The printing or duplicating of forms alone is usually a major feature in any governmental operation and should be subjected to careful scrutiny by a competent committee to avoid excessive obsolescence or multiplicity that seems to continue to grow in spite of anything we can do. There seems to be a chance to save time and money by combining all duplicating processes under one head inasmuch as the variety of machines now in use can be juggled to accomplish many functions such as photostating letters for filing, reproducing accounting figures on the Ozalid machine and producing forms on a Multigraph.

The foregoing are only a few examples of the possibilities of the functions of a service and supply department. When a minor function is introduced into a highway organization, no one knows how or to what extent it may grow. It is imperative that even the most minor function should be placed in an administrative position so that it may be given proper guidance and take its relative place in the scheme of organization. If a function is worth adopting, it is worth proper administration.

#### ORGANIZATION

To properly administer service and supply, a flexible organization capable of expansion or contraction should be set up. Its head should be devoted to "service" and the idea of *servicing* should permeate the whole group. In order to render this service, the fundamental precepts of engineering are called into play. This means that first, all the data pertaining to a subject is collected; second, this data is arranged in an orderly fashion so that it may be compared, analyzed and charted; third, the tabulated data is dosed with a mixture of imagination and experience so as to precipitate a workable and practical idea and fourth, the idea is dressed up with salable facts and presented to one's superiors for acceptance.

It has been our experience that the Chief of Service and Supply should be assisted by six persons:

1. Administrative assistant—engineer
2. Analyst—engineer
3. Chief accountant
4. Traffic Manager
5. Stores coordinator (2)

These men make up a team that is capable of handling most any problem that may be presented provided they are not hide bound. Roughly, the administrative assistant should see that the organization functions smoothly and that new problems are organized in such a manner as to flow through the mill to fruition. The analyst with his staff collects and tabulates the data and should come up with a solution ready for presentation. The accounting section places all problems on a commercial basis and upon acceptance, functions as the bookkeepers and statisticians. A traffic manager completes the circle, in that his function is to see that supplies reach their ultimate users in the most expeditious and economical manner.

#### Coordinators

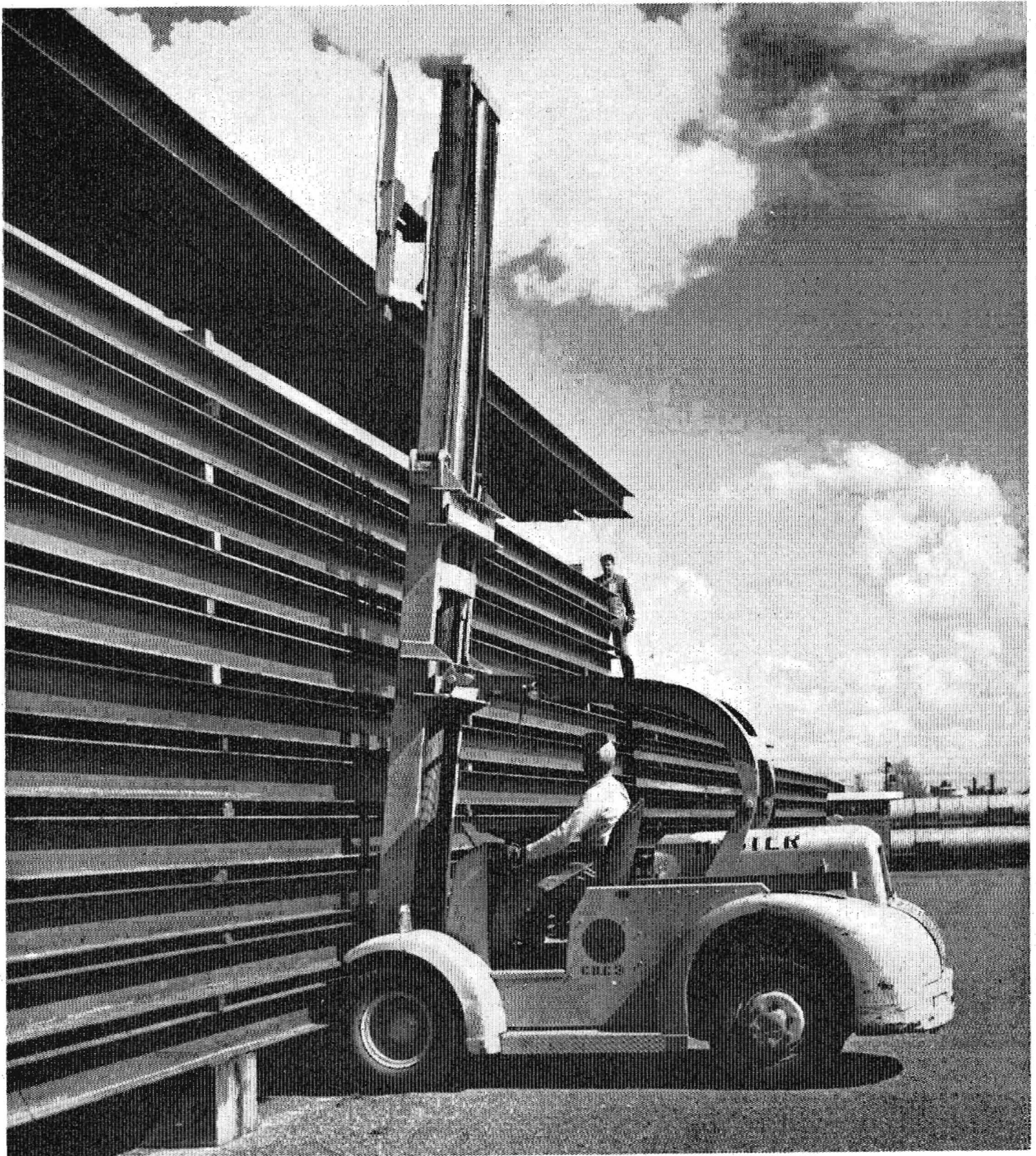
The coordinators, of whom we have two, due to the size of the State, function as "trouble shooters" in the field and also keep a weather eye open in regard to usage of supplies and possible overstocking of materials.

Parenthetically we would like to state that "Stores Department" as applied to California's Service and Supply section is a misnomer. It was chosen at a time when the supply function loomed large in our eyes, but since its inception, the service function has opened up vistas of service that far exceed our original intentions.

The staff of the key men are the usual run-of-the-mill and need no comments here. However, in order to make a service and supply organization really click, it is necessary to have a supreme power capable of passing upon their recommendations and to institute policies. This problem has been solved in California by setting up a board which functions like a board of directors of a commercial concern. The chairman of the board is the Deputy State Highway Engineer and the board members are chosen from the assistant state highway engineers who control those departments that are the major recipients of services rendered or supplies received. In this manner, no one man acts as sole arbiter of policy nor is one single person forced to bear the onus of saying "no."

#### PROPOSED ACTION

The above procedure has been broadly outlined and submitted to this



*Lift truck stacking H piling at Sacramento warehouse. Contractor may borrow required piling from State and save weeks or possibly months awaiting shipment*

group as a tentative idea which we believe may be adopted by the various states in proportions suitable to each

highway department's needs. It is submitted to you gentlemen merely as a concrete basis for discussion—to be

torn apart and to be put back together again as your ideas and needs dictate.

This paper was prepared at the



request of Mr. H. A. Radzikowski, Secretary of this Committee on Maintenance and Equipment. The minutes of the executive committee meeting in Kansas City indicate that on the motion of Mr. R. H. Baldock, your chairman of this committee, the problem of service and supply was referred to the Committee on Maintenance and Equipment for further consideration, hence our appearance before you.

We have attempted to show that the broad principles involved and the objectives to be attained through adoption of a service and supply unit concern themselves with the entire highway organization and are not limited to any one branch such as maintenance or equipment. They embrace the provinces of planning, location, construction, accounting, traffic and all other functions of any highway department and as such, we deem this proposed activity should be centered in the Subcommittee on Administrative Practices. We beg of you to consider and analyze the statements of the objectives of both committees before rendering your decision in this matter.

#### Conclusions

Insofar as the objects of a service and supply committee are concerned, it is felt that primarily the interchange of ideas having to do with the functioning of such a unit would be the first order of business. We do not contemplate that a grandiose scheme of testing and standard specifications will emanate from a committee but rather that if one state finds a means of saving three minutes per day for each survey crew, then the composite savings if applied to all survey crews throughout the country will amount to a considerable sum of money. If one state finds a means of obtaining an item of merchandise that satisfies their needs, then possibly other states may profit therefrom. If one state renders a service within its organization that saves the time of its employees, possibly other states may do likewise. With each grain of information added to our stock pile of knowledge and experience, we would soon have a small mountain of savings accruing to our respective organizations and as a result—more miles of highways at less cost.

## Loss to State

*Continued from page 25 . . .*

ment until about 1940, when this work was also assigned to the Traffic Department. A number of extensive traffic surveys were made and reports prepared during that period. These included the information on traffic covered in the "Report on the Orderly Addition of New Roads to the State Highway System" in 1930. "The Highway Transportation Survey of 1934" was on a state-wide basis and involved an expenditure in excess of \$1,000,000. For a short period, several thousand men were engaged in taking traffic counts on this latter survey. A report prepared by the Maintenance Department was published.

The most extensive work undertaken along this line was the Highway Planning Survey, which is a continuing cooperative project with the Bureau of Public Roads. This survey was initiated in 1936 by the bureau as a country-wide project working through the several state highway departments. The survey included a physical inventory of all rural roads and highways, including location of houses and industries adjacent thereto, in the State and extensive traffic counts to determine the use made of the facilities. Information developed during the survey was published in 1939 in a report "Highway Facts" on a state-wide basis. A second report "Highway Needs," published in 1941, detailed matters affecting the State Highway System. An "Initial Report" following an outline required by the Bureau of Public Roads was also completed, but was not published. Mr. Dennis was in general charge of all this work and followed the progress closely.

Mr. Dennis has been active in the work of the American Association of State Highway Officials and of the Highway Research Board, and has served on a number of committees, either as member or chairman. These assignments included the following:

#### *American Association of State Highway Officials*

Subcommittee No. 2 of Committee on Maintenance Equipment — "Study of Laws and Practices Applying to Special Load Limitations to Prevent Pavement Damages."

Subcommittee No. 3—"Procedure Followed in Coordinating Maintenance Recommendations in Construction Design."

Subcommittee No. 4—"Performance Experience of Subdrains Under and Adjacent to Pavements."

Operating Committee on Maintenance and Equipment.

Use of Radio by Highway Departments.

#### *Highway Research Board*

Economics of Highway Construction and Maintenance.

Salvaging Old Pavements.

Projects Committee on Maintenance Costs.

Highway Maintenance Equipment and Equipment Rental.

Mr. Dennis was chairman of the Committee on Study of Highway Maintenance Equipment and Equipment Rental. In this study, information was collected from all states through the committee members and the detail thus secured was reviewed and assembled by Mr. Dennis in a report which was completed in 1942. He was assigned in 1949 to bring this information up to date and this work was practically complete prior to his retirement.

#### Interest in Radio

Mr. Dennis was also chairman of the A. A. S. H. O. Committee on Use of Radio by Highway Departments, a matter in which he has been especially interested. The California Division of Highways had been operating a system of radio stations in heavy snow removal areas since 1938. The license was restricted to special emergency use, however, which handicapped the work greatly, as only matters of life or death could be communicated except between mobile units and their home station, or when other means of communication, such as telephone or telegraph, were out of service.

When Mr. Dennis became chairman of the committee in 1946, there was an apparent tendency on the part of government officials to relegate the needs of the highway departments to second place. He arranged for a display of radio equipment at the Los Angeles convention of the association in December, 1946. Its use was also demonstrated throughout the meeting. Largely thorough such efforts the full support of the association was obtained. The matter was followed through with federal officials and with the support and cooperation of a few states and other organizations where the value of

radio communication was understood. As a result, the Federal Communications Commission arranged to reserve a group of radio frequencies for highway department use.

#### Maintenance Manual

An important contribution to highway maintenance work is the "Maintenance Manual." The fourth edition of this manual was issued during 1949. It is intended primarily as a guide to Division of Highways forces to aid and standardize their work. The book contains valuable information on highway matters and all editions have been widely distributed to other states and many foreign countries. All four editions were prepared under Mr. Dennis' direction.

The matters mentioned above serve to illustrate the varied activities engaged in by Mr. Dennis during the past 23 years particularly. The items discussed were an incidental part of his work, of course, but represent exceptional service to the State. His main interest has been in the maintenance work and the maintenance organization.

#### Handled Millions

Expenditures for highway maintenance during the 23-year period he was in charge of the department exceeded \$300,000,000. In addition, considerable sums, averaging \$3,000,000 or more per year, have been expended from construction and one-quarter cent or other funds and handled through the maintenance forces.

This field force at present numbers some 2,350 men. At times in the past the force has exceeded 3,100 men. Mr. Dennis has made it a practice to spend a good deal of time in the field reviewing needs and progress of the work. There is perhaps no other man in the state service who is so thoroughly familiar with the entire State Highway System. Certainly there is no one else who has as wide an acquaintance with individuals in the field organization. He also has a large number of friends and maintained excellent working relations with people in other organizations, both within and outside the state service. His friendly spirit and the confidence which he inspired have been definite assets to the work. The organization will miss the counsel that he was

## George W. Savage Resigns as Highway Commission Secretary

IN A RESOLUTION adopted today, the California Highway Commission regretfully accepted the resignation of its secretary, George W. Savage, South Pasadena. Savage is returning to his old love, the newspaper business. He assumed the duties of manager of the Sun Printing and Publishing House of San Bernardino on the effective date of his resignation, September 30th. He associates himself with Highway Commissioner James A. Guthrie, publisher of the San Bernardino Sun and Telegram.

Prior to his appointment as commission secretary, Savage had engaged in the newspaper and printing business in California since 1925. He formerly published newspapers in Inyo County and in South Pasadena. He has served as secretary since January 9, 1948. He will make his home in San Bernardino.

The highway commission's resolution follows:

WHEREAS, In January, 1948, the California Highway Commission was fortunate to secure the services of Mr. George W. Savage as Secretary; and

WHEREAS, His many years of public service amply fitted him to carry out the duties of this office; and

WHEREAS, In the intervening period through the able and conscientious manner in which he has performed these duties with good counsel and timely advice on his part, this association has reflected to the benefit of the California Highway Commission; now, therefore, be it

able to render through his extensive knowledge of the highway system. The enthusiasm and energy which he put into every assignment will also be missed.

Mr. Dennis plans to continue to reside in Sacramento. It is understood he will make some leisurely trips throughout the country and, in proper season, will be hunting or fishing, both lines of endeavor in which he is especially interested. *The best wishes of the organization are with him.*



GEORGE W. SAVAGE

RESOLVED, That the California Highway Commission accepts the resignation of Mr. George W. Savage as Secretary of the California Highway Commission with deep regret; and be it further

RESOLVED, That the members of the Commission extend to Mr. Savage their best wishes for a long and successful career in his new endeavors, and that his public service in the future will be an honor to himself, to his community, and to the State and Nation.

## Court Decision

Continued from page 29...

During the two-day trial commenced on July 19, 1949, the defense presented three witnesses, including the owner. Their testimony as to damages ranged from \$6,000 to \$12,000. This testimony was based entirely upon alleged damage to potential commercial and residential subdivision possibilities of the property. All of these witnesses

... Continued on page 54

# Prison Labor

## Story of Highway Road Camps In the State of California

By G. A. TILTON, JR., Supervising Highway Engineer

This is the fourth article in a series appearing in *California Highways and Public Works*, recording the history, legislation, and administration of State Highway Prison Road Camps in California. The three previous articles were published in the March-April, May-June, and July-August issues, covering respectively, (1) History and Legislation, (2) Organization, and (3) Camp Layouts.

This article covers "Feeding and Nutritional Accounting" which outlines the background and basic features of a successful plan for controlling the cost and nutritional adequacy of meals.

UNDER statutes controlling the California Prison Road Camp pay system, inmates are paid a wage for labor on state highway construction, from which the cost of their maintenance is deducted, including the cost of meals, clothing, shoes, medical attention, toilet articles, tobacco, and pro rata cost of accounting and overhead camp expense.<sup>1</sup>

The difference between the wages earned and the maintenance cost is credited to the prisoners' individual accounts and is payable to them upon release. The intent of this legislative provision is to make road camp prisoners self-supporting and to create an incentive to work and encourage economy in camp maintenance.

### Supervision of Camps

Legislative statutes further require that the Division of Highways supervise all road work, and at the same time provide, supervise and maintain necessary camps and commissariat, including the care, welfare and feeding of prisoners.

Successful operation of the camps under these administrative responsibilities requires that prisoners' earnings be maintained at an average high enough to encourage steady work habits, and that maintenance expense be kept at a minimum by efficient camp management.

### Food Service Important

The most important item of camp maintenance is the food service. Proper discharge of administrative responsi-

bility requires that the food service be nutritionally adequate, palatable, and accord, insofar as practical, with eating habits of the average inmate; all of which is an essential to good camp morale and satisfactory work production.

### Rising Costs Jeopardize Program

During the early part of 1941, the cost of food and supplies began to rise to such an extent as to threaten the solvency of the road camp program. With the maximum wage that could be paid to prisoners fixed by statute, it was foreseen that the cost of maintenance would soon exceed income from wages and wipe out their savings. Therefore it was vitally necessary to curtail camp maintenance operations to insure that maintenance costs did not exceed gross earnings.

### Maintenance Costs Analyzed

An intensive study of maintenance costs in the various camps indicated that the only opportunity for substantial savings lay in reducing the cost of meals, which at that time approximated 50 percent of the total cost of inmate upkeep.

Various efforts were made to control the cost of meals without success, and in the latter part of 1942 it was decided to set an arbitrary maximum limit to meal costs that the camps were not to exceed until such time that some other form of relief might be obtained—the details of how this control was to be met being left to the judgment of the camp superintendent and camp commissary clerk.

As indicated on the accompanying chart of food cost indices, this arbitrary method was successful in confining meal<sup>2</sup> costs within the desired range until the ceiling wage for inmates was increased by the Legislature in 1943.

### Arbitrary Control Unsatisfactory

By the end of the war in 1945, it was evident that control by an arbitrary ceiling was not proving satisfactory. Meals were erratically poor and good, costs fluctuated within a wide range and the entire matter required an undue amount of administrative time and attention to maintain solvency.

It was at this juncture that a survey and detail study of camp food practices was undertaken by the Division of Highways with the assistance of Jane Sedgwick, Food Administrator of the Department of Corrections and Youth Authority.<sup>3</sup>

The survey of camp food practices indicated that closer control of meat, eggs, and milk was essential to minimal cost since the three items constituted over 58 percent of the total food cost. These items are the principal high-cost foods most desired by prisoners assigned to the road camps after long confinement in prison and are, therefore, difficult to control under arbitrary methods.

As a result of this study a modern food control plan was developed for the prison road camps and placed in operation in February, 1946.

All technical matters involving nutritional values, conversion factors and

<sup>1</sup> See article on History and Legislation in April-May, 1949, issue of *California Highways and Public Works*.

<sup>2</sup> Meal costs very closely parallel food costs.

<sup>3</sup> Now Food Administrator for the California Youth Authority.

TOTAL MEALS SERVED THIS MONTH  
DIVIDED BY 3 = 3000 MAN DAYS

STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC WORKS  
DIVISION OF HIGHWAYS—PRISON ROAD CAMPS

CAMP NO. 36 LOCATION Burnt Ranch  
MONTH OF July 1942

INVENTORY OF STORES

| ARTICLE                                 | UNIT                     | ON HAND FIRST OF MONTH |           |        | RECEIVED  |        | ON HAND LAST OF MONTH |           |        | TOTAL ISSUED |        | CORRECTION FACTOR | LBS.  | LBS. PER MAN DAY | BASIC RATION LBS. PER MAN DAY | COST PER MAN DAY |      |
|---|--------------------------|------------------------|-----------|--------|-----------|--------|-----------------------|-----------|--------|--------------|--------|-------------------|-------|------------------|-------------------------------|------------------|------|
|   |                          | QUAN-TITY              | UNIT COST | AMOUNT | QUAN-TITY | AMOUNT | QUAN-TITY             | UNIT COST | AMOUNT | QUAN-TITY    | AMOUNT |                   |       |                  |                               |                  |      |
| <b>GROUP I—MEATS—FISH—POULTRY</b>       |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 1                                       | Beef, Fresh Carcass      | lbs.                   | 168       | .38    | 63.84     | 845    | 321.10                | 150       | .38    | 57.00        | 863    | 327.94            | 1.0   | 863              |                               |                  |      |
| 2                                       | Mutton, " "              | "                      |           |        |           | 42     | 25.62                 |           | .61    |              | 42     | 25.62             | 1.0   | 42               |                               |                  |      |
| 3                                       | Pork, " "                | "                      | 46        | .53    | 24.38     | 178    | 94.84                 | 22        | .53    | 11.66        | 202    | 107.06            | 1.0   | 202              |                               |                  |      |
| 4                                       | Liver, " "               | "                      | 22        | .50    | 11.00     | 25     | 12.50                 | 11        | .50    | 5.50         | 36     | 18.00             | 1.4   | 50               |                               |                  |      |
| 5                                       | Poultry " Carcass        | "                      |           |        |           | 61     | 28.67                 |           | .47    |              | 61     | 28.67             | 1.0   | 61               |                               |                  |      |
| 6                                       |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 7                                       | Bologna                  | lbs.                   | 30        | .38    | 11.40     | 30     | 11.40                 | 5         | .38    | 1.90         | 55     | 20.90             | 1.4   | 75               |                               |                  |      |
| 8                                       | Corned Beef              | "                      |           |        |           | 158    | 86.90                 | 29        | .55    | 15.95        | 129    | 70.95             | 1.4   | 181              |                               |                  |      |
| 9                                       | Frankfurters             | "                      | 71        | .41    | 29.11     | 30     | 12.30                 | 25        | .41    | 10.25        | 76     | 31.26             | 1.4   | 107              |                               |                  |      |
| 10                                      | Sandwich Meats           | "                      | 86        | .50    | 43.00     | 120    | 60.00                 | 20        | .50    | 10.00        | 186    | 93.00             | 1.26  | 261              |                               |                  |      |
| 11                                      | Sausage                  | "                      | 57        | .40    | 22.80     | 30     | 12.00                 | 11        | .40    | 4.40         | 76     | 30.40             | 1.4   | 106              |                               |                  |      |
| 12                                      | Ham                      | "                      | 70        | .59    | 41.30     | 42     | 24.78                 | 33        | .59    | 19.47        | 79     | 46.61             | 1.0   | 110              |                               |                  |      |
| 13                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 14                                      | Fresh Fish (whole)       | lbs.                   |           |        |           | 110    | 64.90                 |           | .59    |              | 110    | 64.90             | 1.0   | 110              |                               |                  |      |
| 15                                      | Fresh or Salt Fish—Filet | "                      |           |        |           |        |                       |           |        |              |        |                   | 1.4   |                  |                               |                  |      |
| 16                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 17                                      | Clams, Canned            | lbs.                   |           |        |           |        |                       |           |        |              |        |                   | 1.4   |                  |                               |                  |      |
| 18                                      | Tuna, " "                | /                      | 17        | .37    | 6.29      |        |                       | 10        | .37    | 3.70         | 7      | 2.59              | 1.4   | 10               |                               |                  |      |
| 19                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 20                                      | Salmon, Canned           | lbs.                   | 36        | .55    | 19.80     |        |                       | 18        | .55    | 9.90         | 18     | 9.90              | 1.4   | 25               |                               |                  |      |
| 21                                      | Sardines " "             | /                      | 50        | .17    | 8.50      |        |                       | 42        | .17    | 7.14         | 8      | 1.36              | 1.4   | 11               |                               |                  |      |
| 22                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 23                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| TOTALS                                  |                          |                        | 653       |        | 281.42    | 671    | 754.51                | 376       |        | 156.87       | 1948   | 879.06            |       | 2214             | .738                          | .750             | .293 |
| <b>GROUP II—EGGS</b>                    |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 24                                      | Eggs, Fresh              | dz.                    | 62        | .70    | 43.40     | 413    | 289.10                | 35        | .70    | 24.50        | 440    | 308.00            | 1.5   | 660              |                               |                  |      |
| 25                                      | Eggs, Powdered           | lbs.                   |           |        |           |        |                       |           |        |              |        |                   | 4.0   |                  |                               |                  |      |
| 26                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| TOTALS                                  |                          |                        | 62        |        | 43.40     | 413    | 289.10                | 35        |        | 24.50        | 440    | 308.00            |       | 660              | .220                          | .214             | .103 |
| <b>GROUP III—MILK AND MILK PRODUCTS</b> |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 27                                      | Milk, Fresh              | gal.                   | 11        | .60    | 6.60      | 565    | 339.00                | 15        | .60    | 9.00         | 561    | 336.60            | 8.62  | 4840             |                               |                  |      |
| 28                                      | " Canned 48/14½ oz.      | lbs.                   | 872       | .12    | 104.64    |        |                       | 541       | .12    | 64.92        | 331    | 39.72             | 1.812 | 601              |                               |                  |      |
| 29                                      | " Powdered               | lbs.                   | 55        | .13    | 7.15      |        |                       | 48        | .13    | 6.24         | 7      | .91               | 8.0   | 59               |                               |                  |      |
| 30                                      | Ice Cream                | gal.                   |           |        |           | 72     | 93.60                 | 66        | 1.30   | 85.80        | 6      | 7.80              | 3.75  | 23               |                               |                  |      |
| 31                                      | Cheese                   | lbs.                   | 82        | .46    | 37.72     | 125    | 57.50                 | 112       | .46    | 51.52        | 95     | 43.70             | 7.0   | 665              |                               |                  |      |
| 32                                      | Cottage Cheese           | "                      | 40        | .19    | 7.60      | 30     | 5.70                  | 12        | .19    | 2.28         | 58     | 11.02             | 5.69  | 329              |                               |                  |      |
| TOTALS                                  |                          |                        | 1060      |        | 163.71    | 762    | 495.80                | 794       |        | 219.76       | 1063   | 439.75            |       | 6517             | .172                          | .181             | .117 |
| <b>GROUP IV—BUTTER</b>                  |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 33                                      | Butter                   | lbs.                   |           |        |           |        |                       |           |        |              |        |                   | 1.0   |                  |                               |                  |      |
| 34                                      | Oleomargarine            | "                      | 102       | .26    | 26.52     | 165    | 42.90                 | 72        | .26    | 18.72        | 195    | 50.70             | 1.0   | 195              |                               |                  |      |
| 35                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| TOTALS                                  |                          |                        | 102       |        | 26.52     | 165    | 42.90                 | 72        |        | 18.72        | 195    | 50.70             |       | 195              | .065                          | .060             | .017 |
| <b>GROUP V—FATS, OTHER</b>              |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 36                                      | Bacon                    | lbs.                   | 139       | .49    | 68.11     | 84     | 41.16                 | 42        | .49    | 20.58        | 181    | 88.69             | 0.66  | 120              |                               |                  |      |
| 37                                      | Oil, Salad               | gal.                   | 40        | 2.45   | 98.00     |        |                       | 39        | 2.45   | 95.55        | 1      | 2.45              | 7.88  | 9                |                               |                  |      |
| 38                                      | Salt Pork                | lbs.                   | 13        | .30    | 3.90      | 105    | 31.50                 | 36        | .30    | 10.80        | 82     | 24.60             | 0.83  | 68               |                               |                  |      |
| 39                                      | Shortening               | "                      | 120       | .23    | 27.60     | 110    | 25.30                 | 120       | .23    | 27.60        | 110    | 25.30             | 1.0   | 110              |                               |                  |      |
| 40                                      | Lard                     | "                      | 60        | .20    | 12.00     | 50     | 10.00                 | 72        | .20    | 14.40        | 38     | 7.60              | 1.0   | 38               |                               |                  |      |
| 41                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| TOTALS                                  |                          |                        | 372       |        | 209.61    | 265    | 107.96                | 309       |        | 168.93       | 412    | 178.64            |       | 345              | .115                          | .100             | .050 |
| <b>GROUP VI—GRAIN PRODUCTS</b>          |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 42                                      | Flour, Bakers            | lbs.                   | 300       | .06    | 18.00     | 4000   | 240.00                | 2600      | .06    | 156.00       | 1700   | 102.00            | 1.0   | 1700             |                               |                  |      |
| 43                                      | Flour, Buckwheat         | "                      | 500       | .07    | 35.00     |        |                       | 400       | .07    | 28.00        | 100    | 7.00              | 1.0   | 100              |                               |                  |      |
| 44                                      | Flour, Graham            | "                      | 300       | .065   | 19.50     | 200    | 13.00                 | 300       | .065   | 19.50        | 200    | 13.00             | 1.0   | 200              |                               |                  |      |
| 45                                      | Flour, Pastry            | "                      | 600       | .05    | 30.00     | 1000   | 50.00                 | 1500      | .05    | 75.00        | 100    | 5.00              | 1.0   | 100              |                               |                  |      |
| 46                                      | Barley, Pearled          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 47                                      | Crackers, Soda           | lbs.                   | 116       | .15    | 17.40     |        |                       | 101       | .15    | 15.15        | 15     | 2.25              | 1.0   | 15               |                               |                  |      |
| 48                                      | Hominy                   | "                      | 190       | .06    | 11.40     |        |                       | 162       | .06    | 9.72         | 28     | 1.68              | 1.0   | 28               |                               |                  |      |
| 49                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   | 1.0   |                  |                               |                  |      |
| 50                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 51                                      | Bread                    | lb loaf                |           |        |           | 100    | 16.00                 | 5         | .16    | .80          | 95     | 15.20             | 0.6   | 57               |                               |                  |      |
| 52                                      |                          |                        |           |        |           |        |                       |           |        |              |        |                   |       |                  |                               |                  |      |
| 53                                      | Oat Meal                 | lbs.                   | 95        | .10    | 9.50      |        |                       | 71        | .10    | 7.10         | 24     | 2.40              | 1.0   | 24               |                               |                  |      |
| 54                                      | Corn meal                | "                      | 116       | .07    | 8.12      |        |                       | 80        | .07    | 5.60         | 36     | 2.52              | 1.0   | 36               |                               |                  |      |
| 55                                      | Cracked Wheat            | "                      | 88        | .12    | 10.56     |        |                       | 73        | .12    | 8.76         | 15     | 1.80              | 1.0   | 15               |                               |                  |      |
| 56                                      | Farina                   | "                      | 107       | .16    | 17.12     |        |                       | 57        | .16    | 9.12         | 50     | 8.00              | 1.0   | 50               |                               |                  |      |
| Totals forwarded to Sheet 2             |                          |                        | 2412      |        | 176.60    | 5300   | 319.00                | 5049      |        | 334.75       |        | 160.85            |       |                  |                               |                  |      |

Inventory of stores form adapted to nutritional accounting feature of Food Control Plan submitted monthly by each camp (4 sheets) showing food consumption and cost per man-day for each food group

dietary are credited to Miss Sedgwick. Practical application of the basic food ration and administrative procedure and control have been developed by the Division of Highways. The basic food ration is patterned after recommendations of Miss Sedgwick and modified to conform to established policies concerning quality of meal service.

#### Modern Food Control Plan Adopted

The food control plan adopted for the camps includes:

- (1) A basic food ration designed to insure nutritionally adequate meals.
- (2) A nutritional accounting procedure to facilitate control of the basic food ration.
- (3) Tables of standard food portions, frequency of service, and basic menu patterns, all of which are correlated with the basic food ration.
- (4) Procedure for ordering and requisitioning food supplies.

The food control plan is intended as a simple and practical guide for camp superintendents, commissary clerks and inmate cooks, as well as an administrative check on camp operations.

#### Basic Food Ration

For the purpose of determining a standard ration and facilitating nutritional accounting, foods of like nutritional values are arranged into 15 food groups. A basic ration in pounds per man-day is then assigned to each food group based on recommended dietary allowances for men at hard work.<sup>4</sup>

| Group  | Basic ration, pounds per man-day |
|--|----------------------------------|
| I Meats, fish, poultry.....                  | 0.750                            |
| II Eggs.....                                 | 0.214                            |
| III Milk and milk products.....              | 2.181                            |
| IV Butter.....                               | 0.060                            |
| V Fats, other.....                           | 0.100                            |
| VI Sugar and syrups.....                     | 0.250                            |
| VII Grain products.....                      | 0.860                            |
| VIII Legumes.....                            | 0.150                            |
| IX Vegetables (yellow, green and leafy)..... | 0.400                            |
| X Tomatoes.....                              | 0.167                            |
| XI Citrus fruits.....                        | 0.220                            |
| XII Potatoes.....                            | 0.800                            |
| XIII Vegetables, other than y. g. l.....     | 0.400                            |
| XIV Fruits, other than citrus.....           | 0.430                            |
| XV Dried fruits.....                         | 0.050                            |

The standard ration, once established, is used as a basis for control of food usage in each food group, as well as for periodic ordering of food supplies. There is sufficient latitude in most of

<sup>4</sup> See reference No. 1, Food and Nutrition Board, National Research Council, 1948, for recommended dietary allowances.

#### INMATE GOURMAND

The problems of a camp superintendent and commissary clerk in feeding prison road camp inmates are many under normal conditions, but when a gourmand arrives in camp their problems become complex.

R. C. McFarland, Superintendent of Camp 27 in Fresno County, was faced with such a case in 1936, when a very small man from Folsom Prison was assigned to his camp and immediately began to astonish his fellow inmates with an inordinate appetite.

The following is quoted from Supt. McFarland's record:

*"From my seat at the table I can observe the man and have seen him put away the following foods at breakfast:*

- "3 packages of cereal*
- 1 dozen large hotcakes*
- 1 gallon of coffee*
- 16 fried eggs*
- Any leftovers on the table.*

*"We serve 16 eggs on a platter, and he would simply slide the entire platter onto his plate, so we would have to cook another platter for the table. At lunch, the crew he works with has to share with him and the man states that he is always hungry. A similar situation exists at dinner."*

The other inmates in camp were immediately concerned, since they were paying for the excessive amount of food he was consuming.

The author investigated and verifies the unusual facts from personal observation and record of inspection reports made at the time.

It became necessary to return the inmate to Folsom Prison.

the food groups, insofar as variety is concerned, to take advantage of changing market conditions without sacrificing nutritional needs. Likewise, the basic ration for certain of the food groups can be raised or lowered for the purpose of controlling costs within reasonable limits and still maintain a nutritionally adequate dietary. This can be accomplished by reducing the ration for the higher priced food groups, such as meat, eggs, and milk, and increasing the ration for the lower priced groups, such as grain products, legumes and potatoes.

#### Nutritional Accounting

The purpose of nutritional accounting is: (1) To determine the quantitative use of food items in each group for dietary control purposes; (2) to determine the quantities consumed in each food group for cost control; and (3) to insure that reasonable efforts are made by camp personnel to comply with the basic ration.

The requirements of both dietary and cost control are readily expressed in a pounds-per-man-day unit. With all food items reduced to this unit in monthly reports, the facts are readily available for observing compliance with the intent of the food control plan, as well as a record for working out improvements in the ration and cost.

#### Inventory Stores Form

By comparatively little rearrangement, the "Inventory of Stores" form in use by the prison road camps prior to adoption of the food control plan, was adapted to the requirements of nutritional accounting by regrouping food items and adding a column for conversion factors and a column for the basic ration per man-day and cost per man-day.<sup>5</sup> More than 200 different food items are listed on four sheets with sufficient blanks for inserting unlisted items.

#### Conversion Factors

For the purpose of converting commercial unit packages, containers, and bulk items to a common pounds-per-man-day equivalent for dietary analysis, a conversion factor is applied to each item. For example: Take the item of meat, fish and poultry in Group I—all items in this group are reduced to a carcass weight equivalent. Beef, for instance, purchased by the carcass, which includes bone, would have a conversion factor of 1, whereas such items as liver, processed foods, and canned foods do not contain bone and must be expanded to a carcass weight equivalent by applying an expansion factor, which for most items is 1.4.

Other food groups are converted to various equivalents as indicated below:<sup>6</sup>

<sup>5</sup> See figure accompanying this article.

<sup>6</sup> Conversion factors as recommended by Food and Nutrition Board, National Research Council, 1948.

TOTAL MEALS ANTICIPATED FOR QUARTER

*July Aug Sept 1943* DIVIDED BY *3*  
*13000* MAN DAYS

TOTAL MEALS SERVED THIS MONTH  
DIVIDED BY *3* = \_\_\_\_\_ MAN DAYS

QUARTERLY REQUIREMENTS

(BASED ON *April 30 1943* INVENTORY)

Table with columns: ARTICLE, UNIT, BASIC RATION (1, 2, 3, 4), CONVERSION FACTOR, TOTAL QUANTITY, CONTINGENCY AND ALLOWANCE (5, 6), TOTAL (7), UNITS ON HAND (8), QUARTERLY ORDER (9-10). Rows include Group I (Meats, Fish, Poultry), Group II (Eggs), Group III (Milk and Milk Products), Group IV (Butter), Group V (Fats, Other), and Group VI (Grain Products).

INSTRUCTIONS FOR DETERMINING QUARTERLY REQUIREMENTS

- (a) Prepare quarterly requirements two months in advance of beginning of quarter.
(b) Fill in blanks at top of page.
(c) Insert Basic Ration for each food group in column 1 opposite total for each group.
(d) Multiply Basic Ration (column 1) by anticipated man days (top of page) and insert in column 2 opposite total for each group.
(e) Enter in column 2 opposite each item the estimated quantity in lbs. per man day for the quarter and adjust these quantities to equal the total quarterly requirements already entered as in (d).
(f) Convert lbs. per man day to units per man day by multiplying figures in column 2 by conversion factor (column 3) and enter in column 4.
(g) Fill in blank at top of column 5 with the number of months in advance of quarterly period this estimate is based on.
Fill in blanks in column 5 opposite each item (excepting perishables)
If two months ahead of period, insert 76 (66% + 10% contingencies).
If one month ahead of period, insert 43 (33% + 10% contingencies).
For all perishable items use 10%.
(h) Multiply column 4 by percentage in column 5 and insert in column 6.
(i) Add columns 4 and 6 and enter in column 7 to get total requirement for 3 or 4 month period, plus 10% contingencies.
(j) Enter units on hand in column 8 (on hand last of month—inventory of stores), excepting perishable items.
(k) Subtract column 8 from column 7 and enter in column 9. This is your quarterly order. Requisition next largest commercial packaging.
(l) Submit this form to Headquarters with quarterly requisitions not later than 6 weeks before beginning of quarterly period.

Quantities On Order and Not Yet Received Should Be Deducted

ANALYSIS OF STORES ISSUED

Total stores issued during period (a) \$
(b) Accounts Receivable per Form C3

Table for ANALYSIS OF STORES ISSUED with columns: INVOICE No., ACCOUNT No., T.R. No., AMOUNT. Includes rows for Total Accounts Receivable and Total Charged to Other Accounts.

Total Charged to Other Accounts \$
Total Stores Issued, Excepting Board \$
Balance Charged to Board Account 4 (d) \$
(a) Enter total stores issued per total on sheet 4 of inventory.
(b) Enter all accounts receivable invoices appearing on Form C3 which are a credit to Stores, Account 1.
(c) Itemize each transfer record covering cost of stores issued to accounts other than Board.
(d) This figure represents the cost to Board Account 4 for stores issued during month.

This is an actual physical inventory of stores and supplies on hand as of 194

Date \_\_\_\_\_ Comptroller Clerk

Inventory of stores form used for preparing quarterly food requirements. LEFT—Fold-over device. RIGHT—Printed instructions on back of page 4

Group I Meats, fish, poultry... Carcass weight
Group II Eggs... Fresh egg
Group III Milk and milk products... Fresh fluid milk
Group IV Butter and oleomargarine
Group V Fats, other
Group VI Sugar and syrup... Sugar
Group VII Grain products
Group VIII Legumes... Dried weights
Group IX Vegetables (y. g. l.)... Fresh as purchased
Group X Tomatoes... Fresh as purchased
Group XI Citrus fruits... Fresh as purchased

XII Potatoes
XIII Vegetables (other than y. g. l.)... Fresh as purchased
XIV Fruits, other than citrus... Fresh as purchased
XV Dried fruits

Correlation of Menus With Food Control Plan

As a part of the food control plan, menu patterns, standard food portions, and frequency of service for various food items are listed in detail in manual form for guidance of the camps, all of

which are correlated with the adopted basic food ration—space does not permit listing in this article.

This part of the food control plan permits considerable flexibility in the menu pattern and avoids a predictable periodic food cycle.

Procedure for Ordering Food Supplies

The food control plan logically begins with ordering and requisitioning

of food supplies for a specific period—say, monthly or quarterly—and well in advance of needs to allow time for securing bids, issuance of purchase orders, and shipment to camp.

The Inventory of Stores Form, designed for inventory and nutritional accounting purposes already outlined, has been utilized by a fold-over device to facilitate requisitioning of supplies in conformance with the basic ration.<sup>7</sup>

#### Food Control Plan a Success

The modern food control plan adopted for the prison road camps in 1946 has been in operation for more than three years and has proved its versatility and practicability and is far superior to any other food control expediencies of the past 34 years. It has been found to be useful in:

- (1) Regulating meal costs.
- (2) Controlling the camp dietary.

<sup>7</sup> See illustration accompanying this article.

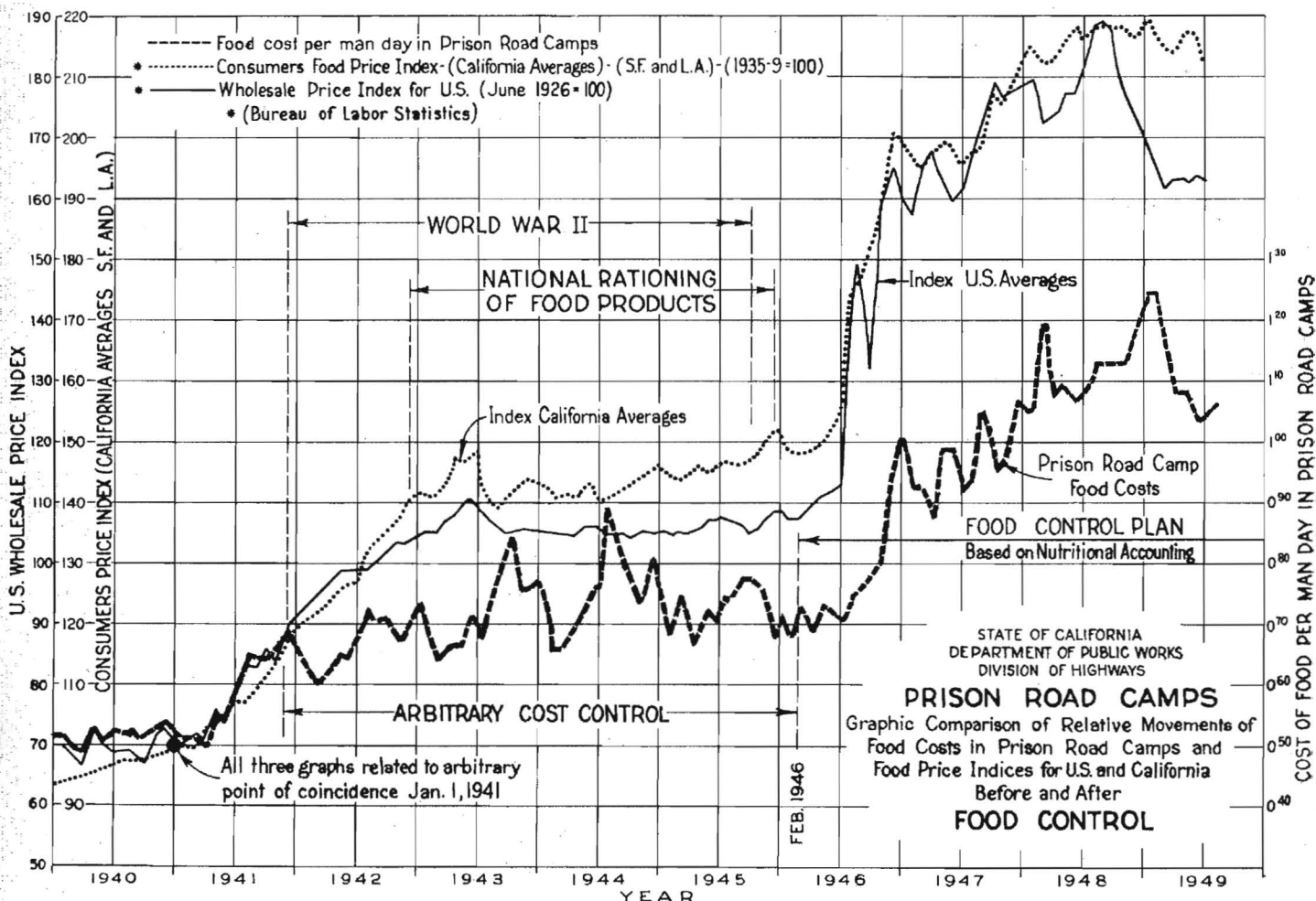
- (3) Furnishing clues for leaks in the food supply line.
- (4) Preventing over or under stocking of food supplies.
- (5) Facilitating ordering of food supplies.
- (6) Correlating (a) ordering of supplies, (b) menu patterns, (c) standard food portions, (d) frequency of item service, and (e) basic food ration.

As previously pointed out in this series of articles, camp morale, custodial risk, and work production of prisoners under the California road camp pay system are directly affected by the adequacy and quality of meal service. Detail attention to this feature of camp maintenance cannot be overemphasized.

*Note: The fifth article in this series, covering custody, care and welfare of prisoners, will appear in the next issue of the California Highways and Public Works.*

#### References

1. Recommended Dietary Allowances, revised 1948. (Washington, D. C.: National Research Council Reprint and Circular Series, No. 129, Oct. 1948.)
2. Tables of Food Composition in Terms of Eleven Nutrients (Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture in cooperation with National Research Council.) (U. S. Dept. of Agriculture Miscellaneous Publication No. 572.)
3. Classification of Foods, and Factors for Conversion of Unit Packages to Pounds for Use in Dietary Analysis of Rations. (Washington, D. C.: War Dept. Technical Bulletin TB MED 25, March 28, 1944.)
4. Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products. (Washington, D. C.: U. S. Department of Agriculture, Production and Marketing Administration, August, 1947.)
5. The Berryman-Howe Short Method of Calculating the Nutritive Value of Diets in Large Scale Feeding (Jane Sedgwick, Food Administrator, California Youth Authority). (Bulletin No. 1, Vol. XII, of the California Dietetic Association, Spring Issue 1945.)



**STATE OF CALIFORNIA, DEPARTMENT OF PUBLIC WORKS, DIVISION OF HIGHWAYS**  
**APPROXIMATE NUTRITIONAL EVALUATION FOR HIGHWAY ROAD CAMP RATION**

Basic Food Groups Expressed in Pounds per Man-day. Compared With the Recommended Dietary Allowances for the Very Active Man. Data Supplied by the Food and Nutrition Board of the National Research Council, Revised 1948

| Class | Food group                      | Amount | Calories | Protein, grams | Fat, grams | Carbo-hydrate, grams | Calcium, mgm. | Phos-phorus, mgm. | Iron, mgm. | Vitamin A, I. U. | Thiamin, mgm. | Ribo-flavin, mgm. | Niacin, mgm. | Ascorbic acid, mgm. |
|-------|---------------------------------|--------|----------|----------------|------------|----------------------|---------------|-------------------|------------|------------------|---------------|-------------------|--------------|---------------------|
| 1     | Meat, fish and poultry          | 0.750  | 840.00   | 48.75          | 71.25      | 1.50                 | 30.75         | 539.25            | 7.35       | 90.00            | 1.40          | 0.57              | 14.55        | 2.25                |
| 2     | Eggs, fresh                     | 0.214  | 135.89   | 11.12          | 9.84       | 0.64                 | 46.65         | 181.47            | 2.33       | 864.56           | 0.11          | 0.31              | 0.04         | 0.00                |
| 3     | Milk and milk products          | 2.181  | 785.16   | 34.89          | 45.80      | 51.52                | 1,212.63      | 931.28            | 1.96       | 2,224.62         | 0.23          | 1.61              | 0.87         | 8.72                |
| 4     | Butter, margarine               | 0.060  | 199.20   | 0.18           | 22.02      | 0.12                 | 4.38          | 4.38              | 0.54       | 898.20           | 0.00          | 0.00              | 0.03         | 0.00                |
| 5     | Fats, other                     | 0.100  | 408.60   | 0.00           | 45.40      | 0.00                 | 0.00          | 0.00              | 0.00       | 0.00             | 0.00          | 0.00              | 0.00         | 0.00                |
| 6     | Sugars and syrups               | 0.250  | 420.00   | 0.25           | 0.00       | 105.00               | 9.25          | 4.00              | 0.55       |                  |               |                   |              |                     |
| 7     | Grain products                  | 0.860  | 1,169.60 | 34.40          | 12.04      | 232.20               | 137.60        | 414.52            | 7.74       | 17.20            | 0.96          | 0.71              | 9.63         |                     |
| 8     | Legumes                         | 0.150  | 244.50   | 14.55          | 2.25       | 41.40                | 80.70         | 295.20            | 6.10       | 1.50             | 0.36          | 0.19              | 1.87         |                     |
| 9     | Vegetables Y. G. L.             | 0.440  | 66.00    | 3.08           | 0.44       | 13.20                | 63.80         | 66.88             | 1.54       | 6,490.00         | 0.12          | 0.10              | 1.18         | 40.04               |
| 10    | Tomatoes                        | 0.167  | 21.71    | 0.83           | 0.16       | 4.34                 | 10.18         | 26.72             | 0.43       | 644.62           | 0.06          | 0.03              | 0.36         | 13.02               |
| 11    | Citrus fruit                    | 0.220  | 30.80    | 0.44           | 0.22       | 7.04                 | 20.02         | 14.52             | 0.26       | 7.92             | 0.05          | 0.01              | 0.33         | 25.96               |
| 12    | Potatoes, Irish                 | 0.800  | 264.00   | 6.40           |            | 58.40                | 24.00         | 148.80            | 2.24       | 120.00           | 0.27          | 0.15              | 3.60         | 36.80               |
| 13    | Vegetables, other than Y. G. L. | 0.400  | 72.00    | 2.40           | 0.40       | 14.80                | 40.80         | 69.20             | 0.76       | 72.00            | 0.04          | 0.08              | 0.36         | 19.60               |
| 14    | Fruits, other than citrus       | 0.430  | 124.70   | 0.86           | 0.43       | 29.67                | 14.62         | 21.93             | 0.55       | 834.20           | 0.03          | 0.07              | 0.60         | 10.32               |
| 15    | Dried fruit                     | 0.050  | 64.00    | 0.60           | 0.10       | 15.10                | 12.25         | 22.60             | 0.90       | 416.00           | 0.02          | 0.03              | 0.33         |                     |
| 16    | Beverage                        |        |          |                |            |                      |               |                   |            |                  |               |                   |              |                     |
|       | Total                           |        | 4,846.15 | 158.75         | 209.35     | 577.93               | 1,707.63      | 2,740.75          | 33.25      | 12,680.82        | 3.65          | 3.86              | 33.75        | 156.71              |
|       | Less cooking losses             |        |          |                |            |                      |               |                   |            |                  |               |                   |              |                     |
|       | Final total                     |        |          |                |            |                      |               |                   |            | 10,144.65        | 2.19          | 3.28              | 20.26        | 101.86              |
|       | Recommended dietary allowances  |        | 4,500.00 | 70.00          |            |                      | 1,000.00      |                   | 12.00      | 5,000.00         | 1.80          | 1.80              | 18.00        | 75.00               |

Food and Nutrition Board, National Research Council, 1948

Calculated by JANE SEDGWICK  
 Food Administrator, California Youth Authority

## Motor Vehicle Registrations Show Increase

Motor vehicle registrations and the volume of highway travel in the United States this year will exceed all previous records, according to preliminary estimates compiled by the Bureau of Public Roads of the Department of Commerce on the basis of reports received from state authorities.

The reports indicate that approximately 43,298,000 automobiles, trucks and busses will be registered by the end of the year, an increase of 2,675,736 or 6.6 percent over the 40,622,264 privately-owned and commercial vehicles registered last year.

The estimated total does not include motor vehicles owned by federal, state, county and municipal governments. The number of publicly owned vehicles registered last year was 529,062.

Commercial vehicle registration, including trucks and busses, is expected to reach a total of 7,807,000 by the end of the year, an increase of approxi-

## THANK YOU

CITY OF GRAND RAPIDS, MICHIGAN  
 Office of Traffic Engineer

CALIFORNIA HIGHWAYS AND  
 PUBLIC WORKS  
 Sacramento, California

DEAR SIR: I wish to thank you for putting my name on your mailing list to receive your magazine *California Highways and Public Works*. I have just finished reading your May-June, 1949, issue and I can honestly say that I read it almost from cover to cover with as much zeal and interest as I would have my favorite weekly magazine. My only regret is that your magazine isn't published more frequently.

Yours very truly,

JEROME D. FRANKLIN  
 Traffic Engineer

mately 446,000 or 6.1 percent more than the 7,360,810 trucks and busses registered in 1948.

California, New York, and Pennsylvania, as usual, lead the states in the estimated total number of motor vehicle registrations.

## Court Decision

*Continued from page 48 . . .*

testified that this type of development would not be possible after the taking of access rights.

Two appraisers testified for the State. These witnesses were highly qualified in the appraisal field and were well informed as to properties and conditions in the area. Both testified that, while in their opinion the land was best adapted to agricultural use, it suffered no diminution in market value through the taking of access rights if considered either for this use or for commercial and residential subdivision purposes.

In his closing argument, the attorney for the State stressed the factual and convincing evidence submitted in support of the contention that freeway access limitation does not in this instance or in most instances decrease the value of abutting lands.

The jury concurred in this opinion by their decision that no damage was done to the property by the taking of access and the consequent verdict awarding no payment to the owner.



# Highway Bids and Awards for August, September, 1949

## July, 1949—Continued

**KERN COUNTY**—At the intersection of State Route 142 and Roberts Lane in Oildale, furnish and install traffic signal system and highway lighting. District VI, Route 142, Section A. L. H. Leonardi Electric Construction Co., San Rafael, \$10,907; R. O. Ferguson Co., Visalia, \$12,362. Contract awarded to Clinton Electric Corp., Los Angeles, \$10,881.

**SAN DIEGO COUNTY**—Across San Luis Rey River near Oceanside, the existing steel bridge to be cleaned and painted. District XI, Route 2. Fred T. Judd Co., Berkeley, \$48,786; Williams & Kelly, Los Angeles, \$58,200; Acme Maintenance Engineering Co., Bell, \$69,485. Contract awarded to H. W. Kirck & Co., South Pasadena, \$44,800.

## August, 1949

**CALAVERAS COUNTY**—Across Murray Creek, about one mile north of San Andreas, a steel beam span bridge with reinforced concrete deck to be constructed and approaches to be graded and surfaced with plant-mixed surfacing on imported base material. District X, Route 65, Section A. B. S. McElderry, Berkeley, \$48,854; Beerman & Jones, Sonoma, \$49,638; Bos Construction Co., Oakland, \$49,993; M. E. Shuper Co., Stockton, \$51,618; Karl C. Harmeling, Stockton, \$53,413; Lew Jones Construction Co., San Jose, \$54,763; J. Henry Harris, Berkeley, \$56,644; Fredrickson Bros., Emeryville, \$57,248; Chas. MacClosky Co., San Francisco, \$57,834. Contract awarded to W. C. Lefever & D. Gerald Bing, Sacramento, \$48,784.

**KERN COUNTY**—In the City of Bakersfield on Golden State Avenue between 23d Street and H Street, north of Garces Circle, about one mile to be graded and paved with Portland cement concrete on cement treated subgrade and plant-mixed surfacing on Portland cement concrete base and on imported borrow. District VI, Route 4. Guy F. Atkinson Co., South San Francisco, \$346,558; J. E. Haddock, Ltd., Pasadena, \$351,104. Contract awarded to Griffith Co., Los Angeles, \$309,533.25.

**KERN COUNTY**—Between Randsburg Road and Searles Station Road, about 2.3 miles to be graded and surfaced with road-mixed surfacing. District IX, Route 145, Section A. Guerin Co., Los Angeles, \$32,603; Miles & Bailey, Madera, \$34,168; R. A. Erwin, Colton, \$35,740; Foster & McHarg, Riverside, \$37,329; Arthur A. Johnson, Laguna Beach, \$38,452; Tyson & Watters Co., Sacramento, \$38,864; Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$39,211; Kirst & Sons, Altadena, \$40,373; Geo. Merz & Co., San Bernardino, \$41,428; Rexroth & Rexroth, Bakersfield, \$55,931. Contract awarded to Clyde W. Wood, Inc., North Hollywood, \$31,410.

**LOS ANGELES COUNTY**—At San Fernando Boulevard and at Burbank Boulevard, traffic signal systems and intersection lighting to be furnished and installed. District VII, Route 4. Westates Electrical Construction Co., Los Angeles, \$24,242; Clinton Electric Corp., Los Angeles, \$24,841. Contract awarded to C. D. Draucker, Inc., Los Angeles, \$23,884.

**MONTEREY COUNTY**—In the City of Salinas between the south city limits and South Main Street, about 0.8 mile to be graded and surfaced with plant-mixed surfacing on cement stabilized crusher run base. District V, Routes 2, 117. Rand Construction Co., Inc., Bakersfield, \$206,412; Granite Construction Co., Watsonville, \$208,113; Valley Paving and Construction Co., Inc., Pismo Beach, \$234,046; Frederickson & Kasler, Sacramento, \$244,953; Stolte, Inc., Oakland, \$270,557. Contract awarded to Ted F. Baun, Fresno, \$192,969.

**NAPA AND SOLANO COUNTIES**—Between ¼ mile west of Napa County line and Cordelia Underpass, about 4.2 miles to be paved with Portland cement concrete on cement treated subgrade. District X, Route 7, Sections A, H. Fredrickson Bros., Emeryville, \$268,633; A. G. Raisch Co., San Francisco, \$289,306; Guy F. Atkinson Co., South San Francisco, \$297,537; M. J. B. Construction Co., Stockton,

\$318,850. Contract awarded to Parish Bros., Benicia, \$259,938.

**ORANGE COUNTY**—Between Newport Beach and Huntington Beach State Park, about 2 miles to be graded and surfaced with plant-mixed surfacing on untreated rock base. District VII. O'Brien & Bell Construction Co., Santa Ana, \$110,222; Sully-Miller Contracting Co., Long Beach, \$113,867; Jesse S. Smith, Glendale, \$115,803; Griffith Co., Los Angeles, \$116,578; John J. Swigart Co., Torrance, \$124,833; M. S. Mecham & Sons, Lynwood, \$127,677. Contract awarded to Cox Bros. Construction Co., Stanton, \$106,617.

**ORANGE COUNTY**—Across Anaheim Bay, North Arm Newport Bay, and Newport Beach Channel, at Seal Beach and at Newport Beach, the steel spans of three bridges to be cleaned and painted. District VII. Route 60, 43, Sections S1B, B, A. American Pipe and Construction Co., South Gate, \$2,500; J. W. Luten, Maywood, \$2,550; Abbott Painting Co., Los Angeles, \$3,364; Action Painting Service, Inc., Maywood, \$4,750. Contract awarded to Blakely Bros. Corp., Los Angeles, \$1,649.

**RIVERSIDE COUNTY**—At the intersection of Seventh Street and Pepper Street in the City of Riverside, furnish and install traffic signal system. District VIII, Route 19. Paul R. Gardner, Ontario, \$9,031; Westates Electrical Construction Co., Los Angeles, \$9,221; Tri-Cities Electrical Service, Inc., Los Angeles, \$10,983. Contract awarded to Ed Seymour, Long Beach, \$8,935.

**RIVERSIDE COUNTY**—Across Temescal Wash in the City of Corona, remove existing bridge and construct a new bridge. District VIII, Route 193. R. A. Erwin, Colton, \$6,308; Parker Engineering Co., Claremont, \$7,763; E. S. & N. S. Johnson, Fullerton, \$4,986. Contract awarded to Covina Construction Co., Covina, \$4,274.

**SACRAMENTO COUNTY**—At the intersection of Fulton Avenue and Marconi Avenue, traffic actuated signals and highway lighting to be installed. District III, Route 98, Section A. R. Goold & Son, Stockton, \$13,683; Grason Electric Co., Sacramento, \$13,687; Luppen & Hawley, Inc., Sacramento, \$13,849. Contract awarded to L. H. Leonardi Electric Construction Co., San Rafael, \$12,725.

**SAN BERNARDINO COUNTY**—Cleaning and waterproofing steel overhead structure. District VIII, Route 31. O. B. Phillips, Jr., Long Beach, \$3,450. Contract awarded to Williams & Kelly, San Bernardino, \$2,444.

**SAN BERNARDINO COUNTY**—At the intersection of E Street, Colton Avenue, and Mill Street at the south city limits of San Bernardino, intersection streets to be widened and widened sections paved, curbs and gutters to be constructed, street light standards to be removed, traffic signal and highway lighting systems to be furnished and installed. District VIII, Routes 26, 43, Sections A, Sbd. Paul R. Gardner, Ontario, \$23,661; Drury Electric Co., San Bernardino, \$25,372; R. A. Erwin, Colton, \$26,153; Herz Paving Co., San Bernardino, \$29,397. Contract awarded to Westates Electrical Construction Co., Los Angeles, \$22,973.17.

**SAN BERNARDINO COUNTY**—Between 87 and 120 miles east of Barstow 18 timber trestle bridges to be redecked, in part, with plank floors and all to be resurfaced with plant-mixed surfacing. District VIII, Route 58, Sections K, L. Thomas Construction Co., San Fernando, \$84,116; E. G. Perham, Los Angeles, \$87,459; Norman I. Fadel, North Hollywood, \$98,528; N. M. Saliba Co., Los Angeles, \$101,861; Andy Sordal and H. C. Johnson, Long Beach, \$101,868. Contract awarded to E. S. & N. S. Johnson, Fullerton, \$79,330.

**SAN DIEGO COUNTY**—At National Avenue and E Street in Chula Vista and at National Avenue and 18th Street in National City, traffic signal systems and highway lighting to be furnished and installed. District XI, Route 2. Ets-Hokin and Galvan, San Diego, \$18,888; California Electric Works, San Diego, \$19,132; Clinton Electric Corp., Los Angeles, \$19,442; Westates Electrical Construction Co., Los Angeles, \$19,634. Contract awarded to Tri-Cities Electrical Service, Inc., Los Angeles, \$17,226.

**SAN DIEGO COUNTY**—On Cabrillo Freeway between "A" Street and Friar's Road in the City of San Diego, furnish and install highway lighting system. District XI, Route 77. Ets Hokin & Galvan, San Diego, \$81,451; California Electric Works, San Diego, \$91,422; Electrical Constructors, Inc., Chula Vista, \$143,344. Contract awarded to State Construction Co., Los Angeles, \$78,989.

**SAN FRANCISCO COUNTY**—At San Francisco-Oakland Bay Bridge, a timber fender at Pier W-5 to be repaired. District IV, Route 68. The Duncanson Harrelson Co., Richmond, \$15,750; Ben C. Gerwick, Inc., San Francisco, \$16,847; Minton & Kubon, San Francisco, \$24,000. Contract awarded to Healy Tibbits Construction Co., San Francisco, \$14,934.

**SAN JOAQUIN COUNTY**—Across Old River, about 18 miles west of Stockton, the existing steel bridge to be cleaned and painted. District X, Route 75, Section A. Fred T. Judd Co., Berkeley, \$18,400; Pacific Bridge Painting Co., San Francisco, \$19,663. Contract awarded to Geo. L. McMahon Co., Burlingame, \$15,564.

**SONOMA COUNTY**—Between Steele Lane north of Santa Rosa and Baker Road south of Santa Rosa, about 2.8 miles, a sprinkling system to be furnished and installed and planting to be done. District IV, Route 1, Section E, SRO. Huettig & Schroom and A. J. Bennett Construction Co., Palo Alto, \$27,704; Associated Engineers, Inc., Palo Alto, \$27,192; Henry C. Soto Corp., Los Angeles, \$28,026; Justice-Dunn Co., Oakland, \$28,256; Watkins & Sibbald, San Anselmo, \$29,094; James H. McFarland, San Francisco, \$31,629; Rincon Nursery, Santa Rosa, \$32,983; Master Plumbing and Heating Co., Inc., Berkeley, \$33,460; Ferguson Bros., Oakland, \$35,845. Contract awarded to Stephen L. Vistica, San Mateo, \$26,327.

**STANISLAUS COUNTY**—Between Turlock and Keyes, about 4.9 miles to be graded and paved with Portland cement concrete on cement treated subgrade and plant-mixed surfacing on untreated rock base and over existing pavement and a reinforced concrete slab bridge to be constructed. District X, Route 4, Section A. M. J. B. Construction Co., Stockton, \$474,027; N. M. Ball Sons, Berkeley, \$481,103; Fredrickson & Watson Construction Co., Oakland, \$488,662; Guy F. Atkinson Co., South San Francisco, \$493,125; Fredrickson Bros., Oakland, \$502,974; Cox Bros. Construction Co., Stanton, \$541,474. Contract awarded to United Concrete Pipe Corp., Baldwin Park, \$466,436.

**YOLO COUNTY**—At Zamora, about 1.2 miles to be graded and surfaced with plant-mixed surfacing on cement stabilized crusher run base. District III, Route 7, Sections B, C. Harms Bros., Sacramento, \$136,948; W. C. Railing, Woodland, \$147,202; A. Teichert & Son, Inc., Sacramento, \$159,587; Tyson & Watters Co., Sacramento, \$186,038. Contract awarded to Fredrickson Bros., Emeryville, \$128,432.50.

**YUBA COUNTY**—In the City of Marysville near the north end of the Yuba River Bridge, sidewalks, curbs, gutters, plant-mixed surfacing and chain link fence to be constructed. District III, Route 3. Rice Brothers, Inc., Marysville, \$4,619; Miles & Bailey, Madera, \$5,256. Contract awarded to William S. Shedd, Yuba City, \$4,485.50.

## F. A. S. County Projects

**FRESNO COUNTY**—Manning Avenue between U. S. 99 and Indianola Avenue about 3.9 miles to be graded and surfaced with plant-mixed surfacing on untreated rock base. District VI, Route 817. Geo. E. France, Inc., Visalia, \$140,473; Ted F. Baun, Fresno, \$141,073; Volpa Bros., Fresno, \$146,786; Valley Paving and Construction Co., Inc., Pismo Beach, \$147,058; Gene Richards and Rex B. Sawyer, Fresno, \$147,792; Guy F. Atkinson Co., South San Francisco, \$155,616; Louis Biasotti & Son, Stockton, \$164,590; Dicco Inc. and Dix Syl Construction Co., Inc., Bakersfield, \$166,816; A. Teichert & Son, Inc., Sacramento, \$169,440; M. J. Ruddy & Son, Modesto, \$173,575; Karl C. Harmeling, Stockton, \$180,108. Contract awarded to Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$135,244.

**LOS ANGELES COUNTY**—Across Compton Creek channel, on Santa Fe Avenue, a reinforced concrete slab bridge to be constructed. District VII, Route 834. Bent Construction Co., Los Angeles, \$204,263; Chas. MacClosky Co., San Francisco, \$218,887; Lars

Oberg, Los Angeles, \$221,110; Macco Corp., Paramount, \$222,962; Hermann Co., Los Angeles, \$223,765; Erickson, Phillips & Weisburg, Oakland, \$224,136; Granite Construction Co., Watsonville, \$225,347; Byerts & Sons, Los Angeles, \$227,259; K. B. Nicholas, Ontario, \$230,668; Northrup Construction Co., Long Beach, \$238,552; Oberg & Cook, Gardena, \$238,871; Sharp & Fellows Contracting Co., Los Angeles, \$239,900; Oberg Bros. Construction Co., Inglewood, \$241,273; Guy F. Atkinson Co., Long Beach, \$241,775; John Strona, Pomona, \$246,642; J. E. Haddock, Ltd., Pasadena, \$248,181; Wonderly Construction Co., Long Beach, \$262,642; Fred A. Chadwick & Co. and MacDonald & Kruse, Inc., Glendale, \$272,352; Norman I. Fadel, North Hollywood, \$273,659; Carlo Bongiovanni, Hollywood, \$279,841; Johnson Western Gunite Co., San Pedro, \$343,700. Contract awarded to George W. Peterson and Jack W. Baker, Los Angeles, \$186,007.80.

**MERCED COUNTY**—Between Los Banos and Pipe Line Road, about 8.7 miles to be graded and surfaced with plant-mixed surfacing and untreated rock base and an existing reinforced concrete slab bridge to be widened. District X, Route 1170. Granite Construction Co., Watsonville, \$175,652; M. J. Ruddy & Son, Modesto, \$177,717; George E. France, Inc., Visalia, \$181,810; Fredericksen & Kasler, Sacramento, \$191,814; Louis Biasotti & Son, Stockton, \$193,193; Frank B. Marks & Sons, Newman, \$206,641; Gene Richards and Rex B. Sawyer, Fresno, \$208,124; United Concrete Pipe Corp., Baldwin Park, \$216,789; A. Teichert & Son, Inc., Sacramento, \$218,198; Ted F. Baun, Fresno, \$225,737; Clements & Co., Hayward, \$226,455; Bunn & Perkins, Modesto, \$226,838. Contract awarded to Covina Construction Co., Covina, \$160,916.

**ORANGE COUNTY**—On Orangethorpe Avenue between the Los Angeles County line and Manchester Avenue, about 3.12 miles, the roadbed to be widened by grading shoulders, placing crusher run base thereon, surfacing the existing pavement and crusher run base with plant-mixed surfacing and applying bituminous surface treatment to borders. District VII, Route 737. John J. Swigart Co., Torrance, \$117,885; K & H Co., Colton, \$119,357; Phoenix Construction Co. and Oilfields Trucking Co., Bakersfield, \$122,610; Baker & Pollock, Ventura, \$123,648; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$128,030; Jesse S. Smith, Glendale, \$128,577; C. O. Sparks, Inc., and Mundo Engineering Co., Los Angeles, \$129,623; Griffith Co., Los Angeles, \$130,291; M. S. Mecham & Sons, Lynwood, \$135,023; Cox Bros. Construction Co., Stanton, \$136,403; Vernon Paving Co., Inc., Vernon, \$147,533.06. Contract awarded to Sully Miller Contracting Co., Long Beach, \$109,658.53.

**RIVERSIDE COUNTY**—On Winchester-Temecula Road, between Benton Road and Winchester, about 8.7 miles to be graded, imported borrow to be placed and bituminous surface treatment applied. District VIII, Route 720. Arthur A. Johnson, Laguna Beach, \$302,092; Cox Bros. Construction Co., Stanton, \$316,957; Vinnell Co., Inc., Alhambra, \$325,393; Peter Kiewit Sons Co., Arcadia, \$337,654; Peter L. Ferry & Son & John M. Ferry, Glendale, \$337,970; Foster & McHarg and E. L. Yeager, Riverside, \$340,760; A. Teichert & Son, Inc., Sacramento, \$367,615; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$369,256; Match Bros. and L. A. & R. S. Crow, El Monte, \$373,137; Silva & Hill Construction Co., Los Angeles, \$380,459; T. M. Page, Monrovia, \$392,654; R. A. Erwin, Colton, \$394,515; Louis Biasotti & Son, Stockton, \$416,072; Clyde M. Wood, Inc., Los Angeles, \$426,208; Clifford C. Bong & Co., Arcadia, \$441,666. Contract awarded to George Herz & Co., San Bernardino, \$293,994.50.

**SAN BERNARDINO COUNTY**—On Lake Gregory Road, between State Highway Route 43 and Huston Flat Road, about 2.2 miles to be graded and bituminous surface treatment applied. District VIII, Route 925. Claude Fisher Co., Ltd., Los Angeles, \$237,640; Vinnell Co., Inc., Alhambra, \$246,737; L. A. & R. S. Crow, El Monte, \$258,480; R. A. Erwin, Colton, \$262,648; Sharp & Fellows Contracting Co., Los Angeles, \$274,813; Clyde W. Wood, Inc., Los Angeles, \$275,507; T. M. Page, Monrovia, \$275,756; Winston Bros. Co. and Yount Constructors, Inc., Azusa, \$280,818; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$283,635; Clifford C. Bong & Co., Arcadia, \$283,943; Calowell Construction Co., Long Beach, \$289,544; Louis Biasotti & Son, Stockton, \$298,056; J. E. Haddock, Ltd., Pasadena, \$304,355; Foster & McHarg and E. L. Yeager, Riverside, \$306,181; Silva & Hill Construction Co., Los Angeles,

\$316,068. Contract awarded to Spicer Co., Los Angeles, \$215,131.

**TEHAMA COUNTY**—Across Elder Creek, about 1/2 mile south of Gerber, a reinforced concrete slab bridge to be constructed and about 1/3 mile of approaches to be graded and surfaced with crusher run base and armor coat applied. District II, Route 1080. Charles MacClosky Company, San Francisco, \$57,648; Lew Jones Construction Co., San Jose, \$62,039; Chittenden & Chittenden, Auburn, \$64,281; O'Connor Bros., Red Bluff, \$64,456; F. Fredenburg, Temple City, \$66,316; Erickson & Pierson, Richmond, \$70,397; J. P. Brennan, Redding, \$83,009. Contract awarded to Transocean Engineering Corp., Oakland, \$49,719.50.

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**FRESNO COUNTY**—Across Warthan Creek in the City of Coalinga, a reinforced concrete slab bridge to be constructed and about 0.2 mile of approaches to be graded and imported base material and imported borrow to be placed and bituminous surface treatment applied thereto. District VI, Route 138, Section A, Cing. W. C. LeFever and D. Gerald Bing, Sacramento, \$47,547; Trewhitt-Shields & Fisher, Fresno, \$47,881; Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$49,856. Contract awarded to Thomas Construction Co., Burbank, \$43,016.15.

**FRESNO COUNTY**—Over the tracks of the Atchison, Topeka & Santa Fe Railway, at Calwa, the steel span of an overhead crossing to be cleaned and waterproofed. District VI, Route 4, Section B, Pacific Bridge Painting Co., San Francisco, \$2,649. Contract awarded to R. W. Reade & Co., Berkeley, \$2,050.

**GLENN COUNTY**—Across Grindstone Creek and across Clark's Valley Creek, respectively, 5.9 miles north of Elk Creek Post Office and 2.3 miles south of Fruto, two reinforced concrete bridges to be constructed. District III, Route 1117 and county road. E. H. Peterson & Son, Richmond, \$54,368; O'Connor Bros., Red Bluff, \$54,473; Lew Jones Construction Co., San Jose, \$55,611; Fredrickson Bros., Emeryville, \$62,665; Baldwin, Straub Corp. and F. P. Basler, San Rafael, \$66,121; Chittenden & Chittenden, Auburn, \$69,666; Charles MacClosky Co., San Francisco, \$72,907. Contract awarded to Weidmer Construction Co., Oakland, \$51,489.05.

**KERN COUNTY**—Between Oak Glen and Grapevine Station, about 1.8 miles to be surfaced with plant-mixed surfacing. District VI, Route 4, Section A, Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$32,470; Peter Kiewit Sons' Co., Arcadia, \$33,740; Dicco, Inc., Bakersfield, \$38,852. Contract awarded to Griffith Co., Los Angeles, \$29,861.

**KERN COUNTY**—At the intersection of Brundage Lane and South Chester Avenue in Bakersfield, a full traffic actuated signal system and highway lighting system to be furnished and installed. District VI, Route 141. L. H. Leonardi Electric Construction Co., San Rafael, \$9,520; Clinton Electric Corp., Los Angeles, \$10,121; Oilfield Electric Company, Inc., Bakersfield, \$11,000; R. O. Ferguson Co., Visalia, \$11,893. Contract awarded to Westates Electrical Construction Co., Los Angeles, \$8,826.

**LOS ANGELES COUNTY**—Over Santa Ana Parkway and outlet ramp, at North Main Street, in the City of Los Angeles, two reinforced concrete bridges for overcrossings to be constructed. District VII, Route 2. Winston Bros. Co. and Yount Construction, Inc., Azusa, \$576,133; Chas. MacClosky Co., San Francisco, \$588,671; W. J. Distelli and R. J. Daum Construction Co., Los Angeles, \$606,892; Guy F. Atkinson Co., Long Beach, \$614,732; H. B. Nicholson, Pasadena, \$619,618; Griffith Co., Los Angeles, \$635,882; Spencer Webb Co., Los Angeles, \$677,909. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$570,171.10.

**LOS ANGELES COUNTY**—On Ramona Parkway between Evergreen Avenue and 0.2 mile east of Helen Drive, about 1.8 miles to be graded and paved with Portland cement concrete on cement treated subgrade and with plant-mixed surfacing on untreated rock base; three reinforced concrete box girder type bridges to be constructed and two existing reinforced concrete pedestrian undercrossings to be extended. District VII, Route 26, Sections LA, D. Griffith Co., Los Angeles, \$1,262,406; United Concrete Pipe Corp. and Jesse S. Smith, Baldwin Park, \$1,262,820; Charles MacClosky Co. and Clyde W. Wood, Inc., San Francisco, \$1,311,810; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$1,312,405; Winston

Bros. Co. and Young Constructors, Inc., Azusa, \$1,345,201; Guy F. Atkinson Co., Long Beach, \$1,365,304; Spencer Webb Co., Los Angeles, \$1,430,165; Peter Kiewit Sons Co., Arcadia, \$1,446,218. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$1,255,489.50.

**LOS ANGELES COUNTY**—In the City of San Fernando, at the intersection of Macley Avenue and Seventh Street, a fixed time traffic signal system to be furnished and installed. District VII, Route 9. Electric & Machinery Service, Inc., South Gate, \$2,071; Westates Electrical Construction Co., Los Angeles, \$2,148. Contract awarded to C. D. Draucker, Inc., Los Angeles, \$1,997.

**LOS ANGELES COUNTY**—On Manchester Boulevard at Grevillea Avenue, Locust Street, and Crenshaw Drive, in the City of Inglewood, furnish and install fixed time traffic signal systems. District VII, Route 174. Westates Electrical Construction Co., Los Angeles, \$6,889. Contract awarded to Electric & Machinery Service, Inc., South Gate, \$6,733.

**LOS ANGELES COUNTY**—On Lincoln Boulevard, between Washington Boulevard and Venice Boulevard, about 0.4 mile, to remove existing surfacing and surface with asphalt concrete and Portland cement concrete pavement on cement treated base. District VII, Route 60. Vido Kovacevich Co., South Gate, \$87,241; Griffith Company, Los Angeles, \$96,013. Contract awarded to Jesse S. Smith & A. A. Edmonson, Glendale, \$80,610.

**LOS ANGELES COUNTY**—On Olympic Boulevard in the City of Santa Monica, from Eleventh Street to Cloverfield Boulevard, furnish and install intersection lighting systems. District VII, Route 173, S.M.ca. Schurr & Finlay, Inc., Los Angeles, \$9,062. Contract awarded to Electric & Machinery Service, Inc., South Gate, \$8,683.

**MERCED COUNTY**—Between San Luis Creek and Highline Canal, about 4.4 miles, border trenches to be excavated and backfilled with imported subbase material, untreated rock base to be placed over existing surface and new borders, the central portion to be surfaced with plant-mixed surfacing, seal coats to be applied and shoulders to be constructed of material from border trench excavation. District X, Route 32, Section B. Covina Construction Co., Covina, \$99,421; Granite Construction Co., Watsonville, \$99,470; Fredericksen & Kasler, Sacramento, \$104,062; Frank B. Marks & Sons, Newman, \$108,201; Geo. E. France, Inc., Visalia, \$113,168; Ted F. Baun, Fresno, \$138,432. Contract awarded to M. J. Ruddy & Son, Modesto, \$97,454.

**MODOC COUNTY**—Between Chambers Ranch and Alturas, about 10.6 miles, existing surfacing, portions of existing base and imported base material to be cement treated and plant-mixed surfacing placed thereon. District II, Route 28, Section B, Alt. Granite Construction Co., Watsonville, \$268,315; Harms Bros., Sacramento, \$276,302; Mercer, Fraser Co., Inc. and Mercer Fraser Gas and Appliance Co., Eureka, \$299,903. Contract awarded to Clements & Co., Hayward, \$253,970.

**MONTEREY COUNTY**—Between San Simcon and Carmel, five existing bridges to be repaired. District V, Route 56, Sections B, C, D, E. Stolte, Inc., Oakland, \$128,874; Lew Jones Construction Co., San Jose, \$129,502; Baldwin, Straub Corp. and F. P. Basler, San Rafael, \$134,589; Granite Construction Co., Watsonville, \$135,397; C. B. Tuttle Co., Long Beach, \$144,278; Metzger Co., San Pablo, \$148,474; Underground Construction Co., Oakland, \$149,889; N. M. Saliba Co., Los Angeles, \$154,289; Guy F. Atkinson Co., South San Francisco, \$190,671; LeBoeuf-Dougherty Contracting Co. and Erickson-Pierson, Richmond, \$196,929; Charles MacClosky Co., San Francisco, \$254,792. Contract awarded to Wm. Radtke & Son, Gilroy, \$128,172.95.

**MONTEREY AND SANTA CRUZ COUNTIES**—Between Watsonville Junction and Front Street in Watsonville, a structural steel beam bridge on reinforced concrete piers and abutments on timber piles to be constructed and about 0.9 mile to be graded and surfaced with plant mixed surfacing on crusher run base. District V, Route 56, Section J.Wat. Granite Construction Co., Watsonville, \$488,090; Chas. MacClosky Co., San Francisco, \$492,813; C. B. Tuttle Co., Long Beach, \$498,112; Bates & Rogers Construction Co., San Francisco, \$503,994; Chittenden & Chittenden, Auburn, \$506,553; Fredrickson Bros., Emeryville, \$513,093; Fredrickson & Watson Construction Co. & M. K. Corp., Oakland, \$521,812; Lord & Bishop, Sacramento, \$541,697; Barrett & Hilp, San Francisco, \$541,873; Elmer J. Warner, Stockton, \$543,359; Underground Construction Co., Oakland,

\$554,057; Erickson, Phillips & Weisberg, Oakland, \$558,888; Guy F. Atkinson Co., South San Francisco, \$577,062; Judson Pacific-Murphy Corp., Emeryville, \$577,581. Contract awarded to Dan Caputo & Ed Keeble, San Jose, \$476,581.51.

**RIVERSIDE COUNTY**—Across Smoky Gulch and across Coachella Storm Drain, 7.4 miles east and 2.5 miles east of Indio, an existing timber trestle bridge to be redecked with prefabricated structural steel deck units and a new reinforced concrete slab bridge to be constructed. District XI, Route 64, Section H. Frank T. Hickey, Inc., Los Angeles, \$92,703; Charles Mac-Closkey Co., San Francisco, \$93,768; John Strona, Pomona, \$94,123; Thomas Construction Co., Burbank, \$94,545; C. B. Tuttle Co., Long Beach, \$100,481; Clifford C. Bong & Co., Arcadia, \$101,355; E. G. Perham, Los Angeles, \$102,679; Spencer Webb Co., Los Angeles, \$102,944; Hensler Construction Corp., Glendale, \$103,866; Byerts & Sons, Los Angeles, \$104,561; Kyle Steel Construction Co., Los Angeles, \$105,572; H. R. Breeden, Compton, \$107,330; F. Fredenburg, Temple City, \$109,206; Norman I. Fadel, North Hollywood, \$111,138; J. E. Haddock, Ltd., Pasadena, \$116,610; R. A. Erwin, Colton, \$121,795. Contract awarded to K. B. Nicholas, Ontario, \$85,816.35.

**SAN BERNARDINO COUNTY**—Between six miles west of Baker and Mountain Pass, 15 timber trestle bridges to be redecked with reinforced concrete slabs. District VIII, Route 31, Sections K, L, N. N. M. Saliba Co., Los Angeles, \$56,652; E. G. Perham, Los Angeles, \$56,938; H. C. Johnson, Long Beach, \$57,067; Thomas Construction Co., Burbank, \$60,485; J. E. Haddock, Ltd., Pasadena, \$62,712; R. A. Erwin, Colton, \$67,102. Contract awarded to E. L. Thorsten, Santa Monica, \$53,963.84.

**SAN JOAQUIN COUNTY**—In the City of Stockton on Charter Way between French Camp Turnpike and El Dorado Street, about 0.2 mile to be graded and surfaced with plant-mixed surfacing on untreated rock base. District X, Route 75. M. J. B. Construction Co., Stockton, \$50,716; Louis Biasotti & Son, Stockton, \$51,789; Stockton Construction Co., Stockton, \$53,696; Karl C. Harmeling, Stockton, \$65,282. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$49,578.40.

**SANTA BARBARA AND SAN LUIS OBISPO COUNTIES**—Between Santa Ynez River and Jonata Park and between Miles Station and Marsh Street in San Luis Obispo, a net distance of about 9.9 miles, a Class "C-Fine" seal coat to be applied. District V, Route 2, Sections D, E, SLO. Ned H. Mulleneaux, Oceanside, \$24,223; Valley Paving and Construction Co., Inc., Pismo Beach, \$27,172; Tyson & Watters Co., Sacramento, \$28,728; J. Henry Harris, Berkeley, \$28,916. Contract awarded to Madonna Construction Co., San Luis Obispo, \$23,139.20.

**SANTA CLARA COUNTY**—Between 0.3 mile south of Saratoga Avenue in Saratoga and one mile south, about 0.7 mile to be graded and surfaced with plant-mixed surfacing on imported base material. District IV, Route 42, Section A. Louis Biasotti & Son, Stockton, \$70,969; Granite Construction Co., Watsonville, \$74,329; Leo F. Piazza, San Jose, \$75,494; Fredrickson Bros., Emeryville, \$76,339; Nevada Constructors, Inc., Reno, \$77,349; Eugene G. Alves, Pittsburg, \$82,380; Ted F. Baun, Fresno, \$85,517; A. J. Raich Paving Co., San Jose, \$87,969; Guerin & Morgan, Los Gatos, \$95,769. Contract awarded to Dan Caputo & Edward Keeble, San Jose, \$68,639.

**SONOMA, NAPA, SANTA CLARA, SOLANO, SAN JOAQUIN, STANISLAUS COUNTIES**—At various locations, sealing paving joints. Howard B. Folsom, Sacramento, \$29,556; C. M. Syar, Vallejo, \$32,952; Ken H. Jones, Sepulveda, \$36,780; James M. Conlon Co., Los Angeles, \$38,770; Ferrabee & Kennedy, Berkeley, \$39,324. Contract awarded to Concrete Pavement Maintenance Co., San Francisco, \$27,852.

**SONOMA COUNTY**—Between Petaluma Creek and Tolay Creek, about 3.9 miles to be graded and surfaced with plant-mixed surfacing on cement treated base. District IV, Route 8, Section A. R. A. Heintz Construction, Portland, Ore., \$476,133; Fredrickson & Watson Construction Co., Oakland, \$493,415; Parish Bros., Benicia, \$493,552; Fredrickson Bros., Emeryville, \$493,783; United Concrete Pipe Corp., Ralph A. Bell and Westbrook & Pope, Sacramento, \$508,774; Dan Caputo and Edw. Keeble, San Jose, \$519,335; Louis Biasotti & Son, Stockton, \$520,220; A. Teichert & Son, Inc., Sacramento, \$523,450; Eaton & Smith, San Francisco, \$539,237; A. G. Raich Co., San Francisco, \$542,534; Arthur B. Siri, Inc. and Chittenden & Chittenden, Auburn, \$581,535; Chas.

L. Harney, Inc., San Francisco, \$588,956; H. Earl Parker, Inc., Marysville, \$593,660; Sharp & Fellows Contracting Co., Los Angeles, \$614,470; Vinnell Co., Inc., Alhambra, \$633,186. Contract awarded to Piombo Construction Co., San Francisco, \$473,012.20.

**STANISLAUS COUNTY**—Between 0.15 mile south of Patterson and I Street in Patterson, about 0.5 mile to be graded and surfaced with plant-mixed surfacing on untreated rock base. District X, Route 41, Section B, Pat. M. J. Ruddy & Son, Modesto, \$27,520; Louis Biasotti & Son, Stockton, \$31,854; A. Teichert & Son, Inc., Sacramento, \$33,594; Frank B. Marks & Sons, Newman, \$37,465; Karl C. Harmeling, Stockton, \$38,061; Tyson & Watters Co., Sacramento, \$40,145. Contract awarded to H. Sykes, Patterson, \$27,247.05.

**TEHAMA COUNTY**—Across South Fork of Cottonwood Creek, about 15 miles west of Red Bluff, two new steel beam spans with reinforced concrete deck supported on a new reinforced concrete pier and abutment to be constructed for the repair of the existing bridge. District II, Route 29, Section E. B. S. McElderry, Berkeley, \$14,859; Weidmer Construction Co., Oakland, \$15,543; Shaul Construction Co., Hayward, \$16,284; O'Connor Bros., Red Bluff, \$17,450; Liston Ehorn, Red Bluff, \$17,770; J. P. Brennan, Redding, \$17,952; Bos Construction Co., Oakland, \$17,990; James H. McFarland, San Francisco, \$18,590. Contract awarded to Evans Construction Co., Berkeley, \$13,751.30.

**TULARE COUNTY**—Between 0.5 mile south of Tagus and Route 10, portions, about 2.9 miles, existing pavement on west lanes to be resurfaced with plant-mixed surfacing. District VI, Route 4, Section F. Gene Richards and Rex B. Sawyer, Fresno, \$56,667; Valley Paving & Construction Co., Inc., Pismo Beach, \$59,350; Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$64,340. Contract awarded to Geo. E. France, Inc., Visalia, \$55,723.

## F.A.S. County Projects

**MADERA COUNTY**—Across Little Fine Gold Creek, about 7.5 miles north of O'Neals, a reinforced concrete girder bridge to be constructed and approximately 0.5 mile of roadway to be graded and bituminous surface treatment applied. District VI, Route 962. Thomas Construction Co., Burbank, \$39,306; Munn & Perkins, Modesto, \$42,755; Miles & Bailey, Madera, \$43,821; M. J. B. Construction Co., Stockton, \$46,397; Trewhitt-Shields & Fisher, Fresno, \$47,445. Contract awarded to W. C. LeFever & D. Gerald Bing, Sacramento, \$38,659.75.

**PLACER COUNTY**—Between north fork of American River and 2.3 miles easterly, about 2.3 miles to be graded. District III, Route 767. Louis Biasotti & Son, Stockton, \$240,135; United Concrete Pipe Corp., Ralph A. Bell and Westbrook & Pope, Sacramento, \$252,355; Fred J. Maurer & Son, Eureka, \$254,330; A. Teichert & Son, Inc., Sacramento, \$274,185; Geo. E. France, Inc., Visalia, \$274,340; N. M. Ball Sons, Berkeley, \$303,373; Silva & Hill Construction Co., Los Angeles, \$317,645; Arthur B. Siri, Inc., and Chittenden & Chittenden, Auburn, \$333,990; H. Earl Parker, Inc., Marysville, \$334,155; Fredrickson & Watson Construction Co., Oakland, \$345,724; Fredrickson Bros., Emeryville, \$359,751; Piombo Construction Co., San Francisco, \$400,108; George Pollock Co., Sacramento, \$472,380. Contract awarded to J. P. Brennan & M. W. Brown, Redding, \$225,310.

**SUTTER COUNTY**—Between Nicolaus Bridge and Tudor Road, about 7.3 miles, plant-mixed surfacing to be placed over existing pavement. District III, Route 926. Rice Brothers, Inc., Marysville, \$68,766; Harms Bros., Sacramento, \$71,660; Clements & Co., Hayward, \$73,825; Granite Construction Co., Watsonville, \$80,115; Louis Biasotti & Son, Stockton, \$80,225; C. M. Syar, Vallejo, \$86,695. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$66,540.

**TULARE COUNTY**—Across Kaweah River and at Ketchum Ditch, about 10 miles northeast of Visalia, a reinforced concrete slab bridge and a reinforced concrete double box culvert to be constructed. District VI, Route 1140. Anderson Co., Visalia, \$53,894; Thomas Construction Co., Burbank, \$54,181; E. H. Peterson & Son, Richmond, \$55,188; M. J. B. Construction Co., Stockton, \$55,674; F. Fredenburg, Temple City, \$55,778; N. M. Saliba Co., Los Angeles, \$59,890; Dan Caputo, San Jose, \$60,202; Trewhitt-Shields & Fisher, Fresno, \$60,605; Munn & Perkins, Modesto, \$65,987; O'Connor Bros., Red Bluff, \$86,636. Contract awarded to C. B. Tuttle Co., Long Beach, \$52,388.

## State Mourns Death of Thomas McCormack, Good Roads Leader

**F**ORMER State Senator Thomas McCormack of Solano County died in Sacramento last August 17th. During 33 years of continuous service in public office he was a staunch supporter of good roads legislation. He first was appointed to the Solano County Board of Supervisors by Governor Hiram Johnson in 1915. He served 20 years in the State Senate, retiring this year.

Senator McCormack was one of the men responsible for the enactment in 1947 of the Collier-Burns Highway Act after a memorable battle with interests opposed to an increase in the gasoline tax and development of the California State Highway System.

On August 18th, the California Highway Commission in session in Sacramento adopted the following resolution:

**WHEREAS**, This commission has been profoundly shocked by the sudden death of the Honorable Thomas McCormack, of Solano County, for many years a member of the Legislature of this State; and

**WHEREAS**, Senator McCormack, for more than a generation, was a leader in the good roads movement in California, having been a member of the committee which formulated and presented to the people the State Highway Bond Issue of 1919; and

**WHEREAS**, As a member of the Board of Supervisors of the County of Solano, and subsequently as a member of the State Senate, and particularly as chairman of its standing committee to which was referred all legislation respecting roads and highways, he gave wholehearted and effective support to the highway program of California, in the interest of the development of the entire State; and

**WHEREAS**, His life was one of honor and integrity and unswerving loyalty to the public interest, a life that exemplified the best tradition of Americanism; now, therefore, be it

**RESOLVED**, By the California Highway Commission, that it hereby acknowledges its great admiration for the accomplishments, during his lifetime, of Senator Thomas McCormack; that it hereby expresses, on behalf of the commission and its individual members, and the Department of Public Works of the State of California, its sense of the great loss that has been suffered by the people of this State; and that it hereby extends to the members of the family of Senator McCormack the sincere sympathy of the commission and of the department upon his passing; and be it further

**RESOLVED**, That when the commission this day adjourns it do so out of respect to the memory of the late Senator Thomas McCormack, and that this resolution be spread upon the minutes of the meeting, and that the secretary be, and he is hereby, instructed to forward a certified copy of this resolution to the members of the family of Senator McCormack.

## In Memoriam

FREDERICK H. PAGET

Fred Paget, Senior Hydraulic Engineer in charge of Snow Surveys for the Division of Water Resources, died suddenly September 16, 1949, while on a field trip in Trinity County.

Fred's death was caused by coronary occlusion. He had spent the night in a Forest Service camp ground near Coffee Creek. In the morning he packed his car, waved a cheery goodbye to other campers and started down the road. He traveled only a block's distance when his heart stopped. His car stalled against the road bank where he was found.

He died performing a task he loved—stocking his snow survey cabins for the winter. The comfort and safety of the men making the surveys in the dead of winter were details to which he devoted much of his time. Under his direction the number of snow courses had doubled and the accuracy of his forecasts of runoff in summer has been widely heralded.

Fred was no remote control worker. He had personally laid out most of the 280 courses in the high mountains.

Frederick Hilton Paget was born September 2, 1898, in Novia Scotia, Canada. His early education was in schools in Canada and at Magill University. During World War I he served in the Canadian Army as a Lieutenant of Engineers. After the war he came to California, graduating from U. C. with a degree of B.S. in 1920.

He first entered state service as a Junior Hydraulic Engineer in 1930. From 1933 to 1936 he was with the U. S. Forest Service. Returning to the Division of Water Resources in 1936 he started work on snow surveys and headed that function at his death. He was serving as president of the Sacramento section of the American Society of Civil Engineers this year.

Fred is survived by his wife Muriel and his son Curtis of 2749 13th Street, Sacramento; by his brother Roff Paget of New York; and by his sisters Mrs. Florence Perry and Mrs. Edith Truman, both of San Francisco.

## Ramona Freeway Assured Rapid Development

CONTINUED PROGRESS eastward from Los Angeles to the Ramona Freeway during the Fiscal Year 1950-51 is assured, according to Harrison R. Baker, State Highway Commissioner of Pasadena, who announced that \$1,896,400 has been budgeted by the Highway Commission for Ramona Freeway projects.

Specifically, this sum will be used to improve a section of the freeway from 0.2 mile east of Helen Drive to Hellman Avenue in Los Angeles County. The total of \$1,896,400 includes costs of construction, engineering, and right of way.

In addition to this improvement, a new Ramona Freeway project was placed under contract on September 1st calling for construction to freeway standards of the section from Indiana Street to 0.2 mile east of Helen Drive. This should be completed in time for work to start in the 1950-51 year on the budgeted project announced today.

Projects already completed on the Ramona Freeway from Macy to Indiana including construction, fencing and erosion control, amount to \$305,300.

Including these costs, as well as right of way, projects under contract, and budgeted project appropriations, a total of \$4,544,700 has been made available to the Ramona Freeway.

"Recent budgeting of new funds for the Ramona Freeway," said Mr. Baker, "insures continued progress on the freeway in eastern Los Angeles County to connections in western San Bernardino County. It is hoped that satisfactory solution will be found on freeway locations in this area so that further development of this route may be consistent with funds as they become available to the Highway Commission."

The commission's 1950-51 budget for District VII, with headquarters in Los Angeles, calls for \$19,719,000 for construction and \$9,620,000 for right of way. Total Southern California area budget includes \$30,816,000 for construction and \$11,895,000 for right of way.

## In Memoriam

GEORGE A. CRAYTON

Members of the Bridge Department and the Division of Highways were saddened by the passing of George A. Crayton, Associate Bridge Engineer, at the age of 64. Mr. Crayton had been ill for some time and was in Sacramento at the time of his passing.

Mr. Crayton was born in Lima, Ohio, on August 3, 1884, and attended Ohio State University. After starting with the Indiana, Columbus & Eastern Electric Railway in 1906, he held several different positions in Ohio until he established a private engineering practice 10 years later, in 1916.

He came west in 1917 to work for the U. S. Bureau of Public Roads in Portland, Oregon. He returned to the middle west in 1919, working for the South Dakota and Illinois State Highway Departments until 1924 when he came to California with the California Petroleum Company.

Mr. Crayton became engineer for the City of Long Beach in 1927, and after that for the City of Laguna Beach, which position he held until 1933 when he started work with the Division of Highways, Bridge Department. He remained with the Bridge Department from that date.

Mr. Crayton was a member of the Masonic Fraternity and in his travels about the country took a great deal of pleasure in collecting historic relics in connection with the development of the Lodge in California.

The department extends its sympathy to Mr. Crayton's family.

### THE WORST SPEED

Centuries before the automobile was invented, Erasmus, the Dutch scholar, observed that "such persons as do make the most haste in the beginning, have commonly the worst speed toward the ending." For your own safety's sake, keep this thought in mind when you drive.

## Au Revoir

*Continued from page 23 . . .*

nature, Mr. Cortelyou played a vital part in the planning and construction of the Terminal Island Freeway. The great lift span bridge over Cerritos Channel was designed by the Sacramento bridge office under the supervision of F. W. Panhorst, and was constructed with the approaches on Terminal Island under contracts supervised by the U. S. Navy. All other design work and construction contracts, with the exception of major grade separation bridge structures, were handled by the district. Many difficult negotiations for rights of way were settled through the personal efforts of Mr. Cortelyou, with splendid cooperation on the part of various railroad companies and harbor and city engineering organizations of both Los Angeles and Long Beach. The fruition of efforts resulting in the completion of

this federally financed freeway project was a tribute to all concerned.

Other great freeway projects initiated under Mr. Cortelyou's supervision are the Ramona Freeway, the Santa Ana Freeway, and the Hollywood Freeway, all of which are under progressive construction at the present time. That portion of the Harbor Freeway acting as a distributor for Los Angeles downtown traffic, connecting through the already completed "Four-Level Interchange" structure with the Arroyo Seco, the Santa Ana and the Hollywood Freeways, is likewise under construction. The Santa Ana Freeway is at the present time completed and open to traffic as far as Eastman Street, a distance of about four miles. The Hollywood Freeway will be paved and opened to traffic next year for a distance of three miles between Virgil Avenue and Grand Avenue near the Los Angeles Civic Center. The Ramona Freeway will be extended to Helen Drive next year providing a total length

of four miles of completed freeway. By 1953, if financing can be provided, the Hollywood Freeway should be completed from the Los Angeles River to Vineland Avenue; the Santa Ana Freeway should be completed from Los Angeles to Santa Ana with the exception of one short section between Rosemead Boulevard and Norwalk; and the Ramona Freeway should be completed to Rosemead Boulevard.

These are all freeway projects of great complexity in design, acquisition and clearing of rights of way, and construction, and will stand as monuments to the engineering genius of a great man, Spencer V. Cortelyou. More particularly will they stand as testimonials to his greater genius for working in harmony with his own organization and with public officials and engineering staffs of counties and cities so that their combined efforts represent truly cooperative enterprises in the public welfare and interest of value beyond measure.

*Portion of legion of friends of S. V. Cortelyou at barbecue in his honor*





*This is a partial view of the foundations for the new Capitol wing. Elevator pits are shown in center left*

## Capitol Addition

*Continued from page 42 . . .*

were not less than 3 feet 6 inches in depth and widths varied from 4 feet to 10 feet. All footings were reinforced for moment and shear; stirrups were all of the same type and placed in pairs two inches apart, thus making it feasible to adjust for varying footing widths.

Existing cesspools extending below the foundation grade were excavated and backfilled with clay-silt obtained from elevator pit and sump excavations. Rigid control was maintained during the backfilling operations in order to develop a density equal to the adjacent natural material.

Due to the necessity for providing access for trucks and equipment to the

demolition work which was carried on concurrently with construction of the foundations, and furthermore because bridging of trenches would be required, the contractor decided that it would not be feasible to perform all of the required excavation in advance of concreting. Instead he developed a plan of operations to divide the foundation area into some twenty pours of about 200 cubic yards each. The operations for each pour consisted of excavating, placing of reinforcing steel, and concreting on successive days. Concrete was mixed and placed with a 35-foot boom paving machine of 1½ cubic yard capacity.

The work was done under contract, by the Continental Construction Company of Sacramento. The design was the conception of Frank A. Johnson,

Principal Structural Engineer who had general charge of the structural design. The contract was administered under Anson Boyd, State Architect, with field supervision activities under the direction of D. C. Willett, Chief Construction Engineer. The design of the grid foundation was done by Ernest Aeppli, Senior Structural Engineer, and involved a great deal of intricate computing. Much of the success of the operations was due to the technical efforts of Herman C. Muller, Senior Structural Engineer who did the research work on the old building and whose ingenuity was responsible for the general design of the reconstructed wall and who also conducted the jacking operations. The writer had direct charge of the field operations, as Acting Construction Engineer.

**EARL WARREN**

*Governor of California*

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**CHARLES H. PURCELL**

*Director of Public Works*

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**FRANK B. DURKEE**

*Deputy Director*

•

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- STEWART MITCHELL . . . . . Principal Bridge Engineer
- E. R. HIGGINS . . . . . Comptroller

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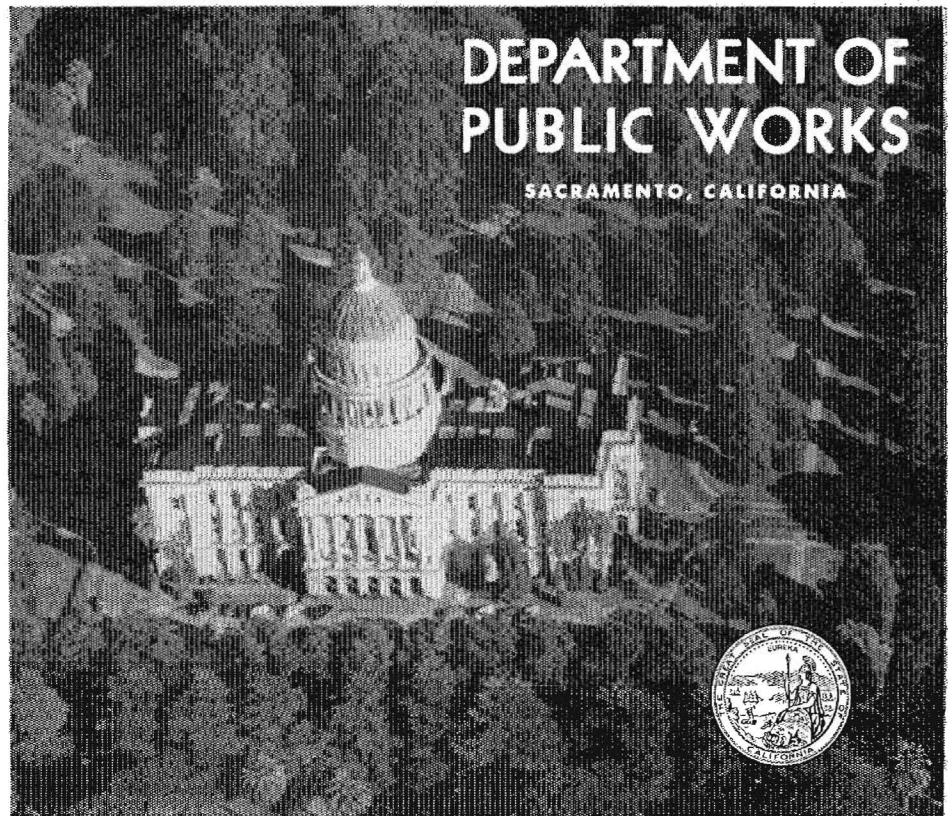
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- GEORGE S. PINGRY . . . . . Assistant Chief
- R. S. J. PIANEZZI . . . . . Assistant Chief
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**District IV**

- JNO. H. SKEGGS . . . . . Assistant State Highway Engineer

**District VII**

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**SACRAMENTO, CALIFORNIA**

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- P. T. POAGE Assistant State Architect (Design and Planning)
- D. C. WILLET . . . . . Chief Construction Engineer

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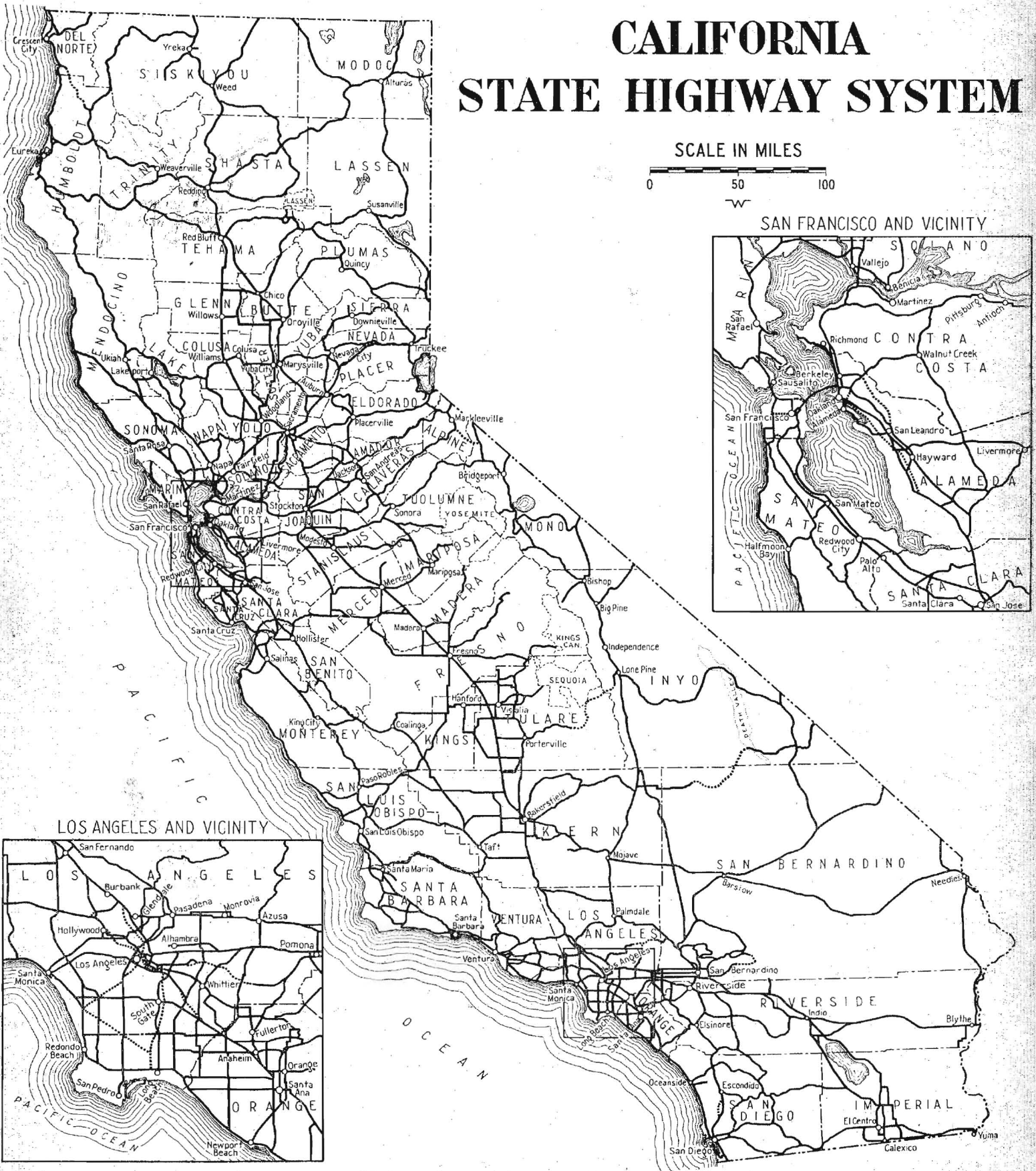
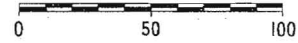
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- CARLETON PIERSON . . . . . Supervising Specification Writer
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- C. A. HENDERLONG . . . . . Principal Mechanical and Electrical Engineer
- WADE HALSTEAD . . . . . Supervising Estimator

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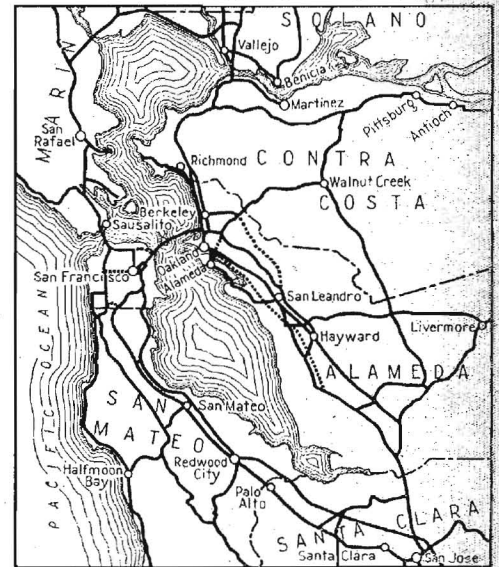
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# CALIFORNIA STATE HIGHWAY SYSTEM

SCALE IN MILES



SAN FRANCISCO AND VICINITY



LOS ANGELES AND VICINITY

