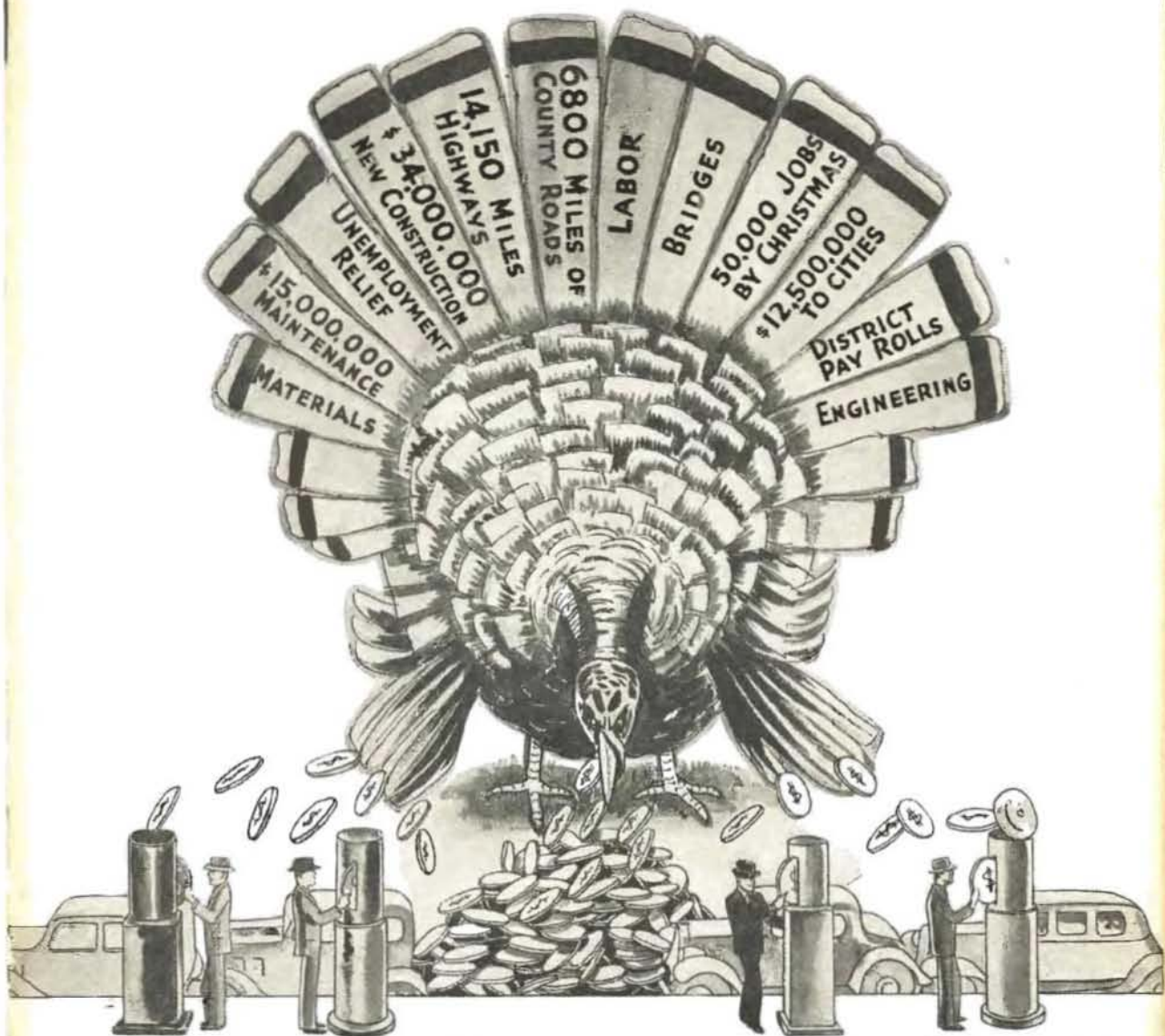


CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



Official Journal of the Department of Public Works
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Governor Rolph Urges Voters to Save Water Plan Benefits for State

In earnest appeal he declares its defeat would be tragedy involving prosperity of commonwealth and work for 25,000. Can never cost taxpayers a cent

By JAMES ROLPH, JR., Governor of California

I APPEAL to you, my fellow Californians, in behalf of a project which is your project, which is for your benefit and your prosperity, and which you must approve or reject at the polls on December 19, 1933. Upon that date a glorious chapter in the annals of California history will be written, if, as I confidently expect, you meet the challenge to our future happiness and welfare to which determined opposition has thrown down the gage of battle.

As your Governor I have first and last, steadfastly and vigorously, lent every assistance possible within my power to further a practicable solution of that dire necessity for an adequate water supply which now imminently threatens to stifle and destroy existing California agricultural and industrial developments of great extent and value, ruin thousands of our citizens, depopulate cities, towns and villages, and bring within its wake a distress and despair to all of California which is indeed a challenge to our manhood and our womanhood and which I know that you, my fellow Californians, will not permit to go unanswered.

Words fail to portray the crisis in our affairs with which we are now faced. Surrender is ruin; action is our only salvation. Fortunately for sixty years, Californians in

places of leadership have anticipated the time when this issue of a water supply would brook of no more delay, and for the past twelve years State and National agencies, legislators, congressmen, and leading citizens have cooperated in preparing for the day now arrived.

Doubly fortunate, are we, that a plan carefully and thoroughly developed as the result of years of intensive labor by the best talent within our country, comes to fruition at this time and also coincidentally with a grave National economic crisis which must be conquered; fortunate because the need for more adequate water supplies is now acute; fortunate because the adoption of this plan by the people of California will give relief by employment to 25,000 or more workers for the next three years, a livelihood for 100,000 persons and present a project ideal in character for N. R. A. adoption and financing.

Therefore, I urge you to support the plan and project provided for in the "Central Valley Project Act of 1933," Chapter 1042, Statutes of 1933, A. B. 259, which act, passed by the Legislature on July 26, 1933, and approved by me on August 5, 1933, would have become a law on October 25, 1933, had it not been prevented from taking effect on that date by the filing of a referendum petition.



JAMES ROLPH, Jr.

New Ridge Alternate Highway Opened After 4 Years' Work. Cost \$2,864,000

By R. C. MYERS, Assistant Engineer

THE culmination of more than four years of active construction endeavor was marked on October 29, 1933, by the opening of the Ridge Route Alternate new super highway, which is to supplant the already famous Ridge Route between Los Angeles and Bakersfield.

Thousands of interested spectators gathered at the "Channel Change" about midway between Gorman and Castaic, where, with fitting ceremony, Harry A. Hopkins, Chairman of the California Highway Commission, formally accepted this new highway on behalf of the State in the name of Governor Rolph.

A multitude of cars were waiting at Castaic and at Gorman where the barriers were removed simultaneously at 10 a.m. and two long caravans were formed, one coming from the north and the other from the south, meeting at the "Channel Change," the location selected for the dedication.

NOTABLES INTRODUCED

Alfred Harrel, Bakersfield publisher, on behalf of the Kern County Chamber of Commerce, acted as Master of Ceremonies, introducing Mr. Hopkins, representing Governor Rolph; State Highway Commissioners Phillip Stanton and F. A. Tetley; Chief Engineer E. E. East, of the Automobile Club of Southern California; Assistant State Highway Engineer G. T. McCoy; District Engineer S. V. Cortelyou of District VII of the State Division of Highways, who was in active charge of the work; John R. Quinn, chairman, and Roger Jessup, member of the Los Angeles County Board of Supervisors; J. Perry Brite, chairman of the Kern County Board of Supervisors; President William A. Simpson, of the Los Angeles Chamber of Commerce, and Ferd Snyder and L. B. Nourse of Kern County Chamber of Commerce.

Music for the occasion was furnished by the bands of Taft Junior College and High School, Bakersfield Junior College, and Roosevelt High School of Los Angeles. L. B. Nourse, Secretary of the Kern County Chamber of Commerce was chairman of the committee on arrangements.

Chairman John R. Quinn of the Los

Angeles County Supervisors and J. Perry Brite, chairman of the Kern County board, explained the benefits to their respective communities that will result from the new highway.

OLD QUESTION ANSWERED

Chief Engineer E. E. East of the automobile club and State District Engineer S. V. Cortelyou spoke on the technical phases of the project.

Mr. East explained one of the reasons why it was not feasible to construct the original Ridge Route along the location of the new highway. He said:

"In 1912 the State engineers made a thorough investigation of the Piru Canyon route as well as all other possible locations for a Los Angeles-San Joaquin Valley State highway. The selection narrowed down to a choice between the Piru Canyon and the Ridge. At that time the floor of the canyon could not be considered because of certain water rights then held to be of importance and the proposal to build a large dam and storage reservoir in this canyon where the road was to go. Under conditions as then existing the Ridge offered the best practical location."

The closing act of the official ceremony was the cutting of a barrier of blue and gold ribbons across the new highway by Chairman Hopkins, releasing to public service one of the greatest units of mountain highway in the country.

CHANNEL CHANGE ECONOMY

Ceremonies were conducted at an appropriate spot where Piru Creek has been diverted from its natural course in a concrete-lined channel which was constructed to avoid building two bridges across this creek. The building of this new channel instead of two bridges saved the State \$75,000.

This study was a typical one of many studies which were made in the location and construction of this highway. The first consideration was always that high standards of alignment and grade should be maintained

(Continued on page 16)



Rugged canyon scenery abounds in Piru Gorge on new Ridge Alternate Highway.

No. 1—Looking south toward Pyramid Rock in the "Big Cut" where 252,000 cu. yds. of rock were moved in cutting a path through a mountain ridge.

Nos. 2 and 3—Bits of the old Ridge Route, showing by way of contrast some of its 1000 sharp curves.

No. 4—One of the four bridges over Piru Creek.

No. 5—Scene near "Channel Change" at entrance to Piru Gorge.

Dangerous Viaduct at San Bernardino to be Replaced by Modern Structure

By **GLENN L. ENKE**, Associate Bridge Designing Engineer

A CONTRACT was awarded October 2, 1933, for reconstruction of the Mount Vernon Avenue viaduct in the city of San Bernardino over the tracks of the A., T. & S. F. Railway at a cost of \$189,985.20, thus inaugurating the beginning of an improvement that has long been felt necessary by all users of States routes 9 and 26 to points in southern California, south of San Bernardino.

Alignment of the present viaduct is especially poor, providing practically a right angle turn at its highest point above ground with only 21 feet width between curbs throughout. The existing structure, in addition to being wholly inadequate for modern highway loads, has been the scene of several fatalities, the last one occurring in April, 1932, in which an elderly couple from Seattle, in negotiating this turn, skidded through the top rail in the southwest corner of the viaduct into the railroad yard thirty feet below.

CUTTING A NEW STREET

In preparing the new alignment care was taken to secure easy access to the viaduct at each end by using a flared approach as large as right of way limitations would permit. It was found necessary to use a 6.725 per cent grade at the south end for a short distance to secure sufficient elevation over track No. 46, a Santa Fe freight loading track, to provide the necessary 22 feet clearance required by the State Railroad Commission. Paving at each of the flared approaches constitutes a real problem in securing a smooth transition onto the ramp that will not interfere with automobile operation over existing street grades on Second and Fourth streets.

As part of this improvement, it was necessary to construct a new street cutting diagonally across to Third Street, some distance east of Mount Vernon Avenue and reroute the Pacific Electric tracks from Third to Second Street, thus eliminating interference with the south approach ramp.

This track is located directly on centerline of the new street and connects with the

original track along Third Street. As construction of the south end of the viaduct proper must be delayed until this preliminary work is complete and trains in operation, a separate contract was let on September 15 to perform this work, which is now under way.

UNDERPASS PROVIDED

The structure proper is made up of 19 spans of lengths varying from 25 feet to 88 feet, 9 inches over the tracks, consisting of reinforced concrete deck supported on steel beams and girders that in turn rest on steel floor beams and columns at each bent, and at the south end a 3-span continuous rigid frame built of reinforced concrete. The latter structure provides an underpass at Third Street and was selected because of its inherent value in providing the maximum headroom available at this point, in addition to the pleasing architectural lines secured by this type of construction.

Two 3-foot 6-inch sidewalks are provided on either side of a 40-foot width roadway that flares into the approaches described above, and a concrete railing of plain design broken at varying intervals by ten concrete light standards on either side complete the viaduct and lend an artistic finish to the entire structure.

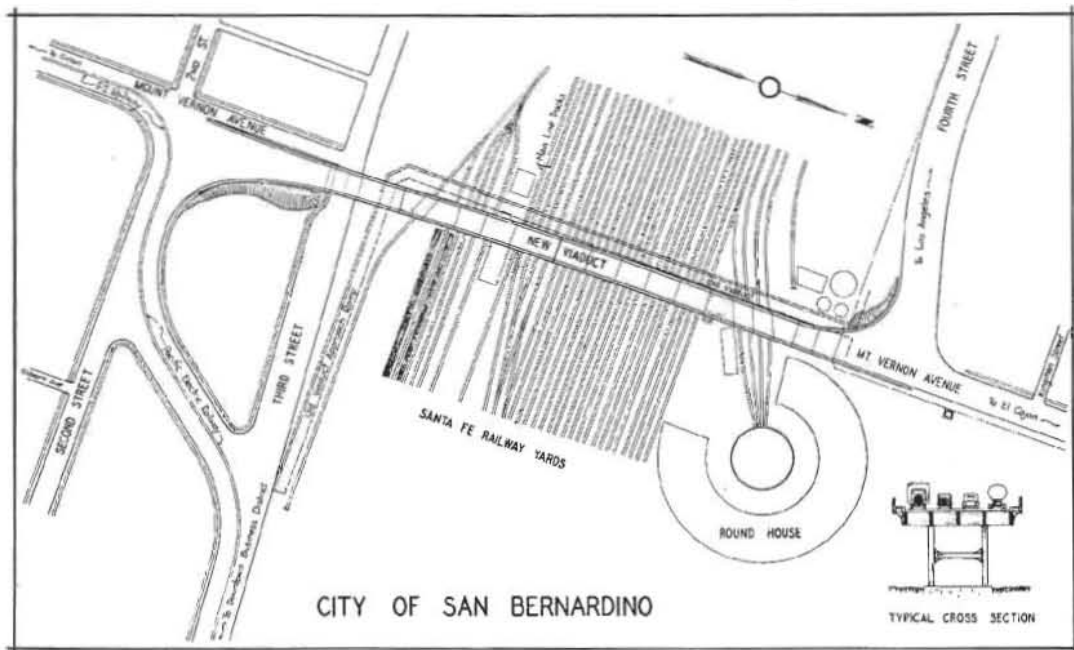
The concrete light standards are worthy of note, being an original modernistic design by T. K. May of the Bridge Department that are to be used for the first time on this viaduct.

BUILT ON OLD FILL

The viaduct is supported partly by an old fill placed in 1883 when the original Santa Fe Railroad yard was built, and as a consequence contains widely varying foundation conditions. Three test pits sunk indicated low bearing value of the soil with possibilities of quicksand at lower depths dependent upon local ground water elevations. Because of these conditions a pile foundation remained the only logical choice and Douglas fir creosoted piles approximately 25 feet long were finally selected to be used throughout the structure with excep-



A DANGEROUS KINK or right angle turn in the narrow old viaduct carrying the State Highway over the Santa Fe yards at Mount Vernon Avenue in the city of San Bernardino has been the cause of traffic fatalities. The above view shows the existing crooked viaduct which will be replaced by a wider modern structure on an alignment indicated by the white dotted line.



FLARING APPROACHES giving safe and easy access to the viaduct proper mark the plans of the new structure. The general arrangement is shown above with approaches in relation to the railroad yard. Position of the existing old viaduct is shown by dotted line.

tion only of a small portion of retaining wall at each end of the viaduct because of their low height and correspondingly low bearing loads and the pier under bent No. 16.

Design of this pier was complicated by interference with a concrete building used as an oil supply house by the Santa Fe Railroad. Cost studies indicated it far too expensive to move and piles could not be

driven underneath it except at a prohibitive expense, so a spread footing will be built 20 feet below ground on a strata of coarse gravel.

In further regard to foundation difficulties, an underground Edison Company concrete conduit carrying two 11,000-volt lines interferes somewhat with piers in the north half of the structure together with a

(Continued on page 19)

25,000 Attend Barbecue Celebrating Opening of Maricopa-Ventura Highway

CUYAMA VALLEY now has a "window" on the sea, and the great lower San Joaquin Valley is given a direct outlet to the Ventura and Santa Barbara coast area by the completion and formal opening on Saturday, October 22d, of the Maricopa-Ventura Highway, officially designated as Joint Highway District No. 6.

A dream of 45 years ago has come true. As early as 1890 a survey was made for a trail across the Pine Mountain range from Ventura into Cuyama Valley. In 1891 a line for a wagon road was run and in 1911 the desire of the Kern County people to get out to the coast in Summer time materialized in the organization of the Good Roads Club by citizens of Maricopa and Taft for the purpose of securing such a transmountain highway.

The movement had the support of J. I. Wagy, now State Senator, and other prominent civic leaders of the three counties, including Harry A. Hopkins, now chairman of the California State Highway Commission.

THREE COUNTIES COOPERATED

A Joint Highway District was formed under the State law in 1926 whereby Kern, Santa Barbara and Ventura counties cooperated with the State and Federal government in the new road enterprise, and the Joint Highway District organization deserves credit for the final achievement in the face of great financial difficulties.

With the Coast Route 40 miles to the west, the Ridge Route 30 miles to the east and no other intervening roads, this new highway makes a great saving in mileage between valley and coast and crosses one of the most rugged sections of the Coast Range.

It leaves the Maricopa-Santa Maria State Highway at its entrance to the Cuyama Valley and follows the valley 20 miles to Ozena, then crosses the Pine Mountain Range into Sespe River Valley, thence down the river through Sespe Gorge to Cold Springs where it climbs over the Topatopa Mountain range and down the north fork of the Matilija River through Wheeler Gorge to Ojai Valley. Thence it follows the Ventura River to the city of Buena Ventura on the Coast Highway.

CROSSES MOUNTAIN BARRIER

The total length of the new highway is about 70 miles. It takes the shortest practicable route across the mountain barrier which is divided into two summits by the Sespe Canyon running parallel with the range. It opens up a large and scenic area of virgin country hitherto inaccessible except by pack outfits.

Pine Mountain is crossed at an elevation of 5000 feet and Topatopa Mountain at 3700 feet. The Sespe Valley, which is followed for 8 miles, ranges from 3500 to 4500 feet elevation. All but the southern 20 miles, which is near the coast, and the northern 10 miles, is above 3000 feet elevation and can qualify as scenic mountain road. The width of the roadway is 20 feet of travel way, with alignment and grade on mountain standards consistent with such rugged country.

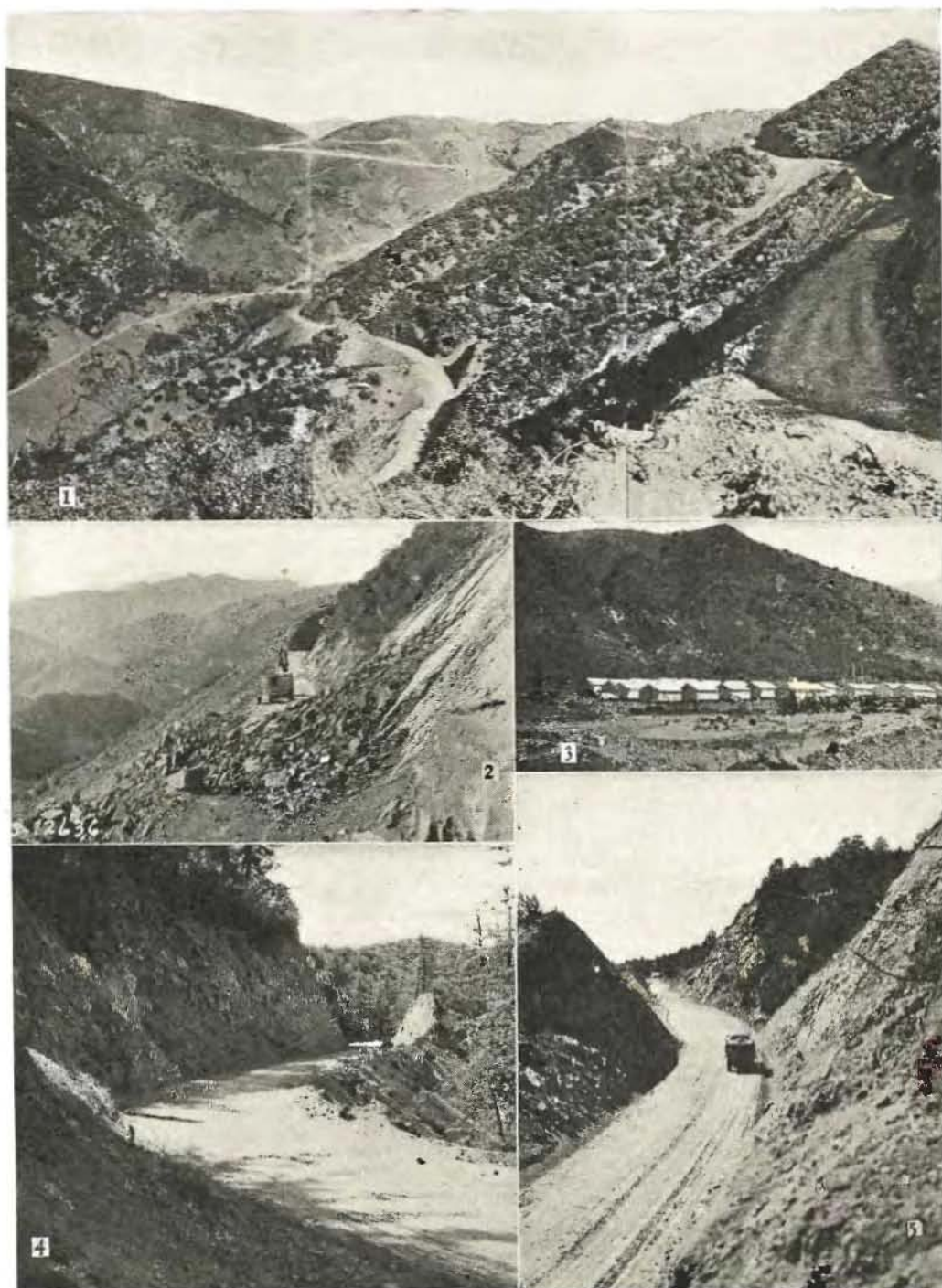
CASITAS PASS CONNECTION

A connection is being built with the Casitas Pass State Highway that will permit access to the Coast Highway near Carpinteria.

The estimated total cost for the whole project approximates \$1,500,000.

The Joint Highway District constructed the section from Pine Mountain to the northern terminus, a distance of 26 miles, and the 23 miles from Pine Mountain south were constructed by the United States Bureau of Public Roads as a cooperative project financed from Federal Forest Highway funds and county and State money in the Joint Highway District.

The last project completed by the Bureau of Public Roads a few days ago before the official opening, comprised the grading of 17.3 miles in Santa Barbara National Park from a point 67.4 miles north of Wheeler Springs on the summit of the divide between Sespe Creek and the north fork of Matilija to a connection with the existing tri-county road on Pine Mountain, at an estimated cost of \$600,000. A portion of the work was through rugged, steep country and involved heavy construction. Eight major bridge structures costing \$70,533 were included in this section, one of them a 260-foot reinforced concrete girder type bridge over Sespe Creek.



MOUNTAIN CLIMBING is made easy for motorists on the new Maricopa-Ventura highway opened with a big barbecue celebration on October 22d. In traversing 70 miles from Cuyama Valley to the coast, it crosses two high mountain ranges. The ascent of the Topatopa range from Matilija Canyon up to the pass into Sespe Canyon is shown in the panoramic scene, No. 1 at top. No. 2—Shovel at work on steep slope. No. 3—Contractor's camp, that housed 250 men. Nos. 4-5—Portions of the new road that required numerous heavy cuts.

State Highway Officials of Nation in Convention Act on Urgent Problems

The American Association of State Highway Officials, composed of State Highway Engineers and other State officials concerned in highway work, represents a cross-section of the latest thought on highway problems. Their conclusions concerning gasoline tax, feeder roads, signs, hours of employment, etc., are reported in the following article by a member of the California delegation.

By HARRY A. HOPKINS, Chairman California Highway Commission

THE nineteenth annual convention of the American Association of State Highway Officials was held in Milwaukee, Wisconsin, October 9-11, with forty-four states and the U. S. Bureau of Public Roads represented, with President Charles H. Moorefield, State Highway Engineer of South Carolina, presiding.

California was represented by Earl Lee Kelly, Director of Public Works; Charles H. Purcell, State Highway Engineer, and the writer. The latter is a member of the Administrative Committee and Mr. Purcell is on the Executive Committee.

The annual report of Executive Secretary W. C. Markham contained so many interesting facts and so much important data that I regret space does not permit mentioning all of them. One pertinent statement in his report reads: "It's a fine-woven rhetorical expression to talk about individual initiative and control, and the kingly qualities exemplified in local self government, but the public has finally learned that state management of highway transportation is just as essential in providing for a continued and economic flow of traffic as it is for Uncle Sam to have the job of carrying a letter from Portland, Maine, to Portland, Oregon."

The total mileage on the State systems is now 372,661, of which pavements of all kinds total 108,430 miles.

FIFTY PER CENT SURFACED

Fifty per cent of the highways on the State systems have a dustless surface or better. Seventeen per cent of all rural highways outside of the State systems have some kind of surfacing.

During the month of July, 1933, there were employed on the State systems 321,535 people and under Federal control in forests and parks 10,252, making a grand total of 331,787. In

comparison to the respective states the average employment for the entire country was one person for every 399 people in the United States.

In view of the fact that none of the Federal funds under the National Recovery Act that provided for \$400,000,000 to be used by State highway departments were in effect when the above figures were prepared it is assumed that the work was performed on an eight-hour basis. Had the thirty-hour provisions in the National Recovery Act been effective it is safe to say that three times as many people would have been employed.

T. H. MacDonald, Chief of the Bureau of Public Roads, discussed in an interesting and informative way "What the State Highway Departments Hope to Accomplish With \$400,000,000." Papers were read and slides shown of construction work on both bridges and highways by speakers from each of the four districts of the country.

IMPORTANT DISCUSSIONS.

Following this symposium, an address by Wilbur J. Watson, architect and engineer, on "Bridges and Civilization," covered history, showing man's first adventures when he used fallen trees across a river as a first step toward the cantilever type of bridge construction. Every type of bridge construction and most of the important bridges of the world were shown by slides with a most interesting description.

While the most outstanding engineers, members of State highway departments and representatives of the U. S. Bureau of Roads presented papers and talks that were most interesting and valuable, it remained for the group meetings to present subjects of vital importance to every phase of work in connection with highway development.

One group covered legal affairs and the matters discussed under this head were rights

By-Passing of Cities Approved at National Highway Convention

(Continued from preceding page)

of way on public domain; through power site reserves over private lands; utilities located along rights of ways; power of eminent domain, whether State or county should exercise this power; commercial vehicles and inter-state commerce; laws, regulations or policies in connection with activities of contractors as well as materials and supplies and many other important phases that legal departments have to interpret.

TRAFFIC LINE GREATEST AID

Traffic control and safety was one of the important group discussions covering uniform traffic regulations as well as standardization of signs and signals. The cooperation of the U. S. Bureau of Roads with the association committee has determined definite practices and recommendations as to visibility of signs. This report also covered cost, financing, regulation, etc.

Another important subject discussed by this group was the use of center and lane line markings. There was not any doubt but that center line marking is the greatest aid to the traveling public and is the means of reducing hazards and the protection of life and property.

Protection at railroad crossings, junction signs, control of roadside industries and structures and billboards versus safety were subjects that had the consideration of those in attendance.

GROUP DISCUSSIONS

Other groups were: Bridges and structures—where subjects were discussed covering new designs, reconditioning and strengthening bridges, etc.; materials group—covering surface treatments, guard rail designs, new methods in concrete highway construction with reference to minimum allowable cement content and maximum allowable water content.

Design of lower type pavements for light traffic roads and lower cost roads where economic conditions would probably have a large part in causing their construction were subjects that attracted considerable attention in the road design group. The road construction group discussed established methods and types of construction as well as types now being developed. In this discussion low cost bituminous pavement for light traffic received a great deal of attention as well as reconstruction and resurfacing of existing pavements, particularly in the municipalities. The highway research group discussed "Are we too reluctant to adopt new methods and practices?"

Roadside planning and development was discussed both within the group meeting under this head and on the floor of the general meeting through papers presented.

It was developed through the meeting that roadside beautification is a demand of the user of the highway as well as the satisfaction to the laudable pride that the engineer has in dressing up and presenting a highway as a masterpiece and a work of art.

Administrative problems were considered by a group and covered matters that might determine policies of

RESOLUTIONS ADOPTED BY NATIONAL HIGHWAY BODY

Following are some of the resolutions passed at the recent annual convention in Milwaukee of the American Association of State Highway officials:

RESOLVED, That this Association petitions and requests the Congress of these United States to make appropriations of regular Federal aid to the States in the amount of not less than \$125,000,000 per year for the two-year period beginning July 1, 1934, and in addition thereto for each year the usual relative grants for roads through national forests and public domain.

RESOLVED, That all the highway work undertaken with funds supplied from State sources or borrowed from the Federal government, for which State revenues are pledged as security, shall be undertaken under the supervision of the State highway departments and under the general procedure established for the administration of Section 204 of the National Industrial Recovery Act, in order to secure coordination of effort and result.

RESOLVED, That all gasoline tax revenues and all motor license and registration license fees are essentially State revenues and should be expended by the State or under the supervision of the State or in cooperation with the National government, upon some properly selected system of roads. Any other use of these funds may easily undermine a great national enterprise and is unsound governmental policy.

RESOLVED, That this Association strongly recommends to all the States that no support be officially given to any proposal to identify by an historic, local, personal, or other name, any highway whatsoever; and be it further

RESOLVED, That the standard signs, signals and markers as promulgated by this Association are hereby recommended to all the States for use in all public highways, to the exclusion of all other official signs, signals and markers.

WHEREAS, Important secondary roads or feeder roads are becoming more and more a State obligation: Be it

RESOLVED, That when a State Legislature adds this duty to a State, sufficient funds should be provided to take on the added obligation.

State highway departments as well as be the cause of legislative action by legislative bodies. The stimulated interest shown by political subdivisions of the states inspired by the provisions of the National Recovery Act and the allocation of funds to states for highway purposes caused wide discussion on future Federal and State policies dealing with the construction of feeder or local roads.

Some members of this important committee were of the opinion that Congress might attempt to dictate the type of construction on Federal aid

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New Waterman Canyon Road Opened at Ceremony. Switchbacks Abolished

WITH impressive ceremonies in which State highway officials and representatives of civic bodies of San Bernardino participated, the last high gear unit of the Waterman Canyon gateway to the great recreational area of the San Bernardino Mountains lying along the Rim O' The World Drive to Lake Arrowhead and Big Bear Lake, was officially opened and dedicated at 2 p.m. on Saturday, October 22d.

A cavalcade of automobiles proceeded from the office of the San Bernardino Chamber of Commerce to the lower end of the new paved highway at the junction near the Indian Arch entrance to the Arrowhead Hotel-Hot Springs road, where the ribbon barrier was cut by Commissioner Frank A. Tetley of Riverside representing the California Highway Commission.

NOTABLES PARTICIPATE

The party then proceeded up the new highway to Panorama Point, a scenic spot overlooking the San Bernardino Valley, where the principal celebration was participated in by Morgan Keaton, Assistant Deputy Director of the Department of Public Works; District Engineer E. Q. Sullivan of the State Division of Highways; R. H. Mack, Secretary of the San Bernardino Chamber of Commerce; President Sanborn and Secretary Chas. Mann of the Rim O' The World League; Supervisors John Anderson, Jr., and Arthur L. Doran of San Bernardino County; Earnest East, Chief Engineer, Automobile Club of Southern California; Ray Stockwell, president of the San Bernardino Chamber of Commerce and others.

The completion of this lower Waterman Canyon project at a cost of \$350,000 eliminates the old road up the floor of the canyon with its steep grades, switchbacks and hair pin turns so sharp that large cars had to back up to negotiate some of them.

MORE GRADUAL ASCENT

The new 24-foot roadway follows a high line along the west wall of the canyon for four and a half miles to a junction with the completed improved upper portion of the highway. The new route makes a more gradual ascent with a maximum gradient of 6.4% and only 25 long radius curves compared with a

maximum 22% grade and 71 sharper curves on the old route.

In describing the new route and the general highway improvement program for making this mountain area more accessible to motorists, Commissioner Tetley said:

"As each unit of the highway approaching the San Bernardino mountains has been completed, the number of automobiles entering has continually increased. The number of mountain homes now runs up into the population of a large city. Most significant of all is the establishment of the great number of boys and girls summer camps. Y. M. C. A., Y. W. C. A., Boy Scouts, Girl Scouts, County and City playgrounds, church camps, in addition to the thousands of private camps are springing up in the spacious forests.

SNOW SPORTS ENCOURAGED

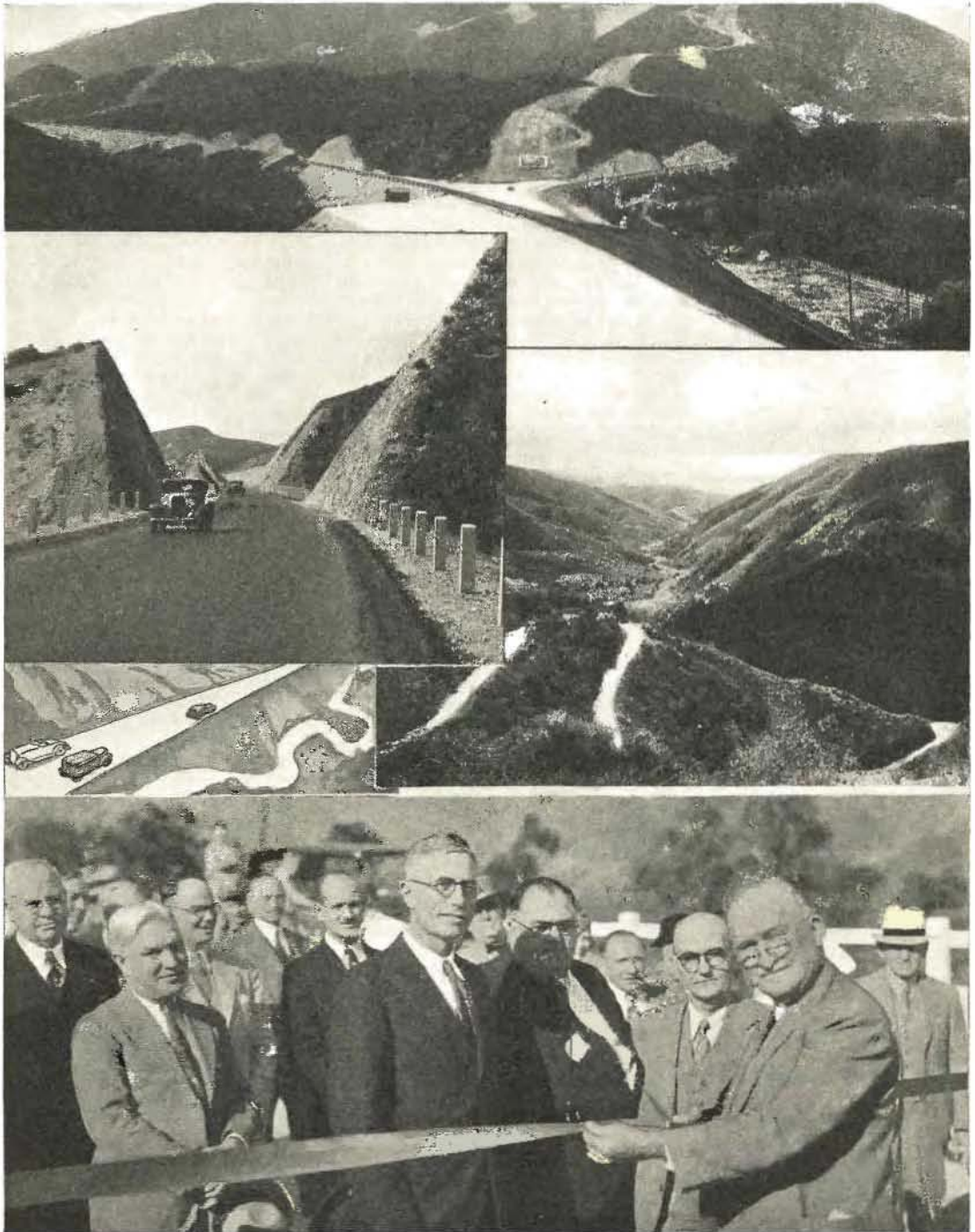
"One of the mountain possibilities that is just beginning to be capitalized is the winter sports. The California Highway Commission has a definite policy of keeping the major roads clear of snow to encourage this activity. Equipment is constantly being improved and as the years go by it becomes easier to efficiently remove snow.

"Forty minutes from the orange groves of the valleys to toboggans in the snow is the unique position of Southern California. With the taking into the State system of the three new desert roads to the mountains the State Highway Commission will, by the improvement and development of these roads, assure safe transportation for the great crowds that go into the mountains from the desert and from the mountains to the desert in the winter time.

"There is probably no parallel experience in the world compared with driving from the sparkling snow of the San Bernardino mountains to the warm sunny desert covered with flowers in less than an hour. As the years go by and these new roads are developed, this feature of the San Bernardino mountains will become famous throughout all California and throughout the world.

"Three such routings are described in the new highway Legislative Act as being taken over. One will proceed down into the east

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BREAKING A BARRIER of silken ribbon, Frank A. Tetley of Riverside, member of the California Highway Commission, opened the new Waterman Canyon road approach to the Rim o' the World recreational area of the San Bernardino Mountains. The ceremonial party in the bottom picture includes (left to right): A. J. Brown, editor; Supervisor A. L. Doran; President Ray Stockwell, San Bernardino Chamber of Commerce; E. Q. Sullivan, State District Engineer; Supervisor John Anderson; Royal Mack, secretary Chamber of Commerce, and Commissioner Tetley. The top picture shows the new highway, beginning a gradual ascent of the west wall of the canyon, while the old road at right proceeds up the canyon floor by steep grades and switchbacks. Left center is pictured a section of the new highway, while at right are seen some of the old switchbacks.

100 Million Dollars for Workingmen

(Continued from page 1)

Upon the filing of this referendum petition I had the alternative of permitting this act to remain ineffective until after the general election in 1934, or of calling a special election. To have delayed would have meant a postponement of relief from a water shortage now acute and serious, a failure on my part to aid a project providing for unemployment relief of the first magnitude, and, finally, loss of all opportunity to receive a gift of more than \$43,000,000 under the N. R. A. and Federal financing for the balance of the cost, in all a total of \$170,000,000, three-fourths of which will go into the pockets of labor, mostly in California. Just think of over 100 million dollars to the working man of California if you vote "Yes" for the State water project and it costs you nothing.

Therefore, on October 4, 1933, I issued the proclamation calling the special election for December 19, 1933, so that you voters may have opportunity, before it is too late, to determine whether this project shall be authorized in time to receive this great gift of Federal money in aid thereof and the financing of the balance of the cost by Federal funds—a self-liquidating project. Never again may we hope to have such an opportunity of Federal aid on a project that affects the prosperity of every human being in California.

It is a project which will create no State liability, obligation or debt. If built, it can only be built upon a "pay-for-itself" basis out of revenues from the sale of water and power made available by it, and all bonds issued will be revenue bonds

secured only by such revenues and not by State credit. I want to impress upon you most forcefully, that under no circumstances, can taxpayers, other than those within public agencies which voluntarily contract to pay for water or power, be compelled to pay a dollar of the cost of this great state-wide benefit or of any part of it. It will solve our most urgent, major water problems for a long time to come, will give immediate employment to thousands of our unemployed, and a livelihood for years to still more thousands of our people.

Prior to calling this special election and under date of September 27, 1933, I filed an application for approval of this project by the Federal Emergency Administration of Public Works. This application consists of 125 pages, includes maps, data and tables, and is accompanied by numerous exhibits. No effort will be spared in the prosecution of this application before the Federal authorities but hope of success in the final analysis now rests with you, the people of California. Your Legislature, your Governor and your constituted agencies of government have done their part, the plan is presented, the project is ready for construction, your favorable vote on December 19, 1933, is necessary.

Without your approval the public weal will suffer and California will lose a gift of over \$43,000,000.

Let us now turn to a more detailed consideration of this project, its more important aspects and the act under which it is to be construed and financed.

DESCRIPTION OF CENTRAL VALLEY PROJECT

The units of this great development are:

(1) **KENNETT DAM** consisting of a 420-foot dam, a 3,000,000 acre-feet reservoir, and hydro-electric power plants at Kennett, a secondary dam and power plant at Keswick, all in the Sacramento River Canyon a few miles above Redding, and a power transmission line from Kennett to a central distribution point near Antioch in the Sacramento River delta;

(2) **CONTRA COSTA CONDUIT** consisting of a canal and pumping plants to convey fresh water from Knightsen in the Sacramento-San Joaquin delta southerly of Suisun Bay to the vicinity of Martinez;

(3) **SAN JOAQUIN PUMPING SYSTEM** consisting of dams, locks, channel improvements, conduits, and pumping plants to convey not less than 3000 cubic feet per second of delta waters up the San Joaquin Valley to the mouth of Fresno Slough;

(4) **FRIANT DAM** consisting of a 252-foot dam, a 400,000-acre-feet reservoir, and power plant on the San Joaquin River in the foothills east of Fresno;

(5) **MADERA CANAL** leading northerly from Friant Dam to the Chowchilla River in Madera County;

(6) **FRIANT-KERN CANAL** leading southerly from Friant Dam and passing through the counties of Fresno, Tulare and Kern to the vicinity of Bakersfield.

A project with three and one-half million acre-feet of water storage capacity, and three hundred fifty-five thousand kilovolt amperes of electric power capacity is provided.

To the Sacramento Valley this development means the storage of storm waters which now flow down the Sacramento River in floods occasioning damage and constant expense to provide for their control and which then waste into the ocean. Withheld behind the great dam at Kennett, a major step in the solution of the Sacramento flood control problem will have been accomplished.

Withheld behind Kennett Dam at a season of the year when they occasion but a menace in the river below, these flood waters will be released into the river throughout the period of low summer flow, maintaining a constant stream at all times of not less than 5000 cubic feet per second, and assuring the navigability of the river to a depth of six feet to Chico Landing and a depth of four feet to Red Bluff. Thus will be solved the major problem of navigation upon this great artery of commerce.

Protection for \$50,000,000 Annual Crop

(Continued from preceding page)

Withheld and so released, this vast quantity of water will maintain Sacramento River levels throughout the year at heights many feet above present low flow levels and enable the numerous pumpers from this river to acquire their supplies at an annual saving of thousands of dollars.

Adequate supplies to meet irrigation and all other requirements throughout any and all years are thus guaranteed to Sacramento River irrigators and water users.

Relief from the annually recurring danger that the Federal government may exercise its paramount authority in aid of navigation and thereby arrest upriver diversions during periods of low flow, so as to protect navigation, will thus be afforded to Sacramento River diverters, as will also relief from the menace of a gigantic legal battle in our courts between Delta users and upper appropriators on the river, many hundreds of whom are now named as defendants in a pending suit by Delta landowners seeking to compel releases of summer flow sufficient to protect their lands from salt water penetration. To both sides this litigation would mean a cost of millions, would make no additional water available, and would finally result in the loss of thousands of acres of developments and millions in investments.

To the 400,000 acres of rich, fertile and productive lands of the Sacramento-San Joaquin River Delta producing an annual crop yield of \$30,000,000, waters supplied from this Sacramento River storage will maintain in Delta channels, reservoirs of fresh water at all times. Thus will be averted the permanent destruction of this great area by salt water penetration from San Francisco and Suisun bays and also the burden of the litigation instituted and now pending by delta landowners against Sacramento Valley diverters.

To the great industrial area in and about the upper San Francisco Bay region, with an annual value of production in excess of one hundred million dollars, a fresh water supply from Kennett storage, through the Contra Costa Conduit, will reduce present water supply costs by thousands of dollars annually and will encourage establishment of additional industries now deterred by the absence of an economically and assured supply.

ADDS NAVIGABLE MILEAGE

To the San Joaquin Valley, the pumping system proposed will provide for the navigability of its great river to Hills Ferry 86 miles upstream from Stockton, will carry water for irrigation needs 63 miles further south to Mendota, and will enable an exchange for present supplies which may then be stored in Friant Reservoir for exportation northerly and southerly to areas, now desperately in need of water, which will be served by the Madera and Friant-Kern canals. Also surplus flood waters now unused will be stored in Friant Reservoir and rights to water, now supplied to "grass lands" within the valley, will be purchased so that a higher use of such water may be made by means of its storage in Friant Reservoir.

Thus will be rescued from drought, highly productive areas of 400,000 acres which now have one-half enough water for their use and which have long been overdrawing from their underground supplies, causing lowering water levels and higher costs of pumping with final exhaustion of supply inevitable. To save 200,000 acres of these lands from reversion to desert conditions, lands that represent an investment of \$50,000,000 and a yield of \$20,000,000 in annual crop value, is a purpose of this project.

WIDESPREAD ECONOMIC VALUE OF PROJECT

So closely related to the direct benefits enumerated above as to be almost inseparable in any discussion of them are the economic considerations involved. To California this project has an economic value that far transcends its cost. It means:

(1) The restoration of navigation on the Sacramento to Red Bluff and its maintenance throughout the year unimpaired by seasonal shortages.

(2) The removal of all threat and danger of the curtailment of irrigation supplies from the Sacramento by the United States War Department in its exercise of paramount Federal authority in aid of navigation.

(3) The elimination of a cloud upon the title of upper Sacramento River users and the menace of a ruinous expense to both Delta users and upper users now occasioned by impending litigation.

(4) Adequate irrigation and other water supplies throughout the year to Sacramento River users.

(5) The maintenance of higher river levels and reduced pumping costs to Sacramento River users.

(6) A major accomplishment in the solution of the Sacramento Valley flood control problem.

(7) A fresh water supply at an annual saving of thousands to upper San Francisco Bay area industries producing annual values of \$112,000,000 and having an annual pay roll of \$13,000,000.

(8) The encouragement of further industrial developments in the Upper San Francisco Bay area.

(9) The protection from salt water ruin of 400,000 acres of Delta lands with an annual crop value of \$30,000,000 which area suffered a crop loss estimated at \$1,300,000 occasioned by salt water incursion during the dry year of 1931. Average yearly crop losses are estimated at \$500,000 and ultimate ruin of the soil itself is inevitable unless a remedy be provided.

(10) The rescue from return to the desert of 200,000 acres of Southern San Joaquin Valley lands

(Continued on page 20)

Novel Caisson Methods Used to Build Bay Bridge Substructure Described

Progress of substructure construction for the San Francisco-Oakland Bay Bridge has excited the keenest interest in communities of the bay area, particularly among the ferry-boat commuters, who view operations of the compressed air flotation caisson method of building the deep water piers. This new method was recently described to the student body of the University of California in a lecture by Chief Engineer C. H. Purcell, from which excerpts are given in the following article.

By C. H. PURCELL, Chief Engineer, San Francisco-Oakland Bay Bridge

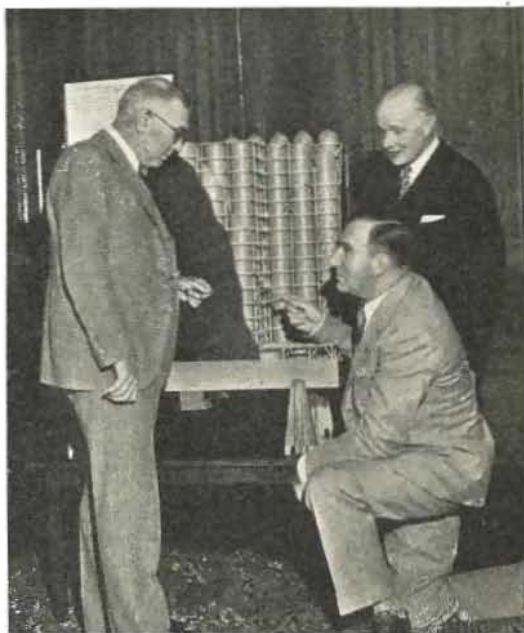
THE SAN FRANCISCO-OAKLAND Bay Bridge is distinctive as a large public project in that it is being built without taxation. This bridge is financed by means of the expectancy from its revenues and tolls, the Reconstruction Finance Corporation having underwritten the bond issue of the bridge.

The mortgage bonds by which this bridge is financed are liens against revenues only and both the Reconstruction Finance Corporation and the State of California Gas Tax Fund look to repayment out of the revenues of the bridge. Both the Reconstruction Finance Corporation and the State must be paid back in full for such bridge bonds as purchased before the bridge can become free to the traveling public.

USING NOVEL METHOD

The substructure of the San Francisco-Oakland Bay Bridge presents many different types of engineering, the most outstanding of which is the caisson floated by means of compressed air contained within cylindrical dredging wells. All our deep water bridge piers between Yerba Buena Island and San Francisco will be constructed by means of the compressed air flotation caisson method, which was perfected by one of our consulting engineers, Daniel Moran. This substructure method is different from that used on any similar project and is just as novel to engineers as it is to the layman.

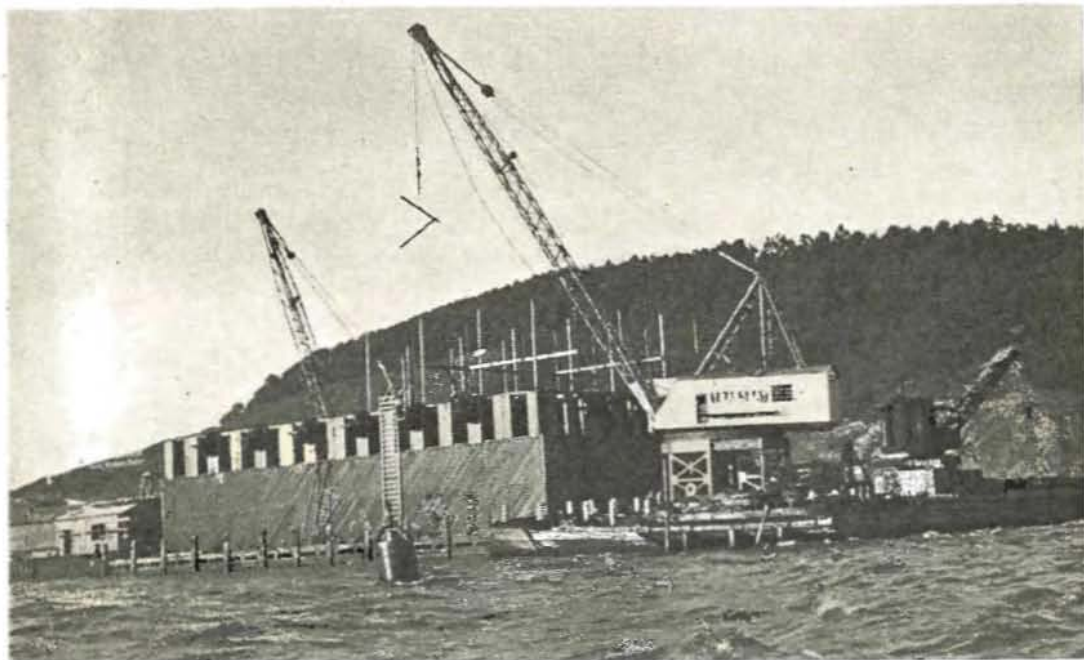
The caisson, already sunk 52 feet below water line, at Pier 6, 1110 feet west of Yerba Buena Island, is typical but it is not the largest of this type of foundation on this bridge. This caisson now under construction consists of a huge rectangular structure the size of a small apartment house, the first story of which is of steel and is known as the cutting



LATEST THING in caissons is represented in this compressed air flotation type model for the Bay Bridge being examined by Chief Engineer Purcell (left), Director Earl Lee Kelly (kneeling) and Leland W. Cutler.

edge. The walls above this cutting edge are of timber caulked with oakum and made watertight.

This Pier 6 caisson is 74' 6" wide by 127' long and the steel cutting edge is 13½' high. Within the timber walls of the caisson are set four rows of seven cylinders each. These cylinders by means of adaptor sections are widened out to a 15-foot square cell at the steel cutting edge; thus each cylinder for its first 13½ feet is a square 15 x 15-foot cell. It is then tapered up to a cylinder 15 feet in dia-



NOT AN APARTMENT HOUSE under construction but a compressed air flotation caisson for a Bay Bridge pier is pictured in the above photograph of a busy scene in the bay just west of Yerba Buena Island. The huge box is 74 feet 6 inches wide, 127 feet long and contains 28 steel cylinders each 15 feet in diameter. It is being sunk to bedrock 170 feet below the bay surface.

meter, which cylinder extends out the full height of the caisson.

CYLINDERS BUILT UP

When the caisson is located on site, concrete is poured around the cylinders. The walls are then built up in 20-foot lifts. Domes are cut off the cylinders and 20-foot lifts added to their height. After the 20-foot lift is completed, concrete is poured within the walls around the cylinders until it is necessary to add another lift.

By the alternate process of pouring the concrete within the walls and raising their height, the caisson is built up until its bottom rests upon the mud in the bottom of the bay. Pier 6 finds bottom at 105 feet below the surface of the water.

Once the caisson rests on the bottom, the domes are taken off the cylinders and dredging operations by means of two-yard clamshell buckets are started to dredge out the mud from beneath the caisson up through the cylinders. The alternate cutting off the dome of the cylinder and adding more height is done by welding and cutting. Each time the dome is welded onto the cylinder, then cut off to be rewelded on again.

CAISSON BONDED TO ROCK

When the caisson lands on rock, concrete is poured into the twenty-eight dredging wells (the number in Pier 6) so that the caisson is bonded to rock. Approximately 30 feet of concrete will be poured within each cylinder. This pour takes place in the water, no effort being made to pump the water out of the caisson cylinders.

In the case of Pier 6, the caisson will find bottom at approximately 170 feet below the surface of the water. This concrete substructure will be built to 40 feet above the surface of the water and the steel tower erected thereon. * * *

Another substructure method on the San Francisco-Oakland Bay Bridge now in operation is that of the false bottom flotation caisson. Two piers are now being built by this method—1500 and 1000 feet west of the Key Route Mole, respectively.

FALSE BOTTOM TYPE

I will take Pier E-5 as typical. This caisson 60 x 90 feet, with the steel cutting edge built up approximately 13 feet high, contains three rows of five square cells. These cells are not fitted with cylinders as in the compressed air flotation caisson but the bottoms of each cell

(Continued on page 21)

Ridge Alternate Has No Sharp Curves

(Continued from page 2)

and the second consideration was that the greatest economy be effected which would be consistent with these standards.

The heaviest construction was on the section through Piru Gorge. It was evident from the first that a small mountain would have to be cut through if high standards of alignment were to be maintained. Since inferior alignment would not be tolerated, the "Big Cut" was made—230,000 cubic yards of rock were excavated in 400 feet of length, leaving a huge pyramid on one side. The ribbon of concrete over which traffic speeds swings on a gradual curve across one Piru Creek

of an essential highway route—a route to connect southern California with central and northern California. The degree of perfection of a highway on this route was necessarily from the first an economical balance between the cost of and amount of money available for such a highway and the amount of expenditure which would be justified by the volume of traffic to be carried.

Although the first cost of a highway routed through Tehachapi and Mojave would have been less than one constructed on the Ridge Route, the former routing would have been 50 miles longer and with the volume of traffic increasing rapidly the saving to traffic by using the Ridge Route easily justified the additional construction cost.

As traffic further increased in volume and speed the sharpest curves of the Ridge Route were "daylighted" but by 1929 it became apparent that any further major improvement on this highway would not be justified in proportion to the resulting savings to traffic. By this time traffic had increased to such proportions that it was evident any material saving in distance or improvement in alignment or grade would have a very great monetary value in reducing operating costs of cars over the route.

SURVEYS PROVED FEASIBILITY

Reconnaissance surveys indicated that it would be entirely feasible to build a new highway on much shorter and greatly improved alignment and at a much lower average elevation.

Although the first cost of such a routing would greatly exceed that of the original Ridge Route, economic studies indicated that the savings in traffic would be so great as to pay for its cost in 2½ years.

This new highway, known as the Ridge Route Alternate, was obviously the next logical step in the development of the major route between Los Angeles and Bakersfield. It should provide for the needs of traffic for a great many years to come, but when traffic finally increases to a point where this road is inadequate, which will eventually follow, the next succeeding step will be well defined. It will simply be a matter of widening the present new highway as the need arises with no loss in the present investment.

In order to help visualize the advantages of the new route over the old Ridge Route, the following comparison of the standards of the two routes is given.



HISTORIC MOMENT when Harry A. Hopkins (center), chairman of the California Highway Commission, representing Governor, cut the ribbon officially opening the Ridge Alternate. Left, Commissioner Tetley; right, Commissioner Stanton.

bridge, through this enormous cut, and across a bridge at the other end of the cut on beautiful alignment which does not slow traffic in the least. In traveling this highway the motorist need not fear that he will encounter a sharp curve at an unexpected place—there aren't any.

JUSTIFIED BY TRAFFIC

The Ridge Route Alternate was not conceived in a day, but has been the result of a logical evolution



OFFICIAL GROUP at Ridge Alternate ceremonies: (left to right) Secretary Howe, Highway Commission; Asst. State Highway Engineer McCoy; Acting Dist. Engineer Gillis; Dist. Engineer Cortelyou; Asst. Resident Engineer Telford; Chief Engineer East Auto Club of So. Calif.; Supervisors Mitchell, Orange and Brite of Kern; Asst. Dep. Director Public Works Keaton; Contractor N. F. Jahn; Secretary Nourse, Kern Chamber of Commerce; Resident Engineer Templeton; Assemblyman Rogers, Los Angeles; Wm. Shoemaker, Orange; Col. A. Marks, Taft; Chairman Hopkins; C. C. Carlton, State Rights of Way Chief; Acting Dist. Const'n Engineer George; Highway Commissioner Stanton; Nat Neff, Orange County Engineer; President Louden, Economic Council, So. Calif.; Secretary Brashear, L. A. Chamber of Commerce; Carl Mock, Santa Ana Chamber; City Manager Nighbert, Bakersfield; Editor McCracken, Anaheim; Supervisor Wimmer, Kern County; President Simpson, L. A. Chamber of Commerce; Supervisor Quinn, Los Angeles County.

Items	Unit	Old Ridge Route	New Ridge Route Alternate
Length	Miles	36.45	26.85
Total curvature	Degrees	35,141	2,492
Highest elevation	Feet	4,234	3,550
Minimum radius of curves	Feet	70	1,000
Maximum grade	Per cent	6	6
		(Uncompensated)	(Compensated for curvature)
Total rise	Feet	4,630	3,450
Adverse grade	Feet	2,220	1,040
Roadbed width	Feet	21-24	38
		(Original contract)	
Width of pavement	Feet	20	30
Original cost		\$1,614,000	\$2,864,000

VAST SAVINGS PREDICTED

Interpreting these figures in terms of savings to traffic over the next ten years (based on traffic census which have been taken for a number of years past) the annual saving is estimated to be \$1,369,000 which capitalized at 5 per cent equals \$27,380,000 or roughly 9½ times the cost of the project. Where could a better investment of public funds be found than this?

The total construction cost of the Ridge Route Alternate is approximately \$2,864,000. This figure

will probably be changed slightly when the two latest contracts on the project, one for slide removal and one for shoulder oiling, have been completed. Including the contract for slide removal the total excavation amounts to 4,252,000 cubic yards. To place this vast amount of excavated material in its final location in the highway embankments 30,267,000 station yards of overhaul have been required or 77 times the total overhaul involved in the construction of the original Ridge Route. Ninety-seven thousand six hundred forty-eight cubic yards of concrete pavement and 16,722 cubic yards of concrete structure and slope pavement have been placed. The total reinforcing steel used on the project was 3,389,000 pounds.

RELIEVED UNEMPLOYMENT

Construction of this highway has come at an opportune time, when the employment which it has afforded has meant much. An average of about 150 men have been employed directly for the past 3½ years in its construction. In addition to this, much additional employment has been afforded in the cement plants and steel mills by the 686,220 sacks of cement and the 3,389,000 pounds of steel which were used in construction.

The question has been asked many times why the old Ridge Route was located to follow the mountain combs over tortuous alignment rather than following the more direct and lower location of the Alternate Route. The main reason was that the cost of such

(Continued on page 28)

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 LAW KELLY.....Director
JOHN W. HOWE.....Editor

Address communications to California Highways and Public Works, P. O. Box 1103, Sacramento, California.

Vol. 11 OCT.-NOV., 1933 Nos. 10-11

Detour—Men at Work

With over \$216,000,000 in programmed State and Federal highway work, the Far West in the next 2 years will build the greatest and most comprehensive group of useful roads, bridges, and grade separations of any similar period.

Based on the Bureau of Public Roads estimate of about \$1,250 per man-year as the average labor earning necessary for decent living conditions, the total NRA allotment of \$3,300,000,000 means work for 2,640,000 men on actual construction for a year. The corresponding \$450,000,000 in Federal money for highways of the nation will keep 360,000 men in the field. Then in the Far West's 2-year highway program aggregating \$216,000,000, there are some 62,000,000 man-days of work. Behind the construction lines in the transportation, manufacturing, and other industries, stand 1½ to 2 men for every direct worker in the field.

One central steering organization—the U. S. Bureau of Public Roads—from its 17-year background of service and intensive study of highway transportation problems supervises the majority of the State and Federal road programs, correlating them to speed the return of men to work.

"Detour—Men at Work" becomes a familiar warning sign on highways throughout the country. As such this sign takes fresh significance. Now it may be praised as a symbol of the upward climb to better times, rather than damned for minor inconveniences caused the motorists.—*Western Construction News*.

With the exception of Michigan, California has a larger registration of motor vehicle trailers than New York or any other State, which may be an indication either that Californians are champion motor tourists, or that more trailers are used on commercial vehicles than in other areas.

\$955,446,000 Spent on State Highways of Nation in 1932

STATE highway expenditures in 1932 amounted to \$955,446,000, according to information collected from State authorities by the Bureau of Public Roads, U. S. Department of Agriculture. Of this amount, \$816,765,000 was expended for construction and maintenance of highways, interest on bonds and notes and miscellaneous expenses. These items represent the capital investment and current expenses on account of State highways. Other disbursements, such as principal payments on bonds, transfers to local road authorities and obligations imposed by statute totaled \$138,681,000.

Maintenance of the State systems, which include 358,210 miles of main highways, gave employment to from 130,000 to 160,000 men throughout the year. States surfaced 29,500 miles of road and more than 6000 miles were graded. The direct employment furnished by this construction was 86,000 men in January. This rose to 215,000 in September and was 144,000 in December. For every man directly employed it is estimated that two others were indirectly employed in supplying and transporting materials and machinery.

Total funds available were \$1,173,576,000, consisting of \$275,259,000 balance from previous year, \$632,200,000 current revenue from State sources, \$161,467,000 federal and local contributions, and \$104,650,000 from sale of bonds and notes. More than 90 per cent of the current State revenue was derived from motor vehicle fees and gasoline taxes.

TOPOGRAPHIC SHEET ISSUED OF EL MIRAGE QUADRANGLE

The final topographic sheet of the El Mirage Quadrangle recently made its appearance. This work was done in cooperation between the County of Los Angeles and the U. S. Geological Survey. The sheet is published on a scale of 1:24,000. Copies are available either at the local stationers or through the Superintendent of Documents, Washington, D. C.

RED LANTERNS FOR PEDESTRIANS

Pedestrians in Kansas may soon have to carry red lanterns when they walk on the highways after dark. Legislation providing that all walkers display red lights is being considered in the Sunflower State as a remedy for the large number of highway accidents involving pedestrians, says a bulletin of the Minnesota Safety Council.

Viaduct Cost Cut by Economies

(Continued from page 5)

48-inch storm sewer that must also remain intact. Numerous oil, gas and water lines below ground remain to hinder the contractor's foundation operations until removed.

TRACKS RELOCATED

It will be necessary for the Santa Fe Railway to shift several of their yard tracks slightly to meet the standard side clearance of 8 feet 6 inches as required by the Railroad Commission. Track No. 46 mentioned above had to be relocated several feet north and depressed one foot below its original elevation to secure standard clearance above top of rail. Original plans called for the building of a temporary steam line to serve the Santa Fe yards while their main 6-inch steam line was being removed from the old viaduct and rebuilt into the new structure.

Investigation into this matter revealed possibilities of a saving amounting to several thousand dollars by transferring this 6-inch line directly from the east half of the old viaduct from which it is suspended to the west half of the new structure which, by coincidence, lays sufficiently close to and slightly above the original structure to permit steel erection without materially disturbing the old viaduct. The line may thus be swung from one to the other without interference of operations save for two new connections required during which time a locomotive will supply necessary steam for the Santa Fe Harvey House at the depot, which relies entirely upon this line for cooking facilities.

ECONOMIES EFFECTED

Inasmuch as all railroad changes due to construction of this new viaduct come under the item "Total Cost of Project," it was to the State's interest to effect as many economies of this type as possible.

Further savings will result from salvaging practically all of the original steel girders out of the old viaduct, refabricating and reinforcing them to suit, and erecting in the new structure. A variety of span lengths was necessary to accomplish this and provide proper side clearance to yard tracks at the same time, but with a little manipulation a group of spans can be obtained in which old girders will be utilized in all but those

requiring special shallow deck construction to secure necessary overhead clearance above railroad tracks.

Two stairways are provided, one built of concrete at Third Street leading up onto the structure from the street below and a light steel stairway near the oil supply house leading into the railroad yard.

RAILROAD COOPERATING

Expansion and contraction of the structure due to temperature, which amounts to a total of 8 inches under a temperature range of 120 degrees, is taken up at one point only. To provide for this large amount of movement, a double steel bent will be installed near the middle of the bridge with a series of interlocking steel bars in the roadway slab, with each span on either side of this bent securely tied back into the tower bracing in spans 5 and 21.

Construction of this viaduct in a minimum period of time and at the lowest reasonable cost has been made possible largely through the willing cooperation of the Santa Fe Railway Company. During actual construction of the piers and the erection of steel in the floor system they have indicated their willingness to close off several of their yard tracks, thereby hampering their own train operations, to permit this work to be done with the least delay, and in all other respects have promised the contractor the utmost in helpful coordination.

M. E. Whitney of the Bridge Department is resident engineer, and will have charge of construction.

TWENTY-SEVEN STATES NOW PUTTING THEIR FULL NAMES ON LICENSE PLATES

The practice of spelling out the full name of the State on automobile license plates, instead of an abbreviation, is growing in popularity. California and 26 other States and the District of Columbia have now abandoned the shorter form, with the result that wherever motorists of those States travel the name is readily noted. Five States having State symbols on their 1933 license plates are: Louisiana, Montana, Texas, Pennsylvania, and South Carolina.

"So you assembled your car entirely from second-hand parts? What did it cost you?"

"Not a cent—I live near a railway crossing."

Water Plan "Pay-for-itself" Project

(Continued from page 13)

valued at \$50,000,000 and producing annual crop values of \$20,000,000.

(11) The establishment of navigability upon the San Joaquin River for a distance of 86 miles upstream from Stockton.

(12) The maintenance of business profits to the Los Angeles metropolitan area from its great tributary domain in the South San Joaquin Valley is of paramount importance to all Southern California. The State has just completed the Ridge Route Alternate at great expense to aid the flow of commerce and commodities to and from this vast hinterland source of supply of the Los Angeles metropolitan area. A fertile, flourishing San Joaquin Valley means an increase of buying and selling steadily adding millions of dollars to the business of Los Angeles and its seaport.

The maintenance of like profits to the San Francisco metropolitan area from other parts of the Central Valley is of no less importance to said area.

Impossible to estimate but nevertheless far-reaching and of great consequence in regard to our economic well is the support that great industrial and agricultural enterprises yield to an army of professional and

business men engaged within their immediate vicinity and even throughout the State. To stand by and allow these investments of many of our people to perish and great pay rolls to diminish, and populations largely dependent for support upon such enterprises to suffer, is but to court disaster and insure greater economic distress especially when the very process of affording protection and relief will give employment to thousands of our fellow citizens, a livelihood to many thousands more for years to come and put into circulation \$170,000,000.

May any Californian turn a deaf ear to such an opportunity to provide for present relief and future security? Can any Californian whether he live in the mountains of Del Norte County or on the banks of the Colorado say that he, or his, will not be benefited? Or even if he thinks there is no benefit to himself, what reason should deter the help which he may so easily extend at the ballot box and without incurring one cent of cost or obligation on account of this project which must pay for itself and is a charge against its revenues and its revenues only.

FINANCIAL SET-UP OF THE PROJECT

It is a startling statement but it is nevertheless a true statement that this vast \$170,000,000 undertaking is to be financed and paid for without the cost of one cent to the California tax payer and without incurring one cent of obligation to the State of California.

It positively does not and can not create a State indebtedness nor does it create any moral obligation on the part of the State to at any future time assume indebtedness on account thereof.

It is a project to be financed by the sale of revenue bonds—the same character of bonds under which the \$75,000,000 San Francisco-Oakland Bay Bridge is now being financed and built. This plan has also been employed in financing the great George Washington Bridge over the Hudson River by the Port of New York Authority. The bond provisions of the Central Valley Project Act are taken almost verbatim from those of the California Toll Bridge Authority Act of 1929, twice upheld by the Supreme Court of California. In the decision in one of these cases rendered April 20, 1933, Chief Justice Waste speaking for the court, declares:

"We must not lose sight of the fact that these bonds are not, and can not be, bonds of the State creating a general liability against it. So far as payment of principal and interest of the bonds is concerned, no funds of the State, general or special, can be resorted to."

Under this plan of financing the bonds issued and sold are secured only by the revenues obtained from the sale of water and power made available by

the project and to this same effect an opinion was recently given by Attorney General Webb.

It is truly a "pay-for-itself" project. The purchaser of one of these bonds has no other security than the revenues to be so obtained; the State gives no guarantee of repayment; the Project Authority consisting of the Attorney General, State Controller, State Treasurer, Director of Finance and Director of Public Works must first be convinced that revenues will be sufficient to finance the project; no bonds may be issued until in their judgment they are convinced; and in turn it is obvious that the evidence, commitments and contracts upon which they base such assurances of revenue must convince the buyer, be it the Federal Government or other agency or an individual. The act itself is positive and certain in its provision in regard to these matters.

The money to build the project will be obtained from revenue bond purchasers and these purchasers will be repaid by revenues obtained from those who receive the benefits of the water and power made available. This is the plan in its essence, it is not and can not under the act be otherwise.

No one is compelled to buy bonds, no one is compelled to purchase water and power. If the project proceeds it will be dependent upon all investors willing to advance money on that basis and upon purchasers of water and power willing to pay the price fixed in return for profits and benefits to be secured by them.

Closely related to the above plan of financing, is the authority of the United States under the N. R. A. to contribute from the \$3,300,000,000 public works administration fund 30 per cent of the cost of labor

N. R. A. Gift of \$43,606,000 Available

(Continued from preceding page)

and materials of any project adopted under that act for Federal assistance, and to also purchase all bonds issued to raise the balance of the money required to build a project.

Already approved by the Chief of Engineers of the United States War Department, the United States Bureau of Reclamation, and the United States Senate Committee on Irrigation and Reclamation, it is well within the bounds of probability that this project will be adopted for N. R. A. financing.

It is a project ideal in its adaptation to President Roosevelt's unemployment relief program and of great value to the Federal Government in meeting its long established policy of aiding in navigation and reclamation work in the several states through its War and Interior Departments. A favorable vote by the people therefore makes possible, indeed probable, a Federal gift in aid of this project in the sum of approximately \$43,606,000 and the purchase by the United States of all bonds issued to raise the balance of the money required.

SOME IMPORTANT PROVISIONS OF THE CENTRAL VALLEY PROJECT ACT

Unhesitatingly, I assure you, my fellow Californians, that the act under which this project is to be constructed safeguards and protects your vested rights and your pocketbook from exploitation. A vigorous campaign is being waged in an effort to dissuade you from a course which if taken can mean but the promotion of your own welfare immediately and for all future time. Briefly, I submit to you some of these safeguards and provisions of this act in support thereof:

(1) No State indebtedness is created:

"Sec. 19. Any and all bonds so authorized * * * shall constitute obligations only of said authority * * * and shall contain a recital on the face thereof * * * that neither the payment of the principal or any part thereof or any interest thereon constitutes a debt, liability or obligation of the State of California. Bonds issued under the provisions of this act shall not constitute or be a debt, liability or obligation of the State * * *."

(2) The only bonds authorized are secured by revenues only:

"Sec. 19. Any and all bonds so authorized shall * * * contain a recital on the face thereof that the payment or redemption of said bonds and the payment of interest thereon is secured by a first and direct charge and lien upon the revenues of any nature whatever received from the operation of said Central Valley Project * * * Bonds issued under the provisions of this act * * * shall be secured only by the rates, charges, and revenues established or accruing from the use or operation of the said Central Valley Project Act * * *."

(3) These revenue bonds are bonds of the Project Authority and not obligations of the State of California.

"Sec. 19. Any and all such bonds so authorized shall be issued in the name of the Authority and shall constitute obligations only of said authority and shall be identified as Water Project Authority revenue bonds * * *."

(4) Self governing public agencies defined in Section 2 of the act and designated as "State agencies" for the purposes of this act are authorized to cooperate

by advances or contributions of money or property. Such authority is of course permissive only and subject to the will of the people either directly or as expressed through their elected officials and as established by the statutes or charters of such agencies. The State, as such, or its departments and other executive branches of government are also permitted to cooperate by advance or contribution but no power to do so without separate and specific legislative authorization is conferred.

Although the provisions of Section 16 of the act provide only for such legitimate cooperation in aid of the project they are nevertheless being misconstrued and declared to be in support of assertions that all or any State funds may be arbitrarily turned over to the construction of this project. Section 16 specifically provides that "appropriations therefor may be made from any funds available for such purpose."

Funds must be appropriated by the Legislature in order to be available to executive branches of our State government and must be "for such purpose" which means that this permission to so cooperate is and will remain inoperative unless funds have been or shall be appropriated by the Legislature either expressly for such advance or contribution or for purposes so coincident with the purposes of the project that such an advance or contribution fairly constitutes but another means of applying such funds to the purpose for which the Legislature designated in making them available.

(5) No interference with vested rights and no taking of private property for the project is authorized except upon exercise of the power of eminent domain and upon compensation paid. The provisions of Section 12 very specifically so provide.

(6) The owners and inhabitants of watersheds from which transportation of water is made to other watersheds are protected in a first right to the waters of their area as and when needed therein as against any taking thereof by the Project Authority under this act. Thus the Sacramento Valley will not lose any right to waters taken and conveyed into the San Joaquin Valley. At any time the Sacramento Valley shall need any of such water it is guaranteed the right to take and use that water. Section 11 so provides:

(Continued on page 22)

A Livelihood to 100,000 for 3 Years

(Continued from page 21)

"Sec. 11. 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 conveniently be 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 * * *."

(7) The primary right of the people of California to the power developed by this project is protected by

provision for a transmission line to a central distribution point near Antioch (Subd. (1) of Sec. 4) and by permission to construct additional transmission and distribution facilities as necessary (Subd. (7) of Sec. 4); by the provisions of the last paragraph of Section 9 relative to transmission of electric energy to central points for supply to State agencies; by the first paragraph of Section 8 giving preference to State agencies in awarding contracts in case of equal and equivalent offers; and by the provisions of the third paragraph of Section 9 relative to cancellation upon five year's notice of contracts under which any person, firm or corporation other than a State agency acquires water or power for resale.

UNEMPLOYMENT RELIEF SHOWN BY CONSTRUCTION SCHEDULE

Lest any doubt the claim made that this project will give employment to 25,000 men and a livelihood for 100,000 people for the next three years and for a lesser number for many years to come, I call your attention to the following specifications:

(1) A construction schedule providing for employment ON THE PROJECT of

14,100 men in 1934
17,900 men in 1935
14,130 men in 1936
12,000 men during first 3 months of 1937
3,000 men during remainder of 1937
A maximum of 4370 and a minimum of 1000 during 1938.

(2) The employment of a GREAT ARMY OF MEN in the production, manufacture and transportation of materials and supplies REQUIRED for the project.

(3) Engineering estimates of labor and materials required are as follows:

6,528,000 cubic yards of concrete.
20,809,000 pounds of reinforcing steel
114,543,000 pounds of structural steel
6,496,000 barrels of cement
5,836,000 cubic yards of rock
3,302,000 cubic yards of sand
38,311,000 cubic yards of excavation
186,224,000 man-hours of labor

Secretary of the Interior Ickes, in charge of the President's Public Works Program, in speaking of the second army of workers who must produce the materials required for the first army engaged directly upon any great project, illustrates his point as follows:

"It takes 10,581 man-hours of labor for the construction of a mile of average roadway. But it takes more than 18,927 man-hours of labor to supply the materials used on this mile of road. Thus the indirect benefit to labor is almost twice the direct benefit to those who work on the actual construction job."

If Secretary Ickes is right the estimate of 25,000

men all told is *ultra-conservative* and we may expect during the three peak years of construction, a far greater total number will be given employment as a result of this huge enterprise.

Coincident with our great unemployment emergency, this project will produce three years of immediate employment during which the bulk of its work will be accomplished, but for many years to come it will afford work for large numbers of men and in its maintenance and operation will afford permanent employment to many men.

CONCLUSION

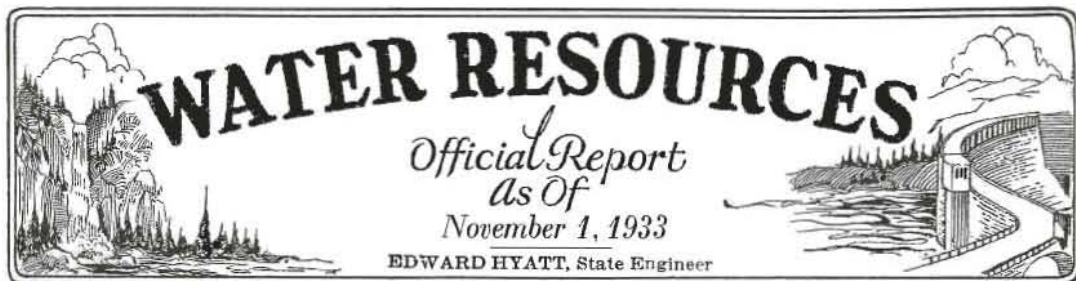
The Central Valley Project Act will be adopted or rejected by you, the people of California, on December 19, 1937. In your behalf and as your Governor I ask for approval of a project which will be a mighty factor in bringing to California prosperity now and security for the future.

I stand not alone. Organized labor, the State Chamber of Commerce, the State Grange, boards of supervisors, boards of city trustees, civic organizations and forward looking, progressive and public spirited leaders and citizens throughout the State have endorsed the project.

The campaign, your campaign, in this cause is being conducted by the State Water Plan Association, 610 Insurance Building, Sacramento, California, under the able leadership of State Senator Bradford S. Crittenden, Stockton, Chairman; State Senator J. M. Inman, Sacramento, Vice Chairman and Treasurer; P. D. Nowell, Tulare, Secretary; Judge Francis Carr, Redding; Jesse Poundstone, Grimes; George A. Atherton, Stockton; W. B. Hogan, Stockton; R. P. Easley, Antioch; Judge Matt I. Sullivan, San Francisco; A. B. Tarpey, Fresno; State Senator John B. McColl, Redding, and other associates.

Support this organization in its campaign to present the true facts that all progressive and public minded citizens may know the truth and vote for a project which entails no detriment to any man and benefit to every citizen of California.

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Taking advantage of the opportunity of securing funds from the Federal Public Works Administration some irrigation districts have applied for loans for new construction extensions and improvements. The Federal Government has allocated \$1,500,000 to the Sacramento flood control project and work is to commence immediately by the War Department on the permanent bank protection program for which the State contributes one-third of the cost.

The flow of the Sacramento River at Sacramento and of the San Joaquin near Vernalis has increased and a marked recession of salinity is indicated at Delta sampling stations.

Details of dam construction, water applications, permits and further activities of the Division of Water Resources are contained in the following monthly report of the State Engineer:

IRRIGATION DISTRICTS

Exclusive of funds requested for the construction of the All-American Canal, applications by irrigation districts amounting to \$1,250,000 have been filed with the Federal Administration of Public Works by irrigation districts for loans of funds for new construction or extensions and improvements.

At a recent special election called on petition of district landowners the question of the dissolution of the Foothill Irrigation District in Tulare County was submitted to a vote. The count was 292 votes for and 13 against dissolution, the proposition carrying with well over the two-thirds majority required by law. The proceedings are now awaiting the confirmation of the superior court.

The voters of the East Contra Costa Irrigation District approved a bond issue of \$76,000 at a special election October 7th. The proceeds from the bonds are to be used for the installation of natural gas engines in the pumping plants of the district.

At a meeting held at San Martin on October 6th the farmers in that part of Santa Clara County lying between Morgan Hill and Gilroy proposed the organization of a water district, the principal object being to increase the ground water supply of the area by diverting the flood waters of Uvas Creek into the channel of Llagas Creek.

With respect to requests for approval of modifications of their assessments for the 1933-1934 levy,

reports were made to the District Securities Commission on the economic and financial conditions in eleven irrigation districts.

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento Flood Control Project.

During this period routine maintenance work has been performed on the flood control system with a small force. Partial repairs are now under way to the Hoke ranch bridge over the east borrow pit of the Sutter By-pass. This work involves the driving of 20 piles for construction of two end supports for the 95-foot truss span. After the completion of the abutments the span will be lowered 7 feet and placed thereon. This work is necessary to insure the safety of the bridge during flood season, after which the two approaches to the span will be constructed.

Emergency Flood Protection and Rectification of Rivers.

Two small jobs of emergency bank protection on the Mad River near Blue Lakes in Humboldt County were completed during this period, at a total cost of \$1,600.

Sacramento Flood Control Project—Construction.

The efforts made by the Reclamation Board and this office to have Citizens' Conservation Corps camps established for clearing flood channels during the winter months have not been successful, the allocation of these camps having been definitely disapproved.

Federal funds to the amount of \$1,500,000 have been allocated to the Sacramento flood control project for expenditure during the 85th fiscal year. The State of California through the Reclamation Board will cooperate in this work probably to the extent of \$500,000, the main items of work to be the construction of levees and the enlargement of the Sacramento River below Cache Slough.

Sacramento Flood Control Project—Bank Protection.

Immediate commencement is contemplated of the permanent bank protection program on the Sacramento flood control project. This is to be done by the War Department in cooperation with the State, the actual work to be performed by the War Department, which contributes two-thirds of the total cost and the State one-third. A total of \$150,000 will be expended for this purpose before July 1, 1934. Under this program, which is expected to be carried on continuously for a number of years, only bank protection of a permanent type is to be

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Salinity Recession Recorded in Delta

(Continued from page 23)

installed, so that eventually the river banks and channels will be permanently stabilized.

Russian River Jetty.

Work has continued on the jetty at the mouth of the Russian River at Jenner with a force of 12 men. A satisfactory quantity of rock of large size has been placed in the jetty during this period.

Pajaro River.

Contract has been entered into with L. C. Karstedt of Watsonville for clearing the channel of the Pajaro River. Work was commenced on October 16th, to cost \$4,000. This is being done in cooperation with Santa Cruz and Monterey counties.

Flood Measurements and Gages.

Routine preparation has been made for the operation of the system of automatic water stage recorders and the collection of data during the winter season. On account of lack of funds routine collection of flood stage data only will be attempted for this season, unless unusual flood stages occur which would make it desirable to meter the flood flows.

WATER RIGHTS

Supervision of Applications to Appropriate.

During the month of September 37 applications to appropriate water were received; 9 were denied and 29 were approved by the issuance of permits. In the same period 3 permits were revoked and the rights under 6 permits were confirmed by the issuance of license.

Inspection of projects reported complete were made during September in Sacramento, Amador, Placer, Sierra and Plumas counties.

ADJUDICATIONS

Shasta River (Siskiyou County).—Briefs on the motion to tax costs have been submitted and the matter is now pending decision by the superior court.

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 December 5, 1933.

WATER DISTRIBUTION

Cedar, Davis, Deep, Emerson, Franklin, Mill, New Pine, Pine, Cottonwood, Owl, and Soldier creeks and South Fork of Pit River (Modoc County).—Water master service was continued throughout the month, to the extent that appeared necessary.

Pit River in Big Valley (Modoc and Lassen counties).—Supervision of diversions from Pit River in Big Valley was discontinued for the season, on September 30th.

Hat, Burney, North Cow, Oak Run and Clover creeks (Shasta County).—Water master service on these streams was continued throughout the month, to the extent that appeared necessary.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

Field and office work on this project has continued on a reduced basis and has included measurements and compilations of the stream flow, diversions, and return flow throughout the Sacramento-San Joaquin territory and salinity and tidal fluctuations in the delta. The census of crops irrigated under all diversions measured is nearing completion.

Due to increased return flow and diversion reductions, the flow of the Sacramento River at Sacramento has increased during the past month to about 3500 second-feet and similarly the flow of the San Joaquin River near Vernalis is now about 1000 second-feet.

With one or two exceptions there has, during the past month, been a marked recession in salinity at the various delta sampling stations. This as indicated in the following comparison of salinity on September 10th and October 10th. The maximum salinity for the season closely paralleled or slightly exceeded the 1929 maxima. The figures for salinity on October 10, 1929, and 1926 are shown in the following tabulation:

Salinity at Upper Bay and Delta Stations in Parts of Chlorine per 100,000

Station	September		October 10th	
	10, 1933	1933	1929	1926
Point Orient	1760	1760	1740	1930
Bullshead	1160	1260	1110	1340
Bay Point	1140	860	960	1330
O. and A. Ferry	900	680	470	620
Collinsville	620	460	340	340
Emmaton	290	210	65	78
Three Mile Slough	250	90	31	62
Rio Vista	102	13	3	12
Isleton	25	5	2	10
Antioch	480	*460	280	460
Jersey	210	130	95	152
Central Landing	23	13	7	19
Middle River	11	12	17	69

* October 6th.

DAMS

To date there have been received 824 applications for approval of dams built prior to August 14, 1929, of which 505 are now under jurisdiction. One hundred eighteen applications have been received for approval of plans for construction of enlargement of dams and 389 for approval of plans for repair, alteration and removal.

Definition of Feeder Road Discussed

(Continued from page 9)

roads and this should be decided by the states themselves. One thought advanced was that the Federal Government should appropriate money to build feeder roads after the Federal aid system had been completed.

Another expression in this connection was that the states should take over all roads outside of city streets in incorporated cities and a new method of securing right of ways be instituted. One suggestion was that adjacent property should relieve the State of some of the costs of rights of way.

It was the general opinion that Congress was not dictating to the states how to build roads and a misinterpretation of the activity of the U. S. Bureau was the cause of this conception occasioned by the bureau's recommendations.

An opinion was offered that feeder roads should be classified in respect to traffic and local advantages. If the local advantage prevailed it should be a local charge. Another statement presented was that the Federal Government should bear the entire cost of all roads of a transcontinental character.

FEEDER ROAD DEFINED

The oft-repeated question since the N.R.A., "What is a feeder road?" came up in this meeting and Thomas H. MacDonald of the U. S. Bureau of Roads said the best he could offer was that any road not on a Federal aid system might be termed a feeder road.

A point was brought out that the countries of Europe were not troubled over classification of roads and that all of their roads were highly developed. This can be easily understood. Where this condition does exist in Europe we find that the area of those countries is about equal to the size of our smaller states.

The final conclusion on this particular subject was that Federal policies in connection with highway construction should not prevail without the states being considered and that national roads might be classed as those rendering national service such as transcontinental highways and State highways classed as those rendering State service, while roads of local importance only and not carrying traffic of state-wide character might be classed under some other designation. However, in the opinion of the writer roads are roads.

BY-PASSING OF CITIES

In discussing the proper formula for dividing the cost of railroad crossing elimination, a point was made by Mr. James of the U. S. Bureau of Roads that the cost should be apportioned as to benefits and that some railroads would have different benefits according to whether the train movement was morning, noon, evening or night.

Another subject that seemed to have unanimous approval was that in the interests of the traveling public the through traffic lane should be given every consideration in its construction to take care of through traffic and that the by-passing of cities would be very necessary in the near future because the cities themselves would be unable to give the police control required and that a master plan should be worked out by all the states, elim-



DIRTY LOOKS and sarcastic words are being exchanged by Chairman Harry Hopkins of the Highway Commission (left) and Commissioner W. W. Barham anent the merits of their respective catches of Klamath River fish caught during a recent inspection trip over northern roads.

inating as far as possible the hazards brought about by routing main traffic lanes through cities.

In discussing the best method to control and enforce the minimum wage and labor hour it was brought out that while the thirty hours provided for by the National Recovery Act would cause a good spread of money and labor, it is too short a period for the average man to earn sufficient for the needs of his family and that provisions should be made for forty hours per week and up to 170 hours per month.

WANTS FORTY-HOUR WEEK

T. H. MacDonald of the U. S. Bureau of Roads brought out the fact that we have thirty hours and that it must be adhered to, but that future legislators should provide for the 40-hour week.

In discussing the danger of ruining the United States numbered system it was brought out that the numbers applied to the different highways are not intended for local community advantage or benefit, but to indicate the most direct route over the best highway between given points.

The resolutions committee presented a resolution that was unanimously passed by the delegates providing for a revision of the United States numbered system. Odd numbers extend from north to south and even numbers from east to west, and are in multiples of ten. The numbers were intended to be consecutive in designating different routes. However, this is not entirely the case at the present time, nor do numbers follow the most direct route.

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\$6,483,850 is October Record Total in Contracts Awarded and Advertised

OVER TWO MILLION six hundred thousand dollars in contracts awarded!
OVER TWO MILLION nine hundred thousand dollars in projects advertised!

OVER NINE HUNDRED THOUSAND dollars in maintenance work begun!

A RECORD BREAKING TOTAL OF NEARLY SIX AND ONE-HALF MILLION dollars for construction and maintenance on State highways for October, 1933.

These statements are not promises, they represent accomplishment—one month's accomplishment by the Division of Highways in advancing recovery in California through the means of State highway construction.

They represent jobs for 4500 Californians, jobs which will furnish food, clothing, fuel and shelter for their families during the coming winter.

RECOVERY COOPERATION

These figures likewise represent the results of the cooperation between the State and Federal governments in rushing the program for recovery, so that the recovery may be an actuality.

The work represented by the October portion of the Department of Public Works program for speeding recovery spreads over California from north to south and from the Sierra to the Pacific.

In a comprehensive and studied effort to bring the activity of highway construction to all parts of the State, the Division of Highways included work in 27 counties in the major construction projects set in motion during October and the work covered by miscellaneous projects and maintenance extends to all 58 counties.

To provide an adequate perspective of the picture of the intensive activity in highway construction during the month, the following tabulation is given, showing amounts of contracts financed from Federal funds allocated to California under the National Industrial Recovery Act, amounts financed from State funds and the approximate number of men who will be given jobs by virtue of the work:

	Federal funds	State funds	Total	Approx. No. men
Construction	\$1,615,400	\$750,900	\$2,366,300	2,000
Maintenance		152,800	152,800	145
Minor Improvements		32,400	32,400	25
Miscellaneous Projects		58,000	58,000	60
Maintenance Work Orders		944,300	944,300	400
Projects Advertised	1,032,000	1,898,050	2,930,050	1,870
Totals	\$2,647,400	\$3,836,450	\$6,483,850	4,500

The following tabulations present different views of the major construction work in the picture for October, showing the types of work, mileage, amounts and number of men required for the various types, on the 31 contracts awarded during the month and the 19 projects advertised.

CONTRACTS AWARDED

Type	Miles	Federal funds
Pavement	16.7	\$596,200
Bituminous Tr. Gravel or Stone Surface	36.4	407,600
Shoulder Treatment	25.0	
Graded Roadbed	9.6	114,000
Bridges and Grade Separations	(16)	497,500
Totals	87.7	\$1,615,300

Type	State funds	Total	No. of men
Pavement	\$165,900	\$762,100	635
Bituminous Tr. Gravel or Stone Surface	112,700	520,300	445
Shoulder Treatment	26,500	26,500	25
Graded Roadbed	147,200	261,200	220
Bridges and Grade Separations	298,700	796,200	675
Totals	\$751,000	\$2,366,300	2,000

PROJECTS ADVERTISED

Type	Miles	Federal funds
Pavement	11.1	\$498,000
Bituminous Tr. Gravel or Stone Surface	15.3	182,700
Shoulder Treatment	24.4	
Graded Roadbed	16.3	335,900
Dredger Fill and Rock Wall, East Approach to San Francisco Bay Bridge	4.1	
Bridges	(3)	15,400
Totals	71.2	\$1,032,000

Type	State funds	Total	No. of men
Pavement	\$130,000	\$628,000	525
Bituminous Tr. Gravel or Stone Surface	96,600	279,300	235
Shoulder Treatment	62,200	62,200	50
Graded Roadbed	233,100	569,999	475
Dredger Fill and Rock Wall East Approach to San Francisco Bay Bridge	1,358,300	1,358,300	550
Bridges	17,850	33,250	35
Totals	\$1,898,050	\$2,930,050	1,870

Supplementary to the above tabulations the following details are given of bids opened and contracts awarded on the larger projects between September 13th and October 29th when 112 projects figured in the bidding:

(Continued on page 30)

U.S. Gas Tax Repeal Favored by Highway Officials in Convention

(Continued from page 25)

The question of double taxation for highways, both Federal and State, disclosed the generous sentiment that a dependable taxation should be worked out that would stand the attack of all critics and the best results would follow.

The tax should be governed by the payer and all State gas tax should be spent or its expenditure controlled by the State and not by political subdivisions of the Federal government. There was a strong sentiment in favor of repealing the Federal Gasoline Tax.

A provision of the National Recovery Act wherein the State highway departments may build highways between points where unprofitable railroad lines are abandoned was discussed and it was disclosed by the U. S. Bureau of roads that upon their request for routes and mileage that the railroads would like to abandon in the whole United States, the railroads only suggested a total of about four hundred miles. However, when they asked for suggestions from the railroads covering feeder roads they suggested several thousand miles.

In discussion of the cost of grade eliminations many thought the Federal government should stand the entire cost. The next sessions of the states' legislatures as well as the next Congress might give this subject serious consideration. However, there should be a uniformity of legislation by the states, and highway crossing separations should have as much consideration.

GRADE SEPARATION FINANCING

The cooperative method of grade separations is followed in most of the states and should legislation relieve the railroads from any participation, would their cooperation return in the future? In view of the fact that the Federal government is now a large stockholder in the railroads of this country and will probably remain so, it is doubtful, should legislation be passed, that they would ever participate again.

It was also suggested that if participation by railroads on grade separation does not add to revenue they should not have to pay any of the cost. It is a delicate subject because when we consider the railroad we have to consider the highway and when we consider the highway we consider it from the county road standpoint as well as that of the State highway and many property owners have paid assessments in connection with highway construction where their property was not benefited or enhanced in value one thin dime.

FEDERAL AID ASKED

The many problems presented to the delegates were so numerous that it is impossible to go into them to any extent or even mention many of them. During this time of economic distress highway construction and maintenance has developed into the biggest industry in this country. During the year 1932 the total expenditures through the State highway departments was \$816,765,481 and the total revenue was \$898,317,394. In expenditures, construction got \$551,445,859 and maintenance got \$169,479,339.

Three New Highways Will Connect Desert and Mountain Areas

(Continued from page 10)

fork of the west fork of Mojave River, known as Miller Canyon. This canyon is almost entirely owned by the public and any who have not been down into this area will be pleasantly surprised when they make the trip. The forests are as lovely as any in Southern California with virgin timber of yellow pine, oaks, Jeffrey pines and dogwood. A beautiful stream follows the bottom of the canyon.

"The route to the desert from Lake Arrowhead is better known.

"The Cushionberry Grade into the Big Bear Lake area is the third routing to be taken over connecting with the desert. It is one of extreme interest having been constructed by way of Coxey's Ranch and Holcomb Valley about 1856. This road was constructed because of the discovery of gold in Holcomb Valley and the pioneer miners toiled up the steep grades to what they hoped would prove a new southland El Dorado.

"From these desert connections the public in the winter and early spring will pass through valleys of flowers to the Cajon Pass and again enter the San Bernardino Valley on the splendid highway lately constructed through the pass."

NOVEL CAISSON METHODS ADOPTED FOR BAY BRIDGE

(Continued from page 15)

are timbered over and the timbers held in place by means of strong backs.

Just as in the other caissons the walls of these are built up and concrete poured around the cells. When it lands on the bottom of the bay, derricks jerk the strong backs free at the bottom of each of the fifteen cells and the timbers which have made the cells watertight for the purpose of flotation are removed and floated to the top; thus each cell is open to the bottom of the bay. Clamshell dredges are then lowered down each cell and the mud is excavated therefrom until the caisson is allowed to rest at its final elevation, in the case of Pier E-5 approximately 170 feet below the surface of the water. * * *

He: "That soprano has a large repertoire, hasn't she?"

She: "Ain't it the truth, and her dress only makes it look worse."—*Exhaust.*

67 Steers Barbecued to Provide Feast at Highway Celebration

(Continued from page 6)

An average of 300 men were employed, working on a basis of 30 hours per week.

An old-fashioned California celebration and free barbecue at the ranch of Senator Wagy on the new highway 41 miles west of Taft, marked the official opening ceremonies. A great throng, estimated at 25,000 people, attended the celebration, and some 10,000 partook of the barbecue for which 67 beeves were slaughtered. The festivities began at 10.30 a.m. and lasted all day with costumed Spanish singers and dancers entertaining between periods of the formal exercises.

Supervisors Stanley Abel and Charles Wimmer of Kern County, Thos. Clark and Charles Butts of Ventura County and Samuel Stanwood of Santa Barbara County, represented the tri-county district whose cooperation brought about the completion of the highway.

Guests from neighboring counties included Supervisors John R. Quinn of Los Angeles County, Hartwell Sumners and Charles E. Crowell of Stanislaus County.

John Lagomarsino was chairman of the tri-county committee in charge of the celebration. In addition to Chairman Harry A. Hopkins of the Highway Commission, the State was represented by Commissioner Timothy A. Reardon of San Francisco and Morgan Keaton, Assistant Deputy Director of Public Works from Sacramento.

CONCLUSION

(Continued from page 22)

We can only expect to come out of the depression by developing work and plenty of it.

Let us own our own water and power. They will belong to the State and that is you, the people. The Bay Bridge, the Southern California Water Plan, the Boulder Dam, the highways, and all other State and municipal projects will make California the foremost State in the Union.

We have the shipping facilities; the markets of the world are at our doors, principally in the Orient. Developments of water and power will insure our prosperity with a guarantee of employment and the maintenance of our agricultural and manufacturing industries. As for markets there are approximately 900 millions of human beings ready to buy our manufactured goods and eat our surplus of food supplies and this project costs you nothing but your effort to vote "Yes" on December 19, 1933.

30,267,000 Yards of Overhaul Required for Ridge Alternate

(Continued from page 17)

a route would have been prohibitive at that time. There were but 1,023,000 cubic yards of excavation on the old route—on the new there were 4,252,000 cubic yards. But such improvement has been made in equipment that the unit cost was 30 cents on the new route as compared with 42 cents on the old for excavating and the haulage unit was only one-third of the old price.

The old route required but 393,000 station yards of overhaul while the new route has required 30,267,000 station yards.

To construct a highway on the location and to the standards of the new route at the time the old route was constructed would have cost more than \$2,500,000 which would not have been justified at that time, either from the volume of traffic or from the amount of money available for the purpose.

BLOW TO SECTIONALISM

Although the hauling of freight is only a small percentage of the total savings which can be credited to the new route, commercial organizations have been quick to realize the large savings which can be effected in hauling agricultural produce from the vast farming areas of the San Joaquin Valley to the metropolitan area at Los Angeles over this new high speed highway as well as by the interchange of freight between southern California and central and northern California. While the savings in freight haul will be large, by far the greatest benefit will accrue to the thousands of motorists, not only from California, but from every part of the country, who use this highway. Not only will there be an appreciable savings in car operating expense but also a large saving of time and the increased comfort and safety of traveling across this mountain range on a highway of modern standards of alignment and grade. As Commissioner Stanton aptly put it in his speech at the dedication ceremony, completion of this new highway unit is truly "the greatest blow to sectionalism in California since the construction of the original Ridge Route in 1915."

"FAG STATIONS" ESTABLISHED FOR SMOKERS IN FORESTS

Smoking has been prohibited in all National forests in California except at "fag stations" established along trails and roads and at camps and places of habitation, according to decree just issued by Regional Forester S. B. Show. A report states that 999 fires in 1932 were caused by lighted matches and burning tobacco being thrown into dry litter of the forest and dry grass and grain fields of the State. One of these fires burned over 219,000 acres of watershed in the Santa Barbara forest.

The motor bus was proceeding rather jerkily, when a pretty young woman passenger asked: "What's wrong with this bus, driver?"

"The engine misses," he replied.

The young woman blushed and smiled. "Why, I've only been married two weeks!" she exclaimed. "How in the world did you know?"—*Motor Land*.

Radiotelephones of Bay Bridge Speeding Work, Saving \$15,000

RADIOPHONES on the San Francisco-Oakland Bay Bridge may appear to be an innovation to the public, but to the engineers on this world's largest construction job they are a necessity.

Although no other bridge or, for that matter, no other known construction job, has used radiotelephones, the San Francisco-Oakland Bay Bridge is larger by two or three times in length than any other bridge in the world, and this length complicates means of communication tremendously.

It requires from 5 to 40 minutes for the bridge boats to go to the various piers and construction points on the San Francisco-Oakland Bay Bridge, according to the speed of the boat and the distance involved. This is not considering the time required in going from the bridge office down to the boat on the waterfront.

OPERATION IS SIMPLE

By means of the Tibbetts radiotelephones with which the bridge construction offices and isolated points have been equipped, an engineer in the San Francisco-Oakland Bay Bridge office at Sansome and Clay Streets, San Francisco, can take down the receiver, tip the tiny lever for calling, and switch it on to receiving until he gets an answer from a distant pier out on the water. He then switches the radiotelephone to broadcasting and talks into the telephone. At the end of his speech the engineer says, "Get ready," and switches from a broadcasting set to a receiving set by the pressure of the lever. The man on the isolated pier in the bay then speaks his message, announces, "Get ready," and switches to reception so that he can receive a reply from the bridge office.

Engineers, who have now used the radiophones daily for the fortnight in which they have been in use, say they prefer them to the standard telephone because there are no interruptions—only one person can talk at a time, and the messages are clear and succinct.

SAVING TIME AND MONEY

The time and money saved by these radiotelephones over the method of sending messengers would run to a staggering figure. When it is considered that the bridge will be in construction over a period of four years, and that each trip of a messenger involves the



HELLO FROM BAY—Inventor D. Reginald Tibbetts speaking by radiotelephone from a work barge to the San Francisco-Oakland Bay Bridge offices in city.

time of the messenger, two boatmen, the depreciation of the boat, its gasoline and upkeep, plus automobile service to and from the boat, or other land transportation, it can be seen that the saving would reach a tremendous figure.

If only one such message were sent a day, the cost would approximate \$15,000, in the opinion of engineers on the job.

The great value of the radiophone, though, is the speed with which communications may reach isolated places, the accuracy of such messages, and the effect of this speed and accuracy on the progress of construction.

AVOIDS COSTLY DELAYS

The cost of the lack of this radiophone service would only partially appear in the cost of sending messengers. The great increased cost would go in the mistakes, difficulties and delays of expensive construction units occasioned by inability of the engineers and contractors to guide the efforts of the workmen at all times.

Green gives you the right-of-way. This is especially true of the long green.—*Buckeye Motorist.*

Highway Bids and Awards

September 15th to October 15th, Inclusive

(Continued from page 26)

BUTTE COUNTY—At W. Branch Feather River, 14 miles north of Oroville, reinforced concrete bridge, one 155-ft. arch span, three 40-ft. girder spans and six 38-ft. girder spans. District II, Route 21, Section B. Lord & Bishop, \$70,974; M. E. McGowan, San Francisco, \$73,215; Bodenhamer Const. Co., Oakland, \$69,738; Rocco & Caletti, San Rafael, \$62,644; Neves & Harp, Santa Clara, \$63,112. Contract awarded to F. C. Amorosa & Sons, San Francisco, \$59,930.

COLUSA AND GLENN COUNTIES—Between Maxwell and Norman, 7.1 miles grade, surfacing. District III, Route 7, Sections C, A. Basich Bros., Torrance, \$110,284; D. McDonald, Sacramento, \$163,937; Larsen Bros., Sacramento, \$129,142; Union Paving Co., San Francisco, \$125,650; A. Teichert & Son, Sacramento, \$135,388; Hemstreet & Bell, Marysville, \$142,992; Clyde W. Wood, Stockton, \$123,265. Contract awarded to Peninsula Paving Co., San Francisco, \$103,432.75.

CONTRA COSTA COUNTY—In Valona, 0.2 mile grading, paved with asphalt concrete. Contract awarded to Southern California Roads Co., Los Angeles, \$22,158.60.

DEL NORTE COUNTY—Between Last Chance Slide and Flannigans, 9.5 miles graded and surfaced with crushed run base and untreated crushed gravel or stone. District I, Route 1, Section B. Hanrahan Co., San Francisco, \$806,930; MacDonald & Kahn, San Francisco, \$845,640; Mercer-Fraser Co. & George Pollock Co., Sacramento, \$713,961. Contract awarded to Youdall Const. Co. and Chas. Harlowe, Jr., San Francisco, \$678,799.

HUMBOLDT COUNTY—Between Benbow and 7 miles north of Garberville, 7.6 miles grading and surfacing with screened gravel. District I, Route 1, Sections A, B. Clyde W. Wood, Stockton, \$347,019; Isbell Construction Co., Carson City, Nevada, \$559,408; George Pollock Co., Sacramento, \$443,257; Fredrickson & Watson, Oakland, \$287,005. Contract awarded to Mitty Bros., Los Angeles, \$334,306.

IMPERIAL COUNTY—Between No. Boundary and Trifolium Cana., 25 miles oil treated crushed gravel

borders. District VIII, Route 26, Sections A, B, C, D, E. B. G. Carroll, San Diego, \$94,959; Griffith Company, Los Angeles, \$84,587; V. R. Dennis Const., San Diego, \$141,960; R. E. Hazard Const. Co., San Diego, \$79,770; United Concrete Pipe Corp., Los Angeles, \$75,290. Contract awarded to Oswald Bros., Los Angeles, \$71,006.

IMPERIAL COUNTY—Between 4 miles west of Westmoreland and Trifolium Canal, 3.2 miles to be graded and paved with Portland cement concrete. District VIII, Route 26, Section A. Griffith Co., Los Angeles, \$74,869; Weymouth Crowell Co., Los Angeles, \$80,425; Walter Trepte, San Diego, \$79,832. Contract awarded to Oswald Bros., Los Angeles, \$74,624.

KERN COUNTY—Between Pierce Road and Tank Farm, 2.1 miles grading, paving with asphalt concrete. District VI, Route 4, Section G. Basich Bros., Torrance, \$101,255; Gogo & Rados, Los Angeles, \$115,781; Hauser & Garnett, Glendale, \$116,050. Contract awarded to Union Paving Co., \$97,061.25.

LOS ANGELES COUNTY—Between Santa Clara River and Castaic School, 5.1 miles to be graded and paved with Portland cement concrete. District VII, Route 4, Section A. P. J. Akmadzich, Los Angeles, \$138,800; Jahn & Bressi Const. Co., Los Angeles, \$127,163. Contract awarded to Griffith Company, Los Angeles, \$101,803.

LOS ANGELES COUNTY—Between Orange Avenue and Barranca Street, 3.8 miles to be paved with Portland cement concrete. District VII, Route 26, Section C. Basich Brothers, Torrance, \$146,989; Griffith Company, Los Angeles, \$147,354; Jahn & Bressi, Los Angeles, \$156,989; Weymouth & Crowell Co., Los Angeles, \$177,823; Southern Calif. Roads Co., Los Angeles, \$168,587; C. O. Sparks, Los Angeles, \$152,272; J. L. McClain, \$151,158; Sander Pearson, Santa Monica, \$165,919. Contract awarded to Oswald Bros., Los Angeles, \$144,668.

LOS ANGELES COUNTY—Between Colby Canyon and Mt. Wilson Road, about 4 miles to be graded. District VII, Route 61, Section A. Sharp & Fellows,



OPENING THE FIRST BID on September 13th, when 89 bidders competed for 13 contracts totaling \$1,220,551. Earl Lee Kelly (center), Director of Public Works, urged successful bidders to speedily put men on the jobs. At Mr. Kelly's left are Deputy Director Eric Cullenward and Assistant State Highway Engineer George T. McCoy. At his right, J. G. Standley, Acting Principal Assistant Engineer, and George Gunston, Disbursing Officer.



STANDING ROOM ONLY and very little of that was available at the September-October bid openings held twice a week in the Highway Commission board room.

Los Angeles, \$516,825; Morrison-Knudsen Co., Los Angeles, \$457,662; George Pollock Co., Sacramento, \$346,466; Guy F. Atkinson Co., San Francisco, \$388,849; Von der Hellen & Pearson, Castaic, \$391,258; Mittry Bros. Const. Co., Los Angeles, \$348,704. Contract awarded to Jahn & Bressi Const. Co., Los Angeles, \$297,529.

LOS ANGELES COUNTY—Between State Street and Anaheim Street, Long Beach, 0.8 mile to be graded and paved with Portland cement concrete. District VII, Route 60, Section F. J. L. McClain, Los Angeles, \$40,661; Kovacevich & Price, Southgate, \$41,002; Weymouth & Crowell, Los Angeles, \$44,487; Sander Pearson, Santa Monica, \$43,902; Griffith Company, Los Angeles, \$39,007. Contract awarded to United Concrete Pipe Corp., Los Angeles, \$38,712.

LOS ANGELES COUNTY—Between Oakes Garage and Palmdale, 5 miles bituminous surfacing, super-elevating, etc. District VII, Route 23, Sections D, E. Geo. K. Thompson, Los Angeles, \$45,752; Granite Construction Co., Watsonville, \$40,932; Southwest Paving Co., \$52,386; T. C. Rogers, Los Angeles, \$44,155; P. J. Akmadzich, Los Angeles, \$53,975; Gibbens and Reed, Burbank, \$51,464. Contract awarded to Griffith Company, Los Angeles, \$35,099.

MARIN COUNTY—In Sausalito between Napa and Water Streets, 0.4 mile grading, paving with asphalt concrete. District IV, Route 1, Section C. Vincent Maggiora, Sausalito, \$49,884; Pacific States Const. Co., San Francisco, \$48,043. Contract awarded to A. J. Ralsch, San Francisco, \$46,427.30.

MARIPOSA COUNTY—Between Orange Hill School and Mariposa, 15.1 miles surfaced with gravel and bituminous seal coating. District VI, Route 18, Sections A, I, J. Basich Brothers, Torrance, \$188,012; Clyde W. Wood, Stockton, \$239,926; George Pollock Co., Sacramento, \$243,505; Hemstreet & Bell, Marysville, \$219,528; Union Paving Co., San Francisco, \$173,014; Jack Casson, Hayward, \$198,532; A. Teichert & Son, Sacramento, \$183,585; E. E. Bishop & Charles Harlowe, Jr., Sacramento, \$242,506; M. J. Bevanda, Stockton, \$197,412. Contract awarded to Fredrickson & Watson Oakland, \$146,094.

MENDOCINO COUNTY—Between Ukiah and Hopland, 9.5 miles bituminous surfacing. District IV, Route 1, Section B. Granite Const. Co., Ltd., Watsonville, \$48,518; A. Teichert & Son, \$57,090; J. C. Comp-ton, McMinnville, Ore., \$51,405; E. A. Forde, San Anselmo, \$46,272; Pacific Truck Service, Inc., San Jose, \$49,777. Contract awarded to Clyde W. Wood, Stockton, \$45,600.

MENDOCINO COUNTY—Bridge across Russian River near Hopland, consisting of one 247-ft through steel truss span on concrete piers, and 21 steel beam spans 889 feet long on reinforced concrete pile bents and 2 concrete abutments. District IV, Route 1, Section L. Lindgren & Swinerton, Inc., San Francisco, \$136,988; J. F. Knapp, Oakland, \$135,490; M. B. McGowan, Inc., San Francisco, \$135,281; Bodenhamer Const. Co., Oakland, \$147,940; Fredrickson & Watson Const. Co., Oakland, \$145,713; Rocca & Calletti, San Rafael, \$136,862; K. E. Parker Co., San Francisco, \$148,458; Mercer-Frazier Co., Eureka, \$116,418; Macdonald & Kahn Co., Ltd., San Francisco, \$147,899; Barrett & Hill, San Francisco, \$140,251; Neves & Harp, Santa Clara, \$130,881. Contract awarded to J. H. Pomeroy & Co., San Francisco, \$133,518.10.

MONO COUNTY—Between Crestview and 2.2 miles south of Rush Creek, 9.7 miles to be graded, surfaced with selected material and bituminous treatment applied. District IX, Route 23, Sections F, G. Union Paving Co., San Francisco, \$312,983; Isbell Construction Co., Carson City, Nev., \$216,318; Morrison-Knudsen Co., Los Angeles, \$212,800; Hemstreet & Bell, Marysville, \$201,477; Basich Bros., Torrance, \$194,345. Contract awarded to Southwest Paving Co., Los Angeles, \$191,235.

MONO COUNTY—Between Point Ranch and Dressler's Corner, 6.2 miles grading and surfacing with bituminous treated gravel. District IX, Route 23, Section I. Isbell Const. Co., Carson City, Nevada, \$155,262; Southwest Paving Co., Los Angeles, \$135,944; Hemstreet & Bell, Marysville, \$124,997. Contract awarded to Basich Bros., Torrance, \$117,965.80.

MONO COUNTY—Between 2 miles north of Lee-vining and Mono Inn, 2.9 miles to be graded, surfaced,

(Continued on page 32)

Highway Bids and Awards

(Continued from page 31)

and bituminous treatment applied. District IX, Route 23, Section H. Basich Bros., Torrance, \$60,405; Kennedy Const. Co., Oakland, \$89,995; Hemstreet & Bell, Marysville, \$64,353. Contract awarded to Isbell Construction Co., Carson City, Nevada, \$54,424.

MONTEREY COUNTY—Between Gonzales and Chular, 6 miles grading and surfacing with asphalt concrete. District V, Route 2, Sections C, B. M. J. Bevanda, Stockton, \$165,526; Peninsula Paving Co., San Francisco, \$143,778; Gogo & Rados, Los Angeles, \$167,909; A. Teichert & Son, Sacramento, \$157,799; Granite Const. Co., Watsonville, \$169,300; Jones & King, Hayward, \$161,408; David H. Ryan, San Diego, \$158,818; Hanrahan Co., San Francisco, \$155,303. Contract awarded to A. J. Raisch, San Jose, \$141,745.

NEVADA COUNTY—Between 1 mile west of Washington Road and one-half mile east of Summit about 7.4 miles surfacing with bituminous treated gravel. District III, Route 15, Sections C, D. Basich Bros., Torrance, \$129,882; Hemstreet & Bell, Marysville, \$126,057.50; Central States Contracting Co., Oakland, \$130,860. Contract awarded to A. Teichert & Son, Sacramento, \$122,408.

PLACER COUNTY—Between Loomis and Newcastle, 5.2 miles grading, paving Portland cement concrete and asphalt concrete. District III, Route 17, Sections A, B. A. Teichert & Son, Sacramento, \$241,929; Hanrahan Company, San Francisco, \$280,521; M. J. Bevanda, Stockton, \$265,385; Fredrickson & Watson, Oakland, \$247,528; Peninsula Paving Co., San Francisco, \$239,928; David H. Ryan, San Diego, \$247,773; Union Paving Co., San Francisco, \$246,858. Contract awarded to T. M. Morgan Paving Co., Los Angeles, \$234,057.

PLACER AND NEVADA COUNTIES—Between Drum Canal and Yuba Pass, 4.2 miles to be graded and surfaced with bituminous treated gravel. District III, Route 15, Sections A, E. The Utah Const. Co., San Francisco, \$250,170; Hemstreet & Bell, Marysville, \$225,224; Union Paving Co., San Francisco, \$247,826; Fredrickson & Watson Const. Co., \$268,792. Contract awarded to A. Teichert & Son, Sacramento, \$237,203.

RIVERSIDE COUNTY—Between Black Butte & Blythe, 9.2 miles to be graded and surfaced with oil treated crushed gravel. District VIII, Route 54, Section E. George Herz & Co., San Bernardino, \$64,437; W. E. Hall Co., \$64,405; A. Teichert & Son, Sacramento, \$54,049; Oswald Bros., Los Angeles, \$52,873. Contract awarded to Walter Trepte, San Diego, \$47,676.

SACRAMENTO COUNTY—Undergrade crossing under S. P. R. R. 13 miles north of McConnell, to Cosumnes River Bridge, consisting of 2 concrete abutments with wing walls and grading, paving with Portland cement 0.37 mile approach. District III, Route 4, Sections A, B. George Pollock, Sacramento, \$92,019; Fredrickson & Watson, Oakland, \$91,455. Contract awarded to J. R. Reeves, Lord & Bishop, Sacramento, \$86,871.70.

SAN BERNARDINO COUNTY—A. R. C. Slab Bridge across San Timoteo Creek near Redlands consisting of two 33-ft spans and two 27-ft spans on concrete pile bents and concrete abutments with wing walls on pile foundation. District VIII, Route 26, Section A. Dimmitt & Taylor, Los Angeles \$38,064; United Concrete Pipe Corp., Los Angeles, \$46,192; John Oberg, Los Angeles, \$38,210; John Strona, Pomona, \$39,331; Herbert H. Baruch Corp., Los Angeles, \$42,918; Oscar Oberg, Los Angeles, \$40,795; Clinton Const. Co., Los Angeles, \$40,528; J. E. Haddock, Ltd., \$41,114. Contract awarded to R. B. Bishop, Long Beach, \$37,633.

SAN BERNARDINO COUNTY—An overhead crossing over The A. T. & S. F. Ry. in San Bernardino consisting of a steel and concrete viaduct 1016 ft. long and road approach to be graded and paved with Portland cement concrete. District VIII, Route 9, Section C. Herbert M. Baruch Corp., Los Angeles, \$230,442; Clinton Construction Co., Los Angeles, \$203,000; Weymouth Crowell Co., Los Angeles, \$199,484; Sander Pearson & Dimmitt & Taylor, Los Angeles, \$217,765; Byerts & Dunn, Los Angeles, \$218,656; Lynch-Cannon Engineering Co., Los Angeles, \$209,317; Morrison-Knudsen Co., Los Angeles, \$240,533; United Concrete Pipe Corp., Los Angeles, \$249,310; Lindgren & Swinerton, San Francisco, \$199,754; M. B. McGowan, Inc.,

San Francisco, \$211,670. Contract awarded to J. F. Knapp Oakland, \$189,985.

SANTA BARBARA COUNTY—Eilwood overhead; 0.8 mile grading, paving with Portland cement concrete. District V, Route 2, Section G. M. J. Bevanda, Stockton, \$88,187; Weymouth Crowell Co., Los Angeles, \$69,891; Western Motor Transfer Co., Santa Barbara, \$82,475; J. E. Haddock, Pasadena, \$67,610. Contract awarded to United Concrete Pipe Corp., Los Angeles, \$63,367.

SANTA CRUZ COUNTY—Between Inspiration Point and 1 mile north, 9.8 miles to be graded. District IV, Route 5, Section B. M. J. Bevanda, Stockton, \$70,574; Clyde W. Wood, Stockton, \$86,837; Fredrickson & Watson, Oakland, \$89,129; MacDonald & Kahn Co., San Francisco, \$111,574; Mitty Bros. Const. Co., Los Angeles, \$69,457; J. L. Conner & Kristich, Monterey, \$111,353; Granfield, Farrar & Carlin, San Francisco, \$84,825; Crow Bros., Los Angeles, \$73,934. Contract awarded to Union Paving Co., San Francisco, \$67,467.85

SHASTA COUNTY—Between Diddy Hill and Montgomery Creek, 1.5 miles to be graded; about 12.9 miles to be surfaced with crusher run base and about 12.9 miles to have bituminous seal coat applied. District II, Route 23, Sections A, B. Union Paving Co., \$181,977; M. J. Bevanda, Stockton, \$161,772; Hein Bros. Basalt Rock Co., Petaluma, \$124,797; Fredrickson & Watson, Oakland, \$133,128; Hemstreet & Bell, Marysville, \$126,954; F. B. Bishop, Sacramento, \$145,853; Isbell Construction Co., Carson City, Nevada, \$171,954; Heafey-Moore Co., Oakland, \$172,496. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$123,785.

SHASTA COUNTY—Between Boulder Creek and 1 1/2 miles east of Bella Vista, 9.1 miles grading surfacing with bituminous treated gravel. District II, Route 23, Section A. A. Teichert & Son, Sacramento, \$199,362; Hanrahan Co., San Francisco, \$249,143; Isbell Construction Co., Carson City, Nevada, \$307,424; T. M. Morgan Paving Co., Los Angeles, \$240,377; Hemstreet & Bell, Marysville, \$225,170; D. McDonald, Sacramento, \$296,518; George Pollock Co., Sacramento, \$267,966; Union Paving Co., San Francisco, \$189,971. Contract awarded to Fredrickson & Watson Const. Co., Oakland, \$186,243.

SOLANO AND NAPA COUNTIES—Between Carquinez Bridge and Cordelia (American Canyon Cut-off), 10.3 miles grading. District X, Route 7, Sections F, G, H, A. George Pollock Co., Sacramento, \$460,452; C. R. Adams, Piedmont, \$579,359; Union Paving Co., San Francisco, \$563,451; Isbell Const. Co., Carson City, Nevada, \$589,375; Mitty Bros. Const. Co., Los Angeles, \$418,501; Fredrickson & Watson, Oakland, \$409,943; Utah Const. Co., San Francisco, \$718,644; Guy F. Atkinson Co., San Francisco, \$485,131; C. W. Wood, Stockton, \$429,561; Hemstreet & Bell, Marysville, \$446,964; Jahn & Bressel Const., Los Angeles, \$406,585. Contract awarded to Granfield, Farrar & Carlin, San Francisco, \$383,769.15.

SONOMA AND MENDOCINO COUNTIES—Between Cloverdale and Hopland, 13.9 miles surfacing with rock base. District IV, Route 1, Sections D, L. Clyde W. Wood, Stockton, \$198,725; George Pollock Co., Sacramento, \$197,525; Peninsula Paving Co., San Francisco, \$128,323; Hein Bros. Basalt Rock Co. & Geo. French, Jr., Petaluma-Stockton, \$238,325; Granfield, Farrar & Carlin, San Francisco, \$128,650; Fredrickson & Watson Const. Co., Oakland, \$143,550; A. Teichert & Son, Sacramento, \$157,475. Contract awarded to Basich Bros., Torrance, \$115,805.

TEHAMA COUNTY—Between Red Bluff and 1 1/2 miles east of Dales, 13.3 miles grading. District II, Route 29, Section A. Heafey-Moore Co., Oakland, \$271,810; Isbell Const. Co., Carson City, Nevada, \$408,252. Contract awarded to Hemstreet & Bell, Marysville, \$198,183.

TULARE COUNTY—Between W. Boundary and 2 miles south of Plaza Garage, 5 miles to be graded and paved with asphalt concrete. Basich Brothers, Torrance, \$84,925; Valley Paving & Const. Co., Fresno, \$95,787; P. J. Akmadzich, Los Angeles, \$106,968. Contract awarded to Union Paving Co., San Francisco, \$75,921.

STATE OF CALIFORNIA
Department of Public Works

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EARL LEE KELLY-----Director
ERIC CULLENWARD-----Deputy Director
MORGAN KEATON-----Assistant Deputy Director

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R. H. STALNAKER, Equipment Engineer
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HAROLD CONKLING, Deputy in Charge Water Rights
A. D. EDMONSTON, Deputy in Charge Water Resources Investigation

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

GEORGE W. HAWLEY, Deputy in Charge Dams
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GORDON ZANDER, Adjudication, Water Distribution

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W. H. ROCKINGHAM, Principal Mechanical and Electrical Engineer

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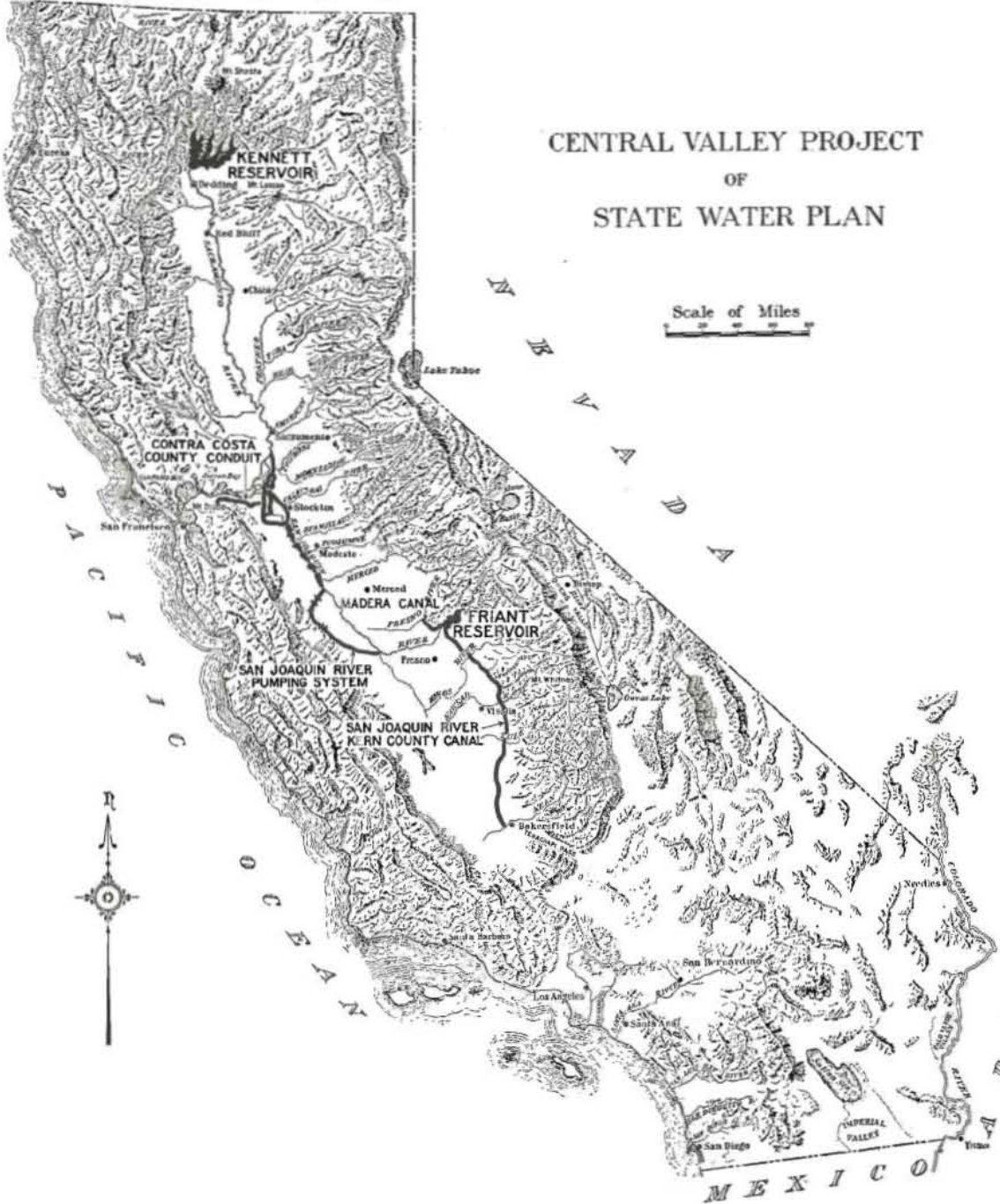
DIVISION OF PORTS

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 20 40 60



M E X I C O

P A C I F I C
O C E A N

A R I Z O N A