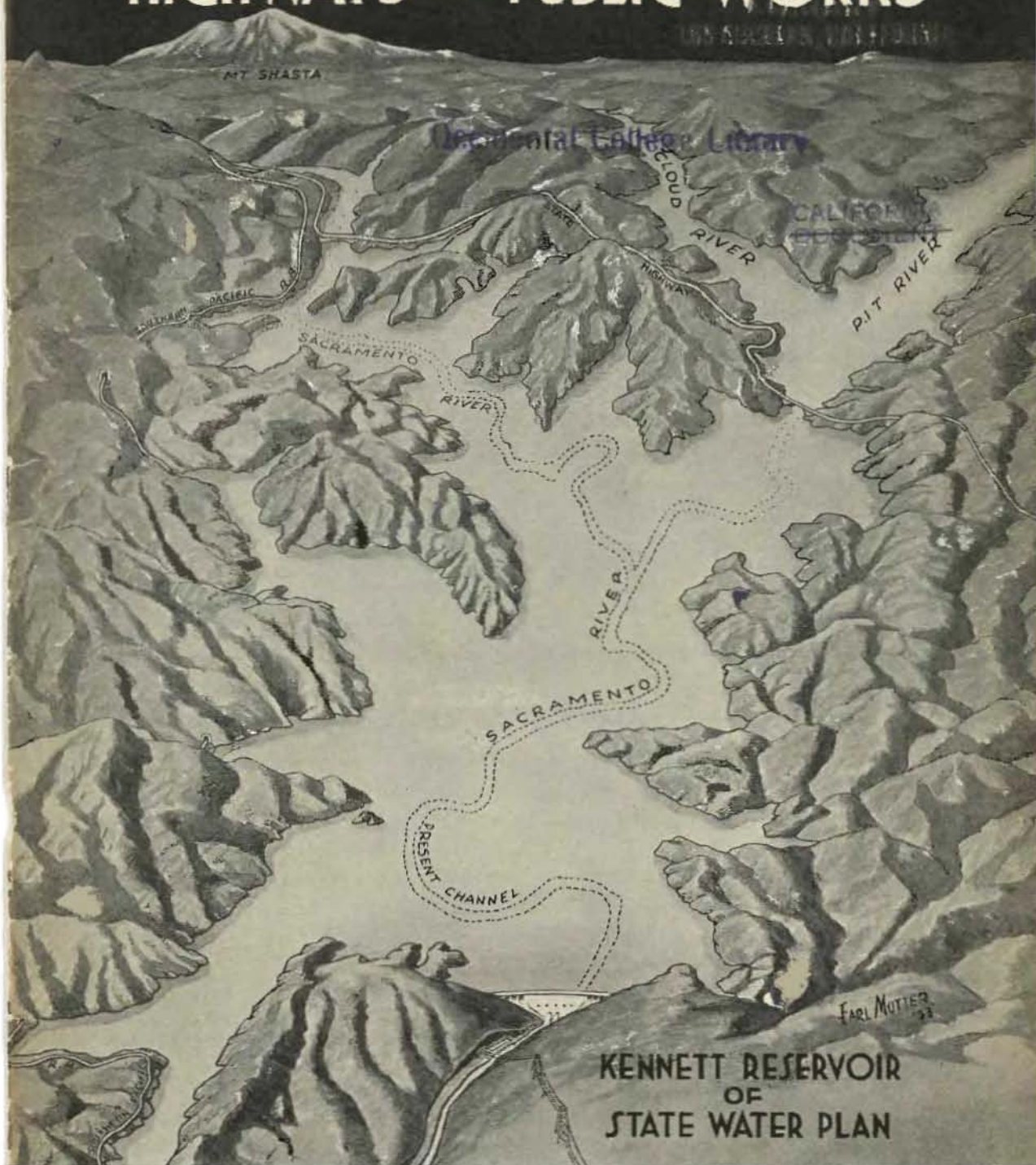



# CALIFORNIA HIGHWAYS AND PUBLIC WORKS



OFFICIAL JOURNAL OF THE DEPARTMENT OF PUBLIC WORKS, STATE OF CALIFORNIA  
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# "50,000 Men at Work by Christmas!" is Highway Division Speed-up Slogan

Bids opened for 50 Projects as first installment of Construction Program under Biennial Budget allotment of \$34,352,438 for jobs in 52 out of 58 Counties

By ERIC CULLENWARD, Deputy Director of Public Works

**F**IFTY thousand men in the "trenches" by Christmas—

Taking liberties with the old cry of the World War, the above is the slogan of the Department of Public Works from now until the festive season.

The "trenches" in this case may amply be considered the highway system of the State of California upon which some thirty-four millions of dollars is to be spent during this biennium on new construction.

With announcement of the budget for this period made August 17th allocating funds for projects in fifty-two of the fifty-eight counties throughout the State, speed has been the order of the day in the Department of Public Works.

Spurred on by repeated orders of Governor James Rolph, Jr., that men be put to work as fast as possible in conformity with the NRA and in an effort on his part to relieve distress and suffering in California, double shifts of specification writers, draftsmen and engineers have launched on a mammoth highway construction program.

With the wholehearted assistance of the State Printing Plant whose employees worked overtime on Saturdays and Sundays, specifications for fifty projects throughout the State were completed in record time for

advertising on August 25th, and on September 13th, 14th and 15th, bids totaling \$3,417,448 were opened at Sacramento for 41 projects, the remainder of the fifty being opened in several district headquarters.

Approximately two million dollars worth of additional projects were planned the following week and from that time on until Christmas it is the hope of the Department that one million dollars worth of projects

per week will be advertised so that by Christmas fifty thousand men will be employed directly or indirectly on construction work throughout the State and in the preparation of materials and machinery used in such work.

In all, \$70,136,000 will be expended by the Department of Public Works under Director Earl Lee Kelly in the 85th-86th biennium ending June 30, 1935.

This sum is the total of all State highway revenues to be received from all

sources and includes the Department's share of the Motor Vehicle Fuel Tax, Motor Vehicle Registration Fees, Motor Bus Franchise Tax and Federal appropriations. The latter consist of California's allotment of National Recovery Act Fund totaling \$15,607,354. The counties' share of Motor Vehicle Fuel Tax is not included in the figures given above.



ERIC CULLENWARD

## Governor Signs Water Bill to Obtain N. R. A. Millions and Work for 25,000

ON August 5, 1933, Governor James Rolph, Jr., affixed his signature to Assembly Bill No. 259, providing for the construction, operation and maintenance of the Central Valley Project of the State Water Plan. This official act of the Governor marked the culmination of ten years of effort to enact legislation which would provide for the construction of a first unit of the State Water Plan. It carried into effect the policy enunciated by the Governor in his inaugural address, wherein he declared:

**"A coordinated solution of these problems has long and earnestly been sought. Surely, in California, where water is so precious, the State must devise a general unified plan for the conservation and use of its water against the increasing needs of its increasing population and the demands of the coming generations whose stewards we are \* \* \*. I stand ready as Governor to give the Legislature and the distressed localities all the assistance in my power toward finding a practicable solution of these pressing problems."**

Further, it brought to fruition investigations started some 60 years ago during the administration of Governor Newton Booth.

### SPEAKERS COMMEND GOVERNOR

A large gathering of friends of the measure including legislators and State officials was present in the Governor's Council Chamber to witness the signing of this bill. Senator Bradford S. Crittenden, who has been a leader in water conservation matters for many years and has served as chairman of each interim legislative water committee, acted as master of ceremonies. Many legislators and other proponents of the measure present strongly endorsed the bill and commended the Governor for his staunch support of water conservation and development and of this legislation in particular.

Among those who spoke were Senator James I. Wagy of Kern County; Senator John B. McColl of Shasta County; Assemblyman Clifford C. Anglim, Contra Costa County; Francis Carr and Jesse Poundstone, members of the Governor's Water Commission; Van

Bernard, former member of a Legislative Water Committee and Harry Barnes, secretary of Madera Irrigation District.

In appreciation of his continued and tireless support of the State water program, the Governor was presented with a token in form of a beautiful silver vase. The presentation speech was ably made by Harry Crowe of Tulare County.

Among the State officials present were Earl Lee Kelly, Director of Public Works; Timothy Reardon, Chief of Bureau of Industrial Relations; Ray L. Riley, State Controller; Harry L. Hopkins, Chairman of State Highway Commission and Edward Hyatt, State Engineer, Colonel Robert B. Marshall, father of the "Marshall Plan" and Assemblyman Rodney L. Turner, one of the authors of the bill also were present.

### MANY OFFICIALS PRESENT

In signing the act, the Governor stated, "This act provides the possible means of obtaining a 30 per cent grant under the N. I. R. A., amounting to 40 or 50 millions of dollars which would make the project self-supporting from water and power revenues alone. The construction of this project would provide, directly and indirectly, employment for 25,000 men for four years and would solve the water problems so serious in the Sacramento and San Joaquin valleys, for many years to come. It is a project which should be consummated at the earliest possible moment because of its great merit and its great public advantages."

Assembly Bill No. 259 will permit the State to avail itself of the opportunity to finance the Central Valley Project under the provisions of the National Industrial Recovery Act. It embodies provisions recommended by Henry T. Hunt, general counsel of the Public Works Administration, to a committee sent to Washington, D. C., by Governor Rolph in May, 1933, for the purpose of conferring with the Federal agencies and California's representatives in Congress in regard to furthering the water project before the Federal Government. The personnel of the committee was



**MILLIONS FOR EMPLOYMENT** were made possible by Governor Rolph's signature affixed to Assembly Bill No. 239 on August 5th, providing for construction of the Great Central Valley Project of the State Water Plan involving a system of dams, canals and conduits for conserving and distributing water and manufacturing power. In the group watching Governor Rolph sign are: standing, left to right, Stanley Abel, Kern County supervisor and W. J. Buchanan, Contra Costa supervisor, respectively secretary and president of the California Supervisors Association; Former Assemblyman R. P. Easley, member Joint Legislative Water Committee; Francis Carr, member California Water Resources Commission; Col. R. B. Marshall, originator of first State Water Plan; Senator B. S. Crittenden, chairman Joint Legislative Water Committee and a sponsor of the bill; Assemblymen C. C. Anglim and Rodney Turner, authors of the bill; State Engineer Edward Hyatt; Jesse Poundstone, member California Water Resources Commission. Seated, left to right, Earl Lee Kelly, Director of Public Works; R. E. Collins, chairman, State Board of Equalization; Senator John B. McColl, a sponsor of the bill; Governor James Rolph, Jr., and Senator J. B. Waggy, a sponsor of the bill.

Edward Hyatt, Chairman, P. D. Nowell, Thomas M. Carlson and Clifford C. Anglim. The bill embodies the fundamental principles contained in Assembly Constitutional Amendment No. 18, approved by the Legislature May 5, 1933, which contains the recommendations of the Joint Legislative Water Committee and of the Governor's Water Commission relative to the State embarking on a State water program.

#### NO STATE LIABILITY

It is a revenue bond act patterned, particularly in its fiscal features, after the California Toll Bridge Authority Act under which construction of the \$75,000,000 San Francisco-Oakland Bay Bridge is being successfully prosecuted, and after laws under which many interstate public projects costing in excess of \$100,000,000 in New York and New Jersey have been carried out by the Port of New York Authority.

It creates no State liability. Costs of the project would be paid entirely from revenues.

A vote of the people is not required to approve this measure and it will become a law on October 25, 1933, unless those seeking to defeat the project secure sufficient signatures to qualify a referendum petition prior to that date.

The salient features of the act (Chapter 1042, Statutes of 1933) may be summarized as follows:

**Creates Project Authority.** A governmental agency is created to administer the act to be known as the Water Project Authority, composed of the Director of Public Works, the Director of Finance, the Attorney General, the State Controller and the State Treasurer. The Director of Public Works is designated as the chairman and the State Engineer as the executive officer of the Authority.

**Construction of Central Valley Project Authorized.** The Authority is authorized and empowered to proceed to construct the Central Valley Project when, in its judgment, income and revenue from all sources will be adequate to pay all costs of the project, including bond redemption, interest, operation and maintenance, and the Authority is directed to proceed with such construction immediately upon funds becoming available therefor.

**Enumeration of Units.** The Central Valley Project comprises the following units:-

- (a) Kennett dam and reservoir on the Sacramento River, with hydroelectric power plants and a main power transmission line to a central substation near the city of Antioch.
- (b) Contra Costa Conduit extending from the San Joaquin Delta to Martinez.
- (c) San Joaquin Pumping System extending from the delta to Mendota (construction of this unit may be deferred).

(Continued on page 12)

# Death Valley Roads Taken Into State System Provide 223 Mile Loop Tour

By J. W. VICKREY, Acting District Engineer

**I**NCLUDED in the 6800 miles of secondary roads recently taken into the State Highway System are the two main entrances to Death Valley—one via Baker and Death Valley Junction, and the other via Lone Pine and Darwin. In reality, the road forms a 223-mile loop from Route 23 at Lone Pine to Route 31 at Baker, with a connection to the State line from Death Valley Junction.

Thirty miles of the road, from the westerly side of Panamint Valley to the sea level contour near Stove Pipe Wells Hotel, is a toll road, and 25 miles across the floor of Death Valley proper is below sea level.

The area traversed is very dry and barren. While the summit of the Inyo mountains is 5300 feet, and Townsend Pass in the Panamint Range is 5200 feet above sea level, the entire area lies well to the east of the Sierra Nevada, and the moisture laden clouds from the west are stripped or entirely dispersed before reaching this area during the winter storm periods. The Valley of the Colorado is the only channel through which vaporized ocean water reaches this high desert country. This probably accounts for whatever winter rainstorms occur.

## MENACED BY CLOUDBURST

A considerable portion of the present road lies along the edge or bottom of creek beds, where it is subject to obliteration by flood water with only an instant's warning, the cloudburst causing the flood having occurred several miles away. Portions lie along the foot of, or across, cloudburst fans, conglomerate masses of rock and debris deposited at the mouth of the canyons, where the flow slackens, and the water spreads and evaporates, or sinks into the sand. Some of these fans reach for a thousand feet up the mountainside, and spread out to miles in length, where they intersect the floor of the valley.

It taxes the imagination to conceive of the force which formed them, but it is not hard to imagine what happens to the road when the cloudburst occurs.

Across the floor of the valley, near the north entrance, the road lies in the path of shifting

sand dunes, and further south, across salt marshes, where it may be that the maintenance man will find the cure for the ever present dust. In all, the road presents a very uninviting, but interesting, problem for the highway engineer.

## HIGHEST SHEER PEAK

The whole floor of the valley, comprising some four hundred square miles, is below sea level. The lowest point is —310 feet (estimated) at Bad Water, near the southern end. The sea level contour encloses an area more than 70 miles long, and from 1 to 6 miles wide. Telescope Peak, in the Panamint Range, rises 11,045 feet above sea level, and towers above the land at its foot, as does no other peak in the United States. Its full height, starting from the plain below sea level, is visible, while Mt. Whitney, more than 3000 feet higher, rises from a plateau almost 4000 feet in elevation, and is less imposing because of its rival neighbors.

The valley received its ominous name from one, Lewis Manly, who, early in 1850, led the remnants of the "Jayhawker" emigrant train out of the valley, over the Panamint Range to the south of Telescope Peak. They paused long enough on the ridge overlooking the scene of so much trial, suffering and death, to bid farewell to "Death Valley."

While the definite record of the valley begins with these emigrants who wandered into it from the Old Spanish Trail, there is no continuous, accurate record, even of the actual climatic conditions, all the available information coming from various sources. There is no doubt, however, but that the summer climate will satisfy even the most ardent lover of warm weather; a temperature of 134° in the shade has been recorded at Furnace Creek Ranch, that being the limit of the thermometer.

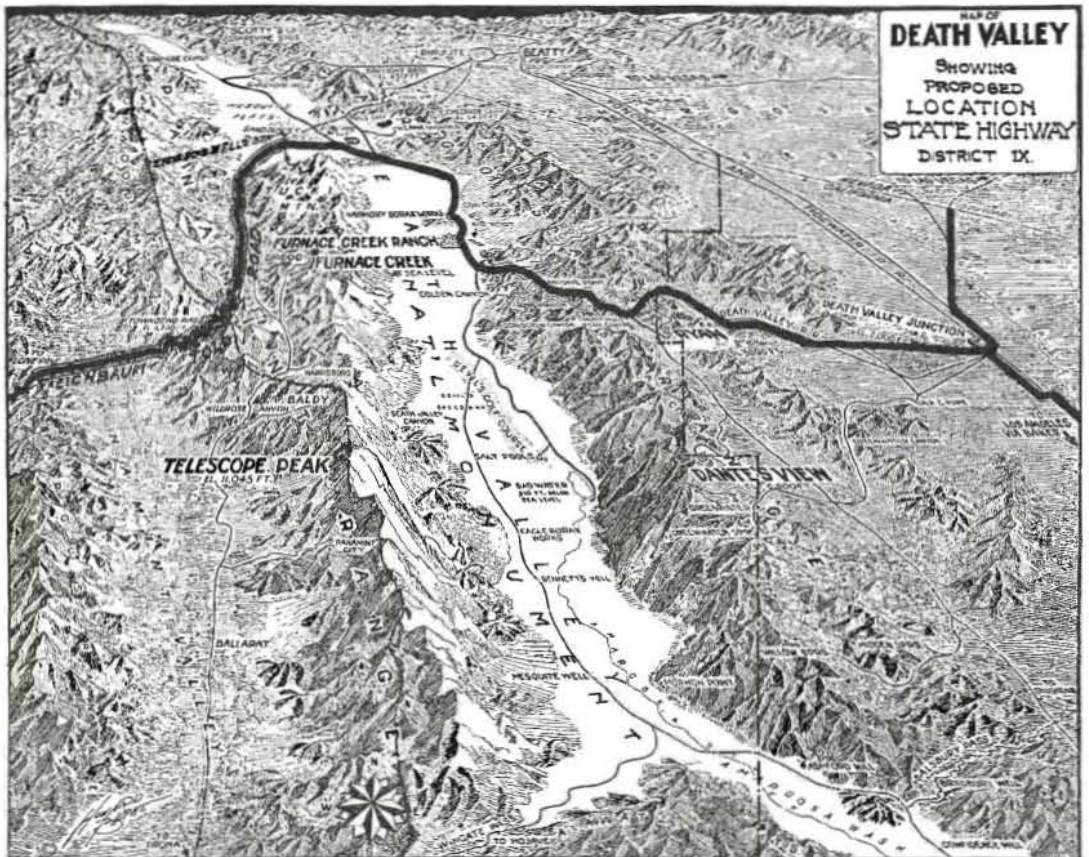
## EXTREME TEMPERATURES

Geological Survey documents suggest a temperature of 150° around the stone beds at the mouths of the canyons, and one writer has guessed that out on the salt beds the heat will go to 160°. Considered from the real estate promoter's viewpoint, the annual

(Continued on page 8)



INTO THE JAWS OF DEATH rode the ill-fated Jayhawker party of pioneer emigrants who tried to cross this great arid sink in 1850 and the survivors named it Death Valley.



Drawn and copyrighted by Howard Burke.

DEATH VALLEY LOOP route taken into State's Secondary System is shown in this sketch.

## "Speed-up" Campaign Begun on Bids

(Continued from page 1)

This budget provides for general administration, engineering, rights of way, maintenance, construction and reconstruction necessary for the upkeep and improvement of the State Highway System which now approximates 14,150 miles. It provides for allocations to joint highway districts and the allotment of one-quarter cent per gallon fuel tax for expenditures within the incorporated cities of the State.

This budget, which has received the approval of the Governor, is the result of many weeks of intensive study by the State Highway Commission and the heads of the Department of Public Works. The Commission, Harry A. Hopkins, chairman, Taft; Timothy A. Reardon, San Francisco; Phillip A. Stanton, Anaheim; Frank A. Tetley, Riverside; and Dr. W. W. Barham, Yreka, sitting with Earl Lee Kelly, Director of the Department of Public Works, held innumerable open meetings and their budget has been drawn to care for the relief of unemployment and the traffic needs of the counties as co-related to the general highway system of the State as a whole.

### A DIFFICULT TASK

It was no mean task for the Highway Commission to allocate the \$34,352,438 for new construction and reconstruction work. Every community had its pet project and the budget is the result of the sifting of many, many proposals until a program was reached by the Commission which it felt would serve the needs of communities and at the same time advance the State Highway System as a whole.

With the budget signed, sealed and delivered, the opening gun was then fired in this program of road building and employment by Earl Lee Kelly. A "speed-up" order rivaling those being sent out at intervals from Washington was issued following a joint conference between the Director and C. H. Purcell, State Highway Engineer, and things began to hum in the Division of Highways.

Included in the \$34,352,438 for this new construction and reconstruction is the Federal appropriation of nearly \$16,000,000 allocating 25 per cent for extension of Federal-aid high-

ways within municipalities; an additional 25 per cent on feeder roads; and the remainder for work upon the Federal Aid System outside cities. This money, in conformity with the terms of the Federal act, is being spent in at least 75 per cent of all counties of the State.

### MOST COUNTIES PARTICIPATE

Major construction allocation provides projects in 89 per cent of the counties, while maintenance and minor improvements cover all the counties.

Commenting upon the "burning of midnight oil" in the Division of Highways, Director Kelly said:

"I have received orders from Governor Rolph to proceed with construction work at the earliest possible moment, since it is the Governor's desire to aid in the Nation's recovery by putting the maximum number of men to work as quickly as feasible.

Legislative limitations prevented us from sending out specifications before August 21st. Therefore, it will be at least October 1st before actual work is done on any of our projects. However, we are rushing our plans and the State will see a beehive of activity on our highway system within the next few months."

"The budget moneys have been allocated primarily to advance the California Highway System as a whole, rather than in an effort to favor any particular locality," said Harry A. Hopkins, Chairman of the Commission. "We have almost doubled the highway system of the State, and it has been a big task to coordinate our allocations with the new needs attendant upon the inclusion of some 6800 miles of county roads into our system, but every allotment we have made has been based upon a desire to maintain the efficiency of our State Highway System to improve it so as best to serve all the people of the State."

A list of projects comprising the major construction items in the new budget follows. The list shows the counties in which the work will be done, the estimated cost of each improvement and its approximate location. More definite details of routing, alignment, type and standards of construction will be available after final engineering surveys and plans are completed.



# List of Highway Budget Projects

(Continued from preceding page)

County	Route	Location	Mileage	Nature of Improvement	Amount
Alameda	5	San Francisco Bay Bridge			
	14	approaches		Grading paving, structures	\$1,650,000
	5	Oakland to 1.5 miles south	1.3	Grading, paving, bridge (see City Projects)	54,300
	75	Oakland Tunnel (portions)		Grading, tunnel	50,000
	14	Albany, San Pablo Ave.		Widening and paving	79,400
	14	Berkeley, San Pablo Ave.		Widening and paving	63,600
	14	El Cerrito, San Pablo Ave.		Widening and paving	118,670
	14	Oakland-Emerlyville, San Pablo Ave.		Widening	41,500
	5	Oakland, Moss Ave.		Webster Street to Santa Clara and Harrison	96,300
	5	Oakland, Foothill Blvd.		South entrance (see item 11 above)	50,000
	Total, Alameda County				
Alpine	23	Centerville to Markleeville	6.6	Grading, surfacing, bridge	\$230,000
	Total, Alpine County				
Amador	34	4 mi. west to $\frac{1}{2}$ mi. west Pine Grove	3.5	Grading, oil surface	\$70,000
	Total, Amador County				
Butte	21	Prison labor camps (primary)		Grading	\$670,000
	21	Oroville to Quincy (portions)		Grading	183,200
	3	Pine Creek Bridge and approach		Bridge, grading, paving	25,300
	Total, Butte County				
Calaveras	65	San Andreas to Angels (portions)	9.4	Grading, surfacing, bridges	\$105,000
	Total, Calaveras County				
Colusa	7	Maxwell to northerly boundary (portions)		Grading, paving, bridges	\$280,000
	50	Rumsey to Route 15 (portions)		Grading, bridge	87,500
Total, Colusa County					\$367,500
Contra Costa	14	San Pablo to Crockett (portions)	1.4	Paving	\$42,500
	75	Oakland Tunnel (portions)		Grading, tunnel	50,000
Total, Contra Costa County					\$92,500
Del Norte	1	Last Chance Slide to Flanigans	9.2	Grading and surfacing	\$595,000
	Total, Del Norte County				
El Dorado	11	Kyburz to Strawberry	9.0	Surfacing	\$115,000
	65	Greenwood Creek and approaches		Bridge, grading	7,500
Total, El Dorado County					\$122,500
Fresno	41	Prison labor camps (secondary)		Grading	\$490,000
	4	Selma to Fowler Switch Canal	1.8	Grading, paving	85,300
	4	Fresno, Broadway		El Dorado to Tulare and Cherry Ave. to Broadway	103,044
Total, Fresno County					\$678,344
Humboldt	1	Benbow to 7 mi. north of Garberville	7.5	Grading, surfacing and bridges	\$575,800
	1	Smith Ranch to Twin Trees	0.7	Bridge, grading, surfacing	116,300

(Continued on page 28)

## Death Valley to be Made Accessible by New State Highways

(Continued from page 4)

average of 75.6° indicates a very delightful climate; but in computing this average, the extremes of 15° and 134° must be considered, as well as the average of one record for July, both nights and days, of 101.2°.

Following the Emigrants in 1849, prospectors were lured into the ranges surrounding the valley by stories of gold, silver and lead deposits, the wealth of which would stagger the imagination, and while such deposits are still missing, and still sought for to some extent, the prospecting did lead to the discovery of borax deposits, which brought about the construction of wagon roads or trails, a railroad and the gradual development of the area to its present status.

There are several so-called roads throughout the valley that can be traveled during the cooler months, and when the cloudbursts have not removed all trace, since in the majority they follow the bottom of the washes, that being the most accessible location. The railroad, however, has been abandoned, as well as the 30 miles of monorail that was constructed by mining interests to the southern end of the valley.

Neither the prospectors nor the later developers, however, have been able to locate more than meager supplies of water suitable for men and radiators, and the visitor is advised to carry his own.

The area comprising most of the valley, to the summits of the bordering ranges, was included in the Death Valley National Monument early in 1933, and the United States National Park Service is turning attention to the proper development of the valley so as to preserve, and at the same time render more accessible, its unique attractions. This attention on their part, together with the gradual improvement of the approach roads, will no doubt attract more and more visitors to this at present isolated area, the many wonders of which will excite the imagination of even the most casual observer.

"I shouldn't think you'd let your wife drive the car downtown alone. She doesn't know the traffic regulations, does she?"

"No, but she's young, and good looking."—*National Highways.*

## Two Big Snow Plows Built in State Shops Exhibited at the Fair

APPLYING the knowledge accumulated during the past two winters in keeping California's main highways open through the high Sierra passes equipment engineers of the Division of Highways have redesigned and rebuilt at headquarters shop two types of snow plows that are expected to swiftly annihilate the deepest drifts old Boreas can pile up against them.

The machines are the most powerful yet designed for snow work. The larger is a huge railroad type rotary. The business end of it suggests a gargantuan demon with bat cars and a great gaping maw full of whirling steel blades for teeth.

The rotor wheel is driven by a Liberty aviation engine developing 420 horsepower at 1800 r.p.m. The speed of the rotor when plowing is from 120 to 180 r.p.m.

### WORKS BACKWARD

The plow assembly is built on a 5-ton truck chassis, and is driven in reverse when plowing. The plowing speed is up to 3 miles per hour and the truck is steered from both ends.

The horsepower of the engine which drives the truck is 114 at peak speed. This gives a total horsepower of approximately 534 for this piece of equipment.

The second machine is an auger blower type plow having a single engine to drive the plow and truck. This engine develops approximately 175 horsepower. This type of plow has been used very successfully by the Division of Highways for the past two seasons.

### CLAWS DOWN DRIFTS

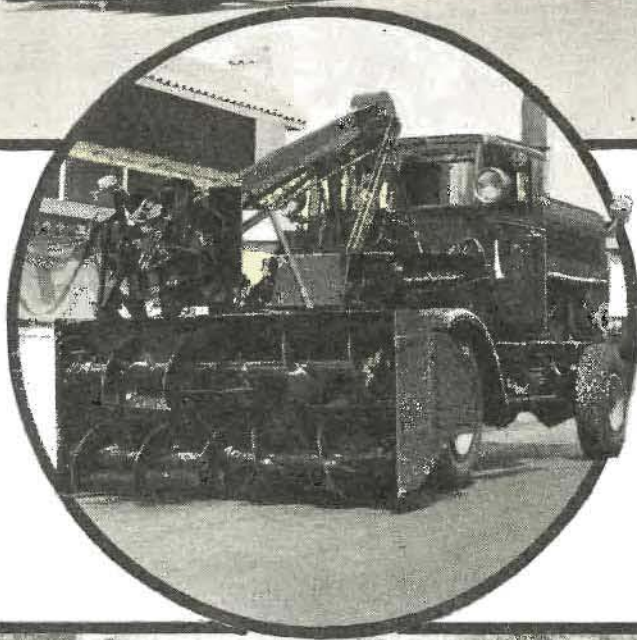
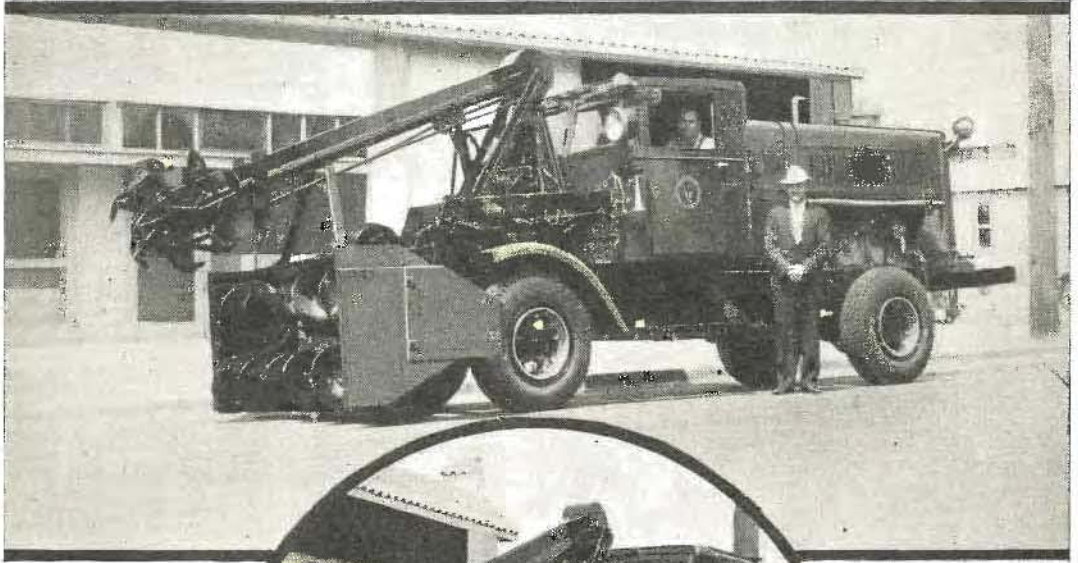
It has a long upper arm equipped with strong steel claws which tears down the drifts moving back and forth across the face of them while the swiftly revolving auger blades below cut their way through.

Both of the big machines, newly painted in the bright orange color adopted by the Department as a safety measure for all road equipment, were exhibited at the State Fair where they excited much interest and attention.

Bobby (short of money): "I say, dad, have you any work you'd like me to do?"

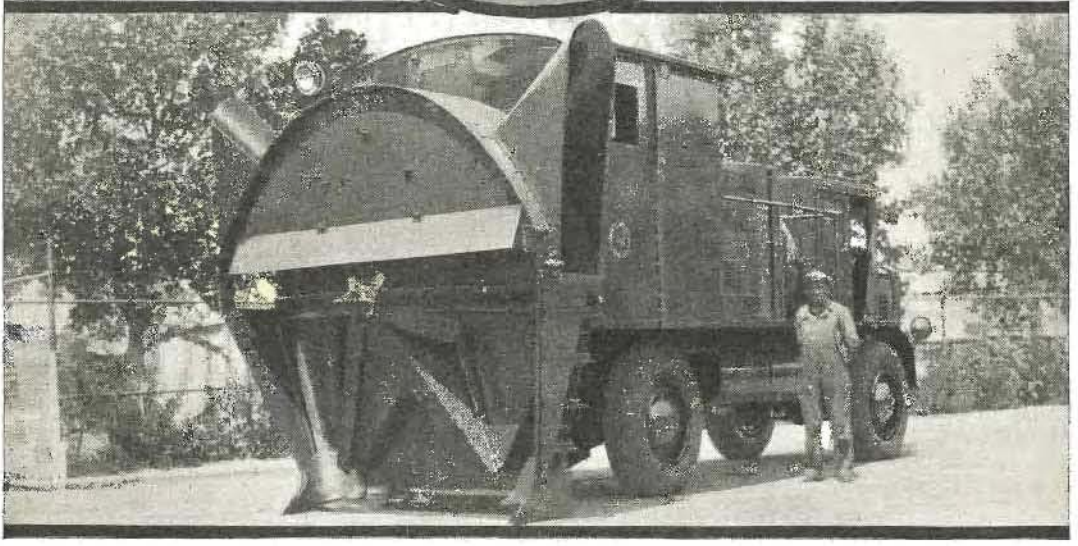
Father (taken by surprise): "Why—no—but—er—"

Bobby: "Then would you like to put me on the dole?"



**SWIFT DESTRUCTION** awaits snow drifts on California highways when this new auger-type plow goes into action this winter. The long upper arm moves back and forth across the tops of the drifts, tearing them down with its powerful steel claws while the whirling auger blades below macerate and bore through the snow bank.

**READY FOR battle** with the biggest snow-drifts the combined efforts of Jack Frost and old Boreas can pile up in the Sierra Passes this huge plow is the most powerful of its type yet designed. The rotary blades are driven by a 420 horsepower Liberty aviation motor while the engine of the truck delivers 114 horsepower. Both this plow and the one shown above were built at the Headquarters Shop of the Division of Highways.



## Creation Of New Highway District Compels Transfers And Promotions

**B**Y chapter 767 of the Statutes of 1933, the last Legislature added to the State Highway System approximately 6800 miles of county roads and city streets. This increase is an addition of more than 92 per cent of the State-highway mileage as of January first of the current year.

On August 21st, the date on which the law became effective, the mileage on the State system jumped from 7350 miles to 14,150 miles.

This sudden doubling of State road mileage has required a readjustment of district boundaries and some shifting of personnel.

### NEW DISTRICT FORMED

The most drastic change has been in southern California where it was found necessary to establish an additional district, bringing the total of State highway districts to eleven. The new district, with headquarters in San Diego, has been formed from portions of Districts VII and VIII. Ventura, Los Angeles, Orange and San Diego counties formerly composed District VII and District VIII comprised San Bernardino, Riverside and Imperial counties.

The territory south of the Tehachapi is now distributed between the three districts as follows:

**District VII: Ventura, Los Angeles and Orange counties.**

**District VIII: San Bernardino County and the westerly half of Riverside County.**

**District XI: San Diego and Imperial counties and the easterly half of Riverside County.**

The greatest change made in the north involves the moving of the district offices of Districts III and X from Sacramento to more central locations within their respective districts.

District III comprises Glenn, Butte, Colusa, Sutter, Yolo, Yuba, Sierra, Nevada, Placer, El Dorado counties and a portion of Sacramento County and the district office is now located at Marysville.

Amador, Alpine, Calaveras, Tuolumne, Mariposa, Merced, Stanislaus, San Joaquin

and Solano counties and a portion of Sacramento County compose District X, which office has been moved to Stockton.

The subdivision of the State into the eleven highway districts with their respective boundaries is shown on the map on the adjoining page.

### PERSONNEL CHANGES ANNOUNCED

To accommodate the new district and to provide the adequate engineering supervision required by the expansion of the State Highway System many changes within the personnel of the highway organization have been required. These changes as announced by the State Highway Engineer, C. H. Purcell, include the following promotions and transfers among the engineering executives on the staff of the Division of Highways.

G. T. McCoy who for the past two and one-half years has been Principal Assistant Engineer has been promoted to the position of Assistant State Highway Engineer. Mr. McCoy came to the Division of Highways in July, 1927, as Assistant Office Engineer in the Central Office. In 1928 he was made Administrative Assistant to Mr. Purcell and in 1931 he was promoted to Principal Assistant Engineer. Mr. McCoy has had twenty-three years' experience both in the field and in high executive capacities.

J. G. Standley, for the past two and one-half years a Staff Engineer on the Central Office staff, is promoted to Administrative Assistant. Mr. Standley has served the Division of Highways continuously since August, 1914, and his continuous rise through the organization has given him an unquestionable foundation for the position of high responsibility which he now assumes.

### NEW DISTRICT CHIEF

E. E. Wallace who has been District Engineer of District VI, with headquarters at Fresno since 1926 has been made District Engineer of the new District XI at San Diego. Mr. Wallace joined the State highway organization in California in 1913 and the work of organizing the new district is in capable and experienced hands as he takes over his new responsibilities.

# 1933 Map Shows Additional District



## HIGHWAY DISTRICT AREAS

- | Districts | Counties  |
|-----------|---|
| I—        | Del Norte, Humboldt, Mendocino, Lake, portions of Trinity and Siskiyou.   |
| II—       | Modoc, Lassen, Shasta, Tehama, Plumas, portions of Trinity and Siskiyou.  |
| III—      | Glenn, Butte, Sierra, Nevada, Yuba, Sutter, Colusa, Yolo, Placer, El Dorado and a portion of Sacramento.            |
| IV—       | Sonoma, Napa, Marin, Contra Costa, Alameda, San Francisco, San Mateo, Santa Clara and Santa Cruz.                   |
| V—        | San Benito, Monterey, San Luis Obispo and Santa Barbara.  |
| VI—       | Madera, Fresno, Tulare, Kings and a portion of Kern.  |
| VII—      | Ventura, Los Angeles and Orange.  |
| VIII—     | San Bernardino and a portion of Riverside.  |
| IX—       | Mono, Inyo and a portion of Kern.   |
| X—        | Amador, Alpine, Calaveras, Tuolumne, Mariposa, Merced, Stanislaus, San Joaquin, Solano and a portion of Sacramento. |
| XI—       | San Diego, Imperial and a portion of Riverside.   |

The vacancy in District VI caused by the transfer of Mr. Wallace is to be filled by R. M. Gillis who has been promoted from Assistant Construction Engineer of the Divi-

sion of Highways to Acting District Engineer at Fresno. Mr. Gillis is an engineer of wide experience both in highway and bridge construction and as an executive. He has had

(Continued on page 19)

## Association Will Oppose Referendum

(Continued from page 3)

- (d) Friant Dam, reservoir and power plant on the San Joaquin River.
- (e) Madera Canal extending from Friant Dam to the Chowchilla River.
- (f) Friant-Kern County Canal extending from Friant Dam to Kern River.

### REVENUES MUST PAY COSTS

**Duty of Authority.** The Authority is charged with the responsibility of the operation and maintenance of the project and it is made the duty of that body to fix and establish rates and charges for water and power, and to enter into the necessary contracts for the sale of water and power, so as to provide revenues sufficient to pay all costs and expenses of construction, operation and maintenance of the project, including bond charges, as and when the same become payable.

**Bond Issue Authorized.** In order to raise the necessary funds for the construction of the project, the Authority is authorized to issue revenue bonds in the aggregate amount of \$170,000,000, such amount, however, to be reduced by the amount of any direct contributions which may be made for the purpose of construction of the project. These revenue bonds will be a direct charge upon, and will be secured *only* by the income and revenue derived from the project, and will not constitute a debt, liability or obligation of the State of California.

**Authorized to Condemn Property.** Under certain restrictions the Authority is authorized, when property necessary for the construction, operation or maintenance of the project can not otherwise be acquired, to acquire the same by eminent domain proceedings and may, upon commencing such proceedings and depositing appropriate security with the court, take immediate possession of such property.

### REASONABLE NEEDS ASSURED

**Prior Right of Watershed.** The act provides that "In the construction and operation by the Authority of any project under the provisions of this act, no watershed or area wherein water originates, or any area immediately adjacent thereto which can be conveniently supplied with water therefrom, shall be deprived by the Authority directly or indirectly of the prior right to all of said water reasonably required to adequately supply the beneficial needs of said watershed area or any of the inhabitants or property owners therein."

**Preference to State Agencies.** In awarding contracts for the sale of water and power, in case of equal or equivalent offers, preference is to be given municipalities, political subdivisions and districts. Any such contract with any person, firm or corporation, other than such State agency, shall be subject to cancellation upon five years notice.

**Mandamus to Compel Duties.** Provision is made for the enforcement by the Authority of any contract obligation undertaken by a municipality, political subdivision or district. Mandamus or other appropriate remedy also is made available to a bond holder to compel the Authority, or any official having duties relating to the act, to perform such duties.

The Central Valley Project if consummated and placed in operation in accord with the provisions of

the bill, would solve the major water problems now existing in the Sacramento and San Joaquin valleys. The Kennett reservoir on the Sacramento River, with a capacity of 2,940,000 acre-feet, the key unit of the project, would materially reduce flood flows on the Sacramento River, restore and improve navigation on Sacramento River to Red Bluff, remove the ever threatened extended litigation between the upper and lower water users on the Sacramento River and repel the invasion of salt water into the rich delta region of the Sacramento and San Joaquin rivers.

The Sacramento-San Joaquin Delta Cross Channel would deliver additional water into the San Joaquin Delta required for salinity control and for industrial and irrigational uses.

The Contra Costa Conduit would furnish fresh water from the delta to the industries and agricultural areas in Contra Costa County, now suffering from lack of water.

By means of the Friant reservoir on the San Joaquin River and the Friant-Kern and Madera canals, irrigation water would be made available to 400,000 acres of highly productive and developed lands in the upper San Joaquin Valley, which now have only half the necessary water supply.

### FEDERAL AGENCIES APPROVE

The San Joaquin River Pumping System would, when constructed and put into operation, make available additional water supplies to the upper San Joaquin Valley, but this procedure is not proposed as an immediate step.

Hydroelectric power generated at Kennett would be transmitted over a main transmission line to a substation located near Antioch, Contra Costa County, where it would be distributed.

Federal agencies which have been studying the Central Valley Project with the primary purpose of determining the Federal interest and responsibility therein have recently rendered favorable reports in regard to the project. The Chief of Engineers of the U. S. War Department, Major General Lytle Brown, in his report of June 27, 1933, stated:

"Plans for the Kennett and Keswick dams, Friant Reservoir and irrigation canals in connection with the latter, are well developed from an engineering standpoint and may be promptly undertaken when funds for the purpose are made available. Should they be incorporated in a public works program provided in the National Industrial Recovery Act, the Federal contribution of 30 per cent of the cost of labor and material employed on the project, as provided for in that act, would, from the figures presented by the Division Engineer, place these projects on a self-supporting basis."

### "FINANCIALLY FEASIBLE"

The Bureau of Reclamation, U. S. Department of Interior, also reported favorably on the project, as follows: "The Great Central Valley Project designed primarily for the relief of highly developed, settled and producing lands suffering from shortage of water supplies, is meritorious and worthy of financial assistance from the Federal Government through the loaning of noninterest bearing reimbursable funds in

(Continued on next page)

## Seeking 30 Per Cent Federal Grant

(Continued from preceding page)

accord with the Federal reclamation policies and precedents. With Federal financing of the project through the employment of noninterest bearing funds for irrigation features, interest bearing funds for the power features and justified direct contributions from the State and Federal governments in the interest of flood control, navigation and other purposes and with fair and reasonable revenues from the sale of electric energy and water, the project for complete initial development is economically and financially feasible." The Bureau of Reclamation report was prepared under the direction of Dr. Elwood Mead, Commissioner, and R. F. Walter, Chief Engineer, by H. W. Bashore, Senior Engineer.

Another Federal body, the U. S. Senate Committee on Irrigation and Reclamation, filed a printed report on its study and investigation of the project. The committee found that there was a large Federal interest and responsibility in the project which should be recognized and provided for by Congress.

### AUTHORITY MEMBERS MEET

The members of the Water Project Authority provided for in Assembly Bill No. 259 held a preliminary and unofficial meeting on August 10. At this meeting, the State Engineer was authorized to prepare a preliminary application to the Federal Public Works Administrator for approval of the Central Valley Project, for a 30 per cent grant of the cost of the labor and materials employed in the construction of the project, and for a loan of funds of the remaining cost under the provisions of the National Industrial Recovery Act. A. D. Edmonston, Deputy State Engineer, was named acting secretary. The application is now under preparation. It will be presented to the Public Administrator, Harold L. Ickes, through the State Advisory Board and the Regional Administrator, Justus S. Wardell. The State Advisory Board is composed of three members, Hamilton H. Cotton, Chairman, E. F. Scattergood and Frank R. Havenner. Frank E. Trask is executive officer of the board.

Assembly Bill No. 259, which was passed by a substantial majority vote in the Senate and by a vote of 58 to 11 in the Assembly, may be referred to a vote of the people in accord with law. The Attorney General was requested by F. G. Athearn, attorney of San Francisco and landowner in Sacramento Valley, to prepare a summary and title for a referendum petition on the bill. Such title was prepared by the Attorney General and the petition is being circulated in several parts of the State. In event the necessary number of qualified signatures, approximately 70,000, are obtained, these names must be filed with the county clerks in the respective counties for verification and then filed with the Secretary of State on or before October 24, 1933.

If the petition is prepared and filed in compliance with the law it will not be voted upon until the next general election in November, 1934, unless the Governor calls a special election before that date. The calling of such a special election is discretionary with the Governor. Referring the bill to the vote of the people means delay and possible elimination of the opportunity of obtaining Federal financial aid.

### COVER PAGE ILLUSTRATION VISUALIZES GREAT RESERVOIR

The illustration on the front cover page of this magazine is a very carefully drawn picture presenting an aerial view of the Kennett Reservoir as it will appear after the Kennett Dam is built and the waters of the Sacramento, McCloud and Pit rivers back up behind the dam into adjoining canyons to form a great reservoir lake.

The estimated flooded area of the reservoir is 23,000 acres, providing 2,940,000 acre-feet of water storage.

An idea of the great area that will be covered by this body of impounded water can be had by a comparison with the dam shown in the central foreground. This structure will be 420 feet high with a crest length of 2430 feet, and just below it is shown a power house that will be built for an estimated installed capacity of 325,000 K. V. A.

### DEFENSE ASSOCIATION ORGANIZED

For the purpose of furthering the Central Valley Project before the Federal Government and of resisting and defeating any referendum on Assembly Bill No. 259, the State Water Plan Association was organized in Sacramento, California, on August 26, 1933. A constitution was adopted and officers, an executive committee and members of the Association were elected.

A large majority of the counties and practically all interests of the State are represented in the Association. The purposes of the Association are clearly stated in the constitution as follows:

(a) To cooperate with and assist the Water Project Authority created by the Central Valley Project Act of 1933 (Chapter 1042, Stats. 1933) in carrying out the purposes, objects and provisions of said act.

(b) To resist and defeat any and all attempts to delay the operation and effect of said act and to resist and defeat any referendum thereof, and also to resist any and all amendments to said act which would tend to defeat or delay the effectuating of its purposes and objects as now exemplified therein.

(c) To aid and assist in securing grants, loans and contributions of funds from the United States or any of its agencies for the purpose of the construction, maintenance and operation of the Central Valley Project, or any part thereof.

(d) To raise funds as herein provided to carry out the foregoing purposes or any thereof.

(e) To furnish to members of this Association such information as may relate to their interests, or the interests which they represent, or as may pertain to the purposes of this Association.

### OFFICERS ELECTED

The following executive committee and officers of the Association have been elected:

(Continued on page 20)

## Increases Shown in Summer Traffic Count and Gasoline Tax Revenues

A COMPARISON of this and last year's annual July traffic count indicates that the decline in traffic which commenced in 1931 has been checked. Sunday traffic showed an increase of 1.0 per cent over 1932. Monday traffic, however, still shows a slight decline of 1.9 per cent.

For 1933 a small increase was evident in the Sunday traffic on all classes of routes. On the other hand, with the exception of the recreational routes, slight losses were recorded on Monday. The percentages of these differences for the various route classifications are shown in the following tables:

### Per Cent Gain or Loss Over Preceding Year

#### ALL ROUTES

	Sunday	Monday
1930	+7.3	+11.6
1931	-5.6	-0.6
1932	-9.4	-8.3
1933	+1.0	+1.9

#### MAIN NORTH AND SOUTH ROUTES

1930	+7.3	+12.6
1931	-6.1	+0.4
1932	-12.3	-11.0
1933	+1.5	-2.2

#### LATERALS BETWEEN INLAND AND COAST

1930	+6.4	+8.1
1931	-5.5	-2.5
1932	-10.1	-8.7
1933	+0.1	-2.6

#### INTERSTATE CONNECTIONS

1930	+13.8	+17.0
1931	+9.1	+10.6
1932	-4.5	-0.5
1933	+1.9	-1.4

#### RECREATIONAL ROUTES

1930	+5.0	+8.5
1931	-11.7	-19.2
1932	-0.5	-0.4
1933	+0.2	+0.3

#### UPWARD TREND SHOWN

The change in the rate of decline in traffic is not remarkable, but it is worth considering in conjunction with gasoline consumption. With the exception of June, 1932, when the Federal tax of one cent per gallon was imposed, each month in 1932 showed a decrease in gas consumption when compared

with the corresponding month in 1931. Like comparisons for the first six months in 1932 and 1933 show similar results.

However, it is notable that an increase in gas consumption was recorded for July, 1933, when the total tax assessed exceeded the 1932 figure by \$226,275.66, and the 1931 figure by \$32,667.75. Thus the smallest rate of change in the traffic census since 1931 corresponds with the first upward trend in gas consumption since 1931.

The addition of 6800 miles of road to the State highway system presents several difficulties in administration, not the least of which is the allocation of funds. By and large the volume of traffic, actual and potential, determines the standards of construction and maintenance, and hence controls the expenditure of funds. In view, then, of the importance of adequate traffic counts, steps have already been taken to obtain traffic data on the new secondary roads.

#### COUNTIES HAVE DATA

In some cases counties have obtained data which are directly comparable to those on the State highway system. Orange County forces, under the direction of Nat H. Neff, county engineer, have for some years coordinated a summer traffic census at twelve stations on county roads with the census on State roads. Similarly, C. A. James has directed counts at 68 stations for the Kern County Planning Commission.

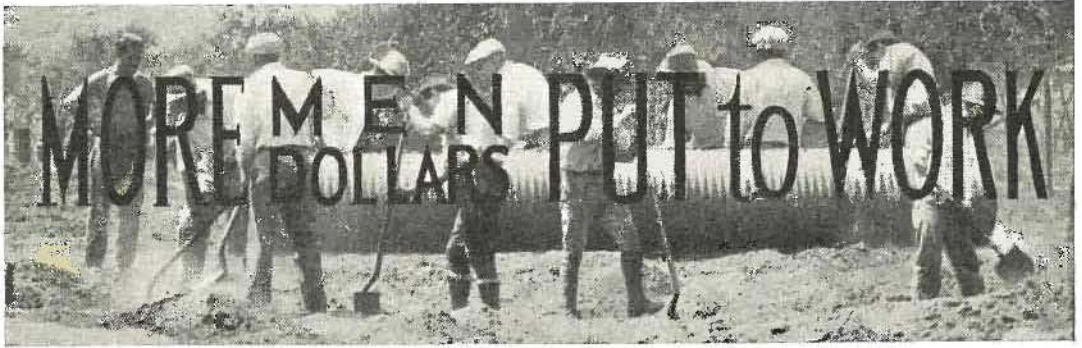
Approximately 45 per cent of the total traffic is carried on the main north and south routes, 26 per cent on the laterals, 17 per cent on the recreational routes, and 12 per cent on the interstate routes.

#### ALL ROUTES COVERED

The count taken on July 16 and 17 between the hours of 6 a.m. and 10 p.m. covered the traffic on all State highway routes, the vehicles being segregated by hourly periods under the following classifications: California automobiles, foreign vehicles, light trucks under two tons, heavy trucks, trailers, busses and horse-drawn vehicles.

(Continued on page 22)





**C**ARRYING out Governor Rolph's urgent instructions that jobs be provided as quickly as possible with road funds the Division of Highways has launched a construction program of unprecedented magnitude. Working night and day after August 21st when the bill adding 6800 miles of secondary roads became a law the engineering staff of the Division of Highways, under State Engineer C. H. Purcell, prepared plans, estimates and specifications for road and bridge construction projects enabling Director of Public Works Earl Lee Kelly to announce on August 25th publication of a call for bids on fifty contracts estimated to cost approximately \$4,018,100, covering work on 470 miles of road and eight bridges.

This broadside of public works for the double benefit of California's citizens was made possible by the allocation to California of \$16,000,000 by the Federal Government under the authority of the National Industrial Recovery Act, and \$35,690,000 from gasoline tax revenues budgeted by the California Highway Commission.

#### *Hearty Cooperation by Federal Bureaus*

That this enormous program has been so successfully begun is a monument to the whole-hearted cooperation which has obtained during this emergency between the engineering staff and officials of the Division of Highways and the officials of the National Recovery Administration and engineering staff of the United States Bureau of Public Roads.

Bids were opened on the projects advertised August 25th on September 13th, 14th and 15th, and it is planned that the work will begin on the contracts about October 15th.

Work under these contracts will be governed by the requirements of the California Recovery Act and the National Industrial Recovery Act. Wages, hours and conditions of employment, the use of a maximum of hand labor methods, construction methods designed to provide a maximum of employment, and compliance with codes of fair competition are all stipulated in the specifications and made a part of the contracts thus insuring to the citizenry of California that the spirit of National recovery will obtain on all State highway work.

It is estimated that on this first lot of contracts in highway construction program, between 3500 and 4000 jobs will be created during the coming months. As the work involved in these 50 contracts will be spread throughout 32 counties, the jobs provided will be similarly spread and the employment so provided will furnish relief to ten or twelve thousand Californians in these areas.

#### *Million-dollar-a-week Advertising Program Planned*

While the large volume of contracts started by the advertising of August 25th is of record-breaking proportions, it must be remembered that this is just the beginning of a highway construction program that will proceed at a steady pace throughout the coming months. It is planned that the advertising of projects will continue at a rate of from one to two million dollars a week throughout the fall and early winter months with the object of providing "JOBS AND MORE JOBS!"

The tabulation and summary of August advertising to be found on the next two pages presents a vivid picture of the magnitude of work advanced to bids in the efforts of the California Highway Commission, the Department of Public Works and the Division of Highways to speed recovery under the leadership of Governor Rolph:

## Record-Breaking Highway Program

County	Location	Miles	Type
Butte	Across West Branch of Feather River 14 miles north of Oroville	---	Reinforced concrete arch bridge
Shasta	Boulder Creek to 1.5 miles north of Bella Vista	9.1	Grade and bit. treated surface
*Mendocino	Across Feliz Cr. at Hopland	---	Steel stringer bridge
*Santa Cruz	1 mile north to Inspiration Point	0.8	Graded roadbed
*Sonoma-			
Mendocino	Cloverdale to Hopland	13.9	Gravel surface
Monterey	San Ardo to King City	74.0	Bituminous treated surf. (portions)
*Santa Barbara	At Elwood	0.8	Pavement on approaches to overhead crossing
*Kern	Pierce Road to Tank Farm	2.1	Grade and pavement
*Mariposa	Orange Hill School to Mariposa	15.1	Bituminous treated surface
*Los Angeles	Orange Ave. to Barranca St.	3.8	Grade and pavement
*Imperial	East Highline Canal to Sand Hills	23.7	Pavement
Imperial	Holtville to East Highline Canal	6.9	Oil treated borders
Mono	Sherwin Hill Summit to Whiskey Canyon	3.7	Grade and bituminous treated surf.
Plumas	Across North Fork of Feather River at Howells	---	Steel arch bridge
*Placer	Loomis to Newcastle	5.2	Grade and pavement
Napa	Easterly Boundary to Napa Wye and Napa Wye to Southerly Boundary	8.2	Bituminous surface treatment
Marin-Sonoma	Across Petaluma Creek at Green Point	---	Repairing timber bridge
San Luis Obispo-			
Monterey	Various Locations	17.2	Oiling shoulders
*Madera	Across Ash Slough 1/2 mile north Chowchilla	---	Timber bridge
*Los Angeles	Foothill Boulevard to Alost Avenue	0.6	Grade and pavement
*Los Angeles	Santa Clara School to Castaic School	5.1	Grade and pavement
Los Angeles-			
Orange	Various Locations	31.0	Oiling shoulders
Imperial	Northerly Boundary to Tri-folium Canal	25.6	Oil treated borders
Imperial	El Centro to Calexico	10.1	Bituminous surface treatment
Riverside	Black Butte to Blythe	9.2	Grade and oil treated surface
*Solano-Napa	Carquinez Bridge to Cordelia	10.3	Graded roadbed
*Colusa-Glenn	Maxwell to Norman	7.1	Grade and surface
*Placer-Nevada	Drum Canal to Yuba Pass	4.2	Grade and bituminous treated surf.

## Advanced to Bids August 25, 1933

County	Location	Miles	Type
Mendocino	Ukiah to Hopland	9.5	Bituminous surface treatment
*Mendocino	Across Russian River 2 miles south Hopland	---	Steel truss bridge
Merced	Northerly Boundary to Livingston	6.2	Bituminous surface treatment
*Tulare	Westerly Boundary to 2 Mi. south of Plaza Garage	5.0	Grade and pavement
Ventura-Los Angeles	Ventura to Castaic Junction	40.3	Seal coat on shoulders
San Bernardino	At Mt. Vernon Ave. Viaduct	0.2	Grade and pavement
Riverside-Imperial	Avenue 62 to 10 miles south of Riverside-Imperial County line	21.7	Oiling shoulders
Riverside	Riverside to Elsinore	25.1	Oiling shoulders
Riverside	Corona to Southerly Bndy.	41.6	Oiling shoulders
Inyo	Bishop to Owens River Canal	3.5	Grade and bituminous treated surf.
*Sacramento	Between Sacramento and McConnell	---	Widen bridges and culverts
*Contra Costa	In Valona	0.2	Grade and pavement
Los Angeles	Colby Canyon to Mount Wilson Road	4.0	Graded roadbed
El Dorado	Across Greenwood Creek 12 miles north of Placerville	---	Timber bridge
Imperial	Araz to Colorado River	6.0	Oiling shoulders
San Bernardino	Needles to Topock	14.3	Bituminous surface treatment
Kern	Between 6 and 10 miles east of Bakersfield	2.0	Bituminous surface treatment
Kings	West of Lemoore	2.7	Bituminous surface treatment
Tulare	South Bndy. to Kingsburg	46.0	Seal coat on shoulders
Glenn, Placer-Colusa	Various Locations	14.2	Bituminous surface treatment
Los Angeles	Vasquez Rock Road to 2 miles east	2.0	Bituminous surface treatment
Sonoma	Willow Brook to Haystack	4.2	Bituminous surface treatment

\* Financed with the aid of National Recovery Highway Funds.

### SUMMARY OF AUGUST ADVERTISING

Type	Miles	Amount
Pavement.....	46.7	\$1,205,100
Bituminous treated surfacing.....	64.9	791,400
Bituminous treatment, borders, shoulders oiling.....	334.0	506,100
Graded roadbed.....	24.2	1,174,100
Bridges.....	(8)	341,400
<b>Totals.....</b>	<b>469.8</b>	<b>\$4,018,100</b>

## 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 1103, Sacramento, California.

Vol. 11 SEPTEMBER, 1933 No. 9

## LONG NEEDED LAW

California at last has a roadside advertising law, designed to protect the scenic beauty of the State's motor routes and prevent accidents by the elimination of dangerous advertising signs. This measure has been signed by Governor Rolph and became effective August 21.

Billboards are perfectly legitimate if kept in their place and roadside services of all kinds have a right to use advertising signs, but they should not be of an unsightly nature, nor should they be placed where they obstruct the motorist's view of the highway.

The new law requires that all firms engaged in the outdoor advertising business must pay a license fee of fifty dollars a year to the State, and that permits must be obtained for the erection of each advertising sign. Permit fees of twenty-five cents a sign and one dollar for each billboard or other advertising structure will be required by the State.

The law prohibits signs within the right-of-way of any highway, and provides limitations on placing structures within three hundred feet of a highway intersection or grade crossing. It prohibits placing of advertising signs where they might prevent a clear view of approaching traffic along a highway for a distance of five hundred feet. It also prohibits any sign visible from highways which imitate any direction or warning sign permitted by State law, such as the words "Stop" or "Slow Down."

California has long needed such regulation of roadside advertising. Those who use such signs will gain favor in the eyes of the traveling public by observing the regulations and thus demonstrating their spirit of cooperation.—*Santa Rosa Press-Democrat.*

## Bay Bridge Officials Talk With All Jobs By Radio Telephone

ULTRA high frequency radio telephones are making conversation possible from isolated bridge piling driven into the bay, from launches, and the offices of the San Francisco-Oakland Bay Bridge in Oakland and San Francisco.

The radio telephone that will connect boats and piers and central construction offices is the invention of and is being installed by D. Reginald Tibbetts, who has entered into contracts with the San Francisco-Oakland Bay Bridge Division, Bridge Builders, Inc., and the Transbay Construction Company, to install 22 radio telephones between construction points and headquarters.

## CONNECTS OFFICES AND WORK

This is the first time the ultra high frequency telephone, regarded by the Federal Radio Commission as an experiment, has been used on any construction job. By its use Bay Bridge officials and contractors can speak from their offices to their men at work on the bay from either shore, or can intercept men in boats on their way to the job.

Tibbetts, the inventor, is a University of California senior and was runner-up in the Edison National Intelligence Contest for young men six years ago.

He installed the first police radio equipment on the coast in 1927 when he made an installation for Chief of Police August Vollmer in Berkeley when he was 16 years old.

He is an electrical engineering student and vice chairman of the University of California branch of the American Institute of Electrical Engineering.

## SIMPLE EQUIPMENT

The radio telephone operates on a 4- to 6-meter wave length compared to 500- to 1500-meter wave lengths used for broadcasting.

The telephones are simple in appearance and use standard telephone receivers and transmitters attached to a box resembling a small radio receiving set.

Chief Engineer C. H. Purcell, in awarding the contract for the San Francisco-Oakland Bay Bridge, declared that communication to the inaccessible points on the bay would prevent expensive trips of messengers and would effect tremendous savings during the years of bridge construction.

## Many Changes in District Personnel

(Continued from page 11)

twenty-five years' experience in highway engineering work.

There is one change that is noted with regret on the part of many of the State highway organization and that is the departure of District Engineer H. S. Comly on a year's leave of absence. Mr. Comly has been in charge of District I with headquarters at Eureka for the past year and a half. One of the oldest engineers, in length of service, Mr. Comly joined the Division of Highways in February, 1912, and has given continuous service for nearly 22 years. In 1924 he was made District Engineer of District II, which position he held until he was transferred to District I in 1932.

Mr. Comly's position will be filled by J. W. Vickrey who has been Acting District Engineer of District IX at Bishop. Mr. Vickrey now becomes Acting District Engineer of District I. He came to the Division of Highways in August, 1917, and was chosen as the engineering executive for District IX upon the retirement of F. G. Somner in 1932.

District Maintenance Engineer S. W. Lowden of District II at Redding has been promoted to Acting District Engineer and will assume charge of District IX at Bishop. Mr. Lowden has been with the Division of Highways since 1912.

### IMPORTANT ASSIGNMENT

With highway construction as one of the main factors in the National Recovery Program the construction program of the California Division of Highways has been geared to high speed. That this construction program be advanced to actual work and jobs for thousands of Californians, necessitates a maximum coordination of all departments. To this end L. V. Campbell, Office Engineer at the Central Office of the Division has been temporarily assigned to the field to contact the eleven district offices and thereby coordinate the work of getting construction projects under way as rapidly as possible for the unusual program just begun. Mr. Campbell has been with the Central Office since 1922.

R. H. Wilson, Office Engineer of District III has been transferred to the Central Office as Acting Office Engineer to take over the duties of Mr. Campbell. Mr. Wilson joined the California Division of Highways in 1912 and served until 1915. With

the exception of two years during the war, he was actively engaged in highway construction in the employ of other States for the next twelve years. In 1927 Mr. Wilson returned to the California Division of Highways and has served in both Districts I and III.

The formation of the new District XI and the consequent changes in executives has caused many changes among the engineering assistants in the various districts. The most notable of these changes are as follows:

### ADDITIONAL TRANSFERS

**I. A. THOMAS**, District Office Engineer, District I at Eureka transferred to District Office Engineer, District XI at San Diego.

**C. P. SWEET**, Resident Engineer in District I at Eureka is promoted to District Office Engineer, District I.

**G. E. HELLASOE**, District Maintenance, District I transferred to Central Office as Assistant Maintenance Engineer of the Division of Highways.

**R. L. THOMAS**, Locating Engineer in District VII at Los Angeles is promoted to District Maintenance Engineer, District I, at Eureka.

**R. L. BEUTHAL**, District Office Engineer, District VI, at Fresno transferred to District Construction Engineer District XI at San Diego.

**C. F. WAITE**, Resident Engineer in District II at Redding promoted to District Office Engineer, District VI at Fresno.

**J. M. SORENSON**, Resident Engineer in District VI, at Fresno promoted to District Maintenance Engineer, District XI at San Diego.

**M. E. CESSNA**, Locating Engineer in District V at San Luis Obispo transferred to Chief Draftsman, District XI at San Diego.

**G. F. PINGRY**, Assistant Right of Way Agent, District VI at Fresno promoted to Right of Way Agent, District XI at San Diego.

**A. E. ANDERSON**, Chief Clerk, District VI at Fresno transferred to Chief Clerk, District XI at San Diego.

**A. H. HENDERSON**, Assistant Disbursing Office, Department of Public Works at Sacramento transferred to Chief Clerk, District VI at Fresno.

## Ground Broken in Ventura County for Greatest State Hospital in West

**T**HE ceremony of turning the first shovelful of earth in connection with the beginning of building construction for the Camarillo State Hospital in Ventura County held at 2 o'clock p.m. on August 15th was a very notable occasion in several important respects.

Governor Rolph made the principal address of the day and performed the ceremony itself.

Dr. J. M. Toner, Director of the State Department of Institutions, presided.

Mrs. Joseph Lewis, wife of one of the former owners of the property, presented the Governor with the official shovel.

### GREATEST IN WEST

The ceremony marked the beginning of building construction work which ultimately will house the greatest State hospital in the west if not in the entire country. The ultimate cost of the buildings required for the institution will be in the neighborhood of \$8,000,000 and the ultimate patient capacity will be 6000 with additional provision for 1000 employees.

The new institution will be the seventh California State Hospital for the Insane and this Ventura County site is conceded to be altogether the best site of the seven available for such an institution.

Mr. Adolpho Camarillo was present with Mrs. Camarillo and in a very effective address accepted the honor of having this great institution named the Camarillo State Hospital.

A stirring address was made by Judge Robert M. Clarke, prominent attorney of Los Angeles, formerly of Ventura County. Mayor Frank Shaw, of Los Angeles, represented that city in a speech of felicitation and Earl Lee Kelly, Director of Public Works, who was unable to be present was represented by State Architect George B. McDougall.

### WORK UNDER WAY

There were approximately 2000 persons in attendance and many took advantage of the delightful day to look over the 1700-acre site.

Contracts have already been let and work is under way on two of the dormitory units for patients which will cost about \$100,000 and accommodate 186 patients.

Other units will be put out for bids within the next few weeks.

Out of \$1,695,000 already made available for the institution, about \$400,000 was used to purchase the site and the remaining \$1,295,000 will provide for additional patient accommodations sufficient to bring the total capacity at the opening of the institution up to about 1000 patients. Present funds in addition will provide for various necessary services for water, sewage disposal, electricity, roads, landscaping, etc., also for necessary furnishings for the buildings including laundry, bakery and kitchen equipment.

It is anticipated that the new institution will be ready for receiving the first 1000 patients by January, 1935.

## WATER PROJECT MEANS WORK FOR 25,000

(Continued from page 13)

The executive committee named is as follows: District No. 1, Francis Carr, Redding; District No. 2, Jesse Poundstone, Grimes; District No. 3, A. B. Tarpey, Fresno and P. D. Nowell, Tulare; District No. 4, W. B. Hogan, Stockton; District No. 5, George A. Atherton, Stockton; District No. 6, C. W. Schedler, Pittsburg; District No. 7, Vacancy; District No. 8, Matt I. Sullivan, San Francisco; District No. 9, J. M. Inman, Sacramento; at large, E. S. Crittenden, Stockton.

Officers of the Association are: B. S. Crittenden, president and chairman of executive committee; J.

M. Inman, vice president, vice chairman and treasurer; P. D. Nowell, secretary of Association and executive committee.

The executive committee formed itself into an active campaign committee to oppose the referendum on A. B. No. 259, and to place before the public the facts and figures pertaining to the project and the legislative act.

Summarizing the important features of the bill and the project, the success of the plan is vitally important to the present and future welfare and development of California. Its public advantages and benefits are great in magnitude and many in number. The construction of the project would involve the expenditure of \$170,000,000, mostly for labor. More than 25,000 men would be gainfully employed for four years, representing about 200,000,000 man hours of labor.



**CEREMONIAL GROUP** at the ground-breaking for Camarillo State Hospital. Left to right are: Mrs. Josephine Lewis, Mrs. Adolfo Camarillo, Governor Rolph, Adolfo Camarillo, and Dr. J. W. Toner.



**MEDITERRANEAN STYLE** architecture characterizes the main entrance to the administration and hospital unit of the custodial male group. Six units under construction are shown in the inset.

## Tabulation of Annual July Traffic Count on State Highways

(Continued from page 14)

Gain or loss in traffic volume for all State highway routes, expressed as a percentage of the July, 1932, count, is as follows:

Route	Terminal	1933	
		Per cent gain or loss Sunday	Monday
		Gain	Loss
1	Sausalito-Oregon Line	7.9	1.5
2	San Francisco-Mexico Line	0.1	5.2
3	Sacramento-Oregon Line		0.2
4	Sacramento-Los Angeles	6.2	2.9
5	Stockton-Santa Cruz	1.4	4.0
6	Sacramento-Woodland Junction	2.2	3.4
7	Benicia-Tehama Junctions	5.1	2.9
8	Ignacio-Cardella	9.6	2.5
9	San Fernando-San Bernardino	1.8	3.2
10	San Luis-Sequoia National Park	2.4	4.5
11	Sacramento-Nevada Line via Echo Pass	7.2	8.5
12	San Diego-El Centro	1.7	8.2
13	Salida-Route 23 via Sonora Pass	14.0	6.3
14	Albany-Martinez		7.4 1.5
15	Route 1 near Calpella-Route 37 near Cisco	1.4	2.7
16	Hopland-Lakeport		8.2 5.4
17	Reeseville-Nevada City	34.7	34.3
18	Merced-Yosemite National Park		6.7 15.2
19	Route 9, W. of Claremont-Beaumont via Riverside		10.1 12.2
20	Redding-Route 1 near Arcata	17.4	14.9
21	Route 3, Richvale-Route 29 via Quincy		2.7 6.8
22	San Juan Bautista-Route 32 via Hellister		14.1 6.3
23	Saugus-Alpine Junction		5.6 5.3
24	Lodi-Route 23, Ebbetts Pass	2.5	0.1
25	Nevada City-Dewineville		15.3 2.2
26	Los Angeles-Mexico via San Bernardino	2.3	6.9
27	El Centro-Yuma, Arizona		10.5 8.1
28	Redding-Nevada Line	21.2	21.1
29	Red Bluff-Nevada Line	11.1	3.3
31	San Bernardino-Nevada Line (Jean)		3.0 0.3
32	Gilroy-Route 4 near Califa	8.0	1.9
33	Paso Robles-Famosa		8.4 5.9
34	Twin Cities-Route 23, Carson Pass	12.1	3.2
35	Peanut-Kuntz		35.0 54.4
37	Auburn-Truckee via Donner Pass	4.2	3.9
38	Meyers-Nevada Line via Truckee River	15.9	21.0
39	Tahoe City-Nevada Line	2.9	26.5
40	Route 13-Route 23, Tioga Pass	8.6	7.4
41	General Grant National Park	118.6	177.9
42	Route 35-California Redwood Park	17.4	1.2
43	Newport Beach-Big Bear Lake via San Bernardino	5.7	1.6
44	Boulder Creek-California Redwood Park	9.3	17.9
45	Willows-Route 3 near Biggs		12.5 3.8
46	Klamath River Road		6.7 14.8
47	Orland-Chico		11.1 0.2
48	McDonalds-Navarro River Road		3.7 7.8
49	Calistoga-Route 15 near Lower Lake	10.6	5.9
51	Santa Rosa-Schellville		5.5 2.5
52	Alto-Tiburon	3.0	9.7
53	Fairfield-Lodi	3.3	0.3
54	Michigan Bar-Central House	47.1	29.7
55	San Francisco-Route 5, Glenwood	16.4	7.1
56	Carmel-San Luis Obispo	36.6	4.5
57	Route 2 near Santa Maria-Route 23 near Freeman	3.1	
58	Bakersfield-Arizona Line (Topack)		3.3 9.7
59	Route 4 near Bailey-Route 31 near Cajon Pass		1.9 39.4
60	Route 2 (El Rio)-Route 2 (Serra)		1.1 1.8
61	La Canada-Route 62, Pine Flats		2.6 6.8
63	Big Pine-Nevada Line	19.3	23.9
64	Mesa-Arizona Line	37.9	36.6
65	Auburn-Sonora		6.2 3.4
66	Mossdale-Manteca		2.9 13.1
67	Route 2-Pajaro River		36.7 49.3
68	San Francisco-San Jose via Bayshore	5.3	11.2
69	San Rafael-San Quentin	52.8	2.1
70	Ukiah-State Hospital, Talmadge		8.2 23.2
71	Crescent City-Oregon Line	5.6	4.6
72	Weed-Oregon Line	21.9	16.4
73	Alturas-Oregon Line	5.1	41.3
74	Napa Wye-Carquinez Bridge	4.8	5.7
75	Oakland-Walnut Creek		6.2 13.5
76	Bishop-Nevada Line	9.7	6.5
77	Pamona-San Diego	2.6	6.5
78	Riverside-Temecula		6.5 1.9
79	Ventura-Castaic		8.6 9.4
80	Zaca-Santa Barbara	6.1	2.3

## Highway Bids and Awards for the Month of August

**ALAMEDA COUNTY**—Between Mission San Jose and Warm Springs, 1.9 miles of bituminous surface treatment. Dist. VI, Rt. 5, Sec. C. Granite Const. Co., Watsonville, \$17,396; Heafey-Moore Co., Oakland, \$17,795; Pacific Truck Service, \$19,068. Contract awarded to Tiffany Const. Co., San Jose, \$16,339.

**FRESNO COUNTY**—Between Kingsburg and Selma, 3.7 miles nonskid bituminous surface treatment. Dist. VI, Rt. 4, Sec. A. Granite Const. Co., Watsonville, \$4,443; L. A. Brisco, Arroyo Grande, \$5,292. Contract awarded to Stewart & Nuss, Inc., Fresno, \$4,405.

**KERN COUNTY**—Between Wasco and Famosa, 8.7 miles bituminous shoulder treatment. Between Bakersfield and Kern Canyon and between Monolith and Cameron, 14.3 miles existing roadbed, bituminous surface treatment. Dist. VI, Rts. 33, 67, 58. Secs. D, E-F, G. Granite Const. Co., Watsonville, \$7,885; F. W. Nighbert, Bakersfield, \$5,125; Gogo & Rados, Los Angeles, \$8,096. Contract awarded to John Jurkovich, Fresno, \$6,723.

**LOS ANGELES COUNTY**—Between Palamos Cr. and Whitaker Ridge, 6.8 mile slopes excavated. Dist. VII, Rt. 4, Sec. G.H. Lang Transportation Corp., Los Angeles, \$82,745; Ugliesias Bros., Inc., San Diego, \$81,239; Weymouth Crowell Co., Los Angeles, \$99,933; T. L. Parker, Los Angeles, \$109,446; Jahn & Bressi Const. Inc., Los Angeles, \$58,339; Hall-Johnson Co., and M. S. Ross, Alhambra, \$89,985. Contract awarded to von der Hellen and Pierson, Berkeley, \$56,717.

**LOS ANGELES COUNTY**—At San Gabriel Canyon near Azusa about 6 miles treated with heavy fuel oil and 9.3 miles of seal coating. Dist. VII, Rt. 62, Sec. A. Kemper Const. Co., Ltd., Los Angeles, \$15,260; George Gardner & Sons, Redlands, \$11,476; J. E. Haddock, Ltd., Pasadena, \$15,844; P. J. Akmadzich, Los Angeles, \$14,914; Gogo & Rados, Los Angeles, \$13,441; Alex D. Chalmers & Max Winter, Jr., Los Angeles, \$12,539; Sander Pearson, Santa Monica, \$13,546; Clyde W. Wood, Stockton, \$15,472. Contract awarded to Match Bros., Elsinore, \$13,355.

**LOS ANGELES COUNTY**—Between Neenach School and Del Sur Road, 18.6 miles of roadbed and 2 miles earth shoulders treated with asphalt road oil and between Wet Canyon and Colby Creek, 5.1 miles roadbed treated with asphalt road oil and bituminous treated seal coat applied. Dist. VII, Rts. 59 and 61, Secs. A.B.C and A. Gibbons & Reed Co., Burbank, \$35,380; George Gardner & Sons, Redlands, \$15,623; Oilfields Trucking Co., Bakersfield, \$23,895; Southwest Paving Co., Los Angeles, \$24,357; Alex D. Chalmers and Max Winter, Jr., Los Angeles, \$25,839; Dimmitt & Taylor, Los Angeles, \$26,587. Contract awarded to Gogo & Rados, Los Angeles, \$15,751.

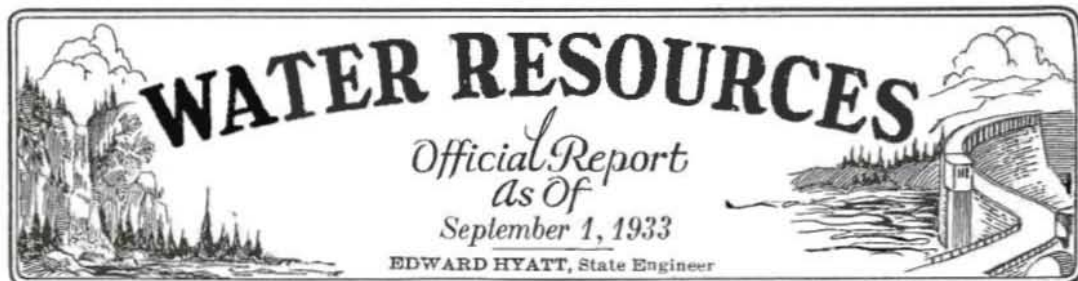
**MADERA COUNTY**—Around Madera, 21.1 miles of shoulder bituminous treatment. Dist. VI, Rt. 4, Secs. A, B, C, D. L. A. Brisco, Arroyo Grande, \$14,176; Tiffany Const. Co., San Jose, \$15,480; Granite Const. Co., Watsonville, \$13,477. Contract awarded to Stewart & Nuss, Inc., Fresno, \$12,811.

**MARIN AND SONOMA COUNTIES**—Between Ignacio and Fairville about 10 miles of bituminous surface treatment. Dist. IV, Rt. 8, Sec. A. Pacific Pavements Co., Ltd., San Francisco, \$22,112; A. J. Raich Co., San Francisco, \$20,497; Pacific States Const. Co., San Francisco, \$21,760. Contract awarded to E. A. Forde, San Anselmo, \$20,300.

**SAN DIEGO COUNTY**—Between Broadway and Harasthy Sts., 1.8 miles graded and paved Portland cement concrete. Dist. VII, Rt. 2, Sec. E. Match Bros., Elsinore, \$88,434; Weymouth Crowell Co., Los Angeles, \$84,287; B. G. Carroll, San Diego, \$72,758; Gogo & Rados, Los Angeles, \$84,309; V. R. Dennis Const. Co., San Diego, \$81,952; Basich Bros., Torrance, \$84,446. Contract awarded to Griffith Company, Los Angeles, \$70,086.

**SAN DIEGO COUNTY**—Between Barnett Ave. and Balboa Ave., 4.4 miles paved with asphalt concrete. Dist. VII, Rt. 2, Sec. E. Southwest Paving Co., Los Angeles, \$129,923; V. R. Dennis Const. Co., San Diego, \$94,859; Daley Corporation, San Diego, \$97,871; Basich Bros., Torrance, \$116,155; Jahn & Bressi Const., Los Angeles, \$107,769. Contract awarded to Griffith Co., Los Angeles, \$92,782.





By an agreement with Governor Rolph and the Director of Finance it has been arranged to carry on an important part of the work of the Sacramento-San Joaquin Water Supervisor, for which the Legislature provided no funds, by cooperation with the Permanent Committee of the River Problems Conference and water users who will finance the operations for the second half of the biennium.

In signing A. B. 259 on August 5, Governor Rolph made possible a means of obtaining 40 to 50 million dollars for the Central Valley Project of the State Water Plan from N. I. R. A. funds. It is also planned to secure 1000 to 1400 Civilian Conservation Camp men for clearing work on the Sacramento Flood Control work for which no funds are otherwise available.

News of the irrigation districts, details of dam construction, water distribution and other activities of the Water Resources Division are contained in the monthly report of State Engineer Edward Hyatt which follows:

#### IRRIGATION DISTRICTS

Some thirty amendments or additions to the Irrigation District Act or other acts affecting the operation of irrigation districts, were enacted by the fiftieth session of the Legislature. The most important of these relate to the levying and collection of assessments, penalties on delinquencies, redemptions, disposal of lands deeded to the State for taxes upon which irrigation districts hold assessment claims and providing for an extension of time for the payment of outstanding district warrants and for the allocation of specific funds for such payments; and setting up a court procedure whereby the indebtedness of a defaulted district may be compromised through a plan agreed to by the directors of the district and two-thirds of the holders of such indebtedness, with the consent of the districts securities commission.

Bulletin No. 18-C, a revision of the California Irrigation District Act and related laws, which is being compiled by the Legislative Counsel in cooperation with this office, is well along toward completion.

The East Contra Costa Irrigation District approved a refunding bond issue of \$1,153,000 at a special election held on August 12, 1933.

#### FLOOD CONTROL AND RECLAMATION

##### *Maintenance of Sacramento Flood Control Project.*

During this period only routine maintenance has been performed on the levees, structures, drains and equipment, with a reduced force.

##### *Emergency Flood Protection and Rectification of Rivers.*

The camp near Lompoc operated by this Division in cooperation with Santa Barbara County as an unemployment relief project, for clearing the channel of the Santa Ynez River, was dismantled on August 17th, and the equipment returned by freight to Sutter. Supervisor Ronald M. Adam reports that the camp was a real success. A menace was removed by clearing the river and thus preventing any damage during flood season, and helpful employment was given to a group of single men who were a real problem to the county, taking them out of competition with family men for the jobs that were available. The camp was established on February 4th, and continued in operation until August 15, 1933. All clearing work in the river channel was completed.

Two requests have been received to undertake additional cooperative bank protection work on the Mad River, one to cost \$2,500, near the Redwood Highway bridge, and one to cost \$600, on the ranch of James B. Moore.

##### *Sacramento Flood Control Project—Construction.*

In connection with the program to continue the work of the Civilian Conservation Corps for an additional six months period, the State Reclamation Board and this office have been active in attempting to secure the establishment of camps for the purpose of performing work on the flood control project, to consist principally of channel clearing. Favorable reports have been forwarded by the officers in charge, in respect to this proposal, covering the establishment of five camps at the following points: Nicolaus, near Knights Landing, Sutter Buttes, District 10, and Gridley bridge. If established, these camps will employ from 1000 to 1400 men for a period of six months.

The employment of the men in the CCC camps, as proposed, will in no way deprive local labor of work, inasmuch as no funds are available for this purpose and the work could not be accomplished except in this manner. Supervision of the work of the camps will require the services of a number of local skilled men.

##### *Russian River Jetty.*

Work will be commenced about September 10th on the jetty at the mouth of the Russian River, with an

(Continued on page 24)

## Water Supervisor Work to Continue

(Continued from page 23)

appropriation of \$10,000. A small crew will be engaged for a period of three months in the placing of additional rock to strengthen the existing structure. The present appropriation is so small that no actual construction or extension can be accomplished and the work to be done is considered maintenance.

### *Flood Measurements and Gages.*

The mimeographed reports of the flood season data for 1925-1926 and 1932-1933 have been printed and are now ready for distribution.

### WATER RIGHTS

#### *Supervision of Applications to appropriate.*

During the month of July, 32 applications to appropriate water were received, 12 were denied and 20 were approved. In the same period 16 licenses were issued.

Among the more important applications received during the month were two by the city of Eureka of which one was to appropriate 400 cubic feet per second and 90,000 acre-feet per annum from Mad River for power purposes at an estimated cost of \$1,200,000, and the other to appropriate 7.7 cubic feet per second and 750 acre-feet per annum from the same stream for municipal purposes at an estimated cost of \$375,000. There were also three large applications for mining purposes, one of which was by T. H. Rosenberger of Forest Hill, California, to appropriate 250 cubic feet per second from North Fork of American River; another by Joseph H. Stephens of Sacramento to appropriate 115 cubic feet per second from East Branch of Monumental Creek, a tributary of North Fork of American River and the other by Wm. H. Taylor, 605 Russ Building, San Francisco, to appropriate 100 cubic feet per second from South Fork of Middle Fork of Yuba River.

Inspections of completed projects were made during the month in Tulare, Kern, San Bernardino, Inyo and Mono counties.

### ADJUDICATIONS

*Shasta River (Siskiyou County).* Action by the court on the motion to tax costs is pending the submission of briefs as ordered at the hearing held before the Superior Court at Yreka, on April 21, 1933.

*Whitewater River (San Bernardino and Riverside Counties).* Case pending in the Superior Court of Riverside County awaiting developments in regard to the proposed All American Canal from Colorado River.

*Clover Creek (Shasta County).* The Clover Creek case is pending in the Superior Court of Shasta County awaiting the court hearing, which has been set for September 12, 1933.

*Bulle Creek (Siskiyou County).* Case pending in the Superior Court of Siskiyou County awaiting action by the parties involved.

*Eagle Creek (Modoc County).* The waters of Eagle Creek were distributed throughout the month in accordance with a schedule of allotments adopted by the water users for the 1933 irrigation season.

*South Fork Pit River (Modoc County).* The schedule of allotments adopted by the water users for trial distribution during the 1933 irrigation season was administered by a water master throughout the month.

*Hat Creek (Shasta County).* The stipulation for judgment prepared by the Division is being circulated by counsel among the interested parties.

*Deep Creek (Modoc County).* The Division's report as referee was filed with the Superior Court of Modoc County on August 18, 1933.

*Franklin Creek (Modoc County).* The Division's report as referee was filed with the Superior Court of Modoc County on July 27, 1933.

*Pine Creek in Surprise Valley (Modoc County).* The waters of Pine Creek in Surprise Valley were distributed throughout the month in accordance with the plan for trial distribution adopted for the 1933 irrigation season.

*Cottonwood Creek (Modoc County).* The schedule of allotments adopted by the water users for trial distribution during the 1933 irrigation season was administered by a water master throughout the month.

### SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

In view of the fact that no provision was made in the budget for continuation of this work, and following the failure of the passage of a special appropriation measure at the July session of the Legislature, the Permanent Committee of the Sacramento-San Joaquin River Problems Conference requested of the Governor and Director of Finance that an appropriation be made from the Emergency Fund to continue the essentials of this work. As a result it was agreed that the State would set up a fund to finance the work for the ensuing fiscal year, provided that by January 1, 1934, the Permanent Committee, the water users and other interests concerned, would furnish guarantees that funds would be raised by them to finance the work for the second half of the biennium. The committee members accepted this proposal and agreed to proceed with plans to obtain the necessary guarantees by January 1, 1934.

The Water Supervisor work will continue to be maintained to the extent possible under the reduced funds which it is estimated should be sufficient to assure the maintenance of the monthly records of stream flow, diversions, and return flow throughout the Sacramento-San Joaquin territory and the salinity and tide gage records in the delta.

Early in August the flow of the Sacramento River at Sacramento dropped to a low of about 1600 second-feet and there has been little subsequent change. During the same period the flow of the San Joaquin River near Vernalis has been about 600 second-feet. Salinity has advanced rapidly in the lower delta channels within the past month and 100 part salinity (100

# Topographic Field Work Completed

(Continued from preceding page)

parts of chlorine per 100,000 parts of water) is now in the vicinity of lower Brannan, Twitchell, and Bradford Islands. Present salinity conditions compare closely with those of 1920 and 1929 as shown by the accompanying tabulation giving the salinity on August 10th at upper bay and delta stations in various years.

*Salinity on August 10th at Upper Bay and Delta Stations, in Parts of Chlorine per 100,000*

Station	Year					
	1920	1926	1929	1931	1932	1933
Point Orient	-----	1870	1720	1860	1620	1720
Bullshead	1420	1610	1320	1610	1120	1080
Bay Point	-----	1190	1040	-----	420	820
O. and A. Ferry	712	1030	660	1320	370	620
Collinsville	518	940	600	1190	*144	420
Antloch	525	730	380	1050	38	300
Emmaton	*217	*268	198	870	*12	159
Jersey	123	400	*174	700	*12	110

\*August 6th.  
 † Martinez.

## DAMS

To date there have been received 823 applications for approval of dams built prior to August 14, 1929, of which 693 are now under jurisdiction. One hundred sixteen applications have been received for approval of plans for construction or enlargement and 386 for approval of plans for repair, alteration or removal.

Twenty-eight dams are under construction or enlargement and 103 are under repair or alteration. Certificates of approval of 580 dams have been issued to date.

### Application Received for Alteration.

Dam	Owner	County
Stoddard Lake	C. L. Carr	Trinity

### Plans Approved for Construction.

Dam	Owner	County
Mud Springs	C. M. Wickham	Lassen
Lower White House	Humphrey Estate, Inc.	San Mateo
Distilling Basin No. 6	Cucamonga Basin Protective Association	San Bernardino

## FEDERAL COOPERATION

### Irrigation Investigations.

In connection with the Federal-State Cooperative Irrigation Investigations, experimental work has continued in the Sacramento-San Joaquin Delta on the consumptive use of water by weeds, tules, and asparagus grown in tanks and on evaporation measurements. Projects under which work has continued in the Santa Ana and Mojave Basins of southern California, include penetration and storage of rainfall, the consumptive use of water by native plants grown in moist areas, and use of water by canyon bottom vegetation. Much of the field work on these projects has been completed and compilations and analyses of the data and results to date will soon be available.

### Topographic Mapping.

Field work in connection with Cucamonga No. 1 quadrangle in San Bernardino County was completed during July and progress was made toward the completion of Dixie, Eureka, Hoopa, Lakeport and Sebastopol quadrangles in Shasta, Lassen, Humboldt, Lake and Sonoma counties.

Topographic sheets covering the Kramer Borate District, a mining area in southeastern Kern and western San Bernardino counties are now available. The scale is 1 to 24,000 and the contour interval is 5 feet.

### Stream Gaging.

Federal-State cooperative stream gaging work has continued in the recording of stream flow at most of the regular stations throughout the State, although reduced appropriations may require the discontinuance of a number of stations on September 30th, the end of the water year. Maintenance of the "summer" stations on the Sacramento and San Joaquin rivers in the valley, has continued with, however, an enforced reduction in the field work.

## WATER RESOURCES

### Pit River Investigation (Modoc and Lassen counties).

The final report on the investigation of the Pit River is being published by the State Printer.

### South Coastal Basin Investigation.

Investigations in the South Coastal Basin are being continued along routine lines as planned, with a reduced staff.

### Ventura County Investigations.

Studies on the cost of spreading water, and work on the preparation of the final report, were continued during the month.

## STATE WATER PLAN

The Legislature of 1933 passed two measures, carrying out the recommendations of the Legislative Committee and the Governor's Commission appointed to investigate and report upon the State Water Plan; one, Assembly Constitutional Amendment No. 18, was approved by the Legislature with slight modifications from that proposed in the reports of the Committee and Commission. It will be submitted to the vote of the people in the general election of 1934. In order that funds might be made available to the Central Valley Project under the provisions of the National Industrial Recovery Act of 1933, Assembly Bill No. 259 was passed at the last session of the Legislature and signed by Governor Rolph on August 5, 1933.

"Remember how Mother used to keep the children out of the jam by hiding the keys to the pantry?"  
 "Yes, and now she does it by hiding the car keys."

## Engineers Invent Repositioning Device to Force Pavement Slabs Into Place

By I. S. VOORHEES, District Maintenance Engineer

WITH much pavement distortion and displacement over tidal flats in Orange County, Route 60, all as resulting from the earthquake of March 10, 1933, the question of repairs was an immediate and pressing one. A mudjacking outfit from Sacramento was promptly on the ground, but even after this crew had restored slabs to grade there still remained wide gaps between adjacent slabs extending for lengths of several hundred feet over a distance of 10 miles in the vicinity of Huntington Beach.

There were 15 such areas ranging from 140 to 400 feet in length, and in width from 2½ to 8½ inches. At first these were considered for filling with asphaltic concrete, or later with Portland cement concrete. Temporary repairs were, of course, made with the first named material.

Maintenance Engineer Dennis thought an effort should be made to pull the adjacent slabs together, so plans to that end were set on foot. Since the force that had created the displacement was tremendous, it was self evident that in some way great force must be marshalled for correction. This problem was not so easy but was finally worked out with the aid of Superintendent W. B. Cannon of the District Equipment Department.

### AN EXPERIMENTAL JOB

It was obvious from the first that the force to be invoked must bear some relation to the weight of the slab to be moved with proper allowance for friction. The slabs weighed about 50 tons, so steps were taken to develop a force at least that much. The job being experimental without precedents to guide us it was aimed to keep costs down so that if the machine did not work there would not be much loss.

As will be noted from the accompanying pictures, the assembly consists essentially of a rectangle designed for working under the theory of parallel forces. The upper member of the force rectangle was made up of 8½ O.D. 42-lb. well casing, which also served to support the mechanism on the trailer.

The lower member consisted of two pieces of ½ x 8 inch Universal plate approximately 40

feet long, separated at the ends with steel blocks 12 inches square and 1½ inches thick welded in there. The ends of the rectangle were made up of 8 x 8 inch steel billets approximately 50 inches long. Rotating pivots for the movable ends were made of 2-inch nickel steel shafting welded to plates, clamped to the billets.

### INCH MOVEMENT PLANNED

The 1½-inch plate in one end of the lower or tension member was bored to fit the shaft as was also the end of the jack. The bottom pivot fitted over the head of a piece of 80-lb. rail 24 inches long which was placed against the concrete with packing pieces of Oregon pine in order to distribute the load and not fracture the edges of the slabs.

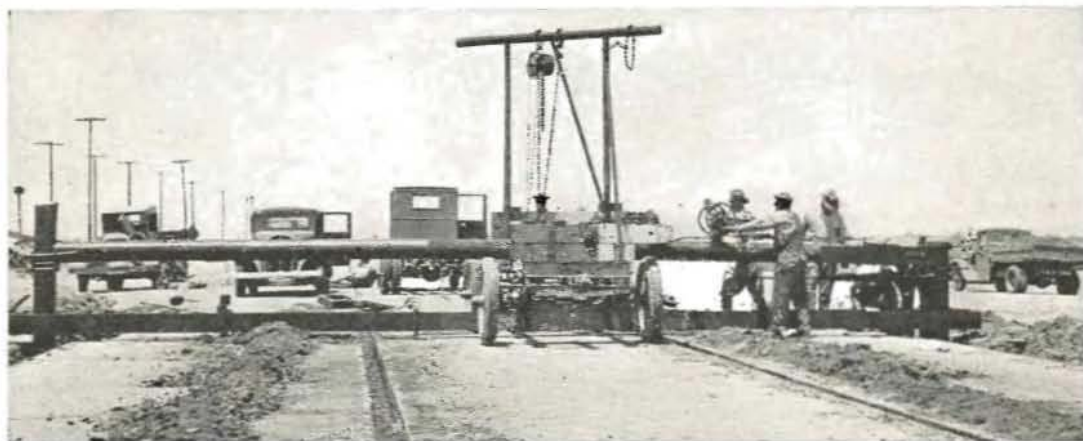
Such filler pieces of wood were particularly essential at the start when the gaps between working ends were approximately 30 feet and were used on both the stationary and movable ends.

As it was uncertain just how far the pavement could be moved at one time without damage, it was planned to give a 4-inch stroke at the pavement and an 8-inch one at the jack, thus securing a 2:1 leverage which aided in the power build-up. As events showed, this proved about right as it permitted movement of the pavement of about 1 inch at each operation, even after making due allowance for crushing of the lumber.

### BUILT JACKING DEVICE

The jacking device was built out of a piece of 6½-inch casing, oil being circulated by a small triplex pump driven by an air cooled engine. A bypass valve was built into the pump, so that by closing the valve, pushing immediately started as the engine ran continuously, and releasing such valve caused the lever to retract. The jack plunger moved at the rate of slightly over an inch per minute so that each push took about five minutes. Moving and setting up consumed a similar period.

A pressure gage was used in order to keep track of performance. It was found that



**BIG SQUEEZE DOES THE TRICK**—General view of pavement jacking outfit assembly in action forcing disaligned pavement slabs into place with 75- to 90-ton pressures.

pressure would at times go up to 3000 lbs. per square inch without distress. The only trouble experienced was from grit in the oil getting into the bypass valve. Average pressure was 1500 lbs.

At first an effort was made to operate with a hand outfit as shown in the picture, but this proved too slow and laborious, so the triplex pump and aircooled engine were installed.

Pressures ranging from 30 to 50 tons were utilized after the slabs had started moving and 75- to 90-ton pressures were required to start such movement.

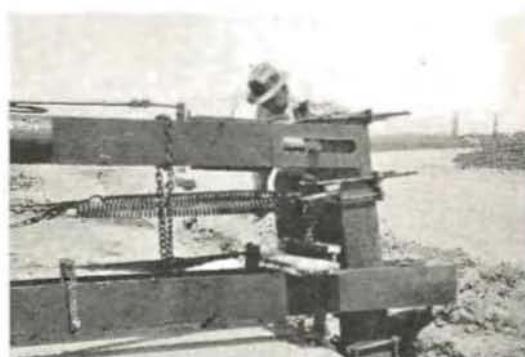
#### PORTABLE OUTFIT

As the outfit must necessarily be portable, even while working, it was built crosswise on a 2½-ton trailer with compression member above and tension member below the trailer frame. A gallows frame to support chain blocks was built to raise and lower it.

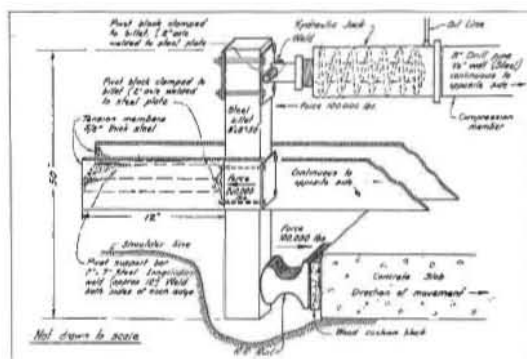
#### OPERATING PROCEDURE

The cracks between adjacent slabs were thoroughly cleared of all materials to a depth of 2 inches below the concrete, and at each joint in the pavement the shoulder was excavated to subgrade for a length of 3 feet and width of 18 inches. After such preliminary work the machine was lowered until the lower end of the steel billets was on a level with the bottom of the concrete slabs.

The building and operation of the machine covered a period of about four weeks. Pavement alignment was restored at 11 locations where the cracks totaled 3370 feet in length with an average width of 4.47 inches presenting a total area of 139.55 square yards. There was an average of 6.89 square yards of gap



**CLOSE-UP** view of the working end of device.



**ISOMETRIC SKETCH** of the movable end of pavement jacking assembly showing details of construction and connections.

closed per day at an average cost of \$6.21 per yard.

The work was done at a net operating cost of \$866.09 of which \$709.90 was for labor and \$156.19 for rental.

## Large Projects Budgeted for South

(Continued from page 7)

County	Route	Location	Mileage	Nature of Improvement	Amount
<b>Humboldt—Cont'd</b>					
	1	County Line Bridge and approaches		Bridge, grading, surfacing	23,500
	1	Jordan Creek to S. Scotia Bridge	2.0	Grading and surfacing	128,000
	46	Weitchpec to Happy Camp (portions)		Grading, bridges	31,500
Total, Humboldt County					\$875,100
<b>Imperial</b>					
	26	Trifolium Canal to 20 ft. pavement	3.2	Grading, paving	\$80,800
	26	San Felipe Wash		Bridge	20,000
	26	Arroyo Salado Tule and Campbell washes, San Felipe Sand Dunes		Grading, paving, bridges	80,700
	26	Trifolium Canal to north boundary	33.0	Surface shoulders	84,800
	27	Holtville to Highline Canal	7.0	Surface shoulders	25,300
	27	Araz to Yuma	6.1	Surface shoulders	6,100
	27	East Highline Canal to Sand Hills	21.0	Shoulder grading and retread	240,000
		Nilan to Mecca (portions)		Grading	27,500
Total, Imperial County					\$565,200
<b>Inyo</b>					
	23	South limits Bishop to Birchim Canyon	13.1	Grading, surfacing	\$140,000
Total, Inyo County					\$140,000
<b>Kern</b>					
	4	1 mi. to 2 mi. south of Delano	1.0	Grading, paving	\$37,000
	4	Oak Glen to 1.6 mi. south	1.6	Grading, paving, bridge	258,000
	23	Lancaster to Mojave	24.0	Surfaced shoulders, widen grade	37,500
	57	Maricopa to west boundary	10.5	Grading, surfacing	250,000
	58	Haypress Canyon to Bear Mountain Ranch	6.0	Grading, surfacing	448,125
		Taft-Greenfield Road to Route 33 (portions)		Grading and surfacing	55,000
Total, Kern County					\$1,085,625
<b>Lake</b>					
	49	Middletown to Twin Bridges (portions)		Grading, surfacing, bridge	\$186,000
Total, Lake County					\$186,000
<b>Los Angeles</b>					
	60	Los Angeles west city limits to Beverly Blvd.	0.6	Grading, paving	\$100,000
	60	West Channel Road to Santa Monica	0.2	Grading, paving	20,000
	4	Santa Clara River to Castaic School	5.4	Grading, paving	140,000
	23	Lancaster to Mojave	24.0	Surfaced shoulders, widen grade	37,500
	9	Big Tujunga Wash to Tujunga	3.3	Grading, paving, bridges	114,000
	4	Near Newhall to Saugus	3.2	Grading, paving, bridge	75,000
	23	The Oaks to Acton Road	10.6	Paving	152,000
	23	Saugus to Williams Ranch (portions)	0.6	Grading, paving, bridge	37,000
	23	Williams Ranch to Seeley's Ranch (portions)	1.4	Grading, paving	70,000
	60	Encinal Canyon to Little Sycamore Creek	5.6	Grading, paving, bridges	80,500
	26	Orange Ave. to Barranca St.	4.0	Grading, paving	157,000
	26	At El Monte		Grade separation	90,000
	26	Atlantic St. to Los Angeles	3.4	Grading, paving, bridges	350,000

# Improvements Provided Along Coast

(Continued from preceding page)

County	Route	Location	Mileage	Nature of Improvement	Amount
<b>Los Angeles—Cont'd</b>					
	61	Colby Canyon to Mt. Wilson Road	4.0	Grading, surfacing	400,000
		Manchester Ave. Route (portions)		Grading and paving	150,000
		Route 4 to Route 60, Sepulveda Blvd. Rte. (portions)		Grading and surfacing	150,000
	60	{ Long Beach- (city)		State Street, N and O Streets	400,000
		{ Los Angeles		Wilmington	
	60	Santa Monica (city)		Lincoln Blvd.	300,000
	9	Los Angeles (city)		San Fernando Road, Route 4 to Foot-hill Blvd.	275,000
	26	Los Angeles (city)		Ramona Blvd., extension to Aliso St.	350,000
	2	Los Angeles (city)		Sunset Blvd. at Glendale Ave., separation	145,000
	2	Montebello (city)		Whittier Blvd	50,000
				<b>Total, Los Angeles County</b>	<b>\$3,643,000</b>
<b>Madera</b>	4	Ash Slough		Bridge	\$40,000
		Fresno to Yosemite Park		Grading, surfacing (portions)	150,000
				<b>Total, Madera County</b>	<b>\$190,000</b>
<b>Mariposa</b>	18	Orange Hill School to Mariposa	15.0	Surfacing and shoulder grading	\$215,000
<b>Mendocino</b>	1	Rattlesnake Bridge No. 3 and approaches	0.6	Bridge, grading, surfacing	\$66,800
	1	County Line and approaches		Bridge, grading, surfacing	23,500
	1	Cloverdale to Hopland	13.8	Grading, surfacing, bridges, grade separations	420,000
	48	MacDonald to Navarro (portions)		Grading, surfacing, bridges	50,000
				<b>Total, Mendocino County</b>	<b>\$560,300</b>
<b>Merced</b>	32	West Boundary to foot of Pacheco Pass grade	3.3	Grading, surfacing	\$260,000
	32	Santa Rita Slough		Bridge, grading, paving	29,000
				<b>Total, Merced County</b>	<b>\$289,000</b>
<b>Modoc</b>	28	Alturas to Cedarville	2.6	Grading, surfacing (portions)	\$81,000
<b>Mono</b>	23	Crestview to 2.2 miles south of Rush Creek	9.8	Grading, surfacing	\$181,000
	23	Sherwin Hill to Whiskey Creek	3.5	Grading, surfacing	35,000
	23	Point Ranch to Dressler's Corner	6.3	Grading, surfacing	116,700
	23	Mono Inn to 2.7 mi. south	2.7	Grading, surfacing	63,500
				<b>Total, Mono County</b>	<b>\$396,200</b>
<b>Monterey</b>	56	Prison labor camps (secondary)		Grading	\$780,000
	2	Chular to 6 miles south of Gonzales (portions)		Grading, paving	167,600
	2	King City to Greenfield	11.1	Grading, surfacing	125,000
	56	Carmel to Carmel River	1.5	Grading, surfacing, bridge	101,000
	56	South Boundary to Molera Ranch		Bridges	307,500
	56	Big Sur to Molera Ranch	4.7	Grading	170,000
	10	San Lorenzo Creek to Priest Valley School (portions)		Grading	150,000
				<b>Total, Monterey County</b>	<b>\$1,801,100</b>
<b>Napa</b>	7	1 mile north of Carquinez Bridge to Cordelia	12.5	Grading	\$59,000
				<b>Total, Napa County</b>	<b>\$59,000</b>

(Continued on page 39)

# Sacramento Area Gets New Bridge

(Continued from page 29)

County	Route	Location	Mileage	Nature of Improvement	Amount
Nevada	37	Yuba River to Soda Springs	11.0	Surfacing .....	\$12,500
	38	Hinton to 5 miles easterly	5.0	Surfacing (portions) .....	18,000
	15	1 mile west of Washington Road to ½ mi. E. Summit	7.4	Surfacing .....	110,000
	15	Spaulding Canal to Route 37	4.1	Grading, surfacing .....	63,500
<b>Total, Nevada County .....</b>					<b>\$204,000</b>
Orange	2	Trabuco Creek .....		Bridge .....	\$26,000
	60	"The Arches" at Newport Beach .....		Grade separation .....	180,000
	43	Santa Ana Canyon (portions) .....		Grading, paving .....	200,000
		Bauro Street .....		Grading, bridge, surfacing .....	52,300
<b>Total, Orange County .....</b>					<b>\$458,300</b>
Placer	17	Loomis to Newcastle .....	5.2	Grading, paving .....	\$252,000
	37	Yuba River to Soda Springs	11.0	Surfacing .....	12,500
	15	Spaulding Canal to Route 37	4.1	Grading, surfacing .....	126,500
	38	Ward Creek and approaches		Bridge and grading .....	14,000
<b>Total, Placer County .....</b>					<b>\$405,000</b>
Plumas	21	Prison labor camps (primary) .....		Grading .....	\$590,000
	21	Oroville to Quincy (portions) .....		Grading .....	183,200
	21	North Fork Feather River .....		Bridge .....	22,400
<b>Total, Plumas County .....</b>					<b>\$795,600</b>
Riverside	26	Banning to Whitewater .....	12.1	Repair dips .....	\$100,000
	64	Black Butte to Blythe .....	9.3	Widening surfacing, base reinforcement .....	50,400
	26	South Boundary to Ave. 62	14.3	Surface shoulders .....	21,800
	64	Near Shaver's Summit westerly .....	12.0	Oil surface .....	30,000
				Interest, purchase of bridge (State's share) .....	9,375
	64	Colorado River Bridge .....		Grading, surfacing .....	300,000
	77	South Boundary to Corona .....	45.0	Surface shoulders .....	42,500
	78	Elsinore to Box Springs grade .....	25.0	Surface shoulders .....	25,000
	19	Beaumont to Riverside (portions) .....		Grading, surfacing-structure .....	650,000
		Nilan to Mecca (portions) .....		Grading .....	27,500
<b>Total, Riverside County .....</b>					<b>\$1,256,575</b>
Sacramento	3	American River, 16th Street		Bridge .....	\$150,000
	4	Sacramento to McConnell .....		Bridges .....	27,000
	6	Sacramento (city) .....		"M" Street Bridge .....	108,000
<b>Total, Sacramento County .....</b>					<b>\$285,000</b>
San Bernardino	26	San Timoteo Creek and approaches .....		Bridge, grading, paving .....	\$37,300
	26	Sierra Ave. to 2 miles west of Colton .....	3.8	Grading, paving .....	150,000
	26	Ontario to Pomona .....	2.1	Grading, paving .....	110,000
	59	Camp Cajon to West Boundary .....	18.0	Grading, surfacing .....	240,000
	43	San Bernardino to Arrowhead Springs .....	1.0	Grading, surfacing .....	40,000
		Cajon Pass to Randsburg (portions) .....		Oiling .....	25,000
	26	Redlands (city) .....		Central Avenue Route .....	100,000
	9	San Bernardino (city) .....		Fourth Street entrance .....	30,324
<b>Total, San Bernardino County .....</b>					<b>\$732,624</b>



## Approaches for Bay Bridge Included

(Continued from preceding page)

County	Route	Location	Mileage	Nature of Improvement	Amount	
San Diego	2	Del Mar to Oceanside.....	16.4	Grading, paving, bridge.....	\$535,000	
	2	Santa Margarita.....		Bridge.....	200,000	
	12	El Cajon easterly.....	1.2	Grading, paving.....	28,000	
	2	San Ysidro to National City.....	10.0	Grading, paving.....	285,000	
	2	Oceanside (city).....		South entrance.....	40,000	
Total, San Diego County.....					\$1,088,300	
San Francisco	68	San Francisco Bay Bridge approaches.....		Grading, paving, structures.....	\$1,650,000	
	68	{ San Francisco (city).....		Federal aid connections on Routes 2 and 68, in city.....	600,000	
	2	}				
Total, San Francisco County.....					\$2,250,000	
San Joaquin	53	Lodi to Rio Vista (portions)		Grading, surfacing.....	\$100,000	
Total, San Joaquin County.....					\$100,000	
San Luis Obispo	2	Pismo to San Luis Obispo (portions).....	2.1	Paving.....	\$77,500	
		Morro Bay to Atascadero (portions).....		Grading.....	100,000	
	Total, San Luis Obispo County.....					\$177,500
San Mateo		Skyline Blvd. to Half Moon Bay (portions).....		Grading, surfacing.....	\$73,000	
		Junipero Serra Blvd. (portions).....		Grading, paving.....	300,000	
		Sharps Park to San Francisco (portions).....		Grading.....	100,000	
	2	Daly City (city).....		Daly City to Colma (Mission Street).....	300,000	
	2	Palo Alto (city).....		Mayfield (5 blocks).....	50,000	
Total, San Mateo County.....					\$823,000	
Santa Barbara	2	Arroyo Honda to Gaviota.....	5.3	Grading, paving.....	\$315,000	
	2	Tajiquas to Arroyo Quemado.....	1.4	Grading, paving.....	60,000	
	2	Nojoqui Grade.....	3.7	Grading, paving, bridge.....	479,000	
	2	Hollister Ave. Subway to Santa Barbara.....	1.6	Grading, paving.....	113,800	
	2	Ortega Hill and San Ysidro Road to Santa Barbara.....	1.9	Grading, paving.....	147,000	
	80	Santa Barbara to San Marcos Pass.....	5.7	Grading, structures.....	500,000	
	80	Santa Ynez River-Santa Agueda Creek, bridge and approaches.....		Bridge, grading, surfacing.....	150,000	
	2	Santa Barbara (city).....		Through routes (city truck route).....	130,000	
	Total, Santa Barbara County.....					\$1,894,800
	Santa Clara	68	Lawrence Station Road to Alviso-Santa Clara Road.....	2.6	Grading, paving, structures.....	\$240,000
2		Gilroy (city).....		Monterey Street.....	15,000	
Total, Santa Clara County.....					\$255,000	
Santa Cruz	5	Inspiration Point to Scott Valley.....	6.7	Grading, surfacing.....	\$265,500	
	5	Santa Cruz (city).....		East entrance.....	52,000	
Total, Santa Cruz County.....					\$317,500	
Shasta	3	Redding to Sulphur Creek.....	1.0	Bridge, grading, surfacing.....	\$178,000	
	28	Diddy Hill to Montgomery Creek.....	16.2	Surfacing.....	55,000	
	28	Ingot to Ashers (portions).....	4.0	Grading, surfacing.....	100,000	

(Continued on page 32)

# American Canyon Cut-off Listed

(Continued from page 31)

County	Route	Location	Mileage	Nature of Improvement	Amount
<b>Shasta—Cont'd</b>					
	20	Shingletown-Viola (portions)	11.5	Grading	\$26,500
	3	Redding (city)		Sacramento River Bridge and approach	124,000
				Total, Shasta County	\$483,500
Sierra	25	Nevada City to Downieville		Grading (portions)	\$30,000
<b>Siskiyou</b>					
	3	At Big Canyon	0.8	Grading, surfacing	\$86,500
	46	Weitchpec to Happy Camp		Grading, bridges (portions)	31,500
		Fort Jones to Route 3		Grading (portions)	50,000
		Yreka (city)		Main Street	90,000
				Total, Siskiyou County	\$258,000
<b>Solano</b>					
	7	1 mi. north Carquinez Bridge to Cordelia	12.5	Grading	\$400,000
	7	5.5 mi. north Fairfield to 1 mi. south of Vacaville	3.3	Grading, paving, bridge	172,000
	7	Cordelia		Underpass	40,000
		Liberty Island Road		Surfacing	25,000
				Total, Solano County	\$637,000
<b>Sonoma</b>					
	1	Cloverdale to Hopland	13.8	Grading, surfacing bridges, grade separation	\$130,000
	8	Foster Line Change	0.9	Grading, surfacing	60,000
				Total, Sonoma County	\$190,000
<b>Stanislaus</b>					
	4	$\frac{1}{2}$ mi. south to $\frac{3}{4}$ mi. north of Turlock	1.3	Grading, paving	\$65,000
	4	Modesto (city)		Ninth Street	70,000
	4	Turlock (city)		"Front Street Route"	35,000
				Total, Stanislaus County	\$170,000
<b>Sutter</b>					
		Tisdale Weir Bridge		Bridge	\$15,000
				Total, Sutter County	\$15,000
<b>Tehama</b>					
	29	Red Bluff to Dales (portion)		Grading, surfacing	\$265,000
	3	Red Bluff (city)	8.5	North entrance	50,000
				Total, Tehama County	\$315,000
<b>Trinity</b>					
	20	Prison labor camps		Grading	\$250,000
	20	South Fork to Burnt Ranch	10.3	Grading, surfacing (portions)	123,500
	20	Over Oregon Mountain		Grading	100,000
				Total, Trinity County	\$473,500
<b>Tulare</b>					
	10	Visalia to Merryman	9.9	Grading, paving, bridges	\$340,000
<b>Ventura</b>					
	2	Ventura to West Boundary	12.0	Grading, paving	\$672,000
	60	Calleguas Creek		Bridge	46,000
	2	Station 110 to Santa Clara River	3.4	Grading, paving	72,000
	60	Encinal Canyon to Little Sycamore Creek	5.6	Grading, paving, bridges	161,000
	80	Casitas Pass (portions)		Grading	150,000
	2	Ventura (city)		Meta Street (complete shoulders)	35,000
				Total, Ventura County	\$1,136,000
<b>Yolo</b>					
	6	At Sacramento		Bridge	\$325,000
	50	Rumsey to Route 15 (portions)		Grading, bridge	87,500
		Liberty Island Road		Surfacing	25,000
				Total, Yolo County	\$437,500
<b>Yuba</b>					
	3	Wheatland to Morrison's Crossing	2.5	Grading, paving, bridges	\$94,400

# STATE OF CALIFORNIA

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 R. H. WILSON (Acting), Office Engineer  
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 FRED J. GRUMM, Engineer of Surveys and Plans  
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 A. D. EDMONSTON, Deputy in Charge Water Resources Investigation

R. L. JONES, Deputy in Charge Flood Control and Reclamation

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CARLETON PIERSON, Supervising Specification Writer

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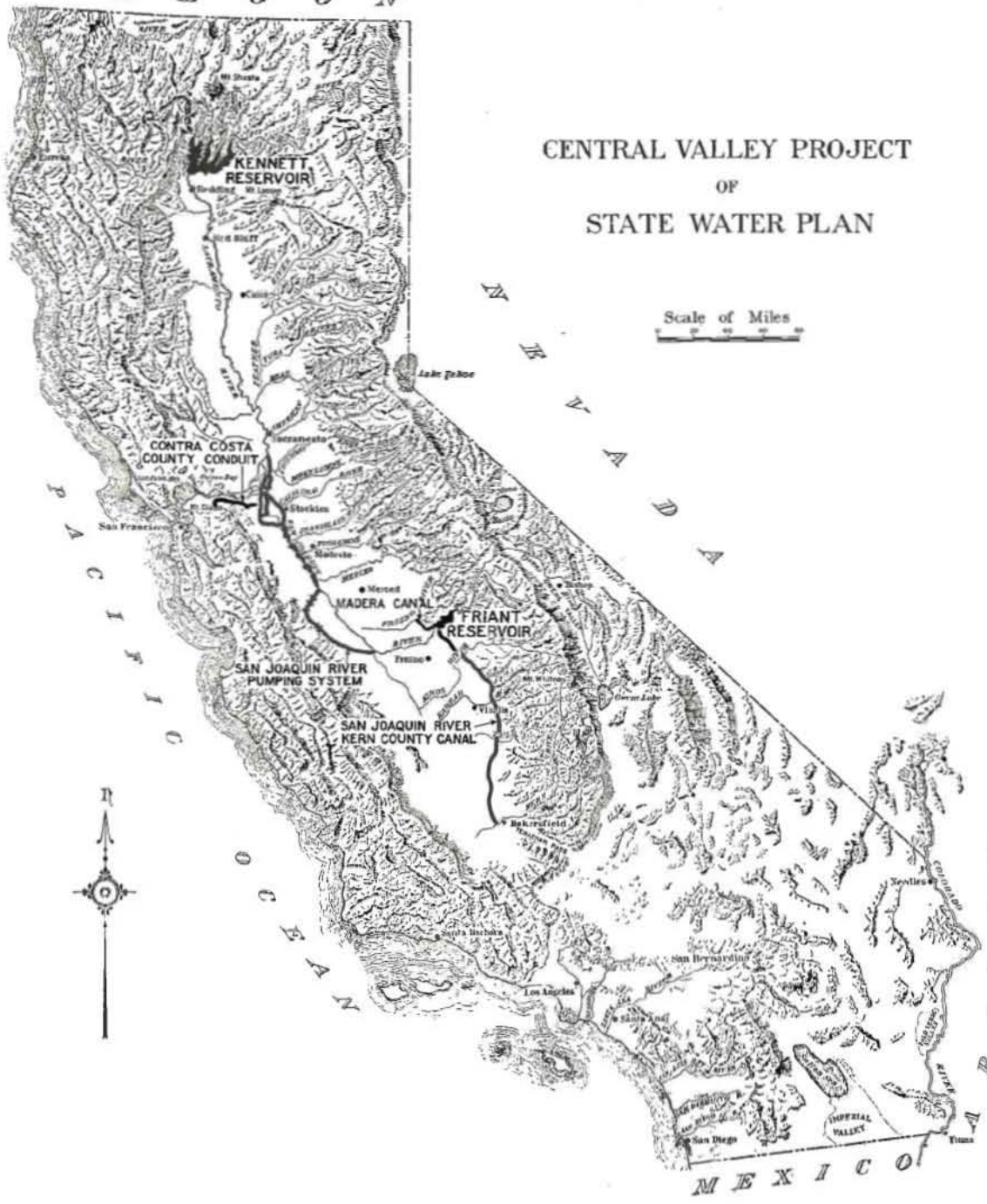
Port of Eureka—William Clark, Sr., Surveyor

Port of San Jose—Not appointed

O R I G O N

# CENTRAL VALLEY PROJECT OF STATE WATER PLAN

Scale of Miles  
0 10 20 30 40



M E X I C O

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