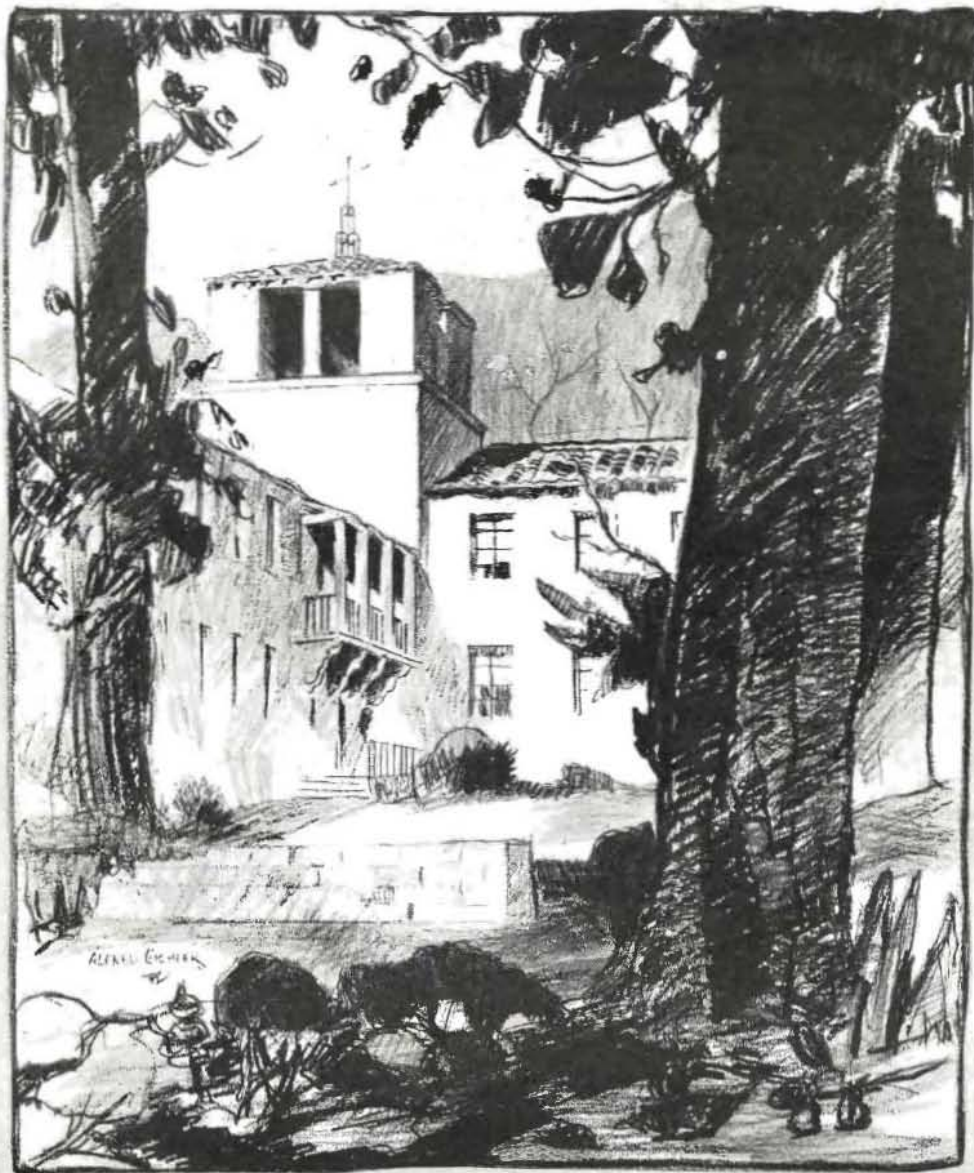


CALIFORNIA HIGHWAYS and PUBLIC WORKS

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California's Ten Year Highway Plan Involves Large Savings for State

Orderly Progress in its Development Assures an Economic
Success and an Adequate Road System

MORE than two million California motorists have a vital and common interest in the State highway system. Five and three-quarters million citizens are vitally affected, both economically and socially, by the improvement and development of that system. That the State road system may reach the maximum of efficient service it must be developed as a unit, with the needs of the entire State held in mind as its development is planned.

With these fundamental facts before them the California State Legislature, by Senate Concurrent Resolution No. 19, filed with the Secretary of State on March 29, 1929, directed the Department of Public Works to make a study of the State highway system and routes which might properly be added thereto. This investigation involved the consideration of the engineering, economic and traffic problems which would be the determining basis for any plan of development of the State system.

REPORT ACCEPTED

In accordance with the instructions of the Legislature the Division of Highways completed a comprehensive study of the traffic needs of the State in their relation to the State highway system and submitted its findings and recommendations to the legislative session of 1931. The Legislature accepted the report and added to the State highway system the secondary routes recommended for inclusion.

The purpose of this article is to place again before citizens of California a brief resume of the conclusions of this study of the State road system and the method of planning for the development of the network of State highways throughout the ten year period from July 1, 1931, to June 30, 1941.

For the first time in the history of road construction in California a comprehensive plan of unified development has been evolved and estimates of cost made for bringing the State system to a point of adequate service within a definite period.

BASED ON COUNTS

Traffic studies, based upon actual counts of motor vehicles using the different State routes during the past seven years, when projected into the future gave a basis for determining possible future increases in traffic. With proper consideration given to the increase in traffic caused by improvement of highways and contributing factors determined by improvement of parallel and connecting routes, a reliable conception of probable future traffic needs was obtained.

It was upon the results of this traffic survey that the routes added to the State highway system by the 1931 Legislature qualified for their inclusion in the system. These additional routes amounted to a total of 804 miles, 633 miles being added to the southern secondary roads and 171 miles to the northern. These new State routes are largely composed of east and west laterals connecting the north and south arterials.

INCLUDES ALL ROUTES

The ten year program drawn up by the Division of Highways calls for sufficient improvement to the present balanced State highway network to bring that network to a point of adequate service to the motoring public by the end of the ten year period. This ten year study included all routes of the State system and the improvement proposed for the ten year period is based upon the necessary widths, grades and types of surfacing as the traffic studies indicated would be required for adequate service.

This setup for proposed improvement is based upon the most economic development of the system as a whole. With the ultimate and unified system in mind, basic features of highway design and construction have been incorporated in each step of proposed improvement that, with the completion of the last step on any particular unit that unit will present the best features of highway construction which the type of traffic using the unit would require.

(Continued on page 29)

Russian River Route to Eliminate Mountain Barrier on Redwood Highway

By COL. JNO. H. SKEGGS, District Engineer

THE Redwood area, that picturesque coast section of California lying north of San Francisco and the bay region and extending to the Oregon state boundary, is the only locality in the world where the giant Sequoia sempervirens has so colonized and thrived through the centuries that it may be said to constitute an empire. This section has long been noted as a summer vacation land, a sportsman's paradise, and a tourist's delight.

The Russian River section, in Sonoma County, is particularly famous for its many summer resorts, due to its easy access from San Francisco metropolitan area; and not only do people here spend vacation seasons, but each holiday and week-end during the summer sees thousands of the city's tired office workers seeking diversion in a day's boating, swimming or fishing on this river. The Redwood Highway is the traffic artery which transports these vacationists, sportsmen or tourists to or through any section of this vast area.

Cloverdale, on the Redwood Highway, is 80 miles north of San Francisco on the Russian River near the northerly limits of Sonoma County, and may be reached by automobile, including time for ferry transportation across San Francisco Bay, in about two and one-half hours. With the exception of a short stretch in Sausalito, the highway is fast, has easy grades, excellent alignment, is paved all the way, and is marked by the elimination of many railroad grade crossings.

LONG A BARRIER

The 17-mile section of the Redwood Highway between Cloverdale and Hopland, however, has long acted as a barrier for quick, fast trips for all points north of Cloverdale, due to the inferior alignment, heavy grades, and resulting slow travel between these two towns.

It contains some of the poorest alignment and heaviest grades on the entire Redwood Highway. Not only is the road tortuous and dangerous for present speeds and heavy traffic, but in traversing the broken mountain terrain cut by many deep valleys and ravines it crosses seven distinct summits

where dense fogs are oftentimes encountered during the winter months.

This section of highway, both as to standards of location and construction, was well justified when it was first constructed in 1913 to 1915. Not only was it adequate for the trunk line traffic demands of that day, but was made to serve as a connecting route to the McDonald-to-the-Sea State Highway, in which capacity as a tap line for the Anderson Valley and beautiful Navarro River redwoods and State Park the better portion will continue to serve the public for many years to come.

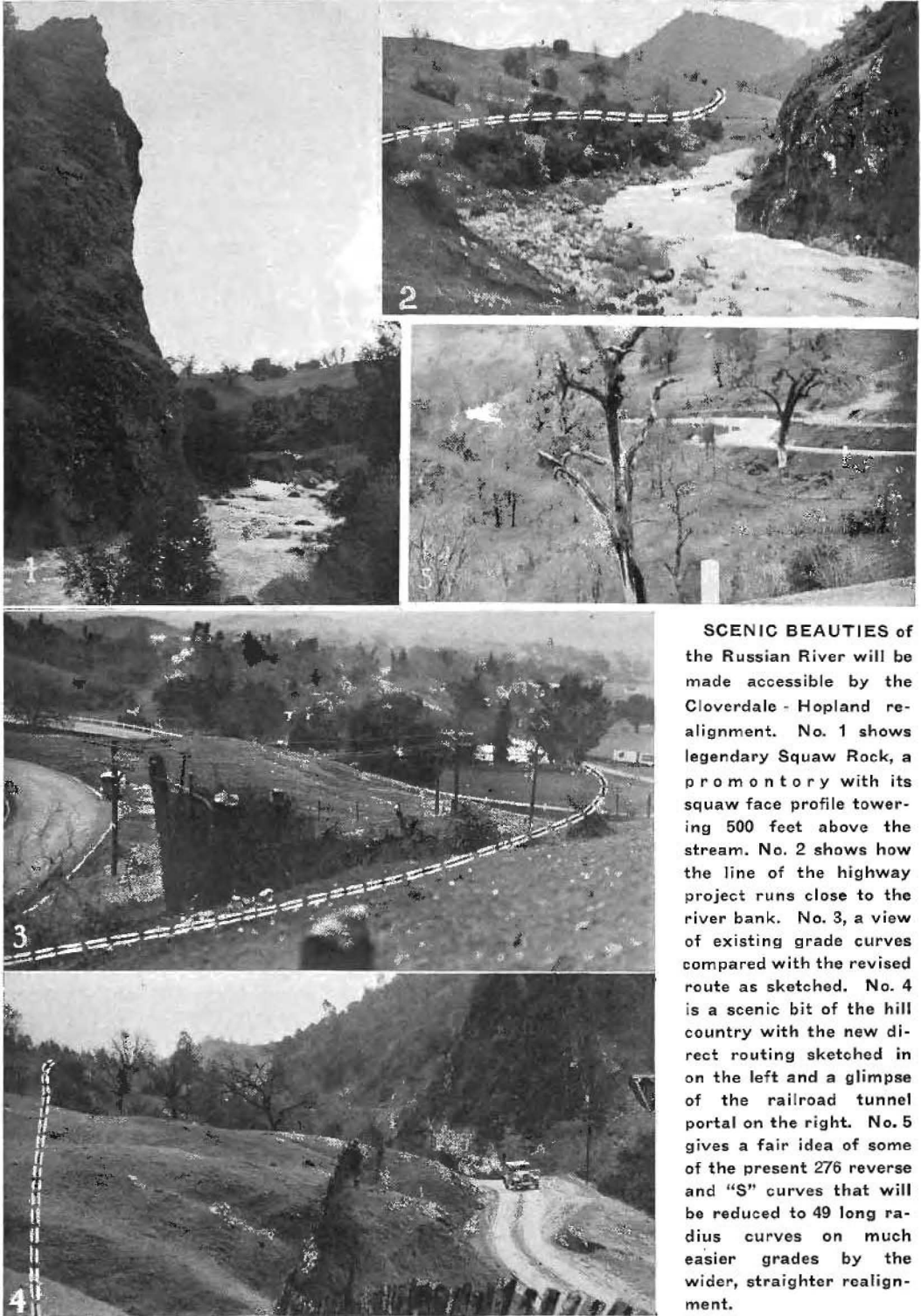
POPULAR IMPROVEMENT

The awarding on February 1st, by Colonel Walter E. Garrison, Director of the Department of Public Works, of the contract for grading a new route up the Russian River from Cloverdale to Hopland, following the approval of the project and allocation of funds by the Highway Commission is not only satisfying a present popular demand, but shows a far-sighted vision of future requirements and developments of this section of our State and its highway. Official groundbreaking ceremonies on February 21st marked the beginning of work on this new section which will open up to the public about 12 miles of scenic river frontage, the only actual Russian River bank location on the entire highway. **The State is purchasing right of way down to and including river frontage wherever possible, for utilization as public park, camping, or picnic ground areas. It should rightfully become one of the most popular week-end destinations for people from Ukiah in the north and San Francisco and intermediate points in the south.**

It traverses a region of restful mountain beauty. Squaw Rock, rising vertically 500 feet above the river and located about half way between Cloverdale and Hopland on the new section, is not only a well-known landmark, which from the north presents a striking likeness of an Indian face, but carries the enchantment of several Indian legends of more or less doubtful origin and authenticity.

In addition to the roadside beauties of the Russian River, the new highway facilitates

(Continued on page 12)



SCENIC BEAUTIES of the Russian River will be made accessible by the Cloverdale - Hopland realignment. No. 1 shows legendary Squaw Rock, a promontory with its squaw face profile towering 500 feet above the stream. No. 2 shows how the line of the highway project runs close to the river bank. No. 3, a view of existing grade curves compared with the revised route as sketched. No. 4 is a scenic bit of the hill country with the new direct routing sketched in on the left and a glimpse of the railroad tunnel portal on the right. No. 5 gives a fair idea of some of the present 276 reverse and "S" curves that will be reduced to 49 long radius curves on much easier grades by the wider, straighter realignment.

Snow Pack and Precipitation Far Above Normal in February Survey

By HARLOWE M. STAFFORD, Supervising Hydraulic Engineer

SNOW SURVEYS as a State project were begun in the spring of 1930 when the scattered efforts of many agencies throughout the State were coordinated and standard methods and procedure using standard snow surveying equipment were inaugurated. Some 150 snow "courses," most of them new, were established throughout the Sierra and, through the cooperating agencies, all were surveyed at the end of March which is the time for the principal survey in securing data to be used in forecasting the April-July stream flow. At certain "key" courses numbering close to fifty, the procedure was also established for monthly surveys from January to April to furnish important data on the progress of the snow pack, its manner of accumulation, etc.

The surveys have continued with some extension each season since 1930 but because the greater number of courses were only newly established in 1930 the present season's surveys complete their records for three years only. Except in a few instances, therefore, this has precluded the development of and comparison of the data to "normals" or long-time averages. For present purposes the results of the recent "key" course surveys, conducted in the latter part of January and early February, are compared to those of the corresponding data in 1931.

GREAT WATER CONTENT

In general, the surveys indicate a depth and water content of the snow in early February of this year greatly exceeding the depth and water content of early February, 1931. For the drainage basins from upper Sacramento River to Stanislaus River the water content of this season's snow pack is indicated to be from three to four times that of 1931 (except for the Mt. Shasta snow course, which shows only 1.4 times); in the Merced and Tuolumne basins, from two and one-half to three and one-half times that of last year; in the San Joaquin and Mono basins about four times on an average; in the Kings, Kaweah, and Kern basins from three to five times; and in the Owens Valley drainages anywhere from three to nine times the water content of last year.

Of the courses for which the period of record of the surveys has been of sufficient length to warrant the development of normals, it is interesting to note that three "crest" courses—Blue Lakes on the Mokelumne-Carson divide, Rhinedollar Lake close to the Tuolumne-Mono divide, and Mammoth Pass on the San Joaquin-Owens divide—indicated a snow depth and water content in early February amounting to between 80 and 85 per cent of the normal to be expected for an entire season. (Up to April 1st.) Another crest course, Summit, on the Yuba-Truckee divide indicated a water content equal to 116 per cent of the normal for the entire season.

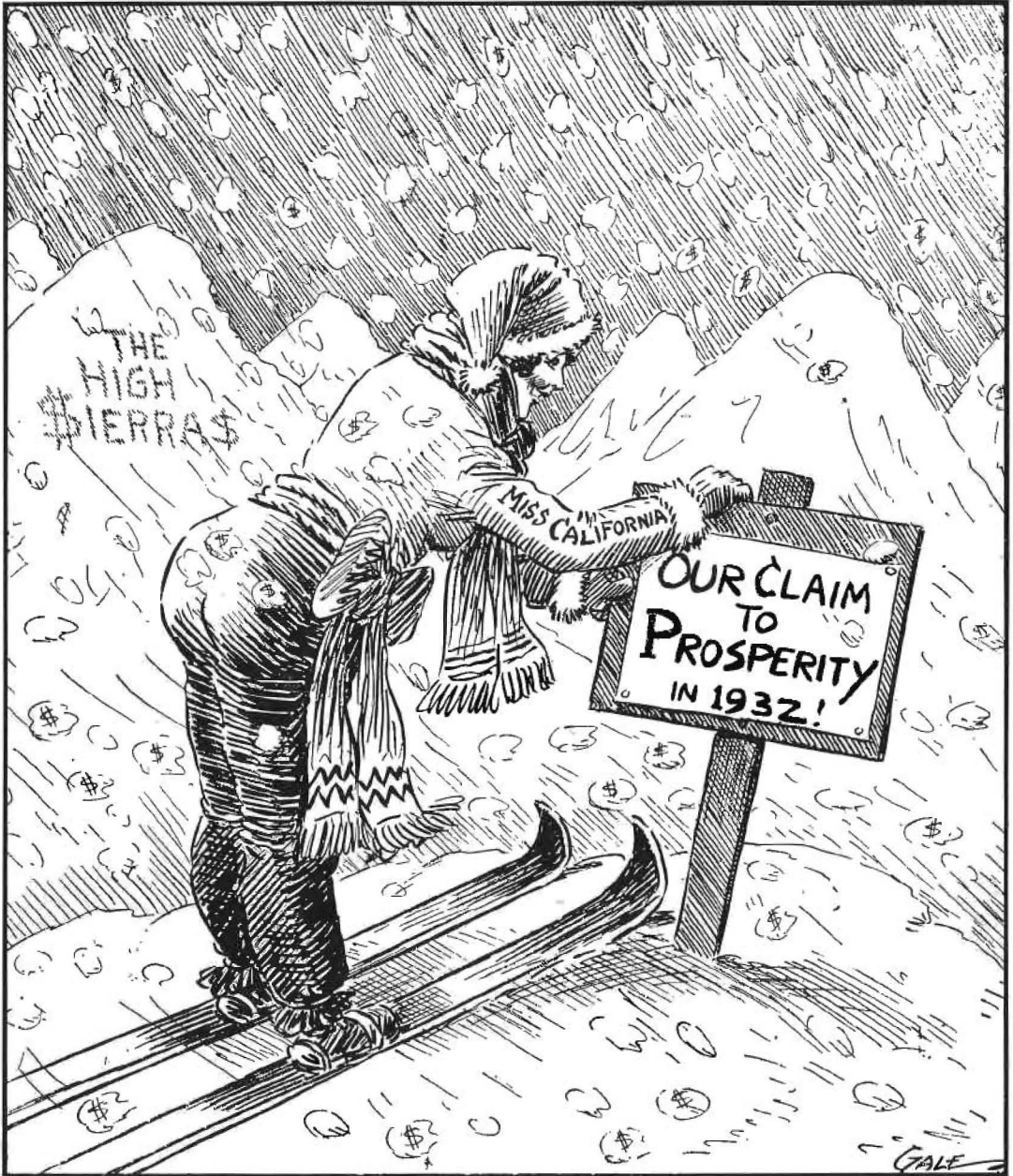
MUCH ABOVE NORMAL

In addition to the data from the snow surveys, a close check is maintained of the records from all precipitation stations in the mountainous and foothill regions of the various stream basins. These are stations of the State, districts, public utilities and the U. S. Weather Bureau but the data are principally for the stations of the latter. In general, these records indicated that the precipitation up to February 1st was between normal and 10 per cent above normal in the upper Sacramento, Pit, McCloud and Feather River basins; from 15 to 25 per cent above normal in the basins from Yuba to Stanislaus; between 40 and 50 per cent above normal from the Tuolumne to Kings basins; from 55 to 65 per cent above in the Kaweah and Kern basins; and from 40 to 60, with a general average of about 50 per cent above normal in the Los Angeles, San Gabriel and Santa Ana basins. Single stations in the Owens and Walker basins indicated a precipitation up to February 1st of 69 and 106 per cent, respectively, above normal, and a general average of 30 per cent above normal was indicated for the Tahoe-Truckee Basin. A general average for the percentage above normal of precipitation to February 1st from the Sacramento to the Kern basins was probably about 35 per cent.

At the Donner Summit on the Yuba-Truckee divide the Southern Pacific Company has maintained a daily observation of

THE WHITE GOLD RUSH!

By GALE in Los Angeles Times



the snow on the ground over a long period of years and this record affords the data for comparisons between this season's snow and that of former years which are most interesting. For a 33-year period it is shown that

the average depth of snow on the ground for February 20th is 92 inches. Actually, on February 20th of this year there was a depth of 132 inches and this depth was only exceeded on February 20th in six prior years.

2300 Miles of Roadsides Being Sprayed and Burned as Fire Hazard

By T. H. DENNIS, Maintenance Engineer

THE Division of Highways Fire Hazard Reduction program for 1932 covers the elimination of roadside weed and grass growth on some 2300 miles of roadsides. It is planned to have the program under way early in March, the work to be divided into twelve contracts and four day-labor jobs.

The location of the work is quite general throughout the State, a 9-foot strip adjacent the right of way line being treated through grazing, grain and brush areas. No spraying is done where the right of way abuts orchard or railroad property.

The treatment consists of applying 27°+ gravity Diesel oil under pressure through orchard type sprays at the rate of 1/35 to 1/10 gallon per square yard of surface treated. Within 24 hours after the application the growth treated turns a yellowish brown color and, at the expiration of a week's time, it can be burned without risk to adjacent property.

EARLY TREATMENT

While this early treatment is not always adequate due to late rains starting a new growth requiring an additional application, it has decided advantages over the late treatment, as the grass is short, permitting a better oil coverage and consequent burning without damage to adjacent fields, and the blackened roadside effect is generally obliterated by the late spring rains. Where recurrent growth occurs, a second light application is usually sufficient, followed by burning which presents little difficulty or hazard.

While Diesel oil is at present the most effective agent for this treatment, it shows no cumulative effect on the roadside growth and the same cost of eradication may be anticipated from year to year.

During the past two years we have been experimenting with a new product which

shows much promise. While its initial cost of application is high, the attendant sterility of the ground following several annual applications makes its final cost less than that of the oil, with the added promise of at least partial release from the annual treatments. An added saving is also possible, as the application does not require burning to eliminate hazard.

IMPROVED EQUIPMENT

The development of the present equipment used in making the application has been the result of much experimenting on the part of the Division of Highways Headquarters Shop Department and Maintenance field forces.

Early treatments were made, using a hand-operated spray bar attached by hose to an oil truck tender. Progress was necessarily slow, depending upon operator.

The present equipment consists of a trailer equipped with engine and turn-table mounting a trussed arm, supporting a series of spray bars. The arm can be quickly moved laterally or horizontally by the operator as occasion demands. The spray bar attached to this arm is usually separated into three 3-foot sections with sprays 12 inches apart.

These spray bars can also be moved horizontally or vertically from the operator's platform to conform with the various slopes encountered, or to avoid unnecessarily spraying trees or shrubs.

13,000 GALLONS A DAY

The trailer has a mobile hook-up with the truck tender and pumps the oil directly from the truck through the spray bars under a 30-pound pressure. When the tender is empty, the trailer is released and attached to another tender. Some 13,000 gallons of oil has been pumped through these sprays with this outfit in an 8-hour day.



T. H. DENNIS



ROADSIDES AFLAME with the roaring red demon leaping and crackling along the hedges is a fearsome sight under ordinary conditions but when you see Highway Maintenance outfits in the vicinity you know everything is safe and under control—just Spring housecleaning.



THE TANK CORPS with numerous units equipped like the above is engaged in the annual preliminary skirmish against old Demon Fire Hazard on all State highways. A weed spraying outrigger on an oil spreading trailer makes combustion sure and complete with a liberal dosage of inflammable mixture.



FIRE ZONE ahead is warning conveyed by Highway car carrying a large sign.



INDIAN TEPEE style of cover protects roadside trees from the spray and possible scorching.

Work Completed and Under Way in Four Counties Along Coast

By L. H. GIBSON, District Engineer

WORK has just been completed on 9.8 miles of the Coast Highway between Atascadero and one and one-half miles south of Santa Margarita in San Luis Obispo County. The roadbed is thirty-six feet wide with a twenty-foot asphaltic concrete pavement.

On the Coast Highway between Arroyo Grande and Los Berros Creek, the road is being reconstructed with a thirty-six foot roadbed and a twenty-foot reinforced Portland cement concrete pavement. Within the limits of this project new bridges are under construction across Arroyo Grande Creek and Los Berros Creek under the supervision of the Bridge Department.

Construction is in progress on Maintenance Buildings, including a foreman's residence at Cambria.

Surveys and plans are complete for the reconstruction of the Roosevelt Highway between Cambria and San Simeon.

ELIMINATES GRADE

San Benito County—On the Coast Highway from Monterey County line to the San Benito River, 5.5 miles in length, a new road is being constructed via the Pinate Rocks. The roadbed is thirty-six feet wide, with a twenty-foot Portland cement concrete pavement. This project, with a portion of the road in Monterey County, 11.1 miles in length, just completed, will eliminate the old San Juan Grade from the main Coast Highway. Winter rains have delayed the work.

Monterey County—Grading and paving the approaches, 0.5 mile in length, to the new steel and reinforced concrete bridge across the Salinas River at Bradley is progressing. The roadbed is thirty-six feet wide with a twenty-foot Portland cement concrete pavement.

On the Roosevelt Highway—along the Coast south of Carmel between Rocky Creek and the San Remo Divide, the old road taken over by the State from Monterey County, will be replaced by a new roadway, now under construction. The roadbed is twenty-four and thirty feet wide with a selected material surface twenty feet wide by eight inches thick.

THREE BRIDGES

On the Roosevelt Highway, south of Carmel, three reinforced concrete arch bridges have just been completed or are under construction at Garrapata Creek, at Granite Creek and at Bixby Creek. All of these bridges are under the supervision of the Bridge Department.

Construction is in progress on buildings, including a residence for the Maintenance Superintendent, at Salinas.

Santa Barbara County—A major change of line is under construction on the Coast Highway between Los Alamos and one and one-half miles south of Santa Maria on a route through Solomon Canyon. The roadbed is thirty-six feet wide, with a twenty-foot reinforced Portland cement concrete pavement. The portion from Los Alamos to two miles north of Solomon Summit is 9.7 miles in length, and the portion from two miles north of Solomon Summit to one and one-half miles south of Santa Maria is six miles in length. Work on both projects is well under way.

New Type of Paving Machine Exhibited at Road Builders' Show

By R. H. STALNAKER, Equipment Engineer

THE 1932 Convention and Road Show of the American Road Builders' Association was held at Detroit on January 11 to 15. The trend toward omission of the heavier classes of construction equipment, which was evident last year at St. Louis, was still more pronounced this year and nearly all classes of heavy equipment were conspicuous by their absence; however, the displays of motor trucks and accessories were better than at any previous show and there was considerable interest in the exhibits covering materials and methods for low cost roads.

At the convention meetings and committee meetings several very interesting papers were presented. As they will all be available in the proceedings a little later, it is hardly worth while to attempt to recapitulate any of them here.

ELABORATE EXHIBIT

Several of the State Highway Departments had important exhibits and the exhibit of the Bureau of Public Roads was particularly elaborate and instructive.

One very promising machine for mixing and laying the so-called roadmix low cost pavement was shown by means of motion pictures. Several small power shovels were shown but none of the larger ones.

A rather interesting new development was a sweeper adapted for attachment to the front end of a light truck, which may be secured either with or without a water tank. This outfit seems to have considerable possibility in connection with the preparation of our roads for oiling. Some new and highly portable car heating units and units for heating bituminous material were displayed.

NOTABLE INNOVATIONS

Only two pull-type graders were shown, both radically different from the conventional type of grader. These machines attracted considerable attention. One new type of dual drive 1-man tractor grader was on exhibit. Several new models of trucks were exhibited and some showed notable innovations.

The exhibit of the New Jersey State Highway Department stressed the various types of grade separations of Highway intersections which are being constructed so freely in that State and some very interesting pictures and plans of these intersections were on exhibit. Our neighbor State, Nevada, had a splendid collection of photographs showing scenery and highways in various parts of the State as well as a supply of literature and maps for distribution.

Detroit being the center of the automobile industry of this country, many of the delegates availed themselves of the opportunity to visit truck and automobile plants in Detroit and vicinity. A particularly interesting trip was that to the General Motors' proving ground near Pontiac, Michigan, where all the tests of cars made by the General Motors Company are conducted.

Father: "What did you and Joe talk about last night?"

Daughter: "Oh, we talked about our kith and kin."
Small Brother: "Yeth, pop, I heard 'em. He seth, 'Kin I hev a kith?' and she seth, 'Yeth, you kin'."
—Exchange.

Winter Traffic Count Reveals Increase on Snow Area Highways

THE PRIMARY purpose of the Highway Division of the Department of Public Works is to serve traffic. In order to carry on the work intelligently it is essential that periodical checks be made of the flow of traffic. Detail information is necessary as a basis for allocation of funds for the preservation of the investment which has already been made and is even more necessary in planning for improvements and extension of the highway system.

The first extensive traffic survey in California was started in 1920. This survey was financed jointly by the State, several counties, and the United States Bureau of Public Roads. The latter organization conducted the survey which was not completed until 1922. The work covered all important phases of the traffic problem as presented at that time. The report of that survey has been of real value and is still used as a reference base for traffic studies. In 1924 a system of traffic stations covering all State highways was laid out, and since that time two regular counts have been made each year.

MAXIMUM AND MINIMUM

The Sunday and Monday nearest the middle of the months of January and July are taken as the dates for these semi-annual counts. These periods were selected as giving the minimum and maximum traffic period for the year. The last count was taken January 10 and 11. Owing to adverse weather conditions it reflected a small decrease in traffic on main North and South routes with an increase on mountain routes leading to snow sport areas. In addition to and during the week of the two-day counts, a seven-day count is conducted at ten stations. These latter stations are selected with a view to securing information as to representative conditions of daily variation for the particular locality.

All counts cover a sixteen-hour period from 6 a.m. to 10 p.m. each day. Sufficient 24-hour counts have been taken to fix the relation of the 16-hour traffic to that of a full day. For practical purposes, the 16-hour traffic is 92 per cent of the total 24-hour count.

The count is segregated by hours and also by type of vehicles—that is, a separate record is made of California automobiles, out-of-state automobiles, buses, light trucks, heavy trucks, and trailers behind

trucks. A column is also provided for horse-drawn vehicles, but the latter class of traffic is practically extinct on the State Highways.

Only the totals of the counts are assembled and printed. Several hundred copies are sent out to commercial organizations, chambers of commerce, tourist bureaus, and other organizations which require the information in connection with their plans for development and other business purposes.

ESTIMATES FOR 1940

A great deal of time has been spent in assembling and analyzing the counts and putting the results in shape to apply to the highway problems. In order to have a basis of comparison on which to determine the width of improvement required for a given section of road, the hourly capacity for two, three, and four lane pavements have been worked out.

A prediction has also been made as to what traffic may be expected in 1940 at all traffic stations on the system.

The variation of traffic day by day and month by month during the year has been considered, all with the purpose of making the semiannual counts readily available to every department in the organization.

SPECIAL CREW ASSIGNED

In addition to the semi-annual counts, special counts are in progress at frequent intervals. The last session of the Legislature, by resolution, required that the study of

roads considered as additions to the highway system be continued. A special crew has been assigned to this work and at least four counts will be made at some eighty points throughout the year by the district maintenance organizations.

Counts are also made at road intersections when a question of signal installation arises and at points where some special hazard or demand for additional facilities or services is under consideration.

The field organization of the Maintenance Department is assigned the task of taking the counts. The final assembling and analysis is handled under the direction of T. H. Dennis, maintenance engineer.

Canada has a system of improved roads embracing over 75,000 miles.

TRAFFIC CENSUS RESULTS PUBLISHED AS ADDENDUM

The annual winter traffic count is being published with this issue of California Highways and Public Works as an addendum supplement. Taken on January 10 and 11, this count records figures for the minimum traffic period of the year when inclement weather usually prevails. Such adverse conditions this year are reflected in a slight decrease over January, 1931, figures on main North and South routes with a marked increase on recreational routes throughout the State indicating the growing popularity of winter sports made accessible by cleared highways. In the desert regions of the South high winds were prevalent on the days of the count.

State Achieved New Records in High Class Paving Construction during 1931

Greater economy and efficiency in the construction of high class pavements accompanied by greater speed in production were achieved for the State of California in 1931 by the Department of Public Works. Through the initiative and efforts of State Highway engineers, new methods and improved equipment were suggested and developed resulting in higher yardage records, better mixes and smoother surfaces. How these were obtained are told in the following article:

By EARL WITHYCOMBE, Assistant Construction Engineer

THE CONSTRUCTION of higher class pavements by the State of California during 1931 has been marked by greater efficiency in the type of equipment employed, as well as by a better knowledge of the use of the materials going into the work. Modern construction methods and machinery, applied by first-class contracting organizations and supervised by experienced engineers, have resulted in economical highway operations and increased output, with no sacrifice of quality of work done.

During the year 1931, one mixer used on a port and cement concrete paving project averaged 467 cubic yards of concrete per eight-hour day for 45 days, operating at 99 per cent efficiency. Two mixers working side by side averaged 853 cubic yards per eight-hour day for 22 days, operating at 92 per cent efficiency.

A new type of chair for supporting steel reinforcing bars has been developed, with the driving unit independent of the steel support. This has met with immediate approval since they are less difficult to drive and there is very little loss of material due to setting. When a pin is bent in driving it can either be straightened or replaced with a new pin without the necessity of replacing the chair.

JOINT CONSTRUCTION

In placing concrete pavements, difficulty was experienced in keeping the concrete from running around the ends of the joint material, and in order to insure a clean-cut joint throughout the entire width of slab, an end socket of sheet metal was devised which virtually serves as an extension to the joint material.

Considerable difficulty has always been experienced with the finishing machine pushing over the joint material. To overcome this, a cast iron frog was so devised as to clamp

on the side forms and lift the machine across the joint.

In order to keep the top edge of the joint material true to line during finishing operations and after the removal of the backing plate, a steel channel section was adopted to slip over the joint material and extend 1½ inch down into the slab.

REDUCING ROUGHNESS

Edging of joints unquestionably adds roughness to the riding qualities of a pavement. To reduce this roughness as much as possible, a dummy joint is being designed that does not require edging. This joint is formed with a steel plate, and after the heavy floating is completed the plate is removed and replaced with a strip of 16-gauge sheet metal, having a suitable anchor on the lower edge. Care is exercised to keep the upper edge of this strip as near the surface of the slab as practicable.

Subsequent floating over the joint removes all surface indication of its existence and after a few hours a distinct crack appears which is uniform in all respects. The problem of skewing all transverse joints to reduce the sharp impact of the 90° joint is being given some consideration at the present time.

California practice in finishing has been slightly altered during the past season. The heavy longitudinal or bull float follows behind the machine finisher, and following this all subsequent floating is being done with a one-man ribbed float 8 to 10 feet long, operated from the side by means of a long handle. Usually three of these floats are employed at the different stages of concrete set, the final floating being just as the last free moisture leaves the surface. **With this method of delayed finish, there has never appeared the slightest indication of scaling and the roughness of texture obtained is highly desirable.**

(Continued on page 37)



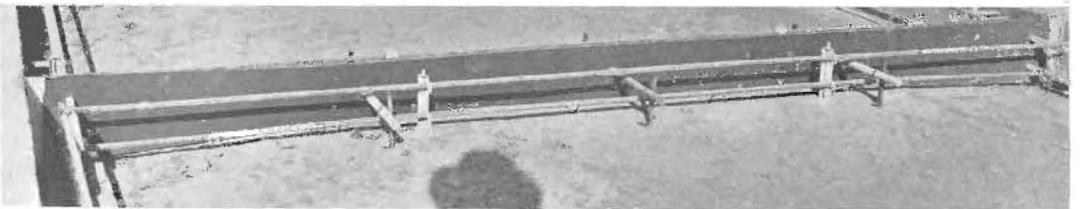
FAST WORK in finishing this new portland cement concrete paving job in Placer County was made possible by several devices created by State Highway engineers.



LIKE A CARPET this big gang laid a broad strip of asphalt concrete pavement in San Luis Obispo County in record time by employing more efficient methods developed by State experts.



NO WRINKLES or rough places are to be found in this fine forty-foot asphalt concrete pavement laid in Santa Clara County under superior mix formulas and finishing methods developed in the Public Works laboratory.



NEW CHAIRS for supporting steel reinforcing bars in expansion joint construction were developed for this paving job in San Joaquin County. The metal chairs are shown supporting the bars.

New Route Reduces 276 Curves to 49

(Continued from page 2)

connections to a scenic, though at present unimproved, county highway up Sulphur Creek to the famous Steam Geysers, a most fascinating and unusual trip through a section of many surprising phenomena of Nature.

From the more practical viewpoint of pure highway traffic considerations, the advantages of the new route can best be shown by comparison with similar features of the existing highway between Cloverdale and Hopland, a few of which are herewith enumerated:

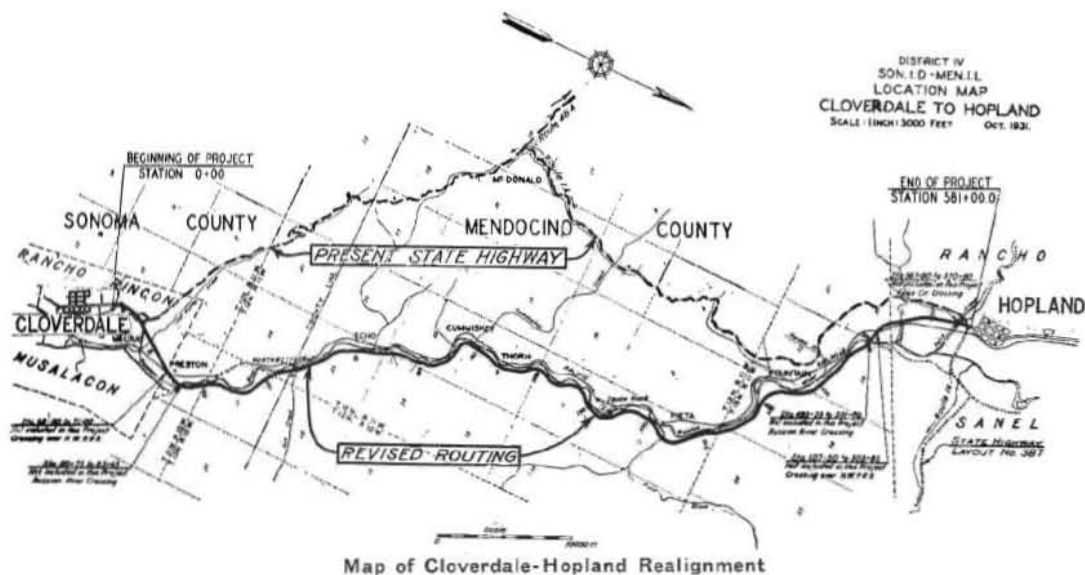
- 1—It saves three miles in distance over the existing route.
- 2—Whereas the present road has 276 curves, 229 of which are of 300-foot radius or less, 99 being 100-foot or less; the new road has only 49 curves, with a minimum radius of 1000 feet.
- 3—The old road has five miles of 7 per cent grade and three and one-half miles of 6 per cent grade, with 3760 feet of rise and fall; whereas the new route has less than three-eighths of a mile of 6 per cent grade, with 1000 feet rise and fall.
- 4—The new route will probably be below the more frequent high mountain fogs and occasional snows encountered on the present road summits.
- 5—The average driving time between Cloverdale and Hopland will be cut in two, with the advantage being greatly accentuated for bad weather conditions.
- 6—Travel on the entire highway should be greatly increased, due to basic safety design and to

the stimulating influence of bringing all points between San Francisco and Cloverdale fifteen to twenty minutes closer to the main domain or body of the area to the north.

OPERATIONS BEGUN

The present contract, under the supervision of District IV, Division of Highways, calls for grading only, clearing operations preparatory to the grading work being well under way. Exceptions have been made in the contract for six major structures which will be contracted under the supervision of the Bridge Department, Division of Highways; two overhead grade separation structures at the Northwestern Pacific Railway crossings at Preston and near Hopland; two bridges across the Russian River at the same general location; one bridge to gap a troublesome slide area opposite Squaw Rock; and a bridge over Feliz Creek.

The grading contract presents many engineering problems in river protection work, and construction through what has long been considered one of the most potentially active slide sections of this country. Unfortunately for the highway, the Northwestern Pacific Railroad occupies the westerly bank of this section of the Russian River, which is much freer from slide formations than the easterly bank, but is also much more precipitous and involves several tunnels and other disadvan-



Opens Scenic River Areas to Public

(Continued from preceding page)

tages. This railroad location on the steep west bank forestalls any possibility of also constructing a highway on the same side even though the bridge structures could be dispensed with.

SLIDE PROBLEMS

The geological formation of the east bank is volcanic, being a lava flow superimposed over the bed rock formation, and in the slide sections in the nature of a porous tuff which becomes cohesive and subject to slippage action when saturated with water, but free from such action when well drained. The principal slide areas show impounding reservoirs above, which allow the water to saturate and seep into the volcanic tuff. The principal engineering feature thus becomes one of drainage toward destroying these impounding areas, or of draining and drying the slopes below the impounding reservoir in the vicinity of the highway. As previously stated, the worst slide area is opposite Squaw Rock, where it is proposed to construct a bridge anchored into the base rock foundation and, if necessary, sluicing the slide down into the river. A fill across this portion would probably be extremely unstable.

The river protection work consists in con-

structing rock retaining walls, utilizing the many large boulders along the river. Rocks are to be placed by derrick to neat lines and grades upon excavated foundation and face of wall is to be laid on 1 to 1 slope and grouted where necessary.

MANY SAFETY FEATURES

The contract price is approximately \$465,000 and allows 400 working days for completion of the grading and minor bridges and structures, which means that work should be completed in the summer of 1933. M. C. Fosgate, resident engineer, on completion of this project can proudly point to some 65 miles of the Redwood Highway of which he has been in direct charge of both grading and paving contracts.

This trunk line highway will be graded to a minimum width of 37 feet, combining therewith such features as railroad grade separations and bridges adequately designed to meet traffic demands for years to come, with all possible safety features being included in the basic engineering design. These provisions, so essential for the accommodation of present and future demands, will when complete stand out as an example of the greatest possible benefit to be obtained through a reasonable expenditure of gas tax funds.

Federal Road Task Still Large--Must Maintain Fast Gait

Although Federal contributions for road building compose only a small part of the money annually spent on roads, the value received makes Federal participation one of the country's best bargains.

This statement was made by Frederic E. Everett, President of the American Association of State Highway Officials, in calling attention to the current road building task.

"The road job ahead is still large. The latest figures available show that at the end of 1930, 30 per cent of the roads in the state highway systems was unsurfaced, 44 per cent covered with low type surfaces and only 26 per cent surfaced with high type pavement.

"On the 197,000-mile Federal Aid system which, remember, is included in the state highway systems, July 1, 1931, 39 per cent of the roads had high type pavements and 40 per cent had intermediate and low

type surfaces. Fourteen per cent were graded and drained and seven per cent were unimproved.

"Progress to date on the Federal Aid system has been excellent. The report of Thomas H. MacDonald, Chief, Bureau of Public Roads, for the fiscal year ending June 30, 1931, shows that there were 11,033 miles completed last year as against 8,682 miles the previous year. But there is still much to do. Thousands of miles of surfaces classed as intermediate types should be lifted to high type. Thousands of miles of graded and drained roads and of low type roads should be hard surfaced. Road usage is still ahead of road supply. The lowered road maintenance costs and car operating costs that go with better roads make it imperative that both the states and the Federal government sustain their road building efforts," concluded Mr. Everett.

Approximately five per cent of pedestrians killed by automobiles in 1930 lost their lives while crossing intersections against a traffic signal.

The girl friend collects antiques, and recently she acquired a horsehair chair, whereupon she discovered immediately why grandmother always wore six petticoats.—*National Motorist*.

State Highway Links Being Built Through Cities on a Cooperative Plan

TWO hundred and two California cities are connected by the State highway system. In many instances the cities are located on through routes and a large proportion of the traffic is not of a local nature. The city streets over which the State highway routes pass are important links in the system and, as such, the condition of their improvement is a vital factor to the road network as a whole. The length of these links lying within the corporate limits of municipalities aggregates 457 miles, which is about 6 per cent of the total mileage of State highways.

As the function of the State highways is to provide adequate and ample intrastate traffic facilities, the Division of Highways recognizes the responsibility of the State for a share in the improvement of the highway links lying within cities. The municipalities are responsible for the share of improvement which could be charged to local traffic.

Upon the basis of this dual responsibility of State and municipality a policy for cooperative participation in improvement has been inaugurated. Many miles of State highway routing within incorporated cities already have been improved by State cooperation with local authorities and many more such projects are already under agreement or anticipated for the near future.

A MUTUAL BENEFIT

By cooperative methods, continuity in the State system is obtained and travel facilitated and at the same time the local community benefits from a higher standard of improvement than the abutting property could afford.

The basis of cooperation is an individual problem for each project and the equitable distribution of costs is determined by conference with the local authorities. The customary basis of cooperation between the State and municipality consists of the State grading, draining and paving to the same standard of construction as obtains on the State highway connecting the cooperative project, and the local community providing for the remainder of paving and grading, placing curbs and

sidewalks and providing the necessary right of way.

While the Division of Highways welcomes proposals from local authorities, and such applications are in excess of the funds available at present, cooperative funds are limited and prior consideration is given to those cities which show the greatest cooperation in advancing their portion of the obligation.

PROJECTS DESCRIBED

During the current biennium funds amounting to \$2,750,000 have been provided for the State's share of cooperative projects and work completed or now under way totals more than one million dollars for the State's share of this cooperative work.

The following brief descriptions of a few of these cooperative projects in which the State has participated or which are anticipated for the near future provide a picture of this phase of highway activities in California.

In Yuba City, Sutter County, the connecting link of the East Side Highway passes along Plumas Street. In cooperation with the authorities of Yuba City the State will widen the existing pavement ten feet on the westerly side of the street, place the curb and sidewalk and move encroaching buildings within the two blocks from Teagarden Avenue to Sumner Street. The city will furnish the additional ten feet of right of way necessary and construct similar widening on the easterly side of the street. The city will also provide a 100-foot right of way from Sumner Street to the city limits and the State will place a 30-foot pavement over this portion of the route.

DALY CITY AND COLMA

One of the larger cooperative projects which it is planned to start this year will be the widening of Mission Street between Daly City and Colma where the Coast Route enters San Francisco. The existing 66-foot right of way is to be widened to 88 feet and 108 feet and the pavement widened accordingly.

The entire cost of this important improvement to this heavily traveled arterial is estimated to be approximately three-quarters of a million dollars. The State will contribute



BEFORE cooperation came to Lodi in highway building in which State and city share the expense, this is how the State highway looked at the point where this main arterial known as Stockton Boulevard crosses the railroad tracks entering the city from the south.



AFTER the cooperative improvement was finished, this view, taken in September, 1931, at the same point, looking south from the north end of the project, shows the broad new concrete pavement, 76 feet wide over which traffic flows through the city without congestion.

\$200,000 to the securing of rights of way and also pay for the cost of a 40 foot pavement width, the remaining costs of right of way and the cost of the balance of the paving will be borne by the city and county of San Francisco, San Mateo County and Daly City.

Where the heavily traveled Coast Route between San Francisco and Los Angeles passes through the city of Santa Clara, at the southerly end of the San Francisco peninsula, traffic has been greatly impeded by the constricted routing along Franklin street. This

(Continued on page 20)

State Pays \$10,000 Daily in Wages to 4400 Road Workers in Relief Quotas

FORTY-FOUR hundred wage earners are now engaged in the extra employment launched by Governor Rolph last October.

On the three-day schedule, 2200 are on the job six days of the week. The pay roll, at the rate of \$4 per day, is \$8,800. To this number should be added the extra men required in transportation and supervision, bringing the daily expenditure up to \$10,000.

The scenes of the work are scattered over the State from the Oregon to the Mexican line. Nearly two hundred communities are sharing directly in the disbursement of the money. Their proximity to highways in need of extra maintenance work has brought them into the picture, not their population or some condition of unemployment differing from other communities.

NECESSARY WORK

As has been pointed out, none of the work has been created for the emergency. It represents kinds of work which under any circumstance and at any time would have to be done "by hand." The localities were selected by the engineers, and the \$1,600,000 to pay for it was provided for by an allocation of the Highway Commission. The work is under the supervision of the maintenance section of the Highway Division; but its general oversight has received the personal attention of the Director of Public Works.

The available funds were not sufficient to spread the work into every community; but each one benefits either by providing a quota

of men or through the lessening of the general strain of unemployment. The relief work will be continued until the fund is exhausted, and it is now believed that the appropriation will carry on until the latter part of April.

As a rule, the men have given value received for the money. It is quite true that laggards get into some of the crews. It is equally true that much of the work, though necessary, seems slow in a machine age. But taken as a whole, the foremen report good results.

HITTING THE BALL FOR EIGHT HOURS PER DAY

The Sonora lateral of the State Highway system is undergoing considerable improvement under the impetus of the "unemployed" crews recently put to work.

All along the highway below Sonora and running down past Yosemite Junction the turns have been widened and daylighted, the bends filled.

New pavement will be placed on the new roadway in the spring when the fills have been packed.

Those who have had a picture of the State acting as a Santa Claus to the unemployed will lose sight of the fallacy if they see these men hitting the ball for their eight hour shift. The State is getting dollar for dollar in their program of caring for the "unemployed."
—Sonora Banner.

FAMILY MEN FIRST

Every effort has been made to give the jobs to married men or those with whole dependents. The publicity given the employment and its nature, has brought in thousands of applications which could not be favorably met. In many instances, these applications have come from communities and individuals in sections where there was no immediate call for extra maintenance work. The experience of Mayors, Legion Commanders, and other officials charged with propos-

ing the personnel has opened to view the unemployment situation in its most distressing form and to its widest ramifications.

More than 7500 notification cards have been mailed in mobilizing 4400 men. Checking the situation as a whole, fully 20 per cent of the men called to work failed to respond.

It is not improbable that many of them, despairing of securing work in their resident community, have begun searching over the State in the hope of succeeding elsewhere.

Fine American Spirit Shown by Men Given Work on Highways

(Continued from preceding page)

The cards mailed to their last registered address evidently did not reach them.

FEW REFUSE JOB

There has been a very small percentage of direct declinations of the jobs offered. Another small percentage has been in the physical inability of some men to do manual labor. There have been some resignations to take other employment. A negligible number have flatly refused three-days-a-week labor.

A pleasant revelation has been the fine, old American spirit of independence and energy. It is doubtful whether more than 60 per cent of the men now doing manual work on the highways were ever before on the business end of the pick and shovel. Many semiprofessional, many clerical men and skilled mechanics have taken this work rather than remain idle. Instances of splendid sportsmanship have come to notice. The jade of misfortune has not broken the spirit of these men. With hearty good will, they have taken their places in the democracy of necessity.

"However," says a close observer, "a study of the subconscious attitude of the idle and unemployed must prove of value to students of social conditions. Striking contradictions appear. Some of the most cheerful types do not themselves appear to recognize their deeper mental reactions.

AN AVERAGE COMPLEX

The resentment of the average man against unemployment and his personal plight is usually revealed only in a friendly conversation. Outwardly, he may seem to feel that he is bucking 'hard luck' that is inevitable in life."

Nevertheless, the State continues an employer of the first magnitude through the direct and contracted activities of the Divisions of Highways and Architecture.

"And this is your bump of curiosity?"

"Right, Professor. I got that by sticking my head in the elevator shaft to see if the elevator was going up. It was coming down."

"Do you want gas?" asked the dentist as he placed the patient in the chair.

"Yes," said the absent-minded professor. "About five gallons—and take a look at the oil."

THE MEN ON THE ROAD

When the day is clear and your car's in gear,
And your foot's pressed down on the gas,
Where the road is straight and the going
great,
Do you notice the Men you pass?

The Men who toil with the earth and oil,
And shovels and picks and brawn,
Though the day be drear and the skies not
clear,
You'll find them carrying on.

You'll find these Men where the storms have
been,
With their shovels and picks in their hands,
Or late at night by a Danger light,
Where a shivering watchman stands.

When you cross the place where the lizards
chase,
Their shadows across the sand,
And the breeze that blows is never froze,
Out in the Desert land.

Or high in the hills where the cuts and fills,
Are covered by winter snow,
You'll find the crew at the work they do,
Wherever the Highways go.

SO RAISE YOUR HAND as you pass where
they stand,
Where they've paved the way for your load,
These Men who smile as they work the while,
The Men who work on the road.

Joseph Holt,
Highway Maintenance Sub-foreman,
District VIII.

California Gains

California is one of the few States in the Union that will show an increase in motor vehicle registrations for 1931, it is believed by the Automobile Club of Southern California from preliminary reports being received. While the gain in the State is small, only .38 of one per cent, or 7982 vehicles, it is regarded as indicating that California has been less affected by the general depression than any other State in the Union.

"Mud Road Tax"

Only 4 per cent of the country roads in the United States have been hard-surfaced. There are 2,500,000 miles of highways that are still mud roads and subject to the "mud road tax" paid by the motor vehicle owners in the form of higher operating costs, increased depreciation, and greater upkeep expense. "We pay for our roads whether we have them or not" is held to be axiomatic by careful students of highway economics.—*American Road Builder*.

Justice: "How did the accident happen?"

Stremic: "Why, I dimmed my lights and was hugging a curve."

Justice: "Yeah, that's how most accidents happen."

—*Case and Comment*.

Tunnel Under Town Abolishes Traffic Bottleneck and Bad Grade Crossing

Elimination of a traffic bottleneck on a transcontinental highway and a grade crossing over multiple railroad tracks is the dual accomplishment by engineers of the Department of Public Works at Newcastle on the Victory Highway. The improvement will be ready for official opening ceremonies in May. Some interesting engineering features of the project are detailed in the following article.

By JAMES W. TRASK, Resident Engineer

THE actual construction of the Newcastle Tunnel and approaches was completed December 21, 1931. The paving was a separate contract and is now being done so that the tunnel will probably be open for traffic by the middle of May.

Newcastle is located between Roseville and Auburn on State Route 17 and Government Route 40, and aside from its local importance that route is a portion of one of the main transcontinental highways.

The new construction eliminates the present highway through the town which has very bad alignment with excessive grades. It will also better the traffic situation, which becomes very congested during the fruit shipping season.

SIDEWALKS PROVIDED

The roadway of the new section is normally 46 feet in width with a 30 foot paved width through the approach cuts and tunnel, and a three-foot sidewalk on either side. The center line clearance of the tunnel is 20 feet 9 inches throughout its 530 feet length, and the structure is on a 2 per cent grade which provides ample drainage. Reinforced concrete lining was used throughout.

Method of Tunneling—Three 7 x 8 pilot tunnels were driven, one at top center and one on each side at bottom right and left. After completion of the pilots, cribbing was placed on each side of the lower drifts with 3 x 8 timbers placed crosswise at roof. Space for muck cars was left between cribs. Material from stope was then shot down, trapped into mine cars, and hauled to spoil pile. The core was excavated by a gas shovel after lining was complete and material hauled by truck to placement.

Formation Encountered—Beginning at west portal, Sta. 154+69, a rotten, partially

decomposed granite filled with mud seams was encountered to Sta. 156+09; from this point to Sta. 159+80 was hard granite although quite seamy. The last 20 feet (to Sta. 160+00, east portal) was similar to that first encountered.

Timbering—Approximately 140 lineal feet of timbering was required in the top and 90 feet in each of the two lower pilots. Timbering was composed of 8 x 8 framed sets at approximately 4 foot centers. 3 x 8 lagging was used and packing was of random sizes and lengths. Stope timbering was of 8 x 8 posts at 4-foot centers with 8 x 8 longitudinal caps, lagging and packing same as for pilots.

Forms—Forms were constructed in panels 10 feet long and eleven panels were required to complete the ring. 1 x 4 T. and G. sheathing was used on 2 x 8 joist at 20-inch centers. The joist were cut to conform to the radius. 6 x 8 longitudinal caps were placed at panel connections, the caps resting on 6 x 6 posts at 5-foot centers.

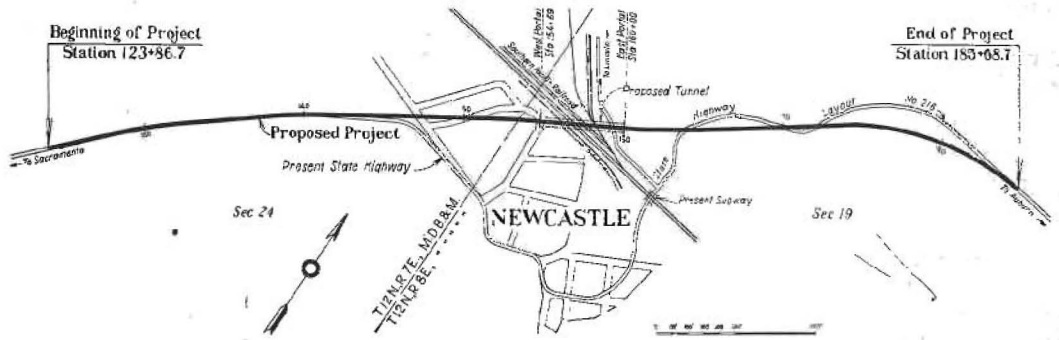
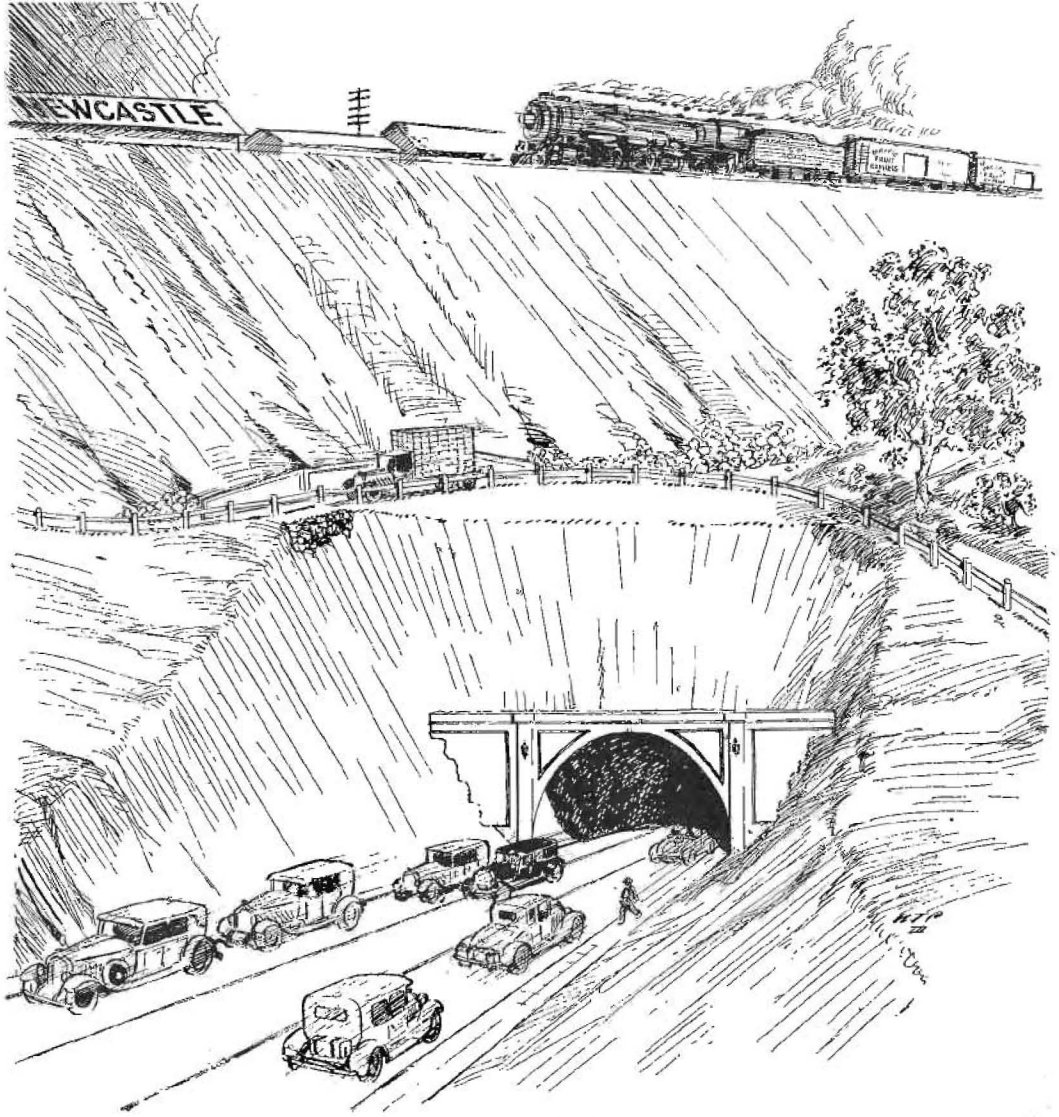
MIXER AT PORTAL

Concrete Lining—The mixer was placed at east portal at an elevation that would permit discharging direct into the mine cars which were operated on top of the core.

The concrete gun was placed directly below the mixer outlet. Concrete was dumped from the mixer into a one-batch hopper, then into a 7 cubic foot hopper, gun capacity, and then directly into gun. The gun had a 6-inch discharge pipe and operated under 100 pounds pressure.

The three lower panels, with a vertical height of 15 feet were poured by gravity in 60-foot sections, using 4 $\frac{1}{2}$ yard mine cars.

The top five panels were poured monolithic in sections up to 60 feet in length with the concrete gun.



New Routing Relieves City Congestion

(Continued from page 15)

street is the main business artery of Santa Clara, with car tracks, safety zones and parallel parking reducing the available traffic lanes to one each way. Under a cooperative agreement with the city, a realignment of the State route through Santa Clara was adopted to modern standards through residential and industrial districts and construction along this line is now well under way and paving should be completed by early summer.

The new routing follows along Clay and Grant avenues from the westerly city limits to the San Jose city boundary and the improvement consists of placing Portland cement concrete pavement and asphalt concrete pavement. The basis of cooperation on this project provides for the State paying for the cost of paving a strip equal to a total width of 40 feet throughout the entire length of the project. The city of Santa Clara and an assessment district are financing the remainder of roadway work, paving, sidewalks and curbs, reconstructing drainage structures and moving obstructions.

At the northerly entrance to Fresno on the State highway the city plans the construction of a grade separation with a 40-foot roadway under the tracks of the Southern Pacific Railroad, on Belmont Avenue, with adequate approaches and street connections. The State has agreed to contribute \$70,000 towards this improvement, the remainder of the expense to be borne by the city of Fresno, the railroad and the county.

Through Bakersfield the route of the State highway will be shortened more than a mile by crossing the tracks of the Southern Pacific Railroad at Beardsley School and paralleling the railroad from Chester Avenue to Union Avenue which connects with the State route entering Bakersfield from the south. The State will spend between six and seven hundred thousand dollars towards this relocation, including new bridges across the Kern River and Beardsley Canal.

PAVEMENT COMPLETED

On the Foothill Boulevard which connects San Bernardino and Los Angeles, a cooperative project was recently completed through Uplands which replaced the old 18-foot pavement with a 30-foot asphalt concrete pavement and adequate shoulders and curbs. In

this instance the construction was done by the State and the city provided the necessary additional right of way.

In the city of Davis, Yolo County, the route of the State highway has recently been widened and paved with asphalt concrete 46 feet in width with a total width between curbs of 50 to 56 feet. The State contributed the cost of a 30-foot asphalt concrete pavement; the remainder of the work, including the additional 16 feet of paving, the shoulders, curbs and gutters, was paid for by the city of Davis and Yolo County.

Where the Los Angeles-Sacramento arterial passes through Lodi, in San Joaquin County, the old 20-foot Portland cement concrete pavement was widened to 76 feet. The work was done under a contract by which the State was placing new pavement north and south of Lodi. The State paid for 20 feet of the widening and the city and a county assessment district provided the funds for the remaining 36 feet.

LARGE COAST PROJECT

One of the larger cooperative projects now under way involves the placing of a 40-foot Portland cement concrete pavement with an 80-foot roadbed on the Coast Boulevard in Los Angeles County between Washington Boulevard and El Segundo. The State is paying for three-quarters of the cost of this work and Los Angeles County is providing funds for the remaining one-quarter.

On this section there is to be constructed a grade separation carrying Culver Boulevard and the tracks of the Pacific Electric Railway over the State highway. The building of this structure will be on a cooperative basis, the cost being divided between Los Angeles County, the State and the Pacific Electric Railway.

On this same route the State is now placing a similar improvement between Corona del Mar and Laguna Beach. Where the pavement passes through Laguna Beach, Orange County is to pay for one-fourth of the pavement width.

CITY VOTES BONDS

Further cooperative work contemplated for this highway along the coast will shortly be undertaken through the city of El Segundo. In this instance the city is securing a 100-foot

State, County and City Cooperating on Coast Improvement

(Continued from preceding page)

right of way on an alignment approved by the State. The city will grade a roadbed 80 feet wide and construct curbs 76 feet apart. A 40-foot pavement will be placed in the center and an oiled macadam surface placed on each side between the pavement and curbs.

The State will pay for a 30-foot width of pavement and a proportionate share of the grading and drainage structures while the remaining cost will be borne by the city of El Segundo and Los Angeles County. Bonds have already been voted by the citizens of El Segundo to defray their portion of the cost.

Orange County has agreed to donate \$36,000 to the city of Fullerton for their share in widening the present 30-foot roadbed to 50 feet and resurfacing the existing 20-foot asphalt concrete pavement with 56 feet of asphalt concrete, on the Coast Route between the Pacific Electric Railway arch bridge and the northerly city limits in Fullerton. **The improvement will also involve the widening of the existing 24-foot overhead structure across the tracks of the Union Pacific Railroad to a full 56-foot roadway.**

At the northerly entrance to San Diego, from the Torrey Pines grade to Atlantic Street the city is securing a 100-foot right of way and has let a contract for grading and drainage structures on the basis of plans and specifications approved by the State. Upon completion of this work the State will place a 30-foot pavement over portions, and a 20-foot one-way pavement over the portion from the top of the Torrey Pines grade to the north end of the Rose Canyon Road, which will parallel the existing pavement and preserve the roadside trees. The cooperative grading and paving of the Rose Canyon cut-off was completed last year as a unit of the general agreement for work on this route within the city limits of San Diego.

WILL END CONGESTION

In the city of Ventura the State will cooperate in the widening of the Meta-Garden-Main Street route through the city. The citizens of Ventura voted a \$100,000 bond issue to assist in the financing of this improvement, which will relieve one of the most congested conditions in this section of southern California.

Allied Truck Owners Thank Governor Rolph

The Honorable James J. Rolph, Jr.,
State Capitol,
Sacramento, California.

Sir:

During many of our recent meetings, even in the southern part of our State, there has been considerable comment concerning the accomplishment of yourself, and your Board of Public Works, in keeping the Donner Summit Road open to the public. Our check indicates that between seventy-five and one hundred twenty-five commercial vehicles travel that road daily. The companies that operate trucks over this route have communicated with us, pointing out the effort that had been expended in keeping that road clear, and needless to say, they feel very kindly toward your administration.

The fact that for the first time in the history of California, this road has been open to the public this far into the winter, certainly indicates that the Board of Public Works is under capable supervision. It would have been an achievement under ordinary weather conditions to have kept the Donner Summit Road open, but to have accomplished this feat this year, in view of the terrific storms and heavy snow falls, is an outstanding achievement.

The motor truck industry of California, whom we represent, wishes at this time to take the opportunity to thank you and your Board of Public Works for the splendid work and spirit that has been shown in keeping this road open.

Our organization represents the entire motor truck industry and all of its phases. We are represented in one hundred and one different cities throughout the State of California, embracing every classification of operator, the private owners of trucks, franchise and contract carriers, city draymen and contractors, the motor truck trailer and tire manufacturers, and the three hundred thousand men that are employed in the motor truck industry.

NATHAN J. ELLIOTT

Executive Vice President and General
Manager Allied Truck Owners

Other cooperative projects which have been completed or are contemplated for the current biennium include improvements within the following cities:

Alturas	Sonora
Susanville	Modesto
Crockett	Oakdale
Vallejo	Plymouth
Kingsburg	Willows
Huntington Beach	Sutter Creek
Pasadena	Claremont
San Bernardino	Glendora
Anaheim	El Cajon

Impressive Ceremonies Mark Official Start of Work on Transbay Bridge

THE San Francisco-Oakland Bay Bridge was officially started toward construction at impressive ceremonies held on Yerba Buena Island, Wednesday, February 24, in the presence of over two hundred State, county and city officials, and civic leaders. Admiral William C. Cole, Commandant of the Twelfth Naval District, officially presented to Governor James Rolph, Jr., the necessary federal permits to construct the bridge.

Admiral Cole, on behalf of the Army, Navy, and Department of Commerce, Lighthouse Service, presented Governor Rolph with a joint permit signed by C. F. Adams, Secretary of the Navy; E. S. Morgan, Acting Secretary of Commerce; F. H. Payne, Acting Secretary of War, granting to the State of California the right to construct the bridge across Yerba Buena Island.

Admiral Cole also presented a permit signed by Secretary of War Hurley, granting the State official permission to construct a bridge from Rincon Hill in San Francisco via the island to the Key Route Mole.

MILITARY WELCOME

Full military honors were accorded to Governor Rolph and the invited guests. Special launches conveyed them to the island, where Governor Rolph was given a seventeen-gun salute when Admiral Cole's official barge approached the landing. Similar honors were extended upon departure of the barge, which flew the Governor's official flag.

At the administration grounds where the ceremonies took place a full guard and band was paraded, and the party honored by four ruffles and flourishes. The program included:

Official welcome from Admiral Cole and address by Colonel Walter E. Garrison, State Director of Public Works, outlining the purpose of the ceremonies and the San Francisco-Oakland Bay Bridge project;

Short talks by: Brigadier-General Joseph C. Castner, U. S. A., and Captain H. W. Rhodes, U. S. Lighthouse Service, to which Governor Rolph responded on behalf of the State.

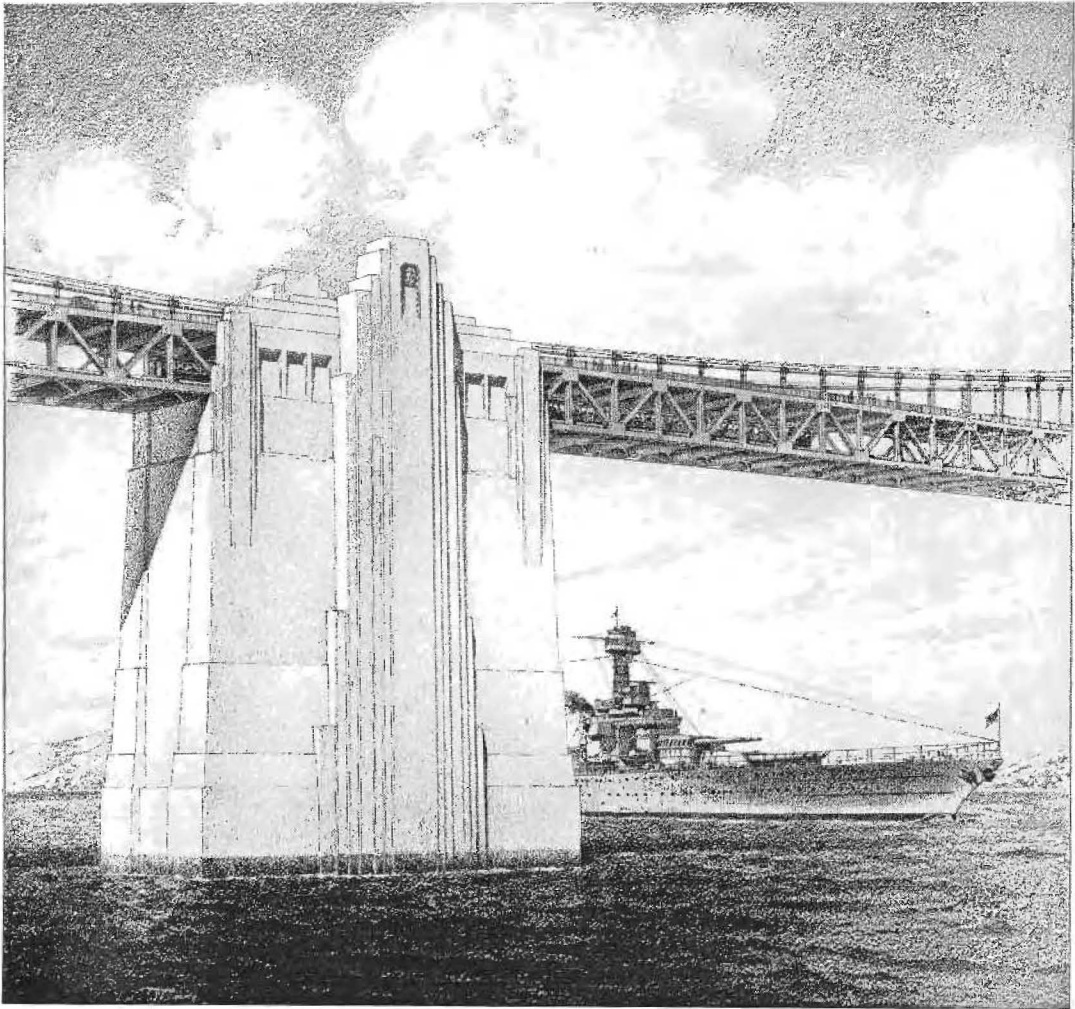
NOTABLES IN PARTY

Following the ceremonies the Governor and his official party were entertained in the quarters of Admiral Cole. Included in the Governor's official party were:

Colonel Garrison, Director of Public Works; Adjutant General Howard, National Guard of California; James I. Herz, Deputy Director, State Department of Public Works; C. H. Purcell, Chief Engineer, San Francisco-Oakland Bay Bridge; Chief Justice Wm. H. Waste, State Supreme Court; Lieutenant-Commander H. G. Nelson, Admiral Cole's Aide; Mark L. Requa, Chairman Hoover Bridge Commission; E. B. DeGolia, Chairman San Francisco-Oakland Bay Bridge Advisory Committee; George Hearst, Publisher, San Francisco Examiner; George T. Cameron, Hoover Commission; Herbert Fleishhacker, President, Anglo-London & Paris National Bank; Prof. Charles D. Marx, Hoover Bridge Committee; Senator Arthur H. Breed, Hoover Bridge Committee; Senator Roy Felton, Author Bridge Legislation and Representative State Senate; Speaker Edgar C. Levey, Representing State Assembly; H. J. Brunnier, Bridge Consulting Board; Hon. U. S. Webb, Attorney General; A. J. Cleary, Chief Administrative Officer, San Francisco; P. W. Meherin, Chairman Harbor Commission Board; Edward Rainey, State Superintendent of Banks; J. J. Tynan, State Board of Harbor Commissioners; Charles E. Andrew, Bridge Engineer, San Francisco-Oakland Bay Bridge; Mayor Fred W. Morcom of Oakland; City Manager Ossian Carr of Oakland; Mayor T. E. Caldecott of Berkeley; City Manager Hollis Thompson of Berkeley; Prof. Charles Derleth, Jr.; Harrison Robinson of Oakland; Joseph R. Knowland, Publisher of the Oakland Tribune, and other notables.

MODERNISTIC DESIGN

While presentation of the permits marks the official beginning of the bridge project, preliminary work has been under way for several months. During the past month sufficient boring and design data has been gathered to practically determine the double



A MODERN SKYSCRAPER rising from the middle of San Francisco Bay will be the impression created by the center anchorage of the San Francisco-Oakland Bay Bridge, according to the design submitted by Chief Engineer C. H. Purcell to Col. Walter E. Garrison, Director of Public Works. The modernistic mass of concrete and steel will tower 300 feet above the water and allow several hundred feet clearance above the crow's nest of the battleship California shown in this picture drawn to scale.

suspension type of span with central anchorage for the West Channel.

A modernistic design of the center anchorage, which represents the best thought of the engineering staff to date was presented to Director Garrison yesterday by Chief Engineer Purcell. This design calls for two independent suspension bridges with an anchorage in the center of the bay between the San Francisco shore line and Yerba Buena Island. This type, which is being considered the continuous suspension type, consists of two 2300-foot main spans and four 1150-foot side spans. To join the two independent structures, a center anchorage is

required to which the cable from each side structure will be secured, according to Design Engineer Glenn B. Woodruff.

The design shows the center anchorage in comparison with the battleship California, which is reproduced to true scale. The center anchorage as designed would be 120 x 212 feet, and 300 feet above the water. It would be built of concrete and steel. The California, shown in comparison, is 125 feet high to the top of the crow's nest.

The bridge engineering staff, according to Director Garrison, is now engaged in perfecting the design for the remainder of the structure. It will also produce a complete

(Continued on page 39)

Governor Officiating at Ceremonies for Twenty-Eight New Buildings

GOVERNOR JAMES ROLPH, Jr., has arranged to be present and participate in seven dedication ceremonies of newly erected public buildings, nine ground breaking ceremonies of buildings on which work is about to begin, and one corner stone laying during the period between February 29th and April 14th, inclusive.

Twenty-eight buildings in various parts of the State will figure in the Governor's itinerary. They represent units with a total cost valuation of \$2,940,500 in the State's construction program being pushed to completion through the Division of Architecture.

Ceremonies in which the Governor participates are as follows:

Date	Time	Place	Estimated cost
March 4th		NAPA STATE HOSPITAL	
	3 P.M.	Ground Breaking—Additions to Ward Buildings -----	\$81,000
March 8th		CALIF. NATIONAL GUARD—PASADENA	
	2 P.M.	Ground Breaking—Armory -----	50,000
March 14th		FRESNO STATE TEACHERS COLLEGE	
	2 P.M.	Ground Breaking—Library Building -----	177,000
March 21st		CALIF. NATIONAL GUARD—SALINAS	
	11 A.M.	Ground Breaking—Armory -----	60,000
March 22d		AGNEWS STATE HOSPITAL— (Santa Clara County)	
	2 P.M.	Dedication—	
		Ward Unit No. 1 at Farm ----	\$340,000
		Ward Unit No. 2 at Farm ----	340,000
		Employees' Quarters at Farm ..	100,000
			780,000
April 7th		STOCKTON STATE HOSPITAL	
	2 P.M.	Dedication—	
		Hospital Building -----	100,000
		Industrial Building -----	25,000
		Employees' Building -----	40,000
			165,000
	3 P.M.	Ground Breaking—	
		Kitchen and Dining Room -----	125,000
March 30th		PACIFIC COLONY, at Spadra, (Los Angeles County)	
	2 P.M.	Dedication—	
		Hospital Building -----	113,000
		Administration Building -----	33,000
		Employees' Bldg. and Garages ..	60,000
			206,000

(Continued on page 35)

Resolutions Urge Federal Aid Bills

AT ITS MEETING held at El Centro on February 5, 1932, the California Highway Commission passed the resolution hereinafter set forth urging the passage of the bills now pending in Congress providing for the continuation of Federal aid in highway building in California.

United States Senator Tasker L. Oddie of Nevada and Congressman Ed. B. Almon of Alabama have introduced two bills identical in their nature to accomplish this purpose.

These bills provide for the following appropriations:

1. For Federal Aid Highways: The sum of \$125,000,000 for the fiscal year ending June 30, 1934; and the sum of \$125,000,000 for the fiscal year ending June 30, 1935. The apportionment to California would total \$8,200,000 for the two years.

2. For Forest Roads and Trails: The sum of \$12,500,000 for the fiscal year ending June 30, 1934; and the sum of \$12,500,000 for the fiscal year ending June 30, 1935. California would receive \$2,856,000 for the biennium.

3. For Roads through Unappropriated or Unreserved Public Lands, Nontaxable Indian Lands or other Federal Reservations other than the Forest Reservations: The sum of \$3,000,000 for the fiscal year ending June 30, 1932, the sum of \$3,000,000 for the fiscal year ending June 30, 1933, and the sum of \$3,000,000 for the fiscal year ending June 30, 1934. California's share of these funds would total \$690,000.

The text of the resolution follows:

"WHEREAS, There have been introduced in Congress Bills S. 36 (Senator Oddie, Author) and H. R. 4716 (Representative Almon, Author), providing for Federal Aid Highway, Forest Road and Public Land Road appropriations for the fiscal years 1934 and 1935, and

WHEREAS, The continuation of these Congressional authorizations in the full amounts set forth in said bills as originally introduced are vital to the welfare of a large section of the population of California and the only construction of magnitude now being carried on is the highway work widely distributed to relieve the serious unemployment situation, and it is necessary to have Congressional authorizations in advance in order that the biennial budget of this State can make the necessary provisions for budgeting funds to match Federal Aid, and

WHEREAS, This Commission's financial plans contemplate the continuation of Federal Aid Highway and Forest Road appropriations, and

WHEREAS, Federal work through the Government's own forests on account of

the lack of Forest Road appropriations in the past has lagged behind California's own work outside the forests, and

WHEREAS, California has made and is now making heavy expenditures on the Forest Road System and assumed the entire construction costs of many of these roads, for which reason this Commission believes that a cut in the Congressional authorization for such purpose would not be equitable to this State, and

WHEREAS, The continuance of the appropriation for roads over Public Lands is particularly important and essential to Southern California which has large areas of public lands,

RESOLVED, That the California Highway Commission does hereby strongly urge the passage of said Bills S. 36 and H. R. 4716 in the amounts as originally set forth in said bills, and the Secretary of this Commission is hereby directed to send copies of this resolution to the members from California of the Senate and the House of Representatives of the United States."



The success of the Fresno Irrigation District in completing the retirement of its entire bonded indebtedness of \$2,000,000 in ten years and the approval of the All American Canal project involving a possible expenditure of \$38,500,000 are two important news items in the report of State Engineer Edward Hyatt covering the activities of the Division of Water Resources in January. The increased flow of the Sacramento River caused by December storms has entirely eliminated salinity in the Sacramento Delta, the report says in giving details of reclamation, and flood control projects, tabulations of dam applications and other work of the Division as follows:

Office work on irrigation districts during the month consisted of the completion and indexing of Bulletin 18, a revision of California irrigation district laws, and the preparation of reports on various irrigation district matters coming before the Districts Securities Commission.

The Fresno Irrigation District, by the payment of \$225,000 on January 1, 1932, retired its entire bonded indebtedness which amounted to \$2,000,000. Retirement was accomplished within a period of ten years, during which time, in addition to providing funds for the payment of bonds, the district expended approximately \$580,000 for permanent improvements to its irrigation system.

The California Districts Securities Commission has established its offices at 620 State Building, San Francisco, California, and at a meeting held on December 21, confirmed the appointment of Harmon S. Ponte as Executive Secretary of the Commission. At the same meeting, \$69,000 refunding bonds of Scott Valley Irrigation District, located in Siskiyou County, were approved for certification, and a hearing was held on the application of the Imperial Irrigation District Imperial County, for approval of a contract between the District and the United States Government for the construction of the All-American Canal, a project involving the possible expenditure of \$38,500,000.

CANAL PLAN APPROVED

On December 30, the Commission held a meeting in Los Angeles, at which a report was made by the State Engineer on the feasibility of the All-American Canal and the project was approved by the Commission. The Commission also approved expenditures of \$33,452 by the Serrano Irrigation District and \$32,789 by the Carpenter Irrigation District for completion of the Santiago Creek Dam, located in Orange County.

At a meeting of the Districts Securities Commission held in San Francisco on January 8, the request of the Waterford Irrigation District, Stanislaus County, for the issue of refunding bonds in the amount of \$631,925, representing all of its outstanding bonded indebtedness was approved. At this meeting the Palmdale Irrigation District, Los Angeles County, presented a request for the approval of a refunding bond issue in the amount of \$445,000 to be exchanged for the same amount of its outstanding bonds.

DAMS

To date 790 applications have been received for approval of dams built prior to August 14, 1929; 89 for construction or enlargement; and 231 applications for repairs or alterations.

a. Applications for Approval of Plans for Construction of Dams.

Dam	Owner	County
Greenspot	Western Fruit Growers, Inc.	San Bernardino

b. Applications for Approval of Plans for Repairs or Alterations.

Twelve such applications have been received during this period.

c. Plans Approved for Construction or Enlargement.

Dam	Owner	County
Walker	Walker Mining Company	Plumas
Upper Hollywood	City of Los Angeles	Los Angeles

d. Plans Approved for Repairs or Alterations.

Dam	Owner	County
Little Boulder Lake	Buckeye Placer Mines, Inc.	Trinity
East Lost Lake	R. W. Bassman, et al.	Alpine
West Lost Lake	R. W. Bassman, et al.	Alpine
Millbrae No. 2	Mills Estate, Inc.	San Mateo
Stanislaus Forebay	Pacific Gas and Electric Company	Tuolumne
Lower Spencer Lake	Wm. A. Hood	Sierra
Bear Valley	Bear Valley Mutual Water Co.	San Bernardino
Crouch	Chas. S. Crouch, et al.	San Diego
Lafayette	East Bay Municipal Utility Dist.	Contra Costa
"C"	Cooperative Land & Livestock Co.	Modoc
Fairchild	Cooperative Land & Livestock Co.	Modoc
"N"	Cooperative Land & Livestock Co.	Modoc
Round Valley	Cooperative Land & Livestock Co.	Modoc
Cowell Reservoir	Mcss Beach Produce Company	San Mateo
Foxley	C. E. Foxley	Riverside

FLOOD CONTROL AND RECLAMATION

a. Maintenance of Sacramento Flood Control Project.

During the last ten days of December a general storm occurred over the watershed of the Sacramento River and its tributaries, which filled all rivers

By-Pass Channels Flooded by Storm

(Continued from preceding page)

and flood channels of the Sacramento flood control system to a low flood stage. Protective works were not threatened at any point, and in most places an additional rise of five feet would have resulted in no particular danger. During this period it was necessary to discontinue all maintenance activities with the exception of levee patrol and operation of the drainage pumping plants. It was necessary to place all pumping plants in full operation.

All of the by-pass channels were flooded and it was necessary to discontinue maintenance clearing work, but this has been resumed with a force of about eighty men in the upper Sutter By-pass within the last week.

Good progress has been made in the establishment of maintenance headquarters near Sutter City. The tract has been graded and the concrete floors and foundations for the buildings are finished. The buildings will probably be completed and ready to be occupied by March 1st.

The clearing of the flowage area in the Knights Landing Ridge Cut was completed with the exception of two days work at the time the storm occurred.

b. Sacramento Flood Control Project.

The work of clearing the timber and brush opposite the openings in the Southern Pacific embankment in the Yolo By-pass west of Sacramento has been completed.

Clearing in the lower Sutter By-pass under contract with A. F. Johnston is approximately 65 per cent complete.

c. Emergency Flood Protection and Rectification of Rivers.

The work of clearing the channel of the Santa Ynez River in cooperation with the county of Santa Barbara, near Lompoc, is 90 per cent complete, but the work was interrupted by the storm. Work will be resumed on January 25th.

River rectification work on the San Jacinto River has continued and additional funds have been provided, making the total amount to be spent \$6,000. This work will be completed before January 30th.

d. Sacramento Flood Control Project—Bank Protection.

No actual work of bank protection is now under way. The recent storm developed weaknesses in the river bank at certain places. Some of these have been examined preparatory to arranging for protective works.

In Reclamation District No. 70, in Sutter County at Girdner Bend, protection is needed for a distance of about 400 feet. Surveys have been made and plans are under preparation for doing the necessary protective work in cooperation with Reclamation District No. 70.

e. Pajaro River.

During the December storm the Pajaro River broke over its banks in several places and several thousand acres of the Pajaro Valley were flooded, including a portion of the city of Watsonville.

Under Chapter 524, Statutes of 1929, two small pieces of levee are being constructed in cooperation with local landowners at a cost of about \$3,000.

f. Russian River Jetty.

A severe storm occurred on the coast in the last week of December, which resulted in damage to the jetty amounting to approximately \$7,000. The new steel trestle is little damaged, but on the old structure approximately 150 feet of track was taken out and about 40 feet of the old portion of the pile wall. Considerable rock was displaced, but it still remains within the jetty section. The track to the quarry was seriously damaged and the connection between the mainland and the quarry was completely washed out. Of the total damage, about \$3,000 is to track, trestle and structure and \$4,000 of the loss is on account of displaced rock.

g. Flood Measurements and Gages.

At several stations where it is intended to make flood discharge measurements from bridges, the stationing was painted on the bridges. Dixon Ridge station was inspected and missing floats, flags and stationing replaced. At the metering station on Sacramento By-pass, floats made fast to anchors were set at 100-foot intervals across the section. A cross-section was taken at the cable at Rattlesnake Bridge. The new station on the middle fork of the American River near Auburn was inspected and a cross-section taken at the cable. During the recent storm one discharge measurement was made at Rattlesnake Bridge.

On January 12th a conference was held to discuss operation of gages and measurement of floods. A complete schedule for flood measurements for season 1931-32 was decided upon.

WATER RIGHTS

n. Applications to Appropriate.

Thirty-five applications to appropriate water were received during the month of December, 14 were denied, 16 were approved and 14 permits were revoked.

Four rather important municipal filings were made during the month; 2 by the city of Fresno involving appropriations from San Joaquin River for municipal water supply purposes and irrigation at an estimated total cost of \$10,000,000. The other two filings referred to were those by the city of San Luis Obispo involving diversions from Lopez Creek, a tributary of Arroyo Grande Creek, for municipal water supply purposes.

On December 12th an application of the Benbow Power Company, Benbow, Humboldt County, was approved allowing an appropriation of 320 cubic feet per second from South Fork of Eel River for the generation of power with which to supply Benbow resort and vicinity.

Preparation of inspection reports covering field investigations made during the last field season is in progress and since October 15th more than 1300 progress reports of permittees and licensees have been received and analyzed.

Large Increase in State Road Traffic Indicated for 1932

THE gain in motor vehicle registrations in California in 1931 despite depressed business conditions and information received from tourist bureaus throughout the country indicate that 1932 will see more motor traffic on the state highways than ever before in the history of California.

The increase in tourist visitors registered in 1931 will be largely augmented this year by the attraction of the Olympic Games and the lure of California's good roads in addition to another expected increase in auto registrations.

State registration totals made public by the Department of Motor Vehicles show fee-paid registrations for the year amounting to 2,107,275.

101,554 Nonresidents

This figure includes motorcycles and trailers but does not include the 38,199 vehicles registered in the State under the exempt license classifications nor the 101,554 cars that were driven into the State during the year by nonresident drivers.

The net gain in fee-paid vehicles over 1930 was 7982. Most of the gain came in commercial vehicles equipped with pneumatic tires, there being an apparent tendency among business men to equip during the year with commercial vehicles somewhat heavier and larger.

"The gain is not large but is encouraging and shows we are holding our own pretty well."

Fee-Paid Vehicles

This was Registrar Russell Bevans' comment on the figure. Here are the comparative fee-paid vehicles registered in 1930 and 1931:

Autos	1,941,969	1,938,068
Solid trucks	15,500	11,271
Pneu. trucks.....	83,887	93,942
Motorcycles	9,405	8,970
Solid trailers	9,563	8,274
Pneu. trailers	38,969	46,750
	<u>2,099,293</u>	<u>2,107,275</u>

The totals will be used as a basis for apportioning motor vehicle license funds to the various counties and to the State Department of Public Works for highway purposes. The motorist thus gets his money back in the form of good roads.

As in past years more than one-third of all vehicles in the State were registered from Los Angeles County. San Francisco was second and Alameda third.

DOWN ON THE FARM

Nearly three-fifths of the farms in the United States have automobiles, according to a report of the Department of Commerce. These census statistics show that fifty-eight per cent of the farms of the country have automobiles and that a considerable number have more than one car. The percentage of farms owning motor trucks was given as 13.4, slightly less than the percentage owning tractors. Of the 3,650,003 farms reporting, there were 4,134,675 automobiles listed.

Cloverdale-Hopland Project Started by Official Ceremony

EARL LEE KELLY, Chairman of the California Highway Commission, officially representing Governor James Rolph, Jr., turned the first spadeful of dirt symbolizing commencement of construction on the Cloverdale-Hopland relocation project on Route 1, Redwood Highway, Sonoma and Mendocino counties.

This ceremony took place as a climax of the "Ground-breaking Jubilee" held in Cloverdale Sunday, February 21st, under the direction of the Redwood Empire Association, jointly sponsored by this association and the Cloverdale Chamber of Commerce.

Several thousand leaders from various parts of the Redwood Empire were in attendance, including the Boards of Supervisors, Chambers of Commerce, Farm Bureaus, and Grange representatives, newspaper publishers, and others.

OFFICIALS WHO SPOKE

H. G. Ridgway of San Rafael, vice president, and chairman of the Events Committee of the Redwood Empire Association, presented the following State Highway officials during the speaking program: Colonel Walter E. Garrison, director of the State Department of Public Works; Earl Lee Kelly, chairman California Highway Commission; C. H. Purcell, State Highway Engineer; John W. Howe, secretary of the Commission; Colonel Jno. H. Skeggs, Engineer District No. 4 of the Highway Division, H. S. Comley, new Engineer for District No. 1 of the Highway Division.

Other State officials on the speaking program included: Senator Herbert Slater, Sonoma County, Senator R. R. Ingels, Mendocino and Lake counties, Wallace L. Ware, Santa Rosa, and Assemblyman Hubert Scudder.

Harry Lutgens of San Rafael, as president of the Redwood Empire Association, presented the greetings of the nine counties. Supervisor Ed. Enzenauer, chairman of the Board of Supervisors, Sonoma County, and N. P. Howe, director of Mendocino County Chamber of Commerce, spoke for their respective counties.

ATTENDED CITRUS FAIR

Others on the speaking program included: George Cavalli, president Cloverdale Chamber of Commerce; Chas. E. Humbert, Mayor of Cloverdale; D. G. MacMillan, Hopland Board of Trade; F. C. Yates, Ukiah Chamber of Commerce; J. A. McMinn former chairman of the Board of Supervisors, Sonoma County; Charles Sedgley, banker of Cloverdale; J. P. Menihan, secretary Cloverdale Chamber of Commerce, and Mr. Granfield, representing the contractors, Granfield, Farrar & Carlin.

At the same time the 34th Annual Citrus Fair was in progress, to which the above officials were invited as guests.

Chairman Earl Lee Kelly was the principal speaker during the afternoon at the Citrus Fair. The motif of the occasion being Colonial in honor of the sesqui-centennial birthday of George Washington. Chairman Kelly delivered an interesting cogent and informative address descriptive of the life of Washington.

Immediately after the morning celebration and jubilee, the Cloverdale Chamber of Commerce entertained their guest with a colorful and tasty buffet luncheon in true wetsern style.



DIGGING IN to start a great highway project Chairman Earl Lee Kelly of the California Highway Commission is shown breaking ground on February 21 for the Cloverdale-Hopland improvement. Left to right, are Senator R. R. Ingels of Mendocino County looking over the shoulder of State Highway Engineer C. H. Purcell; H. G. Ridgway, vice president Redwood Empire Association; Earl Lee Kelly; Harry Lutgens, president Redwood Empire Association; Miss Hazel Hurt, Cloverdale; Colonel Walter E. Garrison, Director, Department of Public Works; Colonel Jno. H. Skeggs, District Engineer; Supervisor Willard Cole, Sonoma; Mayor Charles E. Humbert, Cloverdale.

Ten Year Plan Involves Big Savings

(Continued from page 1)

This economic procedure of development requires that the original alignment, grade and drainage features be so established that development may be carried forward from one improvement to the next without loss of the original investment. While this careful method of highway planning requires expenditures at the earlier stages of development which may seem out of proportion to existing traffic needs, when viewed over the longer period of time it is readily seen that the method resorted to involves considerable savings.

Upon this basis of long time planning, the best engineering practice is made possible. The best economic balance may be obtained

in the selection and alignment of routes, and the most desirable gradient attained with prudent expenditures of funds.

The standards of construction to which the Division of Highways adhered in making up the ten year plan have been the highest for the various types of roads which go to make up the system.

The success of the ten year economic plan of highway construction based upon the present basis of revenue allocation, and the possibility of the State having a unified system of highways which will provide an adequate service to the public at the end of the period is dependent upon following the development plan along its general lines.

Sacramento Delta Salinity Eliminated

(Continued from page 27)

ADJUDICATIONS

Shasta River (Siskiyou County). Case pending in Superior Court of Siskiyou County.

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

North Cow Creek (Shasta County). An amended stipulation for judgment has been signed by all parties and filed with the Superior Court of Shasta County. The Court's decree defining the water rights on North Cow Creek, based upon the amended stipulation, will be entered at an early date.

Oak Run Creek (Shasta County). Case pending in the Superior Court of Shasta County awaiting the entry of a decree in the North Cow Creek case.

Glover Creek (Shasta County). The Glover Creek case came up for hearing in the Superior Court of Shasta County on January 18, 1932.

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

Davis Creek (Modoc County). Case pending in Superior Court of Modoc County awaiting entry of Court's decree.

Mill Creek (Modoc County). The Mill Creek case, referred to the Division by the Superior Court of Modoc County by Order of Reference dated May 1, 1929, was terminated by a decree entered by the Court on December 19, 1931. This decree adjudicated water rights to the extent of 3.00 cubic feet per second for power purposes and 35.83 cubic feet per second for irrigation, domestic and stock-watering purposes on 2204 acres of land. The water rights defined by the decree are appurtenant to 43 property tracts served by 65 diversion conduits.

Following entry of the decree, the Mill Creek Water Master District was created by order of the State Engineer, dated December 30, 1931, in accordance with the provisions of Section 37 of the Water Commission Act. A petition dated January 14, 1932, requesting appointment of a water master for the district, as provided for in Section 37a of the above mentioned act, has been received by the Division.

Deep Creek (Modoc County). The Division's report covering the distribution of the waters of Deep Creek, in accordance with the trial schedule of allotments adopted for the 1931 season, has been completed for circulation among interested parties.

Franklin Creek (Modoc County). The Division's report on the distribution of the water of Franklin Creek for the 1931 season has been completed.

New Pine Creek (Modoc County). The report of the water supply and use of water on New Pine Creek, covering the field investigation conducted on that stream during the 1931 season was completed January 12, 1932.

Eagle Creek (Modoc County). The report on the water supply and use of water on Eagle Creek is in the hands of the State Printing Office.

Pine and Parker creeks (Modoc County). Reports covering water master service on these streams during the 1931 irrigation season have been completed.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

Except for routine maintenance of tide gage and salinity stations, the work under this project during the past month has been confined to office compilations in the preparation of the 1931 annual report which presents the results of all measurements of diversions, stream flow, return flow, use of water, salinity, etc., for the Sacramento-San Joaquin territory. The special report covering estimates of damage in 1931 due to salinity and water shortage is in course of preparation.

The storms beginning in the latter part of December caused a flow in the Sacramento River at Sacramento reaching a maximum of about 64,000 second-feet on December 29th with a probable maximum flow including the discharge of the Yolo By-pass, of around 86,000 second-feet on the first of January. The river flow at Sacramento had receded to 18,000 second-feet on January 11th. This flow of water entirely eliminated the salinity in the Sacramento Delta and early in January the salinity was down to 13 parts of chlorine per 100,000 at O. and A. Ferry.

There was, however, no corresponding large flow to the delta from the San Joaquin River and early in January the salinity at some of the San Joaquin Delta stations was still higher than at points below the delta such as O. and A. Ferry and Bay Point. The large Sacramento flow has been influential in greatly reducing the salinity at San Joaquin Delta points but not to the extent nor as rapidly as would have been the case if a corresponding large flow direct from the San Joaquin River had occurred. By January 10th the salinity had practically reached a winter minimum throughout the delta. These data are shown in the following tabulation:

SALINITY-SACRAMENTO-SAN JOAQUIN DELTA

Station	1/2/32	1/10/32
	Parts of Chlorine per 100,000	
Bay Point	22	15
O. and A. Ferry	13	10
Collinsville	9	8
Anticoh	21	11
Emmaton	4	4
Webb Pump	47	16
Camp 20 Station	-	2
Central Landing	9	3
Holland Pump	27	15
Mandeville Pump	39	16
King Island	43	24
Rindge Pump	5	4
Middle River P. O.	27	5
Clifton Court Ferry	5	2

At present, sampling is being maintained at 44 stations, of which 19 are permanently maintained

(Continued on page 36)

January Water Applications and Permits

Applications for permits to appropriate water filed with the Department of Public Works, Division of Water Resources, during the month of January, 1932.

LOS ANGELES COUNTY—Application 7155. H. H. Townsend, 5039 Hollywood Blvd., Los Angeles, for 0.001 c.f.s. from unnamed spring tributary to Piru Creek Watershed to be diverted in Sec. 30, T. 6 N., R. 17 W., S. B. B. and M., for domestic and stock-watering purposes.

CALAVERAS COUNTY—Application 7165. State of California, Department of Public Works, Division of Highways, c/o C. H. Purcell, State Highway Engineer, Public Works Bldg., Sacramento, for 0.005 c.f.s. from Cottage Spring tributary to North Fork of Stanislaus River to be diverted in Sec. 28, T. 6 N., R. 15 E., M. D. B. and M., for recreational purposes. Estimated cost \$750.

DEL NORTE COUNTY—Application 7167. State of California, Department of Public Works, Division of Highways, Public Works Bldg., Sacramento, for 0.017 c.f.s. from California Creek tributary to Elk Creek to be diverted in Sec. 34, T. 13 N., R. 4 E., H. B. and M., for recreational and irrigation purposes. Estimated cost \$1,000.

INYO COUNTY—Application 7163. Ingle Carpenter, Suite 820, Detwiler Bldg., Los Angeles, for 200 gallons per day from Rock Creek tributary to Owens River to be diverted in Sec. 6, T. 6 S., R. 30 E., M. D. B. and M., for domestic purposes. Estimated cost \$400.

EL DORADO COUNTY—Application 7169. B. W. Stone, 181 Ellis St., San Francisco, for 500 c.f.s. and 125,000 acre-feet per annum from (1) Rubicon River (2) Pilot Creek (3) Gerle Creek (4) Loon Lake (5) Buck Island Lake (6) Rock Bound Lake (7) Little South Fork Rubicon River tributary to American River Drainage area to be diverted in Sec. 3, T. 13 N., R. 16 E., M. D. B. and M., Sec. 11, T. 12 N., R. 12 E., M. D. B. and M., Sec. 24, T. 13 N., R. 15 E., M. D. B. and M., Secs. 1, 31 and 34, T. 14 N., R. 14 E., M. D. B. and M., Sec. 4, T. 13 N., R. 15 E., M. D. B. and M., and Sec. 2, T. 13 N., R. 14 E., M. D. B. and M., for municipal purposes.

MONO COUNTY—Application 7170. Elbert E. English, 1132 Pine Avenue, Long Beach, for 200 gallons per day from Rock Creek tributary to Owens River to be diverted in Sec. 33, T. 4 S., R. 30 E., M. D. B. and M., for domestic purposes. Estimated cost \$25.

MONO COUNTY—Application 7171. Charles O. Perkins, 1143 Vergue Ave., Pasadena, for 200 gallons per day from Rock Creek tributary to Owens River to be diverted in Sec. 33, T. 4 S., R. 30 E., M. D. B. and M., for domestic purposes. Estimated cost \$25.

PLACER COUNTY—Application 7172. Frank Dutra, Newcastle, for 0.02 c.f.s. from seepage water from Newcastle Highway Tunnel and Approach tributary to Secret Ravine, thence Linda Creek and Sacramento River to be diverted in Sec. 24, T. 12 N., R. 7 E., M. D. B. and M., for industrial and domestic purposes. Estimated cost \$225.

TRINITY COUNTY—Application 7173. C. H. Barkdull, 3646 36th Ave., S., Seattle, Washington, for (1) 30 c.f.s. (2) 4 c.f.s. (3) 5 c.f.s. (4) 6 c.f.s. (5) 4 c.f.s., total 50, from (1) Mosquito Creek (2) Big Lake (3) Ammon Creek (4) White Slides and (5) Bear Trap Creek tributary to South Trinity River to be diverted in Secs. 35, 26, 27, 11, 14, T. 5 N., R. 5 E., H. B. and M., for mining and domestic purposes.

MODOC COUNTY—Application 7174. Russell M. Bushey, Canby, for 0.35 c.f.s. from unnamed spring tributary to Pit River to be diverted in Sec. 8, T. 41 N., R. 9 E., M. D. B. and M., for irrigation and domestic purposes (20 acres). Estimated cost \$15.

SANTA CLARA COUNTY—Application 7175. H. D. Gaskill, Cupertino, for 3 c.f.s. from unnamed creek tributary to Calabazas Creek to be diverted in Sec. 24, T. 7 S., R. 5 W., M. D. B. and M., for irrigation purposes. (30 acres.) Estimated cost \$300.

MENDOCINO COUNTY—Application 7176. Harold H. Wonacott, c/o Lewis D. Mooney, Atty., Fort Bragg,

total of 2 c.f.s. (1 c.f.s. from each of 2 sources) from (1) Main Digger Creek (2) South Fork Digger Creek tributary to Pacific Ocean to be diverted in Sec. (1) 24, T. 18 N., R. 18 W., M. D. B. and M., and Sec. (2) 19, T. 18 N., R. 17 W., M. D. B. and M., for industrial purposes (trout farm). Estimated cost \$1,000.

MENDOCINO COUNTY—Application 7177. Mrs. C. Rhea, Cummings, for 1500 gallons per day from Mill Creek tributary to South Fork of Eel River to be diverted in Sec. 4, T. 23 N., R. 17 W., M. D. B. and M., for domestic purposes. Estimated cost \$225.

MONO COUNTY—Application 7178. H. C. Sheetz, 1213 N. Elm Ave., Glendale, for 200 gallons per day from Glass Creek tributary to Owens River to be diverted in Sec. 21, T. 2 S., R. 27 E., M. D. B. and M., for domestic purposes. Estimated cost \$75.

HUMBOLDT COUNTY—Application 7179. Thomas H. Selvaige, Eureka, for 0.022 c.f.s. from unnamed spring tributary to Mattole Creek to be diverted in Sec. 39, T. 2 S., R. 1 W., M. D. B. and M., for irrigation and domestic purposes (5 acres). Estimated cost \$300.

MONO COUNTY—Application 7180. J. C. Feige, Bishop, for 200 gallons per day from Mammoth Creek tributary to Owens River to be diverted in Sec. 2, T. 4 S., R. 27 E., M. D. B. and M., for domestic purposes.

NEVADA COUNTY—Application 7181. Spanish Mining Co. and San Francisco Commercial Co., c/o Robert Beale, Atty., 1404 Humboldt Bank Bldg., San Francisco, for 1.5 c.f.s. from Devils' Canyon Creek tributary to Poorman's Creek to be diverted in Sec. 30, T. 18 N., R. 11 E., M. D. B. and M., for mining, milling, domestic and fire protection. Estimated cost \$6,000.

NEVADA COUNTY—Application 7182. Spanish Mining Co. and San Francisco Commercial Co., c/o Robert Beale, Atty., 1404 Humboldt Bank Bldg., San Francisco, for 3.0 c.f.s. from Poorman's Creek tributary to South Fork of Yuba River to be diverted in Sec. 31, T. 18 N., R. 11 E., M. D. B. and M., for mining, milling, domestic and fire protection. Estimated cost \$11,000.

Permits to appropriate water issued by the Department of Public Works, Division of Water Resources, during the month of January, 1932.

ORANGE COUNTY—Permit 3535, Application 7169. U. S., Cleveland National Forest, 310 Federal Bldg., San Diego, January 7, 1932, for .003 c.f.s. from San Juan Creek tributary to Pacific Ocean in Sec. 3, T. 7 S., R. 6 W., S. B. B. and M., for domestic purposes. Estimated cost \$500.

SISKIYOU COUNTY—Permit 3839, Application 7105. Harry D. Maltis, Castella, January 7, 1932, for 1.00 c.f.s. from Cole Creek tributary to South Fork Indian Creek thence Indian Creek and Klamath River, in Sec. 10, T. 17 N., R. 6 E., H. B. and M., for mining and domestic purposes. Estimated cost \$20.

CALAVERAS COUNTY—Permit 3840, Application 7090. Harry D. Thompson, San Andreas, January 12, 1932, for 1000 gallons per day from Thompson Spring tributary to Murray Creek Drainage Area thence to Calaveras River in Sec. 6, T. 4 N., R. 12 E., M. D. B. and M., for irrigation and domestic purposes on 1 acre. Estimated cost \$260.

SAN DIEGO COUNTY—Permit 3841, Application 6667. Hallam C. Stone, El Cajon, San Diego County, January 12, 1932 for 0.5 c.f.s. from Campo Creek, tributary to Tecate River in Sec. 19, T. 18 S., R. 5 E., S. B. B. and M., for irrigation and domestic purposes on 70 acres. Estimated cost \$5,000.

ORANGE COUNTY—Permit 3842, Application 6720. Louis Robinson, El Toro, Orange County, January 15, 1932, for 0.75 and 80 acre-feet from Trabuco Creek tributary to San Juan Creek in Sec. 5, T. 6 S., R. 6 W., S. B. B. and M., for irrigation and domestic purposes on 182 acres. Estimated cost \$24,750.

SAN MATEO COUNTY—Permit 3843, Application 6154. George N. Keyston and William F. Leib, 50 Post St., San Francisco, January 27, 1932, for 0.95 c.f.s. and 520 acre-feet from El Corte Madara Creek

(Continued on next page)

Vital Statistics on Dam Construction

Applications for approval of dams built prior to August 14, 1929, filed with the State Department of Public Works, Division of Water Resources, during the month of January, 1932.

LASSEN COUNTY—Shugru Dam No. 239. James Shugru, Johnstonville, owner; earth, 16 feet above streambed with a storage capacity of 50 acre-feet, located in Sec. 19, T. 29 N., R. 13 E., M. D. B. and M., for storage and diversion purposes, for irrigation use.

SAN MATEO COUNTY—Reflection Lake Dam No. 606. Cuesta La Honda, Inc., San Francisco, owner; earth, 19 feet above streambed with a storage capacity of 37 acre-feet, situated on unnamed stream tributary to La Honda Creek in Sec. 14, T. 7 S., R. 4 W., M. D. B. and M., for storage purposes, for recreation use.

RIVERSIDE COUNTY—Picnic Dam No. 825. Moreno Mutual Irrigation Co., Riverside, owner; earth, 10 feet above streambed with a storage capacity of 14 acre-feet, situated on South Branch of Singleton Creek tributary to San Timoteo Creek in Sec. 26, T. 2 S., R. 2 W., S. B. B. and M., for storage purposes for irrigation use.

Applications for approval of plans and specifications for the repair or alteration of dams filed with the State Department of Public Works, Division of Water Resources, during the month of January, 1932.

SAN DIEGO COUNTY—Crouch Dam No. 839. Chas. C. Crouch, San Diego, owner; earth, situated on unnamed canyon tributary to Los Chollas Valley in Sec. 3, T. 17 S., R. 2 W., S. B. B. and M.

PLUMAS COUNTY—Taylor Lake Dam No. 288. J. L. Robinson, Reno, owner; rock, situated on Taylor Lake tributary to Hungry Creek in Sec. 35, T. 27 N., R. 11 E., M. D. B. and M.

RIVERSIDE COUNTY—Foxley Dam No. 821. C. E. Foxley, Romoland, owner; earth, situated on unnamed canyon tributary to Salt Creek in Sec. 5, T. 6, R. 3 W., S. B. B. and M.

MODOC COUNTY—"C" Dam No. 145-2. Cooperative Land and Livestock Co., Reno, owner; earth, located in Sec. 1, T. 44 N., R. 10 E., M. D. B. and M.

MODOC COUNTY—"N" Dam No. 145-4. Cooperative Land and Livestock Co., Reno, owner; earth, located in Sec. 24, T. 44 N., R. 9 E., M. D. B. and M.

MODOC COUNTY—Fairchild Dam No. 145-5. Cooperative Land and Livestock Co., Reno, owner; earth, located in Sec. 12, T. 43 N., R. 9 E., M. D. B. and M.

MODOC COUNTY—Round Valley Dam No. 145-8. Cooperative Land and Livestock Co., Reno, owner; earth, located in Sec. 8, T. 44 N., R. 10 E., M. D. B. and M.

NAPA COUNTY—St. Helena, Upper Dam No. 16. Town of St. Helena, St. Helena, owner; earth, situated on York Creek tributary to Napa River in Sec. 26, T. 8 N., R. 6 W., M. D. B. and M.

APPLICATIONS APPROVED

Plans and specifications for the construction or enlargement of dams approved by the State Department of Public Works, Division of Water Resources, during the month of January, 1932.

PLUMAS COUNTY—Walker Dam No. 271. Walker Mining Co., Walkerville, owner; earth, 30 feet above streambed with a storage capacity of 25 acre-feet, situated on Little Grizzly Creek tributary to Indian Creek in Sec. 7, T. 24 N., R. 12 E., M. D. B. and M., for storage purposes, for mining use.

LOS ANGELES COUNTY—Upper Hollywood Dam No. 6-29. City of Los Angeles, Los Angeles, owner; earthfill, 72 feet above streambed with a storage capacity of 193 acre-feet, located in Sec. 34, T. 1 N., R. 14 W., S. B. B. and M., for regulation and storage purposes, for domestic use.

LOS ANGELES COUNTY—San Gabriel Dam No. 2 No. 32-5. Los Angeles County Flood Control District, Los Angeles, owner; rock, 240 feet above streambed

with a storage capacity of 14,000 acre-feet, situated on West Fork tributary to San Gabriel River in Sec. 19, T. 2 N., R. 10 W., S. B. B. and M., for storage purposes, for flood control and other uses

Plans for the repair or alteration of dams approved by the State Department of Public Works, Division of Water Resources, during the month of January, 1932.

TUOLUMNE COUNTY—Stanislaus Forebay No. 97-83. Pacific Gas and Electric Co., San Francisco, owner; earth, located in Sec. 6, T. 3 N., R. 15 E., M. D. B. and M.

SIERRA COUNTY—Lower Spencer Lake Dam No. 298. William Acland Hood, Four Hills Mine, owner; rock, situated on Middle Fork tributary to North Yuba River.

SAN BERNARDINO COUNTY—Bear Valley Dam No. 803. Bear Valley Mutual Water Co., Redlands, owner; multiple arch, situated on Bear Creek tributary to Santa Ana River in Sec. 22, T. 2 N., R. 1 W., S. B. B. and M.

SAN DIEGO COUNTY—Crouch Dam No. 839. Chas. S. Crouch, et al., San Diego, owner; earth, situated on unnamed canyon tributary to Los Chollas Valley in Sec. 3, T. 17 S., R. 2 W., S. B. B. and M.

CONTRA COSTA COUNTY—Lafayette Dam No. 31-2. East Bay Municipal Utility District, Oakland, owner; earth, tributary to Lafayette Creek in Sec. 26, T. 1 N., R. 3 W., M. D. B. and M.

MODOC COUNTY—"C" Dam No. 145-2. Cooperative Land and Livestock Co., Reno, owner; earth dam, located in Sec. 1, T. 44 N., R. 10 E., M. D. B. and M.

MODOC COUNTY—Fairchild Dam No. 145-5. Cooperative Land and Livestock Co., Reno, owner; earth, located in Sec. 12, T. 43 N., R. 9 E., M. D. B. and M.

MODOC COUNTY—"N" Reservoir No. 145-4. Cooperative Land and Livestock Co., Reno, owner; earth, located in Sec. 24, T. 44 N., R. 9 E., M. D. B. and M.

MODOC COUNTY—Round Valley Dam No. 145-8. Cooperative Land and Livestock Co., Reno, owner; earth, located in Sec. 8, T. 44 N., R. 10 E., M. D. B. and M.

SAN MATEO COUNTY—Cowell Reservoir No. 615-2. Moss Beach Produce Co., Moss Beach, owner; earth, located in Rancho Corral de Tierra.

RIVERSIDE COUNTY—Foxley Dam No. 821. C. E. Foxley, Romoland, owner; earth, situated on unnamed canyon tributary to Salt Creek in Sec. 5, T. 6 S., R. 3 W., S. B. B. and M.

APPLICATIONS AND PERMITS

(Continued from page 31)

tributary to San Gregorio Creek in Secs. 20, 29 and 32, T. 6 S., R. 4 W., M. D. B. and M., for irrigation and stockwatering purposes on 898.7 acres. Estimated cost \$150,000.

SAN MATEO COUNTY—Permit 3844, Application 6155. George N. Keyston and William F. Leib, c/o Cyril Williams, Jr., 369 Pine St., San Francisco, January 27, 1932, for 0.05 c.f.s. from tributaries to El Corte Madera Creek tributary to San Gregorio Creek in Secs. 29 and 31, T. 6 S., R. 4 W., M. D. B. and M., for irrigation and domestic purposes on 120.3 acres. Estimated cost \$7,000.

SAN MATEO COUNTY—Permit 3845, Application 6156. George N. Keyston and William F. Leib, c/o Cyril Williams, Jr., 369 Pine St., San Francisco, January 27, 1932, for 0.08 c.f.s. from El Corte Madera Creek tributary to San Gregorio Creek in Sec. 29, T. 6 S., R. 4 W., M. D. B. and M., for fish culture and recreational purposes. Estimated cost \$3,000.

The ace of cards is the man who throws chewing gum in the street to see baby cars get stuck.

Words of Praise for Men Who Keep Roads Safe for Motorists

KIT CARSON and the early pathfinders were hailed as heroes during a motor-log given by Mrs. John Plover before the women of the Chamber of Commerce Auxiliary, but the present day highway maintenance men were lauded as the saviors of the traveling public.

No weather is too disagreeable nor a day too long to prevent the upkeep men of the highway organization from hastening to an impaired section of highway to make it again safe for motorists, Mrs. Plover said.

"With blind faith we follow work cars of the highway men over water covered pavement, and along tortuous ledges secure in the knowledge that they are leading us over safe roadbeds." In these words the speaker paid tribute to that vast army of men whose chief duty is to keep California highways always in repair.

Mr. and Mrs. Plover were among the motorists who escaped from the snow storms that swept through the Sierra Nevada mountains recently. In going out they ploughed through ninety miles of snow in deep ruts cut by the highway patrol cars and to safety, happy over escaping a prolonged winter outing but with a picture of snow mantled mountains that will live in their memories for years.

In closing Mrs. Plover said "And all these perfect roads cost us nothing, except the gasoline tax which is only a pittance compared to the return in comfort, safety and undecipherable beauty that one meets on every hand."—*Santa Rosa Republican*.

ROAD WORK NEVER DONE

Road construction and road work are never done.

We have built thousands of miles of fine highways. But the inexorable march of progress makes more and still more roads necessary. The increased mechanization of agriculture has made it vital that the millions of farmers now living on unimproved roads be given means for fast, efficient and economical transport.

It might be said that a road dollar has never been entirely wasted.—*Pacific Marketing Journal*.

Is "engine" a masculine or feminine word? Depends on whether or not it Mrs.

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.

COLONEL WALTER E. GARRISON..... Director
JOHN W. HOWE..... Editor

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

Vol. 10

FEBRUARY, 1932

No. 2

Editor Tells Effect of Commission's Visit

VISIT of the California Highway Commission to Imperial Valley is certain to have considerable effect on the future of road construction in this part of the State.

In suggesting that local road enthusiasts not ask too much, the commission, in the opinion of local leaders, did not mean to infer that too much has been done here already, or that too much is expected.

It was merely a gentle hint that everything that everybody wants can not be done at once and some projects will have to wait until a later date.

Imperial County has been handsomely treated by the commission in the past few years, and the construction which is now under way or about to begin, is further evidence of the commission's recognition of the importance of Imperial County as one of the principal gateways for traffic from the east to California.

All members of the commission appeared vitally interested in Imperial Valley, not only in connection with highway matters but in the progress that has been made here and in the business activity, which several remarked exceeds that of nearly any other section of the State.

The commissioners left the impression that Imperial Valley has staunch friends at the head of the State's highway affairs and local road enthusiasts have full confidence that their interests will be given every consideration possible.—*Imperial Valley Press*.

A woman, driving into a village, asked one of several boys where she could find a Mr. Jenkins.

Said the youngster, "That's him over in front of McMicks, leaning against the wall."

The woman looked in the direction indicated, and there was Mr. Jenkins. Also she noticed, just beside where he was standing, this legend carved in the stone: "MCMIX."—*London Tid-Bits*.

First Arc-Welded Steel Viaduct for Highway Ends Grade Crossing Peril

By A. J. MEEHAN, Associate Designing Bridge Engineer

IN ACCORDANCE with the grade crossing elimination program of the Division of Highways, a structure now nearing completion has several unusual features that are of interest. The location is 2½ miles east of Merced at the intersection of the all-year Yosemite Highway and the Atchison, Topeka and Santa Fe Railway, where a steel viaduct with field welded construction was the type adopted.

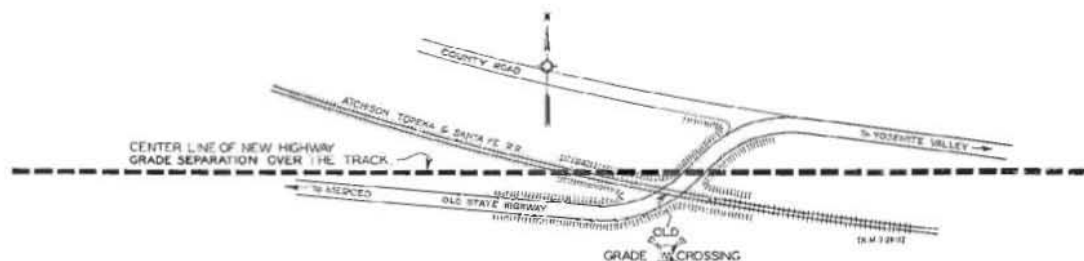
Removal of this grade crossing had become of vital importance. Extreme reverse alignment with consequent impaired sight distance and heavy railroad traffic had created considerable of a hazard to the safe and uninterrupted flow of highway traffic. Reference to the accompanying photograph of the original crossing will serve to present its dangerous alignment.

The new overhead structure is a steel viaduct 1380 feet in length consisting of 40-foot

steel beam spans on steel pile bents and 20-foot tower spans at suitable intervals to secure the necessary longitudinal rigidity. The deck is of concrete with a 24-foot clear roadway. The roadway is adapted to future widening. The project also included paved road approaches, detour and miscellaneous small structures.

Choice of steel was dictated in a measure by its slender proportions, which permitted less rise in grade and shorter spans than concrete, especially as the tracks are crossed at a severe skew. There is also the absence of falsework in the track area. Incidentally, in an overhead crossing there are certain horizontal and vertical clearances to be satisfied as set forth in the rulings of the California Railroad Commission. Provision was made for a future track on the north side of the present one.

(Continued on next page)



SAFE AND SURE, is the new alignment shown on the map made possible by the new 1380-foot viaduct abolishing the hazardous grade crossing on the all-year Yosemite Highway two and a half miles east of Merced where heavy railroad traffic prevails.



A LONG JUMP is made by this unique, welded steel viaduct carrying the highway over the railroad tracks east of Merced.



BAD SPOT, this was, where highway crossed the tracks at a severe skew, impairing visibility, augmenting danger.

Dedication and Ground Breaking Events

(Continued from page 24)

Date	Time	Place	Estimated cost
	3 P.M.	Ground Breaking— Three Dormitory Buildings	\$160,000
March 30th		STATE NARCOTIC HOSPITAL, Spadra	
	4 P.M.	Ground Breaking— Superintendent's Residence	15,000
		Two Ward Buildings	35,000
		Physician's Cottage	10,000
			\$60,000
March 31st		NORWALK STATE HOSPITAL	
	3 P.M.	Dedication— Night Attendants' Quarters	40,000
		Day Attendants' Quarters	36,000
		Physician's Cottage	10,000
			86,000
April 14th		MENDOCINO STATE HOSPITAL	
	2 P.M.	Dedication— Tubercular Ward Unit No. 7	209,000
		Ward Building No. 14	90,000
			299,000
	3 P.M.	Ground Breaking— Laundry Building	60,000

STEEL VIADUCT FOR HIGHWAY

(Continued from page 34)

The structure offers a unique example of modern construction inasmuch as ordinary steel H sections are used for piles and electric arc-welding was permitted for structure assembly. There exists no other recorded major bridge project of the welded type for highway traffic.

For some time the Bridge Department of the Division of Highways has sought to conservatively utilize welding in bearing or shear without subjecting the welds to bending. A list of some of the claims made by welding exponents follows: economy of metal by the absence of rivet holes in vulnerable parts, simplicity and minimum weight of connection details, elimination of shop costs, direct shipment from mill to site, and in some localities noiseless erection is an item.

Where steel piles are used, welding provides an easy means of connection of sway bracing as it corrects misalignment of piles due to driving conditions, and in the steel rail, adjustments are likewise simple. On this work an innovation was the use of cross

bridging of angles in place of heavy, solid diaphragms, not only effecting a reduction in weight, but permitting a more efficient disposal of these stiffening members. Connections were so designed that overhead welding, a particularly difficult operation, was eliminated. A further reduction in costs was effected by using the gas flame for cutting steel in place of expensive machine sawing.

SPECIAL SPECIFICATIONS

It was necessary to write complete special provisions covering electric welding, which meanwhile have been incorporated in our standard specifications. These special provisions cover equipment, supplies, fabrication and personnel. As to the latter, the test work is of considerable importance. Pre-qualification of welders on State work is determined by machine testing specimens of the various types of welds as submitted by the prospective welders. At stated intervals the crew is subjected to the same tests.

The total contract was approximately \$102,000, the lowest of sixteen bids which ranged to \$120,000.

Surveys Reveal Abnormal Records

(Continued from page 30)

throughout the year and six are regular drainage stations. The sampling at other than permanent stations will be discontinued shortly when the salinity has reached the minimum.

CALIFORNIA COOPERATIVE SNOW SURVEYS

The work under this project during the past month has been principally in the office in bringing up to date all compilations of stream flow and precipitation data. In accordance with the established program, it was planned that the first regular surveys at the 50 or more key courses throughout the State should be made in the latter part of January and the season's first bulletin of snow survey and precipitation data sent out early in February. As a result, however, of the abnormal precipitation and snowfall in the latter part of December, earlier surveys in the first part of January were made at a few of the snow courses and a bulletin was prepared to present for selected stations throughout the State, the available snow on ground and precipitation data to January 1st as obtained chiefly from the records for U. S. Weather Bureau stations.

In so far as generalizations for entire stream basins and state-wide territory could be made from the limited stations for which data were available, the precipitation to January 1st was indicated to be from 50 to 60 per cent above normal from the Upper Sacramento Basin south through the Mokelumne Basin, and from 80 to 100 per cent above normal from the Tuolumne to the Kern Basin, with a general average of 70 per cent above normal from Upper Sacramento to Kern Basin. In the Los Angeles, San Gabriel and Santa Ana Basins, the indicated general average was around 110 per cent above normal.

The records of the amount of snow on the ground at the end of December revealed that with few exceptions, the pack at the end of December, 1931, was the greatest, for that date, of all years of record. Unfortunately the period of record for many of the stations is comparatively short. The following gives the data for some of the higher elevation stations:

Station	Drainage Basin	Snow on Ground at the end of December—Inches		
		1931	Previous Maximum and Year	Period of Record
Canyon Dam	Feather	45	33 (1914)	17
Norden (Donner Summit)	Yuba	168	100 (1922)	34
Lake Spaulding	Yuba	56	39 (1916)	20
Twin Lakes	American	98	96 (1922)	11
Huntington Lake	San Joaquin	82	51 (1921)	17
General Grant Park	San Joaquin	92	36 (1928)	7
Giant Forest	Kaweah	66	54 (1922)	11

WATER RESOURCES

a. Mojave River and South Coastal Basin Investigations.

The Mojave River Investigation and South Coastal Basin Investigation have proceeded in a routine way.

Work in preparation for a report on well measurements in South Coastal Basin is almost completed.

b. Ventura County Investigation.

The drilling program on Piru Creek was discontinued in the early part of November because of lack of funds. This work will be resumed when funds are made available in the coming year.

c. Salinas Valley Investigation.

The Salinas Valley Investigation proceeded in a routine way. Very large floods were recorded in the Salinas Valley.

d. Pit River Investigation (Modoc and Lassen Counties).

The report covering the three years investigation, October 1, 1928, to October 1, 1931, is approximately 75 per cent complete.

e. Santa Clara Investigation.

All wells of this investigation were measured between December 1st and December 25th and the heavy rains which occurred during the month have given an opportunity to obtain data with respect to percolation losses which will go to build up the ground water plane and terminal waste on Stevens, San Antonio, Permanente, Campbell, Penetencia, Los Gatos, and Guadalupe creeks. Measurements were made on each creek at high and low stages and staff readings were taken in order to interpolate and estimate total discharges. Measurements were also made on Kirk and Duncan ditches and percolation tests were made on Alamitos and Guadalupe creeks.

f. Napa Valley Investigation.

Stream gagings were made during December on Napa River and Conn, Rector and Dry creeks and the regular monthly reading of wells was made.

STATE WATER PLAN

The California Water Resources Commission held a series of meetings on January 14, 15 and 16 in the State Building, Civic Center, San Francisco. On January 14th the Commission reviewed the financial phases of the Great Central Valley Project of the State Water Plan. On January 15th the Commission met jointly with the Legislative Water Committee in the forenoon, at which time consideration was given to the tentative form of a constitutional amendment proposed for submission to the people of California, authorizing the State Water Plan and providing machinery for its orderly execution. January 16th, the Legislative Water Committee and the California Water Resources Commission met in executive session to consider tentative recommendations made by the Committee and Commission in connection with the proposed constitutional amendment. The Water Resources Commission met in San Francisco on January 21st to further discuss the form of a constitutional amendment for consideration by the Legislature and submission to the vote of the people.

Many New Paving Devices Developed

(Continued from page 10)

In localities where rapid surface drying exists, the slab is kept continually moist by fogging. This fogging is often practiced along with the finishing and floated into the surface. Tests made with a surface hardness determining device developed by the U. S. Bureau of Public Roads show that this surface retempering does not decrease the surface hardness, and in some instances it shows an increase in strength over the normal curing methods.

Fogging has practically eliminated hair checking. During the past season a seven mile project was completed in Imperial Valley by the fogging method and without any hair checking, which previously had been considered an impossibility. Under the fogging method the slab is kept continually moist while uncovered, and, after finishing is completed, it is covered with burlap and kept wet until ponded or covered with an earth blanket.

The present mixture design consists of taking all the fine aggregate available for the individual project, making up mixtures of the individual fines and in combinations, and likewise in combinations with commercial fillers, and selecting the most desirable combination on the basis of stability results obtained in the Testing Laboratory. The idea is to carry as much asphalt in the mixture as the stability test results will permit. Our tests indicate that the most satisfactory film thickness or surface coating of asphalt is not the same for any two different aggregates, and varies considerably.

FILLER RESULTS

The results obtained with our high dust content mixtures warrant the continuation of the present practice. In these surface mixtures, commercial limestone dust filler constitutes 22-25 per cent of the total mixture passing the 10-mesh sieve. We have used, to a limited extent, a substitute filler of diatomaceous earth, with good results, the latter being proportioned in the mix volume for volume with its equivalent of limestone dust. Substitute fillers are accepted only on the basis of stabilities equivalent to that produced with limestone dust.

The high dust content mixture is much less susceptible to pushing and rolling than former mixes, and, considering the increased traffic the latest work has been immediately subjected to, this is a very satisfactory result. The recent mixtures also retain their nonskid qualities a much greater length of time than did the former work. Our oldest pavement of this type has now served 4½ years, and other than the narrow strip in each traffic lane where car drippings collect, the pavement is as nonskid as the day it was built.

PRODUCTION IMPROVED

Production plants have been materially improved in the last few years. Capacity of mixers has been increased to as high as three tons. Improved methods of feeding and storage capacity of heated aggregate have been developed to keep these plants operating at maximum capacity. Mixer gates have been so perfected that a batch may be discharged in a very few seconds and all lost time has been cut to a minimum. Timing devices have been installed on 50 per cent of the plants operating during the past year.

On one project an entirely automatic proportioning device was used. This device, operated by hydraulic jacks powered by electric motors, opens one gate and holds it open until the set weight is deposited in the weight box, then closes the first gate and opens the second gate in the order predetermined. Four separate mixes may be set up at one time and the change from one mix to another is instantaneous by means of a selective switch. The rotation of pull on the bins can be set in any way desired. This project averaged 953 tons per 8-hour day for every day the plant started over a 44-day period, the size of batch being 2½ tons.

Spreader boxes are universally used to distribute the truck loads of mixture. The finishing machine has been quite generally adopted, and various improvements have been made upon it from time to time since its inception several years ago. A traveling track arrangement has been perfected that drags along under the screed and eliminates the necessity of carrying track ahead.

CATERPILLAR MACHINE

One machine has been constructed in California that operates on a caterpillar tread running just outside the side forms, the screeds riding on the side forms as in the other models. This design has many advantages over previous machines. The rake design has been improved by changing the motion to a direct fore and aft movement which gives a combing action to the mix.

Greater smoothness of finished surface is being obtained by substituting a direct cross-roll with the first tandem roller behind the 3-wheeler on initial compression in place of the former practice of diagonal or half circle rolling. In this cross-roll every square foot of the pavement is covered, and if the shoulder width permits, all turning of the roller is done off of the pavement. The smoothness of asphaltic surfaces now approximates that obtained on our portland cement concrete pavements.

The foregoing improvements in methods and results have been accomplished by the hearty cooperation of contractors, equipment manufacturers, and highway engineers working with the thought ever in mind to better the pavement output, both as to quality and quantity per dollar invested.

Forest Road Work

Road work in the national forests of California progressed more rapidly in the fiscal year 1931 than in any previous year, according to a statement by Regional Forester S. B. Show. A total of approximately \$3,000,000 was available for construction and improvement of roads and trails in national forests in California—the largest amount in any previous fiscal year.

In the forest highway system there are now 80 projects with a total length of 2300 miles. About half of this mileage has been improved to a satisfactory standard. The total mileage of the minor road system in the national forests is 20,000 of which about 15,000 miles has been improved.

Gleaned From the Mail Bag

National Park Executive Commends Work of Safeguarding Roads After Floods

From F. A. Kittredge, Chief Engineer, National Park Service, San Francisco: Soon after the floods of the latter part of December I had occasion to drive over your highways from Palo Alto to Yosemite via Pacheco Pass, Merced and El Portal.

I intended to write you at once but neglected to do so, telling you how completely your various organizations had safeguarded washouts, slides and all dangerous places.

There were lanterns, light-bombs, barricades and signs so correctly and generously placed that there could be little opportunity for even the most careless of tourists to overlook the dangerous places in the road.

* * *

HELPED RESTORE SERVICE

From Ben Brown, Division Plant Manager, Pacific Telephone and Telegraph Company: It is with a sincere feeling of gratitude and appreciation that I learn from our field forces who were engaged in the restoration of service in the snowbound mountain area during the recent heavy storms of the cooperation and courtesies extended to our people by employees of District III located at Colfax, Summit and Truckee.

We realize the difficulties and hardships to be encountered during such periods of extreme emergency, and our definite responsibility in maintaining through service on important channels of communication under the most trying conditions.

I particularly desire to call attention to those men in your organization, Messrs. J. W. Vickrey, C. H. Weeks, L. D. Craig, and C. H. Bohrman, who displayed such a fine spirit of cooperation in this emergency, and will appreciate it if you will convey to them my sentiments.

* * *

SNOW REMOVAL APPRECIATED

From A. L. Nevins, Twain Harte Realty Company: We take this opportunity in expressing our appreciation of the wonderful results that the State Highway Department has rendered on the Sonora-Mono Highway.

Commencing in November and December, 1931, we have had considerable snow, and the traveling public has used every means to arrive in the snow area.

It has been our pleasure to note that the State Highway Department is doing everything in their power to maintain the Sonora-Mono Highway in the best possible condition for the traveling public.

* * *

From W. G. Hagelstein, Mayor of Dorris: I take this opportunity of expressing to you the thanks of our town and community for your efforts in keeping the Weed-Klamath Falls highway open this winter.

State Park Chief Reports Splendid Cooperation in Keeping Highways in Repair

From Colonel Charles B. Wing, Chief, Division of State Parks: I thought you might be interested in the item that follows, which is a part of the weekly report of Mr. Foster, who is acting as district superintendent of this area:

"As noted from the Warden's reports, it is surprising the number of cars and people who visit that park (Mt. Diablo State Park) during the periods that the mountain is snow-capped. The traveling of the roads at such periods certainly does not help them any, so that it is particularly pleasing to find how quickly the Highway Department, under Mr. W. F. Holbrook, District Superintendent, is following up and making repairs. They certainly are doing good work at Diablo State Park."

The above thoroughly illustrates the splendid cooperation we are receiving from your department throughout the whole State Park System.

* * *

NO SMALL TASK

From E. H. Brouillard, Secretary Susanville Rotary Club: At a meeting of the Rotary Club of Susanville held on the 23d instant, I, as secretary of the club was instructed to write you expressing the appreciation of the members of the club and of the people of Susanville generally, for the good work which has been done by Mr. E. J. Gribble and his coworkers, in keeping the eastern end of the Susanville-Red Bluff highway open for travel during the recent storms.

The task performed by them was no small one and commands the admiration of all who are familiar with conditions.

* * *

SAFETY ASSURED

From G. P. Blythe, Burlingame: Recently I drove from San Francisco to Agua Caliente and back to San Francisco during the heavy rains. I wish to compliment your department and those who had charge of the highways at that time for the exceptional care that was taken to insure the safety of the traveling public and to facilitate the exceptionally heavy travel occurring during the holiday week.

* * *

THANKS FROM AMERICAN LEGION

From Andrew H. Stahl, Adjutant, Melvin Smyth Post 58: Melvin Smyth Post 58, American Legion, wish to thank the Department of Public Works for the wonderful cooperation toward making the snow carnival at Longbarrn, California, January 17, 1932, such a success. Especially do we wish to thank S. E. Harris and his men who worked so diligently.

Bridge Piles Tested for Safety With 500 Tons of Steel Rails

(Continued from page 23)

design for a continuous suspension type structure. For the East Bay Crossing the designs under consideration have been narrowed down to the cantilever or arch suspension type.

Ten cars of steel rails, weighing 500 tons, were utilized in an interesting test conducted this month by the Bay Bridge engineering staff for the purpose of determining the load that may be safely put on one pile.

INTERESTING TEST

The test was made on nine piles driven 110 feet into the clay found at the bottom of the Bay midway between Yerba Buena Island and the Key Route Mole. After being driven into the bay bottom, the piles were loaded with the steel rails to provide a load of 57 tons per pile. The test showed a settlement, according to Chief Engineer Purcell's report, of less than 3-4 inch per pile.

In the final design for the pier to be located at this point, 480 piles will be driven. Each pile will be subjected to a load of one-half the intensity under the present test, and will be driven 30 feet deeper into the clay than the test piles.

Boring operations have started on the site of the first pier off San Francisco. After these borings are complete the drilling will be shifted to the center anchorage. An additional hole will also be bored at Pier 5, which will complete the bay borings.

SNOW MAY BE RED

What color is snow? White is the natural answer, which may be right or wrong, as the case may be. Snow is generally white, so white that it has become a synonym for exceptional purity. But snow may also be red—blood red, as Judge Walter Fry recalls having seen it on one or two occasions in the Sequoia National Park. U. S. Department of Agriculture chemists found it due to a minute form of life of the genus *Sphaerella*.

FEWER CARS, MORE MILEAGE

Motorists throughout the country averaged 300 miles more of travel per car last year than in 1930, it is revealed in preliminary figures reaching the California State Automobile Association. This conclusion is based on the gasoline consumption for motor cars, which was 500,000,000 gallons above the preceding year.

This showing was made in the face of a reduction of 1,000,000 cars in the production for 1931.

SOME RIDE!



ALL WORK and no play makes a dull day, so these highway workers managed to snatch a little fun at the noon hour by grace of the shovel operator.

Introducing "Pretzel" Intersection Plan

Among traffic relief schemes being developed in New Jersey and some other heavy travel centers, is the "four-leaf clover" or "pretzel" type of boulevard intersection. This consists of separated cross-roads, one bridged across the other, with connecting road links joining each of the four sides of the two main routes.

This plan, it is pointed out by the engineering department of the Automobile Club of Southern California, eliminates the necessity of cars crossing the path of others at any time, regardless of the turn or direction each may wish to take. Motorists desiring to turn left from the one boulevard into the other, will continue under or over the bridged intersection, then turn to the right just beyond the bridge into the connecting link road, making a loop, and turning right again in order to continue in the direction planned on the main cross-road. Thus two right turns make a left turn, without having to cross the path of other traffic.

Highway Bids and Contract Awards Made in January

MERCED COUNTY—One mile east of San Joaquin River to easterly boundary, 0.1 mile to be graded and paved with Portland cement concrete, and 3.5 miles levees to be constructed. Dist. VI, Rt. 32, Sec. C, C. W. Wood, Stockton, 12,232; Granite Construction Company, Ltd., Watsonville, \$13,281; W. A. Dontanville, Salinas, \$13,051; Fred W. Nighbert, Bakersfield, \$14,470; Valley Paving and Construction Co., Fresno, \$17,727; Thermotite Construction, Inc., San Jose, \$12,190; Force Construction Co., Piedmont, \$12,382; Ties-lau Bros., Berkeley, \$13,746. Contract awarded to Delta Dredging Co., Pittsburg, California, \$11,604.

MENDOCINO COUNTY—Bridge across Russian River 3.5 miles northeast of Ukiah, consisting of one 100-foot steel span, fourteen 19-foot timber spans and .3 mile of roadway to be graded and surfaced. Dist. IV, Rt. 15, Sec. A, The Utah Construction Co., San Francisco, \$35,213; M. B. McGowan, Inc., San Francisco, \$33,660; Fred J. Maurer & Son, Inc., Eureka, \$35,331; Healy-Tibbitts Construction Co., San Francisco, \$34,642; A. W. Kitchen, San Francisco, \$34,320; W. J. O'Neil, San Francisco, \$41,055; A. T. Howe, Santa Rosa, \$38,963; J. W. Terrell, Sacramento, \$33,295; Smith Bros. Company, Eureka, \$33,344; Peter McHugh, San Francisco, \$33,506; C. W. Wood, Stockton, \$35,060; Rocca & Calletti, San Rafael, \$36,625; M. R. Peterson, Sacramento, \$33,349. Contract awarded to Helwig Construction Co., Sebastopol, \$32,359.

MONTEREY COUNTY—Construction of Salinas Maintenance Station, 1 mile north of Salinas. Dist. V, Rt. 2, Sec. A, Empire Construction Co., Ltd., San Francisco, \$17,750; J. C. Thornburg, Spreckels, \$13,562; John E. Branagh, Piedmont, \$14,363; Thermotite Construction, Inc., San Jose, \$12,407; Oliver S. Almie, San Francisco, \$13,363. Contract awarded to Theodor Johanns, San Francisco, \$12,176.

PLACER COUNTY—Between Gold Run and Airport, about 11.5 miles to be graded. Dist. III, Rt. 37, Secs. C, D and E, Fredrickson & Watson Construction Co., and Fredrickson Bros., Oakland, \$517,988; Healy-Tibbitts Construction Co., and J. P. Holland, Inc., San Francisco, \$486,143; Granfield, Farrar & Carlin, San Francisco, \$403,822; The Utah Construction Co., San Francisco, \$536,039; Lewis Construction Co., Los Angeles, \$419,034; Contoules Construction Co., and Schuler & McDonald, Inc., Oakland, \$477,916; T. E. Connolly, San Francisco, \$659,922; Clyde W. Wood, Stockton, \$438,042; von der Hellen & Pierson, Castaic, \$449,458; Hemstreet & Bell, Marysville, \$432,249; E. C. Coats, Sacramento, \$532,159; George Pollock Co., Sacramento, \$501,735; Skeels & Graham Co., Roseville, \$451,928; Morrison-Knudsen Co., Boise, Idaho, \$498,777. Contract awarded to Lang Transportation Co., Los Angeles, \$358,419.

SAN DIEGO COUNTY—Between Carlsbad and Oceanside, about 0.3 mile of highway embankment to be widened. Dist. VII, Rt. 2, Sec. B, H. E. Cox & Son, Pasadena, \$5,296; Yglesias Bros., Inc., San Diego, \$5,800; Match Bros., Elsinore, \$6,305; Daley Corporation, San Diego, \$18,768. Contract awarded to H. H. Peterson, San Diego, \$3,783.

SAN DIEGO AND IMPERIAL COUNTIES—Between Tecate Divide and Mountain Springs Grade, 14.6 miles to be graded and paved with Portland cement concrete. Dist. VII, Rt. 12, Secs. G, H, Basich Bros. and Gist & Bell, Torrance, \$339,420; E. Paul Ford, San Diego, \$335,888; Walter Trepte & C. R. Butterfield, San Diego, \$369,382; Daley Corporation, San Diego, \$313,425. Contract awarded to Match Bros., Elsinore, \$289,865.

SAN LUIS OBISPO COUNTY—Erection and completion of Maintenance Station about 2 miles north of Cambria. Dist. V, Rt. 56, Sec. B, Roland L. Hautz, Cambria, \$9,650; Theodor Johanns, San Francisco, \$9,788; Oliver S. Almie, San Francisco, \$9,870; Jones & Turner, Santa Maria, \$9,960; W. J. Smith, San Luis Obispo, \$10,087; Theodore M. Maino, San Luis Obispo, \$10,328; Geo. B. Finch, Atascadero, \$10,532; Earl Bowen, Strathmore, \$10,784; Chas. W. Fairbanks, San Luis Obispo, \$10,850; Thermotite Construction, Inc., San Jose, \$11,112; Edwin D. Jarvis, San Luis Obispo, \$11,800. Contract awarded to Daniels Bros., Cambria, \$8,990.

In Memoriam

JAMES F. ELWOOD, Draftsman in the District VII office of the Division of Highways, died December 21, 1931, of heart disease in Los Angeles.

Mr. Elwood was one of the oldest employees of the District in service, having been employed almost continuously since May 15, 1912.

He was born in England and came to this country in 1901, taking a position as office engineer with the Santa Fe Railroad Company. He was employed by that company and by the Los Angeles & Salt Lake Railroad Company until 1912, when he resigned to take a position with the California Highway Commission.

Mr. Elwood was an exceptionally conscientious and efficient worker during his long period of employment with the California Highway Commission and the State Division of Highways.

He is survived by a widow, Sarah F. Elwood, and a son, Ernest Elwood, who reside in Los Angeles.

An increased road building program always makes more jobs, adds more to general wealth and increases more economic transportation for more people than any other industry.—*American Highways.*

The big surprise of the month was undoubtedly experienced by the Austin owner who drove into the Third Street tunnel in Los Angeles and came out of a gopher hole in Whittier.—*Exchange.*

Then there is the city kid who went to the country to see his grandmother for a visit and saw some ducks walking around and shouted, "Oh, granny, lookit the birds that just got out of a rumble seat!"

ARCHITECTURAL AWARDS

For Month of January

Pacific Colony—Contract for ground lighting to Walker-Martin Corp., Los Angeles, \$6,430.

Stockton State Hospital—Contract for installations of dumbwaiters to Building Specialties Company, San Francisco, \$7,300.

San Jose State Teachers College—Natural Sciences Building—Contract for General Work to J. F. Shepherd, Stockton, \$139,356; Complete Plumbing, Heating and Ventilating work to A. J. Peters & Son, San Jose, \$35,902; Electrical work to Eddy Electric Co., Stockton, \$10,506.

Napa State Hospital—Addition and Alterations to Female Acute Disturbed Cottage and Addition to Acute Quiet Hospital—Contract for General Work to Barrett & Hilp, San Francisco, \$52,550; Plumbing work to J. A. Fazio, Oakland, \$4,150; Heating Work to Schreiber Bros., Oakland, \$2,479; Electrical work to W. B. Baker & Co., San Francisco, \$1,244.

Preston School of Industry, Ione—Dairy Unit and Farm Foreman's Cottage—Contract for General Work to Harry Schuster & Co., Ltd., Oakland, \$23,905; Complete Plumbing and Heating to Carl T. Doell Co., Oakland, \$8,600; for Electrical work to Jack W. Thomas, Sacramento, \$1,650; insulation work to Allyn L. Burr Co., Sacramento, \$1,860; Refrigeration to Carrier Engineering Corp., San Francisco, \$2,636.

Pacific Colony—Three Dormitory Buildings—Contract for General Work to Herbert M. Baruch Corp., Los Angeles, \$74,100; for Electrical work to H. H. Walker, Los Angeles, \$2,375; for Heating and Ventilating work to J. B. Welsh, Alhambra, \$10,400; for Plumbing work to F. B. Jones, Pasadena, \$7,785.

STATE OF CALIFORNIA
Department of Public Works

HEADQUARTERS: PUBLIC WORKS BUILDING, ELEVENTH AND P STS., SACRAMENTO

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COLONEL WALTER E. GARRISON-----Director

JAMES I. HERZ-----Deputy Director

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FRANK A. TETLEY, Riverside

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JOHN W. HOWE, Secretary

HUGH K. McKEVITT, Attorney, San Francisco

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FRED J. GRUMM, Engineer of Surveys and Plans

C. S. POPE, Construction Engineer

T. H. DENNIS, Maintenance Engineer

F. W. PANHORST, Acting Bridge Engineer

R. H. STALNAKER, Equipment Engineer

E. R. HIGGINS, Comptroller

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F. W. HASELWOOD, District II, Redding

CHARLES H. WHITMORE, District III, Sacramento

J. H. SKEGGS, District IV, San Francisco

L. H. GIBSON, District V, San Luis Obispo

E. E. WALLACE, District VI, Fresno

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A. D. EDMONSTON, Deputy in Charge Water
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Reclamation

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Supervisor

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J. W. DUTTON, General Superintendent Construction

W. H. ROCKINGHAM, Mechanical Engineer

C. A. HENDERLONG, Assistant Mechanical Engineer

W. M. CALLAHAN, Electrical Engineer

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RIGHTS OF WAY**

C. C. CARLETON, Chief

FRANK B. DURKEE, General Right of Way Agent

C. R. MONTGOMERY, General Right of Way Agent

DIVISION OF PORTS

Port of Eureka—William Clark, Sr., Surveyor

Port of San Jose—Not appointed

Port of San Diego—Edwin P. Sample



STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

MAP
SHOWING
STATE HIGHWAY SYSTEM

1931

LEGEND
Primary Roads ———
Secondary Roads - - - - -

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