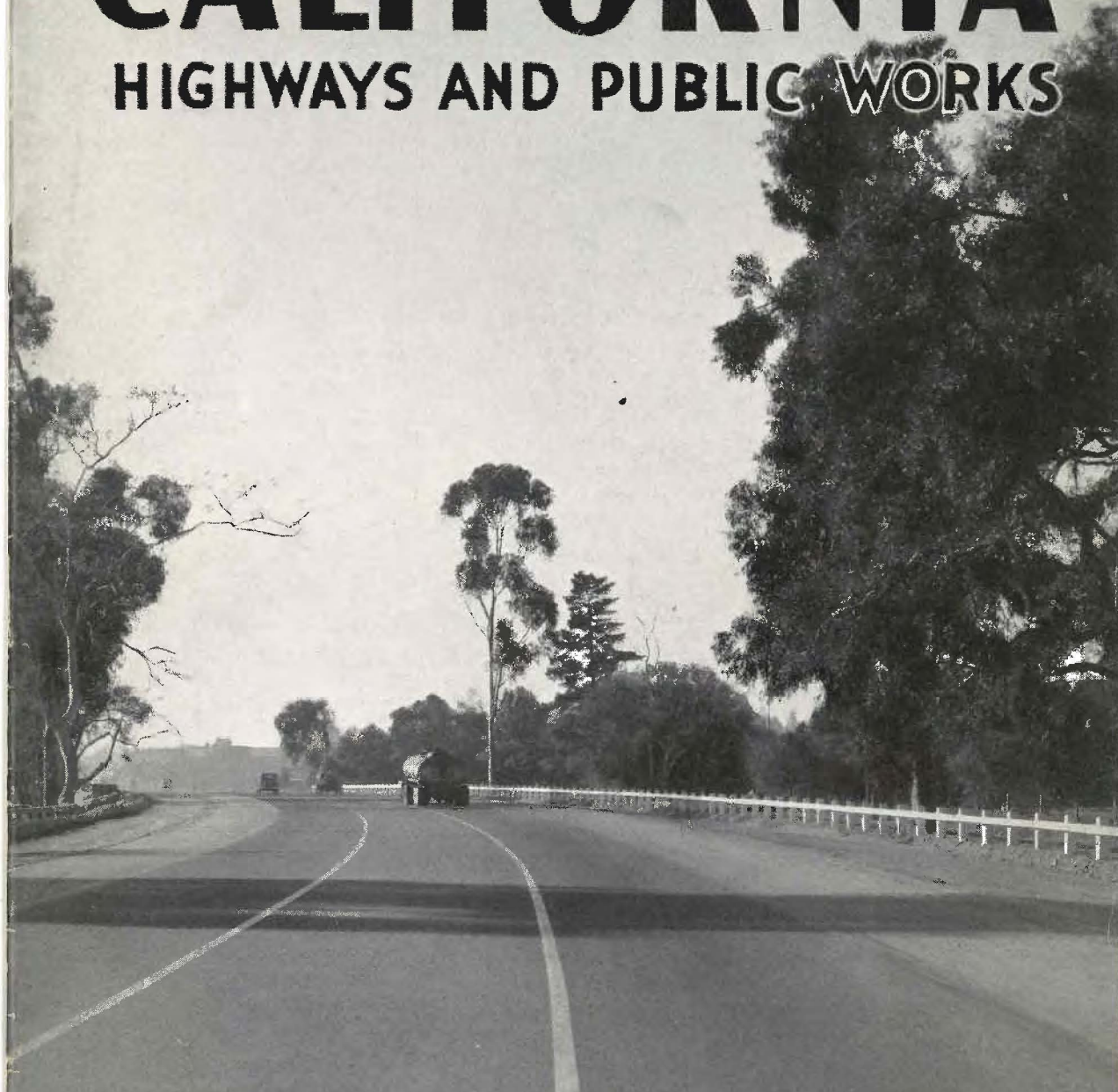


CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



*Santa Barbara Through Traffic
Boulevard on Coast Route (U.S. 101)*

Official Journal of the Department of Public Works
MAY 1935



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Gas Tax Diversions Would Stop All Highway Construction for Next 2 Years

Threatened Depletion of State Revenues Will Leave Balance of Only \$8,419,000 for Entire State Outside of Cities and Entail Loss of Approximately \$20,000,000 of Federal Aid Funds

By EARL LEE KELLY, Director of Public Works

SIX MONTHS ago it was predicted in these columns that the incoming Legislature would be urged to pass bills diverting millions of gasoline tax revenue to other than highway purposes, and warning was given that any such diversion would seriously cripple our highway program, resulting in a loss to the State of many millions of Federal aid funds in addition to imperiling our highway investment and throwing thousands of highway workers on to community relief rolls.

That prediction has come true. We are confronting a crisis vastly greater and more serious in its effect upon our highway system than has ever been faced before in the history of this State, entailing, as it does, a complete cessation of all highway construction for the next two years.

As this issue goes to press, the State is threatened with a loss of \$19,984,000 of gasoline tax and motor vehicle fee funds, out of an estimated total of \$51,800,000 for the ensuing biennium, through allocation and appropriation of an additional $\frac{1}{4}$ cent to city streets and a proposed diversion of funds for bond interest and other governmental functions.

In addition, as a result of such diversion,

the State may lose directly and indirectly approximately \$20,000,000 of available Federal aid funds, out of a possible total of \$36,859,000.

Considering the State highway revenues alone, after deducting cost of administration and maintenance, diversion bills now before the Legislature would leave a balance of only \$8,419,000 of highway funds for the entire State outside of cities.

This sum, as divided by law between the North and the South, would provide but \$2,289,968 for use on primary roads in the North and \$1,919,532 for primary South.

Of the \$2,289,968 primary North there is obligated by State law and contract with the Federal government the sum of \$3,300,000 for approaches to the San Francisco-Oakland Bay Bridge. A deficit of more than

\$1,000,000 would have to be taken from secondary North, leaving approximately \$1,100,000.

Of this balance \$300,000 is obligated by Joint Highway District law on contracts for the low level tunnel between Alameda and Contra Costa counties, Joint Highway Dis-



EARL LEE KELLY

"California at Work" Motif of Great State Display at San Diego Exposition

By **EDWARD J. NERON**, Deputy Director of Public Works

CALIFORNIA goes back to its "cradle" this month to picture its progress and development at California Pacific International Exposition, opening May 29 in San Diego—birthplace of the State's civilization.

International in scope, the world will visit the "City by the Silver Gate" to appraise "California at work" which is the general motif of the display in the spacious exposition palace dedicated to the Golden State.

The new State Building recently completed with PWA funds and SERA labor is 228 feet long and 118 feet wide and has a floor space of approximately 27,000 square feet, in which to house the State's exhibits, to be gathered and erected under administration of the State Department of Public Works.

To provide for a fine, comprehensive display of California at work, the present Legislature has supplied the Department of Public Works with a fund of \$75,000 to be administered under the direction and supervision of Director Earl Lee Kelly, who has appointed Adolph Muehleisen as State Commissioner in charge of the State Building and exhibits.

The California State Building, an architectural triumph in combining early American Mayan and Aztec style with modern construction, is situated at the southwestern corner of Palisades plaza, around which are constructed a \$2,000,000 Ford Building, a beautiful Palace of Education, Palace of Movies, a gigantic Transportation Building, Federal Building and Standard Oil Company's structure.

HANGING GARDEN DECORATIONS

A feature of the facade development of California's building is the hanging garden treatment. The main entrance from the plaza side will show four great murals, picturing scenic grandeur of the State, agricultural development, commerce and natural resources. The murals are the work of Juan Larrinaga, art director of the exposition.

Of the approximate 27,000 square feet of exhibit space in the State Building, 17,000 square feet is allocated to county exhibits and 10,000 square feet to State departmental displays.

Development of the State Building exhibits according to the general theme of "California at Work" is under direction of Orville Goldner, who is also supervising work of the Palace of Education. Mr. Goldner, an authority on art technique of the theatre and screen, is

noted for his creative genius in the production of great movie spectacles, having been associated with large studios for many years. He was also art and technical director of the Shakespeare Guild of America and is instructor in technique of the theater at Stanford University summer school. He is a graduate of the Museum School of Design, Toledo, Ohio, and California School of Arts and Crafts.

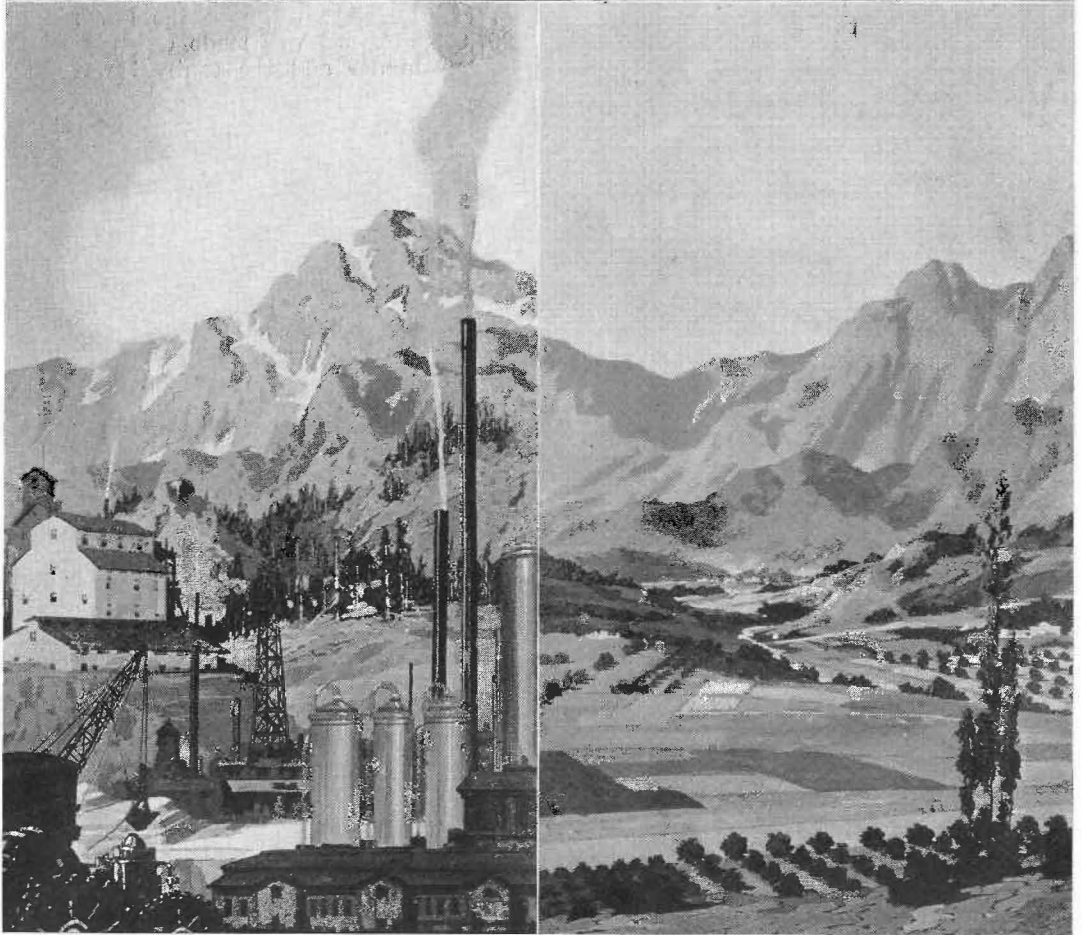
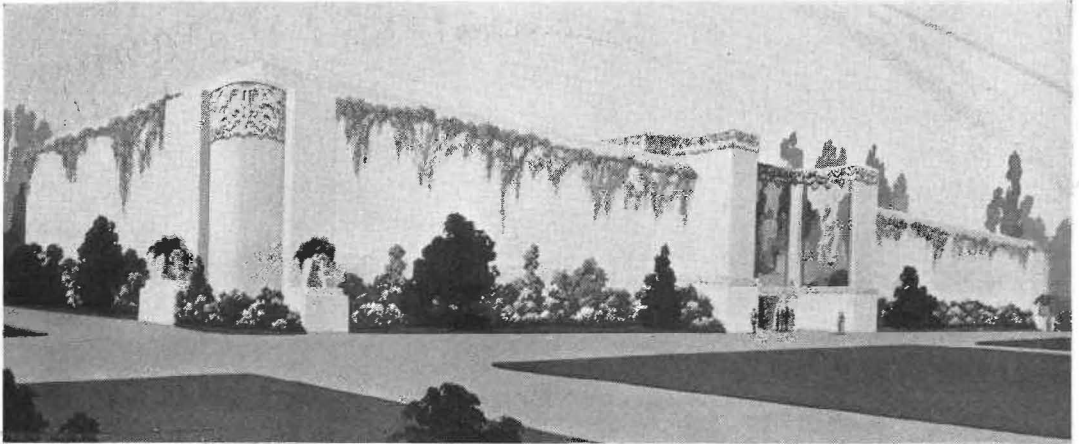
HUGE RELIEF MAP FEATURE

Under his direction a great relief map of California, 120 feet long and 12 feet wide, has been made to form the central division of the building and around and under the map will be developed the various departmental

(Continued on page 24)



EDWARD J. NERON



STATE BUILDING AT SAN DIEGO EXPOSITION is a combination of early American Mayan and Aztec style of architecture with hanging garden decorative treatment of facades. The structure is 228 feet long by 118 feet wide and has 27,000 square feet of floor space. Below are shown two of the four great mural panels picturing the agriculture, commerce and natural resources of the State that adorn the sides of the main entrance to the building from the plaza. State and county exhibits will divide the floor space with numerous working models giving realistic portrayals of important activities.

Progress on M Street Bridge at Sacramento Promises Opening in Fall

By W. A. DOUGLAS, Assistant Construction Engineer of Bridges

IN 1910 the Sacramento Northern Railway Company constructed a through steel truss railway bridge across the Sacramento River connecting Sacramento and Yolo counties at the foot of M Street. With financial assistance from these two counties the bridge was provided with narrow roadways and sidewalks cantilevered out from the frames. The bridge was built with a swing span to accommodate river traffic. The operation of the swing span was slow and involved a considerable loss of time to vehicular traffic desiring to use the bridge.

In spite of the restricted roadways and delays due to slow operation, the bridge has served traffic, carrying the majority of travel between Sacramento and the San Francisco Bay region, the Redwood Highway and the West Side Highway to the north for 25 years. During the early part of this period the capacity of the two roadways was well in excess of the demands placed upon it. However, with the increase in density and speed of automobile traffic during the last 15 years thoroughfares which appeared broad and highly satisfactory prior to 1920 have become entirely too narrow and cramped for safe, comfortable travel.

Civic pride, too, had a hand in hastening the obsolescence of the 1910 bridge. With the bulk of passenger travel switching from rail and water to highways it has become increasingly important that an attractive as well as adequate highway entrance to the State's capital city be provided.

FOUR GOVERNMENTS COOPERATE

The pressure of local demand and highway necessity finally culminated in the provision of funds by the city, county, State and Federal governments in 1933 followed immediately by the necessary studies, preparation of agreements with interested and affected parties and the preparation of plans and specifications leading up to the advertising of the work June 1, 1934. An enlightening discussion of the multitude of problems and difficulties encountered in the preliminary stages of this project can be read in an interesting article entitled "New M Street Bridge

at Sacramento to be under construction in the spring," written by F. W. Panhorst, acting bridge engineer, which appeared in the January, 1934, number of this magazine.

On June 27, 1934, eight proposals for the construction of the new M Street Bridge were received by the Division of Highways. The totals of the proposals ranged from the high bid of \$1,025,224 down to the low bid of \$907,365. Award was made on July 14 to the low bidder and the contract was duly approved on July 31.

Work began immediately on preparations to excavate for and pour the concrete river piers and to construct the temporary railroad shoofly trestle. The contractor's principal concern during the fall was the completion of the river piers before progress should be hampered by winter rises in the river level.

FOUR COFFERDAMS DRIVEN

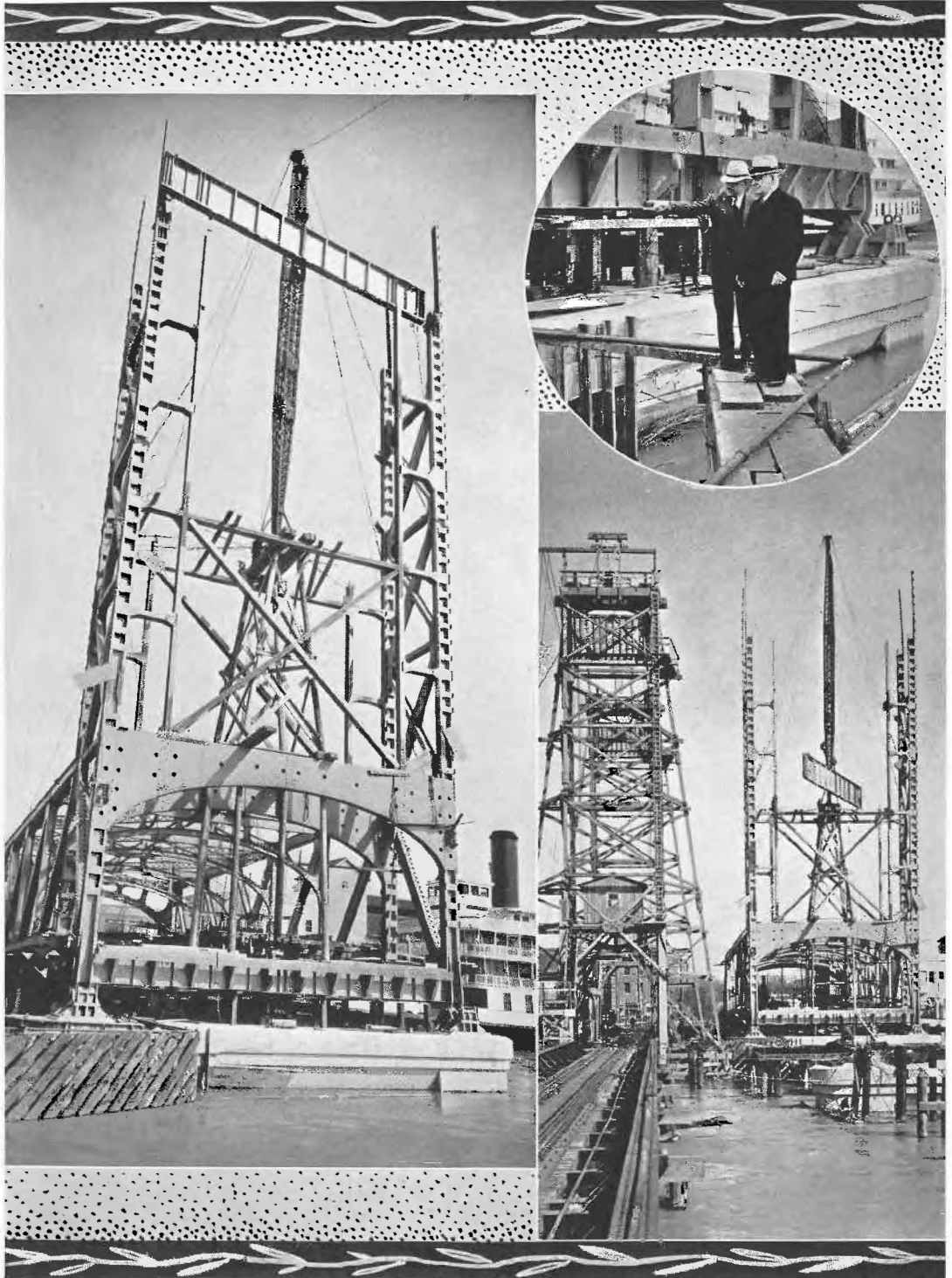
Plans required that excavation for these piers be carried down through the silt, sand and gravel of the river bed to suitable foundation at elevation -50, or approximately 55 feet below the summer level of the river. To accomplish this work the contractor, after first predredging the pier sites, set up and drove 60-foot steel sheet pile cofferdams. Four of these deeper pier footings were required—two each for the two main or rest piers.

Due to interference with the operation of the swing span of the old bridge only two diagonally opposite cofferdams could be driven simultaneously. No unusual difficulty was encountered either in driving the cofferdams or excavating.

To balance the hydrostatic pressure it was necessary to pour a concrete seal approximately 24 feet in thickness in each cofferdam before the water could be pumped out. Each of the four cofferdams was about 30 feet in diameter requiring for the seal alone nearly 650 cubic yards of concrete. Five transit-mixers were used and each of the four seals was placed by continuous pouring from 18 to 22 hours.

With tight seals in place each cofferdam could be pumped readily and the piers com-

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CONSTRUCTING EASTERLY LIFT TOWER OF M STREET BRIDGE at Sacramento—This huge steel structure has now been built to practically its full height which will be about 200 feet above low water. Inset shows Governor Frank F. Merriam inspecting massive bearings of the lift tower. Below, a view of the temporary wooden detour bridge and a derrick lifting one of the new tower girders into position.

Sacramento Flood Control Project Proved Efficiency During April Storm

By R. L. JONES, Deputy State Engineer

A VERY convincing demonstration of the efficiency of the Sacramento Flood Control Project occurred last month when following a week of intermittent showers, a storm of fair intensity developed over the Sacramento Valley and the Sierra Nevada watersheds, commencing on April 6th. The rainfall was heavy in the valley areas and in spots in the mountain and foothill watersheds, but was not sufficiently sustained to produce a serious flood.

The resulting stream flows reached only medium flood stages, with few exceptions. Generally, the flood was about one-quarter of the maximum flood for which the Sacramento Flood Control Project is designed, although some of the channels carried a greater proportionate flow. No completed part of the project was endangered.

Rainfall commenced on the afternoon of April 6th and continued through April 8th. Precipitation was not especially heavy on the upper Sacramento River watershed, but was fairly heavy, although spotted, on the Feather, Yuba and American River watersheds, reaching almost cloudburst proportions on the lower Bear River watershed and adjacent foothill areas.

The precipitation in the mountains above the 5000-foot elevation was practically all snow. Throughout, the rainfall was of short duration and was not preceded by preparatory rainfall, so that conditions necessary to produce a major flood were absent.

The rainfall in the city of Sacramento was unusually severe, breaking several records as to rate of fall. A total of 3.19 inches fell on Sunday, April 7th. Many streets were flooded for short periods and the city drainage system was severely overtaxed. However, no serious damage was done, although a few basements were flooded.

Rainfall at Representative Stations
(For 24-hour period ending at 7 a.m.)

Name	April 7	April 8	April 9
Delta	1.25	1.74	.06
Dunsmuir	.67	1.60	T
Kennett	1.32	1.68	1.06
Red Bluff	.80	.64	.12
Knights Landing	.41	1.34	.14
Quincy	2.00	.93	--
Oroville	.90	.82	.24
Folsom	.44	2.00	1.02
Sacramento	.37	3.19	.21
Placerville	--	2.42	.23
Colfax	.62	3.90	.15
Grass Valley	2.63	1.80	.98
Blue Canyon	2.53	1.98	.04



R. L. JONES

The total storm rainfall was light compared with that of 1928. The March 1928 storm covered a period of six days, with total precipitation as follows: Kennett, 6.94 inches; Quincy, 9.80 inches; Nevada City, 12.70 inches; Placerville, 10.90 inches; Blue Canyon, 14.40 inches; Oroville, 4.82 inches.

The stages reached in the various river and flood channels were not excessive and, except in a few instances in relation to uncompleted levees of the project, resulted in no dangerous conditions and need not have caused alarm. The

heights reached by the water at various points are given in the table below:

Water Surface Heights

Station	Time of crest	Gage height	Flood height
Colusa	8.30 a.m., April 10th	25.1	30.3
Tisdale weir	5.00 p.m., April 10th	48.2	53.0
Knights Landing	11.30 a.m., April 10th	30.2	34.6
Folsom	8.45 a.m., April 8th	18.8	--
Sacramento, I St.	5.00 p.m., April 8th	28.6	31.3
Verona	All day on April 9th	35.8	41.8
Marysville	7.00 a.m., April 9th	17.3	26.2
Nicolaus	1.30 p.m., April 9th	20.5	28.1
Sacramento weir	6.00 p.m., April 8th	32.6	34.5
Lisbon	7.00 p.m., April 10th	17.3	26.2

(Continued on page 14)



FLOOD SCENES NEAR SACRAMENTO—At top, squatters' cabins in American River overflow area. Center—Aerial photograph showing confluence of swollen Sacramento and American Rivers with the city of Sacramento protected by levees and Yolo By-Pass from any extensive damage by flood waters which only reached low, overflow areas in environs. Below, scene along American River at 12th Street Bridge showing State highway through North Sacramento partially submerged.

Hydraulicking Highway Cut Through Mountain Costs 2.26 Cents Per Yard

By **WALTER B. LITTLE**, Acting Resident Engineer

WHEN the Highway Commission on April 29, 1932, authorized the construction of the road between Weaverville and Junction City, on State Highway Route 20, in Trinity County, an engineering investigation was made of the conditions to be encountered and it was decided to excavate a huge roadway cut through the summit of Oregon Ridge by hydraulic means, as an economical and sound procedure.

The existing road passes over Oregon Ridge, to the south of the selected route, with grades in excess of 15 per cent and curves of short radii.

As the use of hydraulic methods is a departure from usual procedure in excavation for highway construction, the conditions encountered have proved of interest in the solution of many and varied problems.

METHOD PROVEN SUCCESSFUL

In this particular case, the first year's operation has thoroughly demonstrated the success of this method of excavation where the lay of the land and the availability of a water supply furnish the fundamental principles justifying such a step.

During the first nine months of actual operation of the hydraulic plant, 1,557,000 cubic yards were excavated at a cost of only 2.7 cents per cubic yard, or less than one-tenth the cost of excavating by ordinary methods and the total for 11 months was 2,481,000 yards at a unit cost of 2.26 cents per cubic yard.

At the head of Oregon Gulch, on the west of the ridge, is the mine pit of the La Grange Mining Company, formerly one of the largest hydraulic gold mines in the world, but idle for many years. This pit, once a hill but now a shallow hole covering 300 acres, is bounded on the east by the summit of Oregon Ridge, which drops off precipitously for 100 feet in elevation to the surface of the loose gravelly debris in the pit; while on the west, Oregon Gulch slopes gently down to its junction with the Trinity River.

To the south is a ragged, broken country unsuitable for road location; but on the north of the pit is a steep, smooth plane of bedrock,

upon which it is proposed to locate the highway.

MASS IS SLIDING

In the area where this north rim joins the summit ridge, comprising some 35 acres, is a mass of heterogeneous debris, varying from 50 to 150 feet in depth. Continuing a movement started years ago by the operations of the La Grange Mine, this mass of material is creeping across the line of the proposed road at a rate of one and one-half feet per month, which required its removal, estimated at 3,000,000 cubic yards.

Fortunately, this slide is composed of soft material, such as sand, fine gravel, finely crushed bedrock and clay seams and masses. The ridge proper, as discovered through geologic investigation, is also composed of such materials as stratified gravel, clay and boulders, though considerably harder than the material of which the slide is composed. This formation is at least 300 feet deep. Both formations, however, are suitable for excavation by hydraulic means; and the material in the sliding mass is ideal for that purpose.

OLD EQUIPMENT LEASED

The greatest handicap in most hydraulic undertakings is the heavy expense involved in the preparation for actual operation, in the construction of canals, pipelines, flumes, and in the acquisition of water rights. The La Grange Mining Company had, and was willing to lease, hydraulic equipment of all kinds, a dumping ground for tailings in Oregon Gulch, and a water supply system which could provide water by gravity for the operation of the hydraulic monitors.

All that was necessary was for the State to repair and supply conduit, eleven miles of flume ditch and pipe line tapping East and West Weaver creeks; build a reservoir for regulation of the water supply; install short service flumes, ditches, pipe lines and giants for the control of the water; and finally to turn on the water and start digging.

The proposed roadway cut through Oregon Ridge is a large excavation project involving a cut having a possible depth of 280 feet, a

(Continued on page 16)



HYDRAULIC GIANTS AT WORK on Oregon Mountain. In circle, at top, giant is operating on 150 foot embankment below summit. Center is close-up of giant undermining ridge. At bottom, view of valley showing area being sluiced to bedrock. Stream at left is tailings from giant operations. Existing highway is seen crossing stream. Dotted lines indicate route of proposed highway.

State May Lose All Federal Aid Funds

(Continued from page 1)

trict No. 13 which is a cooperative project now in course of construction.

Therefore, there will remain not one cent for State highway improvement or construction on the primary State highways in the 45 northern counties.

There will remain only about \$800,000 for expenditure on the secondary State highways in the 45 northern counties.

In the southern 13 counties there will remain \$1,919,532 for primary State highways and \$2,104,750 for secondary highways, a total of \$4,024,282 for the biennium.

\$5,880,000 TO GENERAL FUND

In addition to the allocation of an additional $\frac{1}{4}$ cent to city streets other than State highways amounting to \$5,812,000 and bond interest and redemption of \$8,104,000, as proposed in bills before the Legislature, the State comptroller has announced it will be necessary within the next few weeks to conscript, under constitutional mandate, approximately \$5,880,000 from gasoline tax revenues for general fund purposes.

The results of such proposed legislative diversion upon the Federal aid funds coming to the State are as follows:

The Federal government, by the Hayden-Cartwright Act of June 18, 1934, has established the principle that State highway revenues derived from gasoline taxes, motor vehicle registration fees, licenses, or other motor vehicle taxation must be devoted exclusively to highway purposes, if the states desire to continue to receive their full share of Federal appropriations.

The Federal Statute provides that any State which diverts any portion of its highway revenues derived from taxation of highway users for nonhighway purposes after June 18, 1934, will immediately be deprived of one-third of all regular Federal aid highway appropriations.

FEDERAL AID LOSSES

The Division of Highways envisages the results of the adoption of this policy upon Federal aid as follows:

Immediate loss of one-third of all regular Federal aid for the next two years, amounting to \$3,200,000.

Probable loss of one-third of the emergency Federal aid to be appropriated under the President's present work program, amounting to \$9,100,000.

The amounts thus taken away may make it impossible for the State to match the balance of the regular Federal aid for the next two years, in which case the whole of such aid will be lost, amounting to an additional \$9,585,000.

It is probable that the proposed Federal grade separation program for California can not be undertaken.

NO FUNDS FOR COSTS

While funds to be apportioned under the President's program need not be matched with State funds, numerous items of the cost of such projects, such as right of way, property damage, engineering, etc., have not heretofore been payable from Federal funds, and State funds must be available for such purposes or the Federal moneys are not forthcoming. Lack of necessary State funds would result in the loss of \$10,000,000 of emergency Federal money, in addition to the losses heretofore listed.

The net result of all these proposals will leave the State virtually without funds for new construction for the next two years.

Available revenues and the effects of the proposed legislation upon them are shown in the following tabulation:

STATE HIGHWAY REVENUES:

Gas Tax.....	\$46,500,000	
Motor Vehicle Fees.....	5,300,000	
Total		\$51,800,000

Expenditures required for maintenance and administration:

Administration	\$2,558,000	
Maintenance	15,215,000	
$\frac{1}{4}$ cent to cities (present law)	5,812,000	
Total		23,585,000

Balance—State Highway Funds... \$28,215,000

$\frac{1}{4}$ cent to city streets other than State highways (now pending).....	5,812,000	
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Balance—State Highway Funds... \$22,403,000

General Fund Conscriptioin \$5,880,000

(Continued from preceding page)

Diversions from State highway purposes:	
Conscriptioin for general fund.....	\$5,880,000
Balance—State Highway Funds..	\$16,523,000
Bond Interest and redemption 87th-88th fiscal years.....	
	8,104,000
Balance—State Highway Funds..	\$8,419,000
FEDERAL AID APPROPRIATIONS:	
Regular Federal aid (Hayden-Cartwright Act of 1934) which has to be matched with State funds.....	\$9,585,000
Maximum possible emergency Federal aid for highways and grade separations, 1935 appropriation:	
Highways	\$15,892,000
Grade separations.....	11,382,000
Total possible emergency Federal aid	27,274,000
Possible total all Federal funds ..	\$36,859,000

Federal regulations do not permit Federal funds being expended for rights of way or property damage, and only those engineering costs chargeable to engineers actually employed on the project. Past experience shows that rights of way costs average ten to twelve per cent of the cost of the project; also that engineering costs not reimbursable from Federal funds average five per cent of the cost of the project. There are also marginal con-

struction items such as cattle passes, fences, irrigation structures, and the like, which the Federal government will not pay for, which amount to at least five per cent.

STATE LACKS \$15,500,000

It will require at least \$10,000,000 of State funds to match the regular Federal aid.

It will require at least \$5,500,000 of State funds to handle the emergency Federal aid program.

Secondary highways added to the State highway system in 1933 need at least \$2,500,000 for minor improvement, such as oiling, surfacing, drainage, etc., which is not eligible for Federal aid.

The above facts have all been presented to the State Legislature by the Department of Public Works, and it is hoped that despite the pressing financial problem we are facing in an effort to balance the State budget, the legislator's will not find it necessary to make these very costly diversions from the State highway revenues, not only from the financial standpoint of crippling the continued orderly highway construction program which has meant so much in the development of our State in the past, but also the resultant effect of depriving thousands of men of useful gainful employment thereby increasing the unemployment list in every county of California.

Researchers Extend Roadside Development

The Joint committee on Roadside Development of the Highway Research Board and the American Association of State Highway Officials has found and maintains that practical roadside development when accomplished in accordance with approved principles of Landscape Engineering contributes to the economy, efficiency and safety of highway maintenance and operation.

In support of this statement the following factors are presented:

1. Stabilization of slopes reduces erosion.
2. More adequate drainage is provided.
3. Drifting snow, sand and dust is in part controlled.
4. Traffic hazards are greatly reduced and guard rail costs decreased.

5. Cost of mowing roadsides is reduced.
6. Land and property values are enhanced.
7. Land damage claims are lessened.
8. Better public relations are promoted.

In addition to the above factors which elevate standards of efficiency, safety and economy and the many important considerations of increased utility and esthetic enjoyment, the committee makes the following recommendations:

Close collaboration between all State planning boards and administrative agencies controlling highways, parks, reservations and other recreational areas.

In order to stabilize land values, promote safety and convenience and insure a more permanent and attractive countryside, the vital importance and value of the accepted principles of urban zoning should be studied and adjusted for practical application to all rural highways and parkways.

Bay Bridge to Have 16 Toll Stations All Located on the Oakland Approach

AUTOMOTIVE traffic over the San Francisco-Oakland Bay Bridge will be expedited by the operation of sixteen toll collection stations located near the eastern end of the bridge.

Designs for the toll houses and an operations building modeled along the most modern lines have been approved by Chief Engineer C. H. Purcell. The complete structure will be erected on the fill in the Oakland tidelands which will constitute the east-bay approach to the bridge.

The operations building, located on the north side of the approach roadway, will contain a garage, machine shop, electric controls, police station and general bridge maintenance office.

Beneath an overhead structure extending across the roadway from the main building will be sixteen toll collection stations, fourteen to accommodate passenger automobiles and two for trucks, with an equal number of traffic lanes. Two collectors are to be stationed in each of the eight houses.

Trains will approach and leave the bridge on tracks passing behind the operations building at the extreme north side of the approach.

PAVING EASTERN APPROACH

Contractors are pushing operations on the east bay superstructure of the bridge and on Yerba Buena Island. While paving still is in process at the eastern approach to the bridge, contractors are getting under way with the erection of the west anchor of the cantilever span over Army Point on Yerba Buena. At the other end, Span E-6 now is sixty per cent complete. This is the third of the 508-foot railroad type spans to be started.

Far inside Yerba Buena, miners have bored ribs down from a crown tunnel to two side tunnels and placed forty I-beams in these lateral drifts. For twenty feet, steel lining has been placed on top of the I-beam ribs, and the space between these plates and the rock roof has been packed with broken rock.

CATWALK ROPES ERECTED

The work of concreting this loose rock above the steel, all of which later will be encased in concrete, has just been started.

Between the east portal of the tunnel and Pier YB-1 three additional spans of concrete upper deck roadway have been completed.

Construction is progressing rapidly on the west bay superstructure. With all the catwalk ropes in final position between the San Francisco anchorage on Rincon Hill and Tower W-2, the work of raising bundles of catwalk flooring to the top of the tower is going forward.

At the center anchorage, Pier W-4, the A-frames, to which will be tied the suspension cables supporting the twin bridges, have been erected. Concreting to the level of the lower deck is under way and the third week of May saw the placing of catwalk ropes between Tower W-3 and the center anchorage.

VIADUCT STARTED

Erection of the Yerba Buena Island cable bent has been completed save for riveting.

Construction of a huge inverted concrete box east of Fifth Street in San Francisco as the start of the long viaduct which will bring the bridge down to grade has been begun.

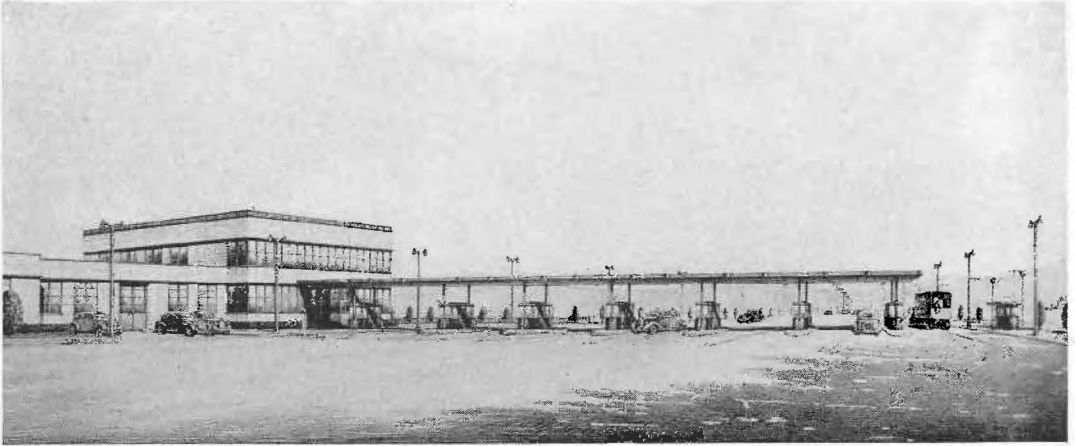
Work on the great transbay bridge now has reached the stage where each week's progress is plainly apparent to ferryboat commuters and sightseers.

ENGINEER LOCATES GRAVEL DEPOSITS BY ELECTRICITY

An engineer of the State Highway Department, has developed a method of locating buried gravel deposits by means of electricity, says the Minnesota Highway News.

His method has proved more economical and satisfactory than the old system of locating gravel by drilling test holes, highway department officials assert. By this method electric currents are sent through the earth and by measuring the electrical resistance encountered, the engineer determines what is beneath the surface.

California grade-crossing accidents killed 161 persons in 1784 accidents last year. This is about a 3 per cent decrease from the 169 killed in 1847 accidents in 1933.



BAY BRIDGE TOLL HOUSES numbering 16 will be located beneath an overhead structure extending from the large operations building straight across the wide roadway at the Oakland end of the bridge. Traffic will be accommodated in 16 lanes, 14 for passenger vehicles and two for trucks. The operations building will contain a garage, machine shop, electric controls, police station and maintenance office.



AERIAL VIEW of the East Bay structure and the Oakland approach fill as constructed to date showing the fourteen 288 foot steel spans and Span E-8, the first of the five 500 foot cantilever spans already erected. A traveling derrick is erecting the second 500 foot Span E-7. The Maltese cross indicates the location where the 16 toll collection stations will be erected on the wide fill extending across the flats from the Oakland shoreline.

By-Pass Channel Relieved River

(Continued from page 6)

Very little water was flowing in the by-passes, the Sacramento River from Knights Landing upstream was five feet below flood stage, the Feather River was eight feet below flood stage, and the Sacramento River at Sacramento was three feet below flood stage.

All of the weirs of the Sacramento Flood Control Project are now completed, except the outfall gates at Butte Slough. The project is so designed that the Sacramento River shall carry a maximum quantity of water in the river channel itself at all times, to be relieved into the by-passes over the weirs when the water approaches a dangerous stage. The weirs, therefore, have the effect of causing rather high stages in the Sacramento River even during small floods such as that of last month.

This flood is the first one occurring since the completion of the Moulton and Colusa weirs and the raising of the crest of the Tisdale weir, and it is therefore the first time that the river has acted as intended under the flood control project.

Heretofore the river has had relief into the by-passes at lower elevations, but the new condition of higher river stages will exist during all future floods. It will be further increased to some extent by the completion of the Butte Slough outfall gates this summer.

In future floods, even small ones, the water stage in the Sacramento River at such stations as Colusa, Knights Landing and Sacramento will approach within a few feet of the flood height and will be held to these stages for longer periods. This is the manner in which the project is intended to function and need cause no alarm, provided the levees are maintained in good condition.

It is estimated that the peak or crest discharges during this flood were as follows:

	Second feet
American River at Fair Oaks.....	70,000
Sacramento River at Colusa.....	49,800
Sacramento River at Verona.....	67,000
Sacramento River at I Street.....	95,000
Bear River at Wheatland.....	35,000
Moulton weir.....	11,500
Colusa weir.....	23,200
Butte Slough.....	14,500
Tisdale weir.....	13,300
Fremont weir.....	67,300
Sacramento weir.....	12,000
Yolo by-pass at Dixon Ridge.....	60,000

During this flood the by-passes were required to carry relatively little water, the bulk of the drainage passing down the main Sacramento River channel. Had the flood been larger, the additional water would have been carried in the by-passes with safety. It was not necessary to open the gates of the Sacramento weir, although approximately 12,000 second feet was discharged over the crest at a depth of 1.65 feet.

The peak quantity passing the latitude of Sacramento was approximately 155,000 second feet, or 26 per cent of a project quantity flood of 590,000 second feet.

At the beginning of the April storm, there was a considerable snow pack in the Sierra Nevada resulting from the several smaller storms occurring in March, the snow cover extending to an unusually low elevation. By the night of April 8th, practically all of the low snow below the 5000-foot elevation had disappeared. The depths of snow on the ground at Norden at 8 a.m. were: April 8th, 152 inches; 9th, 158 inches; 10th, 152 inches; and 11th, 142 inches. It is doubtful whether the melting snow at the lower elevations contributed materially to the intensity of the stream run-off.

PROJECT FUNCTIONED PERFECTLY

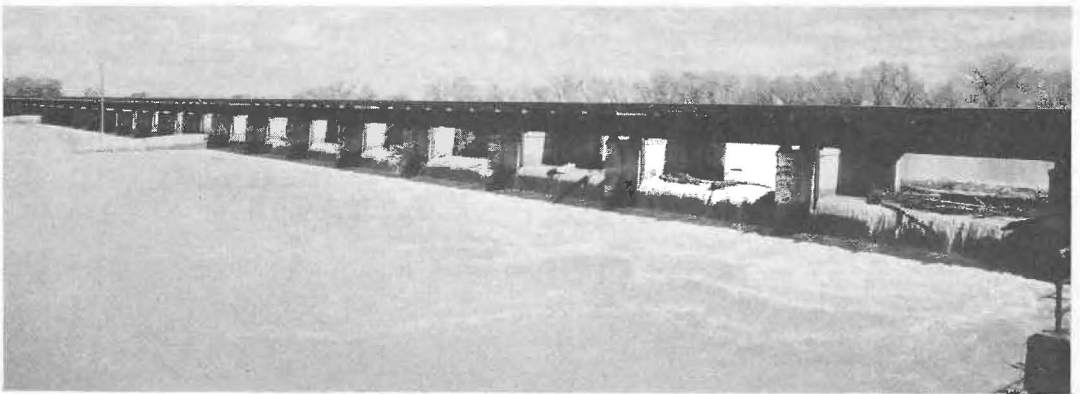
The works of the Sacramento Flood Control Project functioned perfectly, and water did not rise to dangerous stages in any of the streams and by-pass channels, except in a few places where the project levees are not yet complete. A number of persons living in the overflow channels were rendered homeless, but no damage occurred in areas protected by the flood control system. All of the by-pass and overflow channels were covered with water and Little Holland and Prospect Island tidal reclamations in the lower Yolo by-pass were flooded.

The Sacramento River levee on the east side north of Colusa was nearly overtopped in a number of places, mostly at low spots such as road crossings. These were successfully protected by sandbags and earth. This levee is not yet completed to project height and cross section.

The Bear River was the only tributary in which a real flood occurred, the discharge being approximately 35,000 second feet near



BY-PASS AND WEIR IN OPERATION—Aerial view of normally dry land in the vicinity of Sacramento on which excess waters of the Sacramento River are being distributed and carried off through the Sacramento Weir, Sacramento by-pass and Yolo by-pass units of the Sacramento Flood control Project.



SACRAMENTO WEIR HANDLING 12,000 SECOND FEET at peak of flood is 1800 feet long and located 4 miles upstream from city. Water flowed over the weir at a depth of 1.65 feet but it was unnecessary to open the gates. Secondary State Highway Route 50 crosses on top of weir structure.

Wheatland and about 40,000 second feet at its junction with the Feather River, at which point the official project quantity is 30,000 second feet. This stream, therefore, had a peak discharge 30 per cent in excess of the project quantity. As a result of this extreme discharge, two breaks occurred in the incomplete levee on the north side of the Bear River near Wheatland, causing only nominal damage.

As has been stated, no damage occurred during this flood in areas protected by completed portions of the flood control project. Damages occurring on account of incomplete units of the project were on the Bear River, previously described, and near the mouth of Cache Creek in the Yolo by-pass, where about 200 acres of sugar beets were flooded. All other reported damage occurred in the by-passes and overflow chan-

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Giants Move 1,419 Yards Per Hour

(Continued from page 8)

bottom width of 100 feet and a length of about 2500 feet, with 5,000,000 cubic yards to be removed.

RIDGE CROSSES GULCHES

That the cut should be as deep as 280 feet is a result of the peculiar characteristics of the country. Oregon Ridge lies approximately midway between Junction City and Weaverville, rising to an elevation of 3100 feet, and extending in a north and south direction. Leading directly toward the ridge on the west is Oregon Gulch and on the east, Grub and Goodyear gulches. All of these slope gently upward until they reach a point near the base of the ridge, from which they rise steeply several hundred feet to the summit.

The effective result of this is almost complete lack of support on either side for any roadway grade leading from the ridge. By cutting deeply through the summit ridge, need for much of this nonexistent support is eliminated; and the grade can be held to a reasonable rate.

On February 28, 1934, hydraulic operations started in the removal of the sliding debris of the north rim and have continued steadily, with the exception of the summer season between July 15 and October 31, in accordance with existing State law for hydraulic operations in this section of the State, with the result that one year later 1,557,000 cubic yards of material had been removed at a cost of 2.7 cents per cubic yard.

The total movement to May 14, covering 14 months elapsed time or 11 months of actual operation, was 2,481,000 cubic yards. The unit cost for this quantity was 2.26 cents per cubic yard. The average movement was 1419 cubic yards per operating hour.

BETTER THAN ESTIMATE

This compares very favorably with the engineer's estimate for this period of 1,500,000 cubic yards, at a cost of $3\frac{1}{2}$ cents per cubic yard, notwithstanding the fact that precipitation and stream run-off were far below normal during 1934, which resulted in a water supply that averaged only 9.2 cubic feet per second for the eight months of the past season; whereas, with normal weather and snow-pack, the water supply should have been twice or

three times as great. Under ordinary methods, eight average sized power shovels and thirty or more trucks would have been required to equal this output.

Digging with water is fundamentally simple. Water confined to a pipe line or other vessel exerts a pressure on that vessel proportional to the vertical height to the nearest free surface, or the "head." If water under a head is allowed to escape from an orifice, it will do so with a velocity which depends on the amount of the "head." Anything loose, even soft bedrock, in the path of a stream under sufficient head, will be knocked violently out of the way, broken up and carried away in the stream which leaves the point of the jet.

FOUR REQUISITES

Four things are necessary for economical hydraulic excavation: first, a water supply; second, pipe lines and other structures to confine that water under high heads and conduct it to the point of use; third, an orifice in the shape of an hydraulic giant to control the emission of the water from the pipe; and fourth, sufficient grade leading away from the operations to give the tailing stream velocity enough to transport the excavated material. Since on Oregon Mountain these conditions are easily met, it was possible for the Division of Highways to embark on its unique venture in roadbuilding with assurance of success.

A typical setup for one of the hydraulic giants as used on Oregon Mountain, is as follows: From the regulating reservoir of 4,500,000 gallons capacity, there extends a pipe line about sixteen hundred feet long, built of riveted steel pipe, decreasing in diameter from 30 inches to 26 inches and 18 inches as the head on the pipe line becomes greater. Head available at the bottom end of the pipe to which the giant is connected is then about 400 feet. Because this head produces a pressure of about 170 pounds per square inch, or about six times that in an ordinary automobile tire, both pipe line and giant need to be securely anchored and braced.

GIANTS WEIGH TON

The key unit in the setup is the hydraulic giant, by which the water is directed against the bank to be excavated. The machines used weigh about one ton each and consist essen-

SUMMARY OF HYDRAULIC GRADING OPERATIONS ON OREGON RIDGE

Year and month	Days per month	Excavation, cu. yds.	Cu. yds. per day	Unit costs		Water Sup. C.F.S.	Monthly volume Water C.Y.	Per cent solids	Hours operated	Per hour	Duty
				Monthly	Average						
1934—											
March.....	32	162,000	5,060	3.69c	3.69c	16.6	1,695,850	9.5	202.5	800	7.6
April.....	30	231,000	7,700	3.00	3.28	16.7	1,602,450	14.4	264.5	870	11.5
May.....	31	215,000	6,930	2.57	3.03	9.3	920,350	23.4	164.2	1,310	18.7
June.....	30	141,000	4,700	2.28	2.89	4.7	450,700	31.3	82.2	1,720	25.0
July.....	12½	16,000	1,280	2.86	2.89	1.5	60,590	26.4	11.7	1,370	21.1
October.....	1	2,000	2,000	3.43	2.89	2.9	9,400	21.3	1.8	1,090	17.0
November.....	30	233,000	7,770	2.27	2.75	5.4	519,040	44.8	88.6	2,630	35.8
December.....	31	182,000	5,870	2.77	2.75	7.3	714,150	25.5	103.4	1,760	20.8
1935—											
January.....	31	57,000	1,840	6.79	2.94	4.4	434,260	18.5	51.2	1,110	14.8
February.....	28	318,000	11,360	1.94	2.73	12.2	1,102,670	28.8	207.9	1,530	23.0
Total or average for year.....	256½	1,557,000	6,060	-----	2.73	9.2	7,509,960	20.7	1,178.0	1,320	16.6
March.....	31	288,000	9,280	2.07	2.63	10.5	1,045,150	27.6	161.7	1,780	22.0
April.....	23½	636,000	27,060	1.20	2.26	24.3	1,822,150	34.9	322.9	1,970	27.9
Total or average to date.....	311	2,481,000	7,980	2.26	-----	10.4	10,377,260	23.9	1,662.6	1,419	19.1

tially of a short steel spout pipe, to the outer end of which is screwed a cast steel nozzle of the size desired. Connecting the spout pipe and the supply pipe is a mechanism working on the principle of the ordinary universal joint, but larger, heavier, and hollow to allow the passage of water. The size of the nozzle, at the end of the spout pipe, varies from six to nine inches. Work on this project has been with seven and eight-inch nozzles.

From the eight-inch orifice, under 400-foot head, issues a stream traveling at the rate of 90 miles an hour, discharging 46½ cubic feet per second, or approximately a ton and a half of water. An equivalent amount of power would be represented by a string of average sized motor cars, traveling at a rate of 90 miles an hour, crashing into a bank at the rate of 60 per minute. Much damage is the inevitable result in either case, the chief difference being that the stream of water does damage to the bank, while the motor cars would succeed only in smashing themselves.

METHODS OF OPERATION

The giant is set in such a position that its stream can cut away the toe of the bank to be excavated. As the bottom of the bank is cut away, the top of the bank will weaken and topple down with a crash which breaks it into small particles easily carried away by the tailing stream. This process is repeated indefinitely, and many of the slides which result contain many thousand cubic yards.

When the face of the cut has been moved too far away from the giant (the maximum practical distance at a 400-foot head is about 300 feet) the giant is dismantled and moved ahead as close to the bank as is safe.

While a one and one-fourth cubic yard power shovel will excavate 125 yards in an hour, the average maintained on this project by the hydraulic giant is 1300 yards per hour, with a maximum of 3000 yards.

UNDERCUTTING PRACTICE

It is practically as easy to undercut a bank 250 feet high as it is to undercut one of 50 feet; but, in the former case, five times the material comes down for each foot of undercutting, and the unit cost is consequently very much cheaper. Obviously, as high a bank should be maintained in front of the giant as possible. This explains, too, why the excavation of a deep cut in lifts, as is done with power shovels, is to be avoided. For the bank must then be undercut for each lift; less material caves down to be carried away for each foot of undercutting; the rate of excavation is, therefore, slower; and the giants and pipe lines must be moved more frequently.

A better method of finding how effectively the water is being used, is to calculate the percentage of solids being taken down by the tailing stream. This is the ratio between the volume of material removed and the amount of water used and to date has averaged 21 per cent, or one cubic yard of earth for each five yards of water. The maximum rate of exca-

(Continued on page 25)

Ring Connectors Used in M Street Detour Bridge Lift Span

(Continued from page 4)

pleted in the dry. The approach piers, as well as the rest piers, were completed to an elevation above normal high water before the river raised to the extent of interfering with the work.

DETOUR BRIDGE NECESSARY

Another major item of work started early in the contract period was the construction of the railroad detour bridge about 100 feet north or upstream from the permanent bridge. The detour consists of nine plate girder spans and timber approaches and an 80-foot clear lift span, all supported on timber piles.

Except for the steel girders the detour bridge, being of a temporary nature, is built entirely of untreated timber. For efficiency and economy, split ring and toothed ring timber connectors were used to fasten the connections in the towers and trusses of the lift span. Another interesting feature of the temporary bridge is the use of gusset plates of plywood up to four inches thick and having as many as 31 plys or laminations.

The temporary railroad bridge was completed and traffic was taken from the old structure about February 1, 1935. The sub-contractor began at once dismantling the 25-year-old bridge and removing the steel. That phase of the work was completed quickly and for the past month erection of the new steel has been proceeding rapidly. By May 1, the east span and tower was in place and erection of the west steel span was well begun.

COMPLETION SET FOR SEPTEMBER

It is expected that both towers will be completed by July 15, 1935, and the lift span in place by August 15, 1935. The construction of the deck, installation of machinery, wiring, lighting fixtures, paving approaches and miscellaneous small items of work will probably require the balance of the contract period, which ends September 30, 1935. The contractor anticipates no difficulty finishing within the time limit.

Although the total bid price of contract items was \$907,000, it is expected that with certain extra work found necessary and with about \$20,000 worth additional roadway and

(Continued on page 32)

Wild Flower Show Staged by District Highway Employees

By E. Q. SULLIVAN, District Engineer

THE COPIOUS and well distributed rains this year have caused the Mojave Desert to bloom as a vast flower garden. The desert wild flowers are the finest since 1928, and to give the people of San Bernardino an idea of Nature's bounteous display, the highway employees of District VIII staged for the second time a wild flower show in the District Office on April 6 and 7.

Flowers from all corners of District VIII were gathered early Saturday morning, marked as to location where found and carefully delivered to the San Bernardino office. When the show was opened to the public at 2.00 o'clock Saturday afternoon, every room was a bower of beauty.

200 VARIETIES LABELED

The main exhibit was in the drafting room where the long work tables were one mass of color. The other rooms of the building were filled with large bouquets and baskets of blooms.

Nearly 200 varieties were recognized and labeled with their popular names. The tall, white desert lilies, royal purple and gold asters, the striking desert candlesticks dominated the show with their beauty.

One feature greatly appreciated by the public was the exhibit of tiny transplanted "ground-cover" flowers in endless colors; these flowers looked like jewel mosaics.

Yuccas and cacti were segregated in one room. Varieties of petrified wood, desert curios and interesting highway maps and pictures were also on display throughout the building.

2000 FOLKS ATTENDED

During the two afternoons, nearly two thousand people registered, taxing the building to capacity. The flower show came to a delightful close Sunday night when botanists, school children and other flower lovers were allowed to select collections and carry them home for further study and enjoyment.

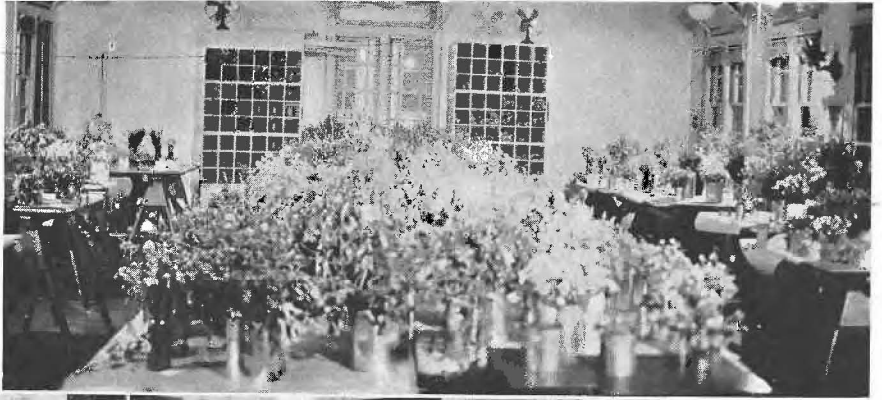
The entire District VIII office force served as a reception committee, and the enthusiastic and appreciative crowds made the affair a most happy one.

Little Girl (to eight-year-old boy): Oh, I think you are jus' lots better lookin' than your daddy.

Little Boy: I ought to be. I'm a later model.

WILD FLOWERS

of the Desert
as exhibited
in District VIII
Highway offices
in the city of
San Bernardino



CACTI BLOOMS,
Yuccas and
Striking Desert
Candlesticks
made a display
of exotic
beauty

DESERT LILIES

tall and white
with
royal purple
and gold
Asters



200 VARIETIES
included tiny
ground cover
floral jewels
and larger
blooms of
radiant colors

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official journal of the Division of Highways of the Department of Public Works, State of California; published for the information of the members of the department and the citizens of California.

Editors of newspapers and others are privileged to use matter contained herein. Cuts will be gladly loaned upon request.

EARL LEE KELLY.....Director
JOHN W. HOWE.....Editor

Address communications to California Highways and Public Works, P. O. Box 1499, Sacramento, California.

Vol. 13

MAY, 1935

No. 5

GASOLINE TAX DIVERSION

An official communication to the members of the Chamber of Commerce of the United States issued by President Henry I. Harri-man in part reads as follows:

Taxes levied for highway use should be applied for highway purposes. * * * The membership of the chamber have by repeated declarations supported the principle that highway users, in addition to being fully subject to all other taxes, should through special taxes pay the cost of improving and maintaining the highways of general motor use, and that the proceeds of such special taxes should be applied exclusively for highways. * * *

The principle of nondiversion of special highway-user taxes was recognized by Congress last year in the Hayden-Cartwright Act, whereby any State will be denied a third of its Federal aid funds for highways if by diversion of user taxes it reduces its contribution to the Federal aid system * * *

The reasons underlying the chamber's position in support of the principle of non-diversion may be summarized as follows:

1. Diversion breaks faith with the highway user. He has generally accepted his responsibility for the major part of the highway bill, and this means of paying it. The money he thus pays obviously should not be put to other use.

2. Diversion creates resistance to proper and needed highway-user taxes. If the motor-using public know that the revenue from such taxes is likely to be diverted, they will not accept the burden thereof with the good will that has generally prevailed.

Professor: "The Chinese travel in junks. Now can anyone tell what junk is?"

Student: "Sure, dad's auto."

Gas Tax Returns in State Take Sudden Drop During March

OPTIMISTIC statements recently released to the newspapers predicting that gasoline tax collections this year might exceed by approximately \$5,000,000 those for 1934 appear to have been a bit premature in the light of a decided and not fully explained decrease in collections for the month of March.

The tax collecting board based its hopes for a record year on February taxes assessed to oil companies, which amounted to \$3,063,237.07, or \$268,109.43 more than collections during the same month in 1934. That figure brought the 1935 gas tax returns up to more than \$670,000 in excess of collections for the same period last year, or a gain of 12.5.

On this percentage of increase was predicted estimates that if the ratio of upward trend in gasoline tax returns continued, California might expect to collect in 1935 a total of \$44,500,000, or \$4,950,000 more than in 1934.

But an entirely different situation existed on April 22 when collections for March were announced. Assessments for that month totaled \$3,243,021.56, or \$805,490.15 less than for March of last year, a loss of 19 per cent. Whereas at the end of February, receipts for the first two months of the year exceeded those of last year by approximately \$670,000, at the end of March receipts for the quarter had fallen off \$130,000 over the total for the same period in 1934.

Gasoline taxes for March, 1934, showed an increase of 24.4 per cent over the collections for the same month in 1933. This was larger than the amount for any month in 1933, although, normally, the yield in the summer months is higher than in the winter and spring.

The extreme downward fluctuation of assessments for the month of March indicates the futility of optimistic estimates such as those made two months ago.

Circus Manager: "Well, what's wrong now?"

India Rubber Man: "Every time the strong man writes a letter he uses me to rub out the mistakes."—*Boston Globe*.

First Married Woman—Aren't our husbands the limit, my dear? Does yours know what to do in a traffic emergency?

Second Married Woman—Sure, he's got ears.



TRAFFIC DEMANDS MORE ROOM in the South San Francisco underpass on Bayshore Highway. Dotted lines on photo of Southern approach show proposed widening operation on structure, hillside and roadway.



FORTY FEET MORE WIDTH of roadway will be provided through the underpass by extending the structure as shown by dotted lines on view of approach from north.

Widening Bayshore Highway Underpass

IN 1927 an undergrade separation structure was built separating the highway and Southern Pacific Railroad grades at the crossing on the Bayshore Highway in the southern city limits of South San Francisco. A forty-foot clear roadway was provided.

The subway was so designed as to permit the use of one abutment as a center pier when it became necessary to widen the roadway.

Due to the heavy traffic on this route, it has now been considered advisable to increase the width. Consequently, bids were received April 10, 1935, for a contract to construct a widening structure, providing an additional forty feet of roadway.

The contract was awarded April 30 on a

low bid of approximately \$130,000. In addition to the contract work it is estimated that railroad work incidental to the improvement will cost about \$67,000, making a total cost for the project of \$197,000, over 90 per cent of which will be furnished as a part of the work relief program of the Federal government and administered through the U. S. Bureau of Public Roads.

The original subway, including both railroad and highway, cost nearly \$300,000. It is expected the present contract work will be completed early in 1936.

Before a man laughs at the awkward way his wife parks the car, he should look at himself when he sews a button on his shirt.

Doctor: "If your nerves are frayed, the thing to do is to bury yourself in your work."

Patient: "And me a concrete mixer!"

New Office Building for District III in Marysville Opened With Banquet

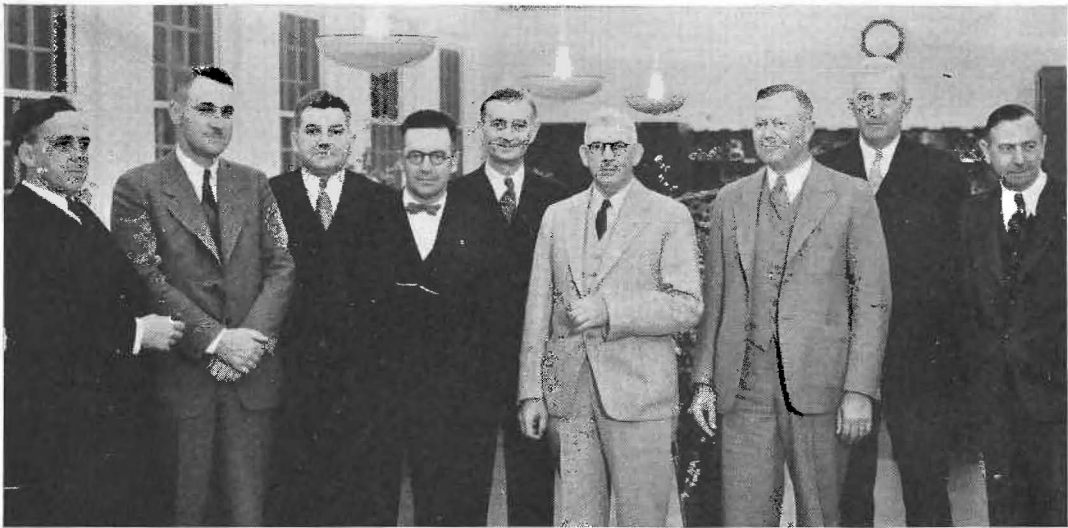
THE NEW office headquarters of District III in Marysville was formally opened Saturday evening, May 4, the occasion being celebrated by a banquet sponsored by the Sutter-Yuba Chamber of Commerce. The banquet was followed by an inspection of the building by the public, and Sunday afternoon, between the hours of two and five, the building was also opened for public inspection.

The dinner was attended by Director of Public Works Earl Lee Kelly, Deputy

officials of the eleven counties comprising District III, members of the local and State chambers of commerce and employees of the Department of Public Works, and the Division of Architecture. In all there were about 350 guests present at the banquet.

The meeting was conducted by President Horace E. Thomas of the Sutter-Yuba Chamber of Commerce, and the main speaker of the evening was Director of Public Works Earl Lee Kelly.

The audience listened with rapt attention



HIGHWAY DIVISION EXECUTIVES at Marysville Headquarters celebration in the above group, left to right are—J. G. Standley, Principal Assistant Engineer; G. T. McCoy, Assistant State Highway Engineer; Edward J. Neron, Deputy Director of Public Works; R. H. Wilson, Office Engineer; F. J. Grumm, Engineer of Surveys and Plans; District Engineers C. H. Whitmore, R. E. Pierce and F. W. Haselwood and Materials and Research Engineer T. E. Stanton.

Director Edward J. Neron, Assistant State Highway Engineer G. T. McCoy, Chairman Harry A. Hopkins of the California Highway Commission, State Senators W. P. Rich and Thomas Scollan, District Engineers F. W. Haselwood from Redding, Jno. H. Skeggs from San Francisco, and Robert E. Pierce from Stockton.

In addition to these guests there was a large delegation of members from headquarters staff at Sacramento, representatives from the boards of supervisors and other county

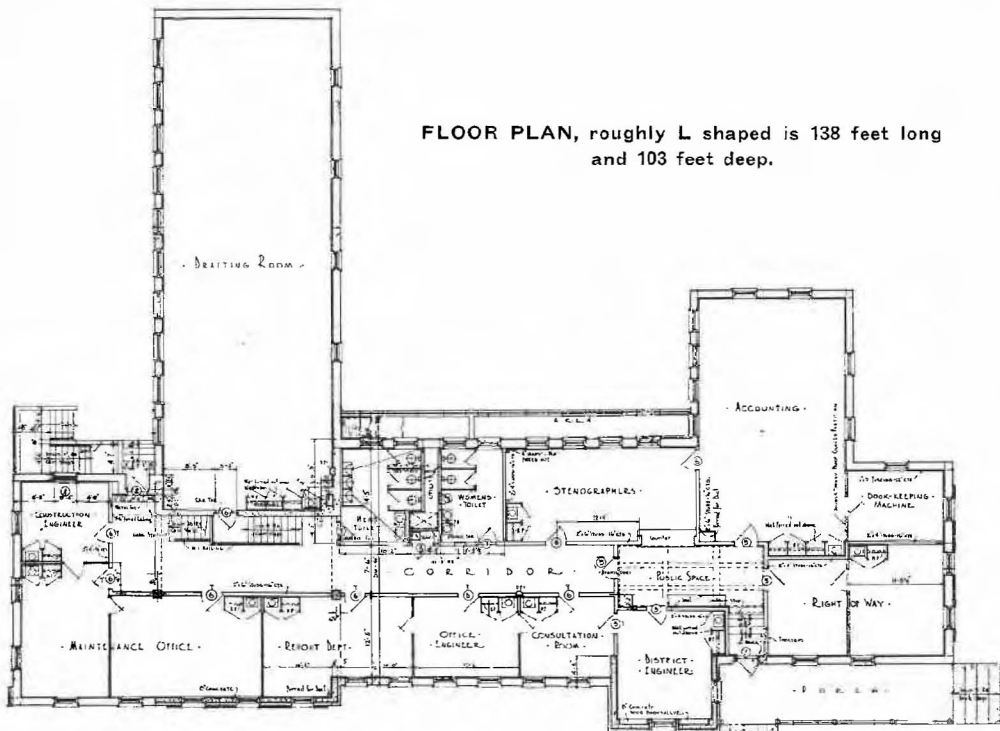
when Director Kelly told of the serious financial situation the State highway system is facing owing to attempts to divert many millions of gasoline tax dollars to other than highway uses as proposed in bills before the Legislature.

If these attempts are successful, Mr. Kelly said, it will be necessary to stop practically all highway construction work on July 1st when the new biennium starts.

Mr. Kelly explained that in addition to the



NEW MARYSVILLE HEADQUARTERS for District III of the Division of Highways is a class C brick building of Early California type architecture. It provides 12 offices in addition to drafting, blueprint and waiting rooms, laboratory and large basement storage space. It represents an investment of \$60,000 on a lot donated by Marysville City School Board.



FLOOR PLAN, roughly L shaped is 138 feet long and 103 feet deep.

Working Models Feature State Exhibit

(Continued from page 2)

exhibits showing the State of California at work.

The map will picture in detail highways, parks, natural resources, waterways, city and county developments, and in the center will be imposed a cut-away educational picture of the Capitol, showing legislative, executive and judicial departments of State government at work.

Individual exhibits are well under way for the counties and displays of the Department of Public Works, Department of Motor Vehicles, Department of Natural Resources, Department of Agriculture, Department of Military and Veterans' Affairs, Bureau of Printing, Division of Criminal Investigation, and the State's famous Indian Museum.

DIVISIONS SHOW WORKING MODELS

Typical of the exhibits the State will feature in its "California at work" program is that of the Department of Public Works. In this display will be the Division of Water Resources' working model of Central Valley Water Project; Division of Architecture's models of new Camarillo State Hospital and Santa Barbara State Teachers College; Division of Highways' working models of material testing devices and modern highway and bridge construction, and San Francisco-Oakland Bay Bridge Authority's working model, showing the cable spinning on the gigantic span now nearing completion over San Francisco Bay.

Department of Motor Vehicles will feature its Division of Registration, California Highway Patrol, Division of Accounting, and Division of Operators' Licenses and Adjustments, all at work under a 25-foot display map of the United States illustrating various kinds of license plates used in the different states, licenses of foreign nations and an exhibit showing how the State maintains nearly 100,000,000 records of motor vehicles and enforces its traffic regulations to protect human life and property.

PANORAMAS OF NATURAL RESOURCES

The Department of Natural Resources exhibit will take up a space the length of the great relief map and will be situated to take advantage of ceiling-to-floor panoramas built on the reverse of the big map. In this exhibit will be seen elaborate models of parks

and forests, fish and game activities, mines and oil fields, etc.

The State Athletic Commission's display will show how State governed athletic activities pay all expenses for operation of California's veterans' home at Yountville and the Bureau of Criminal Identification exhibit will be a graphic story of how modern methods are used to eliminate crime—a story of the teletype, fingerprints, chemistry and ballistics.

In addition to standing displays, an auditorium is provided for a continuous motion picture of California, its history, progress and prosperity.

A hospitality typical of California will be provided by a corps of gracious women under direction of Mrs. Celia A. Dunham, prominent social and club leader of the State, who has been appointed hostess for the State Building by Governor Frank F. Merriam. Wallace Walters is Supervisor of Exhibits and Sam Williams custodian of the building.

It is confidently predicted that when the doors of Balboa Park open for the fair May 29, the world will realize California's Legislature wisely provided means for the State to "stimulate recovery" and "end economic depression and unemployment" as the terms of legislation suggest in making appropriation for a State exhibit at California Pacific International Exposition.

STATE MAPS OUT DEVELOPMENT SAN DIEGO WATER RESOURCES

Plans for the complete development of the water resources of the San Diego River Basin and flood control of the San Diego River in the Mission Bay area are contained in Bulletin No. 48, "San Diego County Investigation," issued by the Division of Water Resources.

The publication presents detailed data and information on the water supplies and agricultural lands of San Diego County; the present status of irrigation and domestic water supply developments; the utilization of water supplies from surface and underground sources; the irrigable lands and water requirements and the domestic and municipal requirements of the metropolitan area, and the flood flows of the principal streams and probable frequency of occurrence.

The investigation was made by P. H. Van Etten, senior hydraulic engineer, under the direction of A. D. Edmonston, deputy State Engineer, and was undertaken in cooperation with the county of San Diego and the city of San Diego. The bulletin comprises six chapters and two appendices and includes 55 tables and 30 plates, maps and diagrams.

Car Owners Average 7250 Miles per Year

Do you drive your auto 7250 miles a year? The average California car owner does, it was developed by the Division of Highways in a recent road transportation survey.

This mileage was arrived at by questioning drivers of 108,000 passenger autos, about 6 per cent of the entire passenger registration for last year of 1,712,000.

It also was found that the average age of passenger motor vehicles is 5.3 years. Half of the total number are nearly six years old; in fact, one-fourth are more than seven years old.

From the total mileage produced by these 108,000 cars, an annual average of 7250 miles per year is computed. The annual mileage of a car decreases with its age. Cars in the two-year-old group—those in the first full year of operation—averaged 11,900 miles, and those eight years of age averaged only 2500 miles. It is considered in the transportation report, therefore, that the average of 7250 miles annually is conservative.

A total of 326,342 motor vehicles registered in other states used California highways last year and the survey showed these averaged 1500 miles on State roads.

HYDRAULICKING FOR HIGHWAY CUT

(Continued from page 17)

vation attained is 45 per cent solids—one yard of earth to each two and two-tenths yards of water.

The nearest comparable operation to the present work on Oregon Mountain was the mining excavation work carried on by the La Grange Mine. Because their speed of excavation was restricted by the need for running all material through sluice boxes, it can not be expected that their rate of removal would be so high. It is interesting, however, to note that 12 per cent of solids was their maximum rate of excavation, about one-half of the State's average rate of performance, and about one-fourth of the State's maximum rate of performance.

Twenty-one men are employed at the present time. Most of these are used for moving pipe lines and giants. For operation of the giants, a crew of three men is necessary: one at the reservoir, one at the giant, and one watchman. To spread the work to as many men as possible, labor works only thirty hours per week. The present monthly expenditure on this project is approximately \$3,000.

3000 ADDITIONAL MILES OF AUTOMOBILES USED ON BUSY HIGHWAYS IN 1934

The increase in automobile ownership of 1,000,000 vehicles in 1934 over 1933 placed almost exactly 3,000 miles of additional cars on the nation's already busy roads and streets.

There about 11 times as many cars on the roads and streets today as there were 20 years ago and there is less improved road space per car.

Progress of course has been made, yet today there are still four times as many cars per mile of improved roads as there were in 1915.

Gasoline consumption figures indicate that today's cars are used at least 50 per cent more than those of 20 years ago. On that basis, today's improved roads are at least six times busier than those of 1915.

BY-PASS CHANNEL RELIEVED RIVER

(Continued from page 15)

nels, which are intended to be used primarily for the passage of flood waters. The tidal reclamations in the lower Yolo by-passes are expected to be flooded at every high water.

All other reported damages in the Sacramento Valley were outside of the flood control area, and were due to the usual storm mishaps caused by heavy rainfall on particular areas. Some damage was caused to the highway and railroad near Arbuckle and also near Lincoln in Placer County. At the latter place the highway was flooded and a section of the Southern Pacific track was washed out by an unusually heavy flow in Coon Creek. Four men were drowned in the flood and ten railroad section men lost their lives while making repairs to the track.

Generally, the public had the impression that the flood situation was more serious than it actually was. It should be realized that certain areas such as by-passes, etc., must be reserved for flood relief and that they are intended to be flooded at intervals.

ENGLAND PUTS POLICE GIRLS ON TRAIL OF SPEED BOYS

In England, the road-hog had better watch his step. Police Commissioner Lord Trenchard has appointed a squad of police women to help enforce the new 30-mile-an-hour speed limit in built-up areas. These police women will ride in parties in automobiles. All will wear plain clothes. If a motorist passes at too high speed, the girls will sound a gong. Then police signs will flash on the car and the offender will be summoned to traffic court.—*Public Safety.*



The State Engineer who has been in Washington, D. C., during the past month in furtherance of Federal approval of the Central Valley Project and securing Federal funds for its construction reports very encouraging progress and expects favorable action shortly after the executive order is issued by the President outlining the organization set up for the work relief program under the \$4,880,000,000 Federal relief fund.

Final action on Federal financing of the Central Valley Project may come within a very short time after issuance of the executive order. The Federal government's recognition of the Central Valley Project has been recorded in the action of the House passing the omnibus Rivers and Harbors Bill which authorizes \$12,000,000 towards the cost of the project. The bill carries out the recommendation of Army engineers who estimated that flood control values in the construction of Kennett Dam would benefit the government to the amount of the appropriation suggested.

All Federal agencies that have investigated the project and all Federal bodies interested have given a favorable report and it is therefore believed that with the completion of the President's new organization set up a prompt decision will be made relative to the Central Valley Water Project.

Other activities of the division are detailed in the monthly report as follows:

IRRIGATION DISTRICTS

Action on the petitions of the directors of various irrigation districts to the California Districts Securities Commission is shown in the following orders of the commission issued to the districts:

Modesto Irrigation District, Stanislaus County—

Bonds in the principal amount of \$177,000 as security for a construction loan of like amount from PWA, validated.

South Fork Irrigation District, Modoc County—

Bonds in the principal amount of \$133,000 as security for a construction loan of like amount from PWA, validated.

San Dieguito Irrigation District, San Diego County—

Bonds in the principal amount of \$202,500 as security for an RFC loan of like amount with which to refinance the district, validated; also, expenditure of \$5,360 to certain landowners for money advanced to the district for construction work, approved.

Palo Verde Irrigation District, Riverside County—

Readjustment of district debt through provisions of Chapter IX of the Federal Bankruptcy Act, approved. Amount involved \$4,174,300.

Corcoran Irrigation District, Kings County—

Readjustment of district debt through provisions of Chapter IX of the Federal Bankruptcy Act, approved. Amount involved \$733,000.

Merced Irrigation District, Merced County—

Readjustment district debt through provisions of Chapter IX of the Federal Bankruptcy Act, approved. Amount involved \$16,190,000.

El Dorado Irrigation District, El Dorado County—

Feasibility of voting refunding bonds in the principal amount of \$360,500, approved; also refunding expenditures in the sum of \$5,350.50 approved.

Thermalito Irrigation District, Butte County—

Feasibility of voting refunding bonds in the principal amount of \$172,500 approved.

Palmdale Irrigation District, Los Angeles County—

Maturities, terms and conditions of exchange of refunding bonds approved. The exchange involves the surrender to the district of \$445,000 principal amount of original district bonds for \$222,500 of refunding bonds.

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento Flood Control Project.

During this period there were several rainstorms, none of which could be classed as a major storm. Commencing on April 6th, a storm of fair intensity developed over the Sacramento River watershed. The rainfall was heavy but of short duration and the resulting stream flows reached only medium flood stages. The Sacramento River throughout its length reached comparatively high stages, but the relief over the weirs into the by-passes was comparatively small and it was not necessary to open the Sacramento weir. All of the by-passes and overflow areas were covered with water.

Prospect Island and Little Holland Tidal Reclamations were flooded, two small breaks occurred on the Bear River near Wheatland, and some difficulty was

Salinity Eliminated by April Floods

(Continued from preceding page)

experienced in holding the Sacramento River levee on the east side above Colusa. Otherwise little damage was done by the flood, except to the homes of squatters in the overflow areas. Full details of operation of the flood control project will be found elsewhere in this magazine.

SERA RELIEF WORK

Work under the SERA projects during this period has been disorganized since the storm of April 6th because of flood waters covering the areas in which work had been progressing. On April 9th work was resumed on the Bear River.

A total of 20,705 man-hours of relief labor was worked during this period, making a total to date of 228,467 man-hours. The work done during this period is as follows:

	Man-hours
Federal Transient Service, upper Sutter By-pass	1,190
SERA Project No. 58-B14-15, Feather River north of Marysville	3,748
SERA Project No. 58-B13-35, Feather River south of Marysville	5,519
SERA Project No. 35-B14-222, leveling spoil bank, American River	172
SERA Project No. 51-B13-10, Bear River	5,846
Federal Transient Service, seepage canal	220
SERA Project No. 51-B14-39, Butte Slough By-pass	2,754
SERA Project No. 51-B14-39, Nelson bow levee	730
SERA Project No. 51-B14-39, cutting thistles and weeds on levees and warehouse property	526
Total	20,705

DAMS

Application for the enlargement of the Flora Steele Dam located in San Mateo County was filed on April 12, 1935, the estimated cost of which is \$3,000.

Revised plans and specifications accompanying an amended application for construction, at a total cost of approximately \$15,337,081, of San Gabriel Dam No. 1 were filed by the Los Angeles County Flood Control District on April 13, 1935. The amended application provides for modified specifications and an enlarged section. The proposed structure, when completed, will have a height of approximately 370 feet and will store 56,000 acre feet.

The repair work on Los Verjels Dam on Dry Creek in Yuba County has been completed for the season.

In the Santa Clara Valley work is well under way at Vasona Dam and on the Calero Dam, the auxiliary structure of the latter being practically complete. Excavation for the outlet conduit at the Stevens Creek Dam is progressing.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

Work has continued during the past month in compiling the 1933 and 1934 reports. These will comprise the records of diversions, stream flow, return flow and salinity. Salinity sampling is being maintained at sixteen permanent stations on the upper bays and in the Delta.

During the recent April storms, the flow of the Sacramento River at Sacramento reached about 95,000 second feet on April 9th. At the same time there was considerable flow in Yolo By-pass. The flow dropped to about 65,000 second feet on April 15th and increased to 69,000 second feet on April 19th. With the sustained flow of this magnitude, salinity has been practically eliminated to the lower end of Suisun Bay as shown by the following results for samples taken on April 14th:

Salinity at Upper Bay and Delta Stations on April 14, 1935

Station	Salinity in parts of chlorine per 100,000
Point Orient	720
Bulls Head	1
O and A Ferry	4
Collinsville	2
Emmaton	1
Antioch	3
Dutch Slough	2
Rindge Pump	1
Middle River	3

WATER RIGHTS

Thirty-five applications to appropriate water were received during the month of March, 11 were denied and 21 were approved. In the same period 12 permits were revoked and 12 passed to license.

On October 1st progress reports were requested from 1292 permittees and to date 1143 replies have been received. On the basis of these reports 148 cases have been listed for inspection during the coming field season. 39 permits have been revoked and 179 extensions have been allowed.

On October 15th reports were requested from 433 licensees and to date 403 replies have been received, on the basis of which 31 cases have been listed for investigation and 12 licenses have been revoked.

FEDERAL COOPERATION TOPOGRAPHIC MAPPING

During the month of March drafting was completed in connection with the Eureka Quadrangle in Humboldt County and the Bogus Quadrangle in Siskiyou County and progress was made in connection with the Treadwell Quadrangle in Kern County. In addition

(Continued on page 28)

350 Attend New Office Building Fete

(Continued from page 22)

millions proposed to be diverted for State general fund purposes through pending legislation, the State stands to lose by such diversions many more millions of Federal aid funds with the result that the only money available for northern California will be that already pledged for the San Francisco-Oakland Bay Bridge approaches.

Chas. H. Whitmore, division engineer in charge, spoke briefly, in response to the welcoming addresses of Mayors Leo J. Smith of Marysville and E. E. Benham of Yuba City. Whitmore introduced numerous members of his staff and thanked the chamber of commerce and the Marysville school board for their assistance and cooperation in obtaining the new headquarters building site.

Music for the occasion was supplied by the Harmony Glee Club, under direction of Ralph B. van Courtright, and the singers won most enthusiastic applause.

It was estimated that more than half the assemblage was from communities outside of Sutter and Yuba counties. The State chamber of commerce was represented by William Boucher of Sacramento and H. H. Dunning of Marysville.

EARLY CALIFORNIA STYLE

The new district office building is located at the corner of Seventh and B streets on a lot approximately 163 feet square. To the rear of this lot is a second area of equal size which is to be developed as a maintenance yard. The plot was donated to the State by the school board of the city of Marysville.

The building itself is a class "C" structure with exterior walls of brick. Interior bearing partitions, floor and roof construction are of wood. The roof covering is of shingle tile, the brick walls painted. In style the building is a single story "Early California" type.

FLOOR PLAN L SHAPED

The floor plan is roughly L shaped, being 138 feet long and 103 feet deep.

There are 12 offices provided on the first floor, as well as a public waiting room and a large drafting room. In the basement is an overflow drafting room, a laboratory, a blueprint room and storage space.

Nearly all of the basement area is excavated.

Winter heating is cared for by an oil fired boiler plant connected to direct radiators, except in special locations, where fan type unit heaters are employed. For hot weather a water cooled air ventilating system provides cooled air to all offices and work rooms.

HAS OWN WELL

Water for this system is taken from a deep well which is also connected to a pneumatic system for water supply to plumbing fixtures.

Sound and heat insulation of office ceilings is secured by the use of insulating board.

All lighting fixtures in working areas are of the indirect type.

The building, when complete with walks, driveways, parking area, lawn, shrubbery, and sprinkling system, will represent an investment of approximately \$60,000.

BUILDING INDUSTRY INCREASE SHOWN BY LICENSES GRANTED

With all trade indices pointing to an unmistakable upward trend in construction activities, William G. Bonelli, director of the California Department of Professional and Vocational Standards, calls attention to a flood of applications for contractors' licenses pouring into his office as further evidence of a more stable condition within the building industry.

In March, he reports, 460 licenses were issued, of which 406 were granted to persons entering the various branches of building and construction for the first time. In the forepart of April, 301 licenses were granted, of which 255 went to new contractors. The total number of licenses issued by this bureau for the fiscal year to date is 22,297, or only 173 behind the total of 22,470 for the entire fiscal year which ended June 30, 1934.

ADVANCE MAP SHEETS AVAILABLE

(Continued from page 27)

tion thereto triangulation was completed in connection with the Elk Creek Quadrangle in Tehama, Glenn and Mendocino counties.

Advance sheets are now available for the Colfax Quadrangle in Placer and Nevada counties. This is a revision of the former quadrangle sheet which was surveyed in 1885-87. The advance sheet is published on a scale of 1:96,000 and will finally be published on a scale of 1:125,000, which is the same scale as the original.

Advance sheets of Mint Canyon, Red Rover and Lake Quadrangles in Los Angeles County are now available. These are published on a scale of 1:24,000 with contour intervals of 5 and 25 feet. The surveys for these quadrangle sheets were made in 1931 and 1932 by the U. S. Geological Survey in cooperation with Los Angeles County.

Highway Bids and Awards for the Month of April

ALAMEDA COUNTY—Over A. T. & S. F. Ry., S. P. Co., & Key System in Oakland; steel and concrete viaduct. District IV, Routes 5, 69. Sections Oak. Emy. Mitty Bros. Const. Co., Los Angeles, \$1,053,965; Clinton Construction Co., San Francisco, \$1,087,800; N. M. Ball & Bodenhamer Const. Co., Oakland, \$1,965,780; MacDonald and Kahn Co., Ltd., San Francisco, \$1,094,118; Healy Tibbitts Construction Co., San Francisco, \$1,159,550; Bates and Rogers Construction Co., Oakland, \$1,067,813. Contract awarded to Barrett & Hilp, San Francisco, \$1,026,780.

ALAMEDA COUNTY—In Hayward between South boundary and "B" St., 0.6 mile. Grade and A. C. & P. C. C. Pave. District IV, Route 5, Section Hay. Hanrahan-Wilcox Corporation, San Francisco, \$27,896; Union Paving Co., San Francisco, \$26,240. Contract awarded to Jones and King, Hayward, \$24,389.

ALAMEDA COUNTY—In Hayward between "B" St. and North City Limits in San Leandro, between South City Limits and Begier St., 1.9 mile. Plane surface fill, rail trenches and place Plant-mix surface (Med. curing type). District IV, Route 105, Sections Hay. and SLA. Union Paving Co., San Francisco, \$13,824; Ransome Co., Emeryville, \$14,256; United Concrete Co., Portland, Ore., \$15,262; Jones & King, Hayward, \$14,177; Hanrahan-Wilcox Corp., San Francisco, \$16,697. Contract awarded to Lee J. Immel, Berkeley, \$14,176.50.

KERN COUNTY—Between one-half mile S. and 4 miles east of Western Water Works Pumping Station; 4.5 miles. Grade and Bit. Tr. Sel. Surf. Mat'l. District VI, Route 140, Sec. A & B. C. W. Caletti & Co., San Rafael, \$48,388; Stewart & Nuss and John Jurkovich, Fresno, \$50,827; Gogo and Rados, Los Angeles, \$46,124; J. L. Conner, Monterey, \$57,729; Dimmitt and Taylor, Los Angeles, \$55,831. Contract awarded to Basich Brothers, Torrance, \$44,862.80.

LOS ANGELES COUNTY—Between Ocean Ave. and Lincoln Blvd., 0.6 mile. A. C. & P. C. C. Pave. District VII, Route 60, Section S. Mca. J. L. McClain, Los Angeles, \$66,563; Gogo and Rados, Los Angeles, \$69,882; Geo. R. Curtis Paving Co., Los Angeles, \$69,275; Sharp & Fellows Const. Co., Los Angeles, \$69,587; Oswald Bros., Los Angeles, \$64,529; United Conc. Pipe Corp., Los Angeles, \$62,970. Contract awarded to Griffith Co., Los Angeles, \$60,923.40.

LOS ANGELES COUNTY—In City of Inglewood. Between Prairie Ave. and Commercial Street, 0.5 mile. A. C. or P. C. C. Pav. and Plant Mix Surf. Shoulders (Med. curing type). District VII, Route 174, Section Ing. Geo. R. Curtis Paving Co., Los Angeles, \$24,435; So. Calif. Roads Co., Los Angeles, \$26,192; Griffith Company, Los Angeles, \$24,963; Mundo Engineering Co., Los Angeles, \$26,580; Oswald Bros., Los Angeles, \$25,397. Contract awarded to United Conc. Pipe Corp., Los Angeles, \$23,515.50.

MENDOCINO COUNTY—In Ukiah & Willits, 1.3 mile retread surfacing. District I, Route 1, Sections Uki. and Wlts. Ransome Company, Emeryville, \$16,762; Lee J. Immel, Berkeley, \$18,322; Sidney Smyth & Albert Helwig, San Rafael, \$17,820. Contract awarded to E. A. Forde, San Anselmo, \$15,561.02.

PLUMAS COUNTY—Two bridges across N. Fk. Feather River at Rock Cr. and near Storrice, steel spans. District II, Route 21, Section A. Bodenhamer Construction Co., Oakland, \$115,838. Rocca & Co., San Rafael, \$123,619; Lord & Bishop, Sacramento, \$114,801; Bates & Rogers Construction Co., Oakland, \$122,144. Contract awarded to M. B. McGowan, Inc., & C. W. Caletti and Co., San Francisco, \$113,448.

SAN DIEGO COUNTY—Through the Narrows, 1.7 mile. Grade and road mix surface treat. District XI, Route 198, Section F & G. Geo. J. Bock & Son, Los Angeles, \$40,390; Daley Corp., San Diego, \$48,200; V. R. Dennis Const. Co., San Diego, \$49,896; Sharp & Fellow, Los Angeles, \$55,699. Contract awarded to Dimmitt & Taylor, Los Angeles, \$34,891.80.

SAN JOAQUIN COUNTY—Between French Camp and Stockton, 3.8 miles. Grade and A. C. Pavement. District X, Route 5, Section B & Stockton. Chas. L. Harney, San Francisco, \$109,244; Valley Paving and Construction Co., Fresno, \$108,188; Fredrickson and Watson Construction Co., Fredrickson Bros., Oakland, \$109,663; A. G. Raisch, San Francisco, \$103,283; Hanrahan-Wilcox Corp., San Francisco, \$99,728;

States Memorialize Congress to Abolish Gasoline Tax June 30

WASHINGTON, D. C.—More than 250 organizations, representing millions of citizen taxpayers, have filed protests against Federal taxation of gasoline with members of Congress. In addition, legislatures of 21 states have adopted memorials asking that the tax be ended with the expiration date, June 30 next.

The Federal gasoline tax, it is pointed out, was enacted in 1932 as a temporary emergency measure and was re-enacted in 1933 and again in 1934. The first year the tax cost the American motoring public \$62,839,826, the tax becoming effective in June of that year. In 1933 the amount derived was \$181,125,987, and in 1934 it was \$170,109,269, making a grand total of more than \$414,000,000.

The original rate was 1 cent per gallon, which was increased to 1½ cents in 1933, and reduced to 1 cent in 1934.

It is contended that the "emergency" which necessitated the imposing of a gasoline tax by the Federal government is ended. Revenue from taxes levied upon alcoholic beverages and substantial increases in revenues from virtually all other Federal taxes have given the government sources of income lacking when the "temporary" tax was placed upon gasoline in 1932.

States which have memorialized Congress to repeal the Federal tax include: Arkansas, California, Colorado, Florida, Maine, Maryland, Michigan, Minnesota, Mississippi, Montana, Nebraska, New Mexico, New York, North Carolina, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, and Utah.

Congressional committees have recommended that this tax be removed by letting it die on its expiration date, June 30, 1935.

A. Teichert & Son, Inc., Sacramento, \$108,013. Contract awarded to Heafeymoore Co., and J. A. Casson, Oakland, \$89,977.40.

SAN MATEO COUNTY—Between Crystal Springs Road and Third Ave., 0.2 mile; grade and A. C. Pave. District IV, Route 2, Section S.M. L. C. Seidel, Oakland, \$53,268; Hanrahan-Wilcox Corp., San Francisco, \$57,511; The Pay Improvement Company, San Francisco, \$55,672; Chas. L. Harney, San Francisco, \$58,531. Contract awarded to A. G. Raisch, San Francisco, \$46,280.10.

YOLO COUNTY—In Woodland, between S. C. L. and Main St., 0.6 mile. Grade, widen, and surface. District III, Route 7, Section Wd. A. G. Raisch, San Francisco, \$31,775; Hemstreet & Bell, Marysville, \$34,879; Ransome Company, Emeryville, \$35,592; Chas. L. Harney, San Francisco, \$34,333; Lee J. Immel, Berkeley, \$33,654. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$29,414.50.

Snow Plow and Crew Buried Under Slide That Brings Death to One Man

DANGER and hardships—sometimes death—encountered by the men of the Division of Highways who battle through the winter months to keep snow-covered roads in California mountains open to travel are little realized by motorists who use the cleared traffic lanes.

Combating storm conditions in two widely separated districts, the Division of Highways in March and April suffered the loss of one man and the injuring of another, both members of snowplow crews engaged in conflict with the elements.

Henry C. White, assistant operator of a plow in the Lake Tahoe region, was killed, buried under an avalanche of snow, and Kenneth Knight was injured and his machine badly damaged in an accident near Oregon Mountain in Del Norte County.

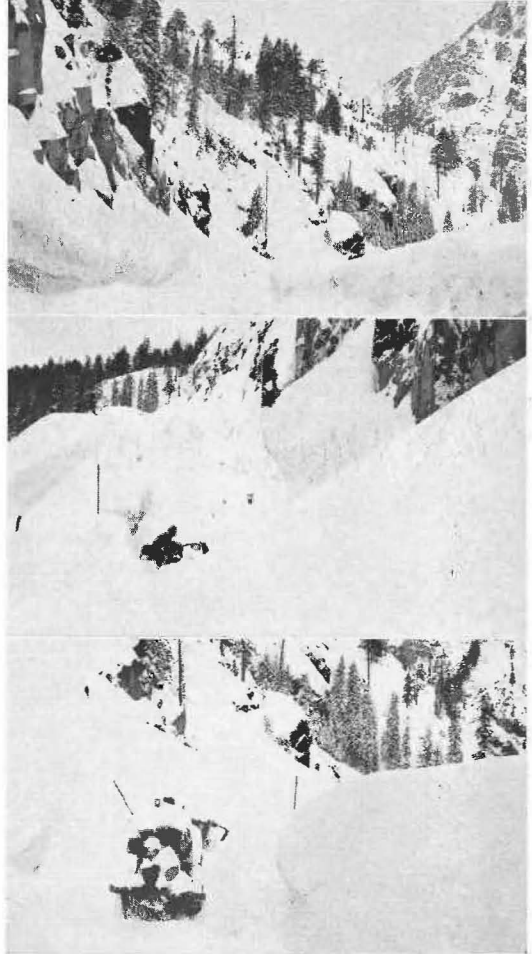
BURIED BY SLIDE

Entombed by the same snowslide that brought sudden death to White, Operator Jack Rowe miraculously escaped by digging himself out.

White and Rowe were attacking a snowslide in which they feared an automobile might be trapped when tragedy engulfed them without warning. The two men, on Sunday afternoon, April 7, were dispatched with their snow plow to a point on the roadway between Bay View Rest and Eagle Falls near Emerald Bay on State Route 38 along the west side of Lake Tahoe. Tons of snow had swept down the mountainside, burying the road to a depth of 20 feet and for a distance of 500 feet. Because the slide had not been witnessed it was thought entirely possible that a passing automobile might have been imprisoned.

The two men drove their plow into the drift, dreading what they might uncover. They had proceeded about 15 feet when the auger shear bolt of their machine, encountering hard snow and ice, snapped off. Both operators went to the front of the plow to make repairs. It was found that a chisel was required and Rowe climbed into the cab to get one from the tool chest.

While thus engaged he heard an ominous



SNOWSLIDE TRAGEDY—At top, scene of slide on Lake Tahoe highway. Center—First rescuers find only exhaust pipe of plow protruding above snow. At bottom—Plow partly exhumed in recovery of victim's body.

sound which he later described as a "swishing noise." He remembers nothing more until he came to and discovered himself buried alive under a great mass of snow. Beside him was a jagged piece of broken window glass from the cab of the plow. With this, he feverishly dug himself out and immediately began a frantic search for

Snow Plow Plunges off Grade to Bottom of 100 Foot Canyon

White. Digging into a drift at the front of the machine he finally extricated his assistant. His efforts to revive White failed and so he went down the mountain to Emerald Bay and telephoned for help.

WHITE INSTANTLY KILLED

When the rescuing party arrived at the scene it was learned that White had been almost instantly killed. Investigation revealed that a second snowslide 200 feet wide had struck the snow plow and the force of it had thrown Rowe across the width of the cab of the machine and out the other side through the glass window of the cab door. It was a piece of this broken window that enabled Rowe to exhume himself.

What might have been a fatal accident befell Kenneth Knight on March 20 while he was enroute with truck and snowplow to Oregon Mountain. Just west of Idlewild on Route 1, the truck with plow suddenly shot off the road, dropped 50 feet and continued its plunge to the bottom of a 100-foot canyon, landing in the bed of the Smith River.

REMARKABLE ESCAPE

Knight either jumped or was thrown from the truck, and picked himself up 40 feet down the slope. Strangely enough, his machine remained on its wheels for the entire distance to the river.

Operator Knight had no recollection of how the accident occurred. He was going around a sharp right curve, the road being covered with three inches of fresh snow, which lay over a thin sheet of ice next to the pavement. It is believed the front wheels of the truck were cramped to the right, skidded on the icy roadbed and threw the machine into the canyon. The damage to the truck was \$1,200, the damage to the plow unestimated. Knight escaped with a few severe bruises.

Bulgaria has instituted a road tax of three per cent of the market value of all motor vehicles and trailers, the tax being payable at the time of the issuance of the first license.

Policeman (after the collision): "You saw this lady driving toward you. Why didn't you give her half of the road?"

Motorist: "I was going to, as soon as I could discover which half she wanted."—*Stray Stories*.

Right of Way Agents Form Association in Southern California

WITH a desire to make the public better acquainted with their work, a group of right of way men in the Los Angeles area recently organized the Southern California Right of Way Agents' Association which has embarked upon the publication of a monthly magazine of its own.

The officers of the association are: Frank C. Balfour, State Division of Highways, Los Angeles, president; George A. Mitchell, vice president; Ralph F. Beegan, secretary, and H. S. Swearingen, treasurer.

The first issue of the magazine, *The Right of Way*, is off the press. Ralph F. Beegan and George A. Mitchell of the Los Angeles County road department are publisher and managing editor respectively. Robert I. Plomert, Jr., General Petroleum Corporation, Los Angeles, is editor and has as assistants Louis A. Griley, South Gate; Frank M. Colville, Los Angeles flood control department, and Fred A. Ballin, Jr., Southern Title Guaranty Company, Los Angeles. H. S. Swearingen of the Bureau of Right of Way and Land, Los Angeles, is treasurer.

In all great public and private improvement and development projects requiring the acquisition of easements, land sites and property, the right of way man has been an important behind-the-scenes participant. He has had to smooth the way for the engineer and the builder. He is the contact man, diplomatic good will advance agent and paver of ways.

Members of the Southern California Right of Way Agents' Association consider their work a profession and propose to dignify it as such. They plan to bring about a better understanding between property owners and right of way men, thus facilitating development undertakings whether they be the building of State highways, construction of railroads, creation of water, light and power projects or the laying of pipe lines.

The purpose of the association, as set forth in its constitution, is "to unite the efforts of all right of way men toward a betterment of conditions of the individual; to promote high standards and cooperative spirit among its members; to assist in creating a harmonious and friendly feeling between members and their respective employers; to engender in its members attributes which elevate the profession in which they are engaged.

Young Sign Vandals Turn Allies of the Division of Highways

By I. G. THOMAS, Office Engineer, District XI

THREE young boys, ages ten to twelve, were caught recently by an employee of District XI picking small reflector units from one of the highway reflectorized signs.

Believing that the boys did not realize the seriousness of removing these reflectors and desiring to impress upon them the grave consequences as well as to enlist their assistance in the future, a letter was addressed to each of the boys requesting them to report to the district engineer's office and explaining that failure to do so would mean turning their names in to the officers of the law. Promptly at the appointed hour the boys appeared, two of them accompanied by their parents.

The three of them were talked to directly, the parents being placed on the side lines to "listen in"; and "listen in" they did, for not one word was offered by them until the talk was over. However, it was apparent, before the talk had advanced far, that the boys had been taken in hand before coming to the district office.

It was thoroughly explained to the boys that these signs are placed along the highways to save and protect the lives of the motorists and that by removing the reflector units and defacing painted warning signs they might cause serious accidents.

It developed that the boys were members of a patriotic boys' organization and did not realize the seriousness of their actions. They have given their word of honor to do all they can to protect the signs and to report anyone found defacing them.

Thus we feel that the Division of Highways has gained some allies in the never-ending fight to keep our warning signs readable.

M STREET BRIDGE OPENING IN FALL

(Continued from page 18)

beautification work being done on the Yolo approach, that the contract work will cost nearly \$950,000.

With the prospects of favorable construction weather for the next few months and with work continuing as at present, it appears that by October automobiles entering or leaving by Sacramento's western entrance will be able to use the new bridge.

In Memoriam

In the passing of JOHN C. MORE on April 17th, at Los Angeles, District VII of the Division of Highways not only lost one of its most valuable employees but also one of the most beloved and highly esteemed men in the organization.

"J. C.," as he was affectionately known by fellow workers, was one of the original employees of District VII, his name appearing on the February, 1912, pay roll as Chief of Party. He was employed continuously by the Division of Highways in the positions of Chief of Party, Resident Engineer, Superintendent, Assistant Division Engineer, and District Office Engineer, from 1912 until his death, with the exception of the time spent in the Army during the World War.

Mr. More was born May 9, 1882, at Grand Rapids, Michigan. He completed his education at the University of Michigan, where he was a member of the Delta Kappa Epsilon fraternity. Shortly after graduating, he came to Los Angeles, and was employed by the Rindge Estate as Engineer from 1905 to 1912. In February, 1912, he entered the employ of the California Highway Commission. From 1912 until the beginning of the World War he was engaged in highway location and construction work as Chief of Party and Resident Engineer.

Almost immediately after the war started, Mr. More was commissioned Captain of Engineers in one of the first regiments to see active service in France. On three different occasions he was decorated for bravery in action, receiving citations from both General Pershing and General Foch.

Returning from France in 1919 he reentered the employ of the California Highway Commission, and was soon promoted from Superintendent to Assistant Division Engineer, and then District Office Engineer, in which position he played an active part in State highway administration for a number of years.

All who came in contact with Mr. More had the highest regard for him, both personally and professionally. His many promotions attest to his years of efficient and loyal service to the State.

He was intensely interested in military affairs, being in the Officers' Reserve Corps for a number of years, and belonging to the Hollywood Post of the American Legion.

He is survived by his widow, Mildred S. More, and a brother, Edward E. More, both of Los Angeles, and a brother, Stoddard S. More, of Kalamazoo, Michigan.

"What is your occupation?"

"I used to be an organist."

"And why did you give it up?"

"The monkey died."—*Toronto Star*.

To a man returning home rather late, his wife said: "I suppose you've been sitting up holding a sick friend's hand."

"Not much," said the husband. "If I had held his hand, I wouldn't be broke."

STATE OF CALIFORNIA

Department of Public Works

Headquarters: Public Works Building, Eleventh and P Sts., Sacramento

FRANK F. MERRIAM.....Governor
 EARL LEE KELLY.....Director
 JUSTUS F. CRAEMER.....Assistant Director
 EDWARD J. NERON.....Deputy Director

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CALIFORNIA HIGHWAY COMMISSION

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 PHILIP A. STANTON, Anaheim
 FRANK A. TETLEY, Riverside
 DR. W. W. BARHAM, Yreka
 C. H. PURCELL, State Highway Engineer, Sacramento
 JULIEN D. ROUSSEL, Secretary

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 J. G. STANDLEY, Principal Assistant Engineer
 R. H. WILSON, Office Engineer
 T. E. STANTON, Materials and Research Engineer
 FRED J. GRUMM, Engineer of Surveys and Plans
 C. S. POPE, Construction Engineer
 T. H. DENNIS, Maintenance Engineer
 F. W. PANHORST (Acting), Bridge Engineer
 L. V. CAMPBELL, Engineer of City and Cooperative Projects
 R. H. STALNAKER, Equipment Engineer
 E. R. HIGGINS, Comptroller

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 F. W. HASELWOOD, District II, Redding
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 L. H. GIBSON, District V, San Luis Obispo
 R. M. GILLIS, District VI, Fresno
 S. V. CORTELYOU, District VII, Los Angeles
 E. Q. SULLIVAN, District VIII, San Bernardino
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 R. E. PIERCE, District X, Stockton
 E. E. WALLACE, District XI, San Diego
 General Headquarters, Public Works Building,
 Eleventh and P Streets, Sacramento, California

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 J. J. HALEY, Jr., Administrative Assistant
 HAROLD CONKLING, Deputy in Charge Water Rights

A. D. EDMONSTON, Deputy in Charge Water Resources Investigation
 R. L. JONES, Deputy in Charge Flood Control and Reclamation
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 SPENCER BURROUGHS, Attorney
 EVERETT N. BRYAN, Hydraulic Engineer, Water Rights
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 GORDON ZANDER, Adjudication, Water Distribution

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 W. K. DANIELS, Administrative Assistant

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 C. H. KROMER, Principal Structural Engineer
 CARLETON PIERSON, Supervising Specification Writer
 J. W. DUTTON, Principal Engineer, General Construction
 W. H. ROCKINGHAM, Principal Mechanical and Electrical Engineer

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 FRANK B. DURKEE, General Right of Way Agent
 C. R. MONTGOMERY, General Right of Way Agent
 ROBERT E. REED, General Right of Way Agent


DIVISION OF PORTS

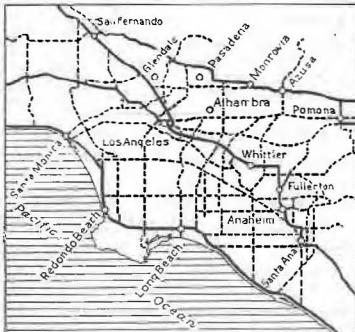
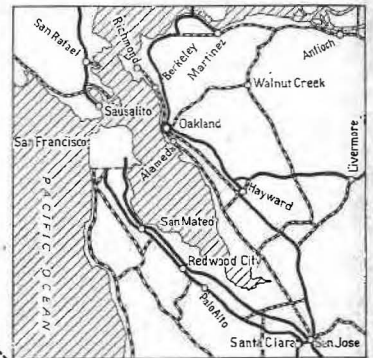
Port of Eureka—William Clark, Sr., Surveyor
 Port of San Jose—Not appointed

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

MAP
SHOWING
STATE HIGHWAY SYSTEM

LEGEND

Primary Roads 
Secondary Roads 



See Detail Map

See Detail Map