

CALIFORNIA HIGHWAYS and PUBLIC WORKS

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1932

CONFIDENCE HIGHWAY

DEPRESSION ROAD

Official Journal
of the
DEPARTMENT
of
PUBLIC WORKS
STATE OF
CALIFORNIA

December 1931

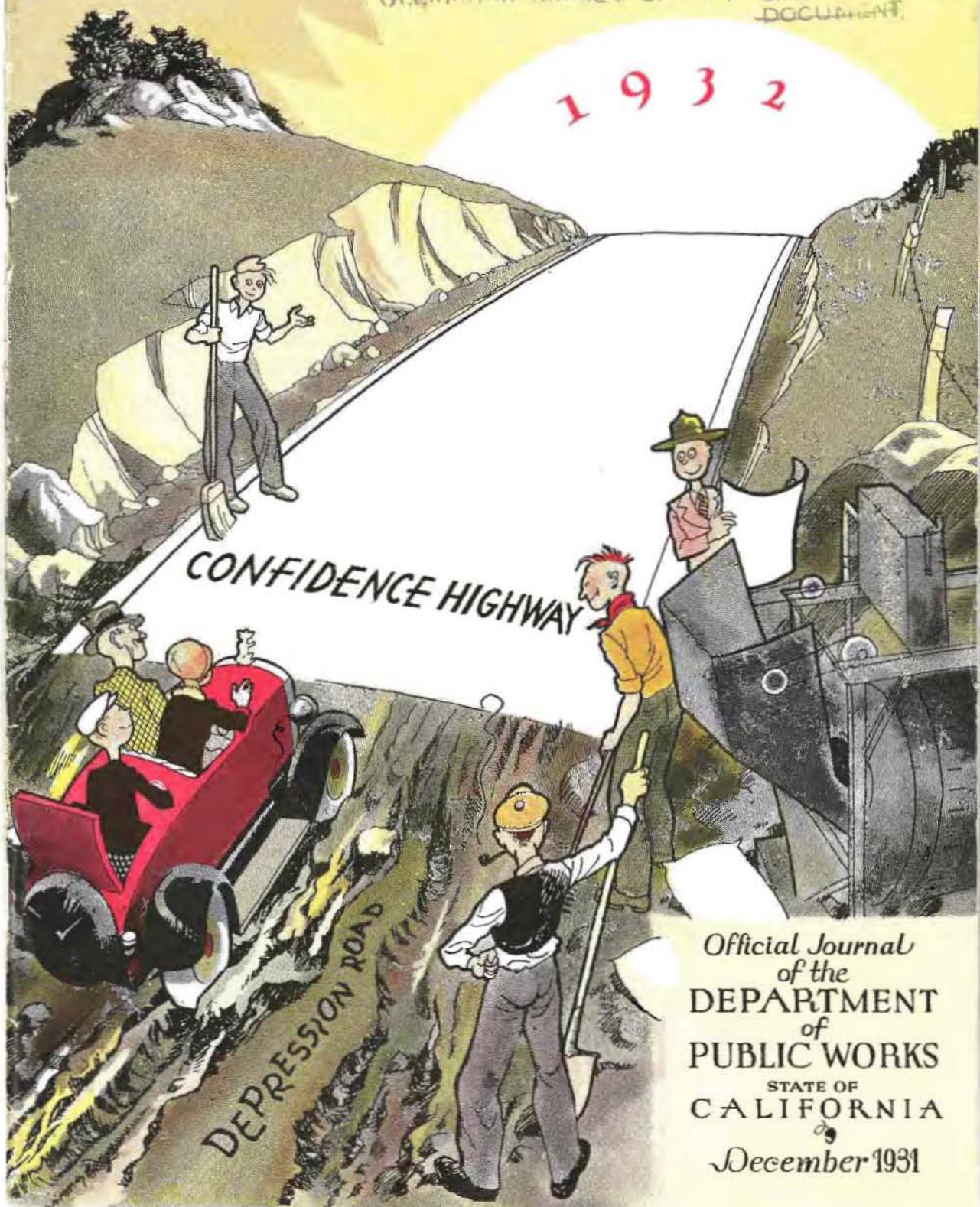


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803 Miles of Road Built 115 Public Buildings Erected } in 1931

Department of Public Works Shows a Record Breaking Year
for Highway and Architectural Divisions

By COLONEL WALTER E. GARRISON, Director of Public Works

EXCEEDING by several millions of dollars the improvement record of any former year, the Public Works Department of the State of California will pass from 1931 into 1932 in full action against another impressive schedule of work.

Dollar marks and figures are the only symbols by which the story can be reduced to concrete form. But, back of the cold figures is the exhibit of work well done; and the diffusion of comfort and happiness to tens of thousands of families through the circulation of these dollars.

TOLD IN FIGURES

The work of the Highway Division is so continually under the eyes of millions that a summing up of its annual story must prove of special interest to Californians. This is written in mid-December. The totals about to be given (with the exception of an item of \$1,593,200 covering bids to be opened prior to January 1) are those on completed or going projects. That item is now read into the total as it will have been contracted by the time this reaches the reader.

The Division of Highways has transacted a business during 1931 that totals \$42,554,000. The items entering into the total are: Work under way \$24,648,200; bids to be opened prior to January, \$1,593,200; work carried

over from 1930, \$9,402,600; maintenance cost for the year, \$6,910,000.

Converted into terms of mileage, the record shows 803 miles of completed or progressing improvement. The items making this total follow: Graded, 70 miles; untreated crushed rock surface, 59 miles; bituminous treated crushed rock surface, 454 miles; bituminous macadam pavement, 7 miles; Portland cement concrete pavement, 138 miles; asphalt concrete pavement, 75 miles.



Colonel Walter E. Garrison

The California State Highway system comprises 7281 miles. Of this total, 3091 miles are paved; 1425 graded and merely surfaced with oil and crushed stone; 819 graded and macadamized—leaving 1946 miles ungraded and unsurfaced, practically untouched.

Responding to public demand, the Legislature each session makes an orderly inclusion of secondary road mileage. The last Legislature alone added roads that call for an expenditure of \$71,000,000. This vast amount covers only one biennium's increased demand on funds available for construction, recon-

struction and maintenance. The fine showing for 1931 is, after all, only a credit against a vast and increasing debit.

It follows that if the program is to go forward, the present sources of revenue, majoring in the gas tax, must remain unimpaired.

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Fighting Snow on Mountain Highways With Latest Methods and Machinery

By T. H. DENNIS, Maintenance Engineer

For the first time in the history of California a determined effort is being made to keep Donner Pass on the Victory Highway through the Sierra Nevada range, open to traffic throughout the Winter. This famous gateway to Northern California traverses a heavy snowfall area ninety miles long and reaches a maximum elevation of 7135 feet at Donner Summit. The following article describes the methods and modern heavy equipment now in use battling snow on this and other mountain highways.

FOR NEARLY ten years the Division of Highways organization has been interested in the problem of snow removal. It was evident in 1922 that the increase in motor travel, coupled with the improvement of the mountain roads, would eventually justify keeping the main through routes open to traffic.

The first special equipment for this work was assigned the Pacific Highway between Dunsmuir and Weed in cooperation with Siskiyou County. Provision was also made for taking care of the occasional heavy storms which might block the Ridge Route between Los Angeles and Bakersfield. These two routes have comparatively light snowfall, although removal work is required each winter on the Pacific Highway where an elevation of about 3800 feet is reached.

Nothing special was done on the other routes for several years, except as roads could be opened with the regular tractor and grader equipment, as, for instance, the roads between Redding and Alturas, Redding and Arcata, and Nevada City to Downieville. The principal reason for this was not lack of appreciation of the benefits to traffic, but was due to the unimproved conditions of the mountain roads.

Narrow Road Handicaps

It is not possible to handle any great quantity of snow within the limits of a narrow, crooked road. Even if the road is free from

snow it is very difficult to keep it passable under California winter traffic conditions unless the road surface is rocked or paved. The next step in the snow removal work, therefore, was a concerted effort to keep certain snow routes open as late as possible in the fall, and to open them as soon as conditions permitted each spring.

This stage still holds for a number of the State routes and will continue to apply for some years to come.

This period gave the organization opportunity to try out various methods of work and types of equipment, as well as gain experience which is so essential to the success of snow removal operations.

Two years ago, equipment was allotted to the lateral between Red Bluff and Susanville so that the route was kept open throughout the winter. The road crosses two summits—one at Mineral and the other at Fredonia Summit, which is at an elevation of about 5000 feet. Last year, additional equipment, including two rotary shovel type



T. H. DENNIS

plows, truck mounted, was secured for the Donner Pass route between Sacramento and Reno. This road was opened several times during the winter season, it being closed only one month during the year to traffic. While gratifying to the traveling public, this success was possible only because of the unusually light snowfall and especially favorable winter conditions.

The completion of construction work during the

(Continued on page 16)



KING WINTER WORKS overtime on this Donner Summit area of his frigid domain. Here is a view of the Eastern Donner Grade taken from a point just below the Summit showing the snow-covered road that maintenance crews are keeping open to traffic and Donner Lake in the distance.



This fixed shovel rotary type machine keeps the road open on the Crest Route near Big Bear Lake, San Bernardino County.



Speed push plow from the Colfax station operating near Soda Springs on the Auburn-Truckee road.



SNOW FIGHTERS DIG IN to these comfortable quarters on the Donner Summit whenever they can call it a day. The house accommodates sixteen men and the roundhouse shed and machine shop houses ten big truck plows. Both buildings are steamheated.

Cajon Pass Curves Doomed, 59 of Them-- Improvement Involves Moving a Creek

By E. Q. SULLIVAN, District Engineer

CAJON PASS, historic gateway to southern California for all transcontinental traffic entering the State through Needles and Las Vegas, is again to be touched by the magic wand of modern engineering and have some of its narrow, winding stretches replaced by the highest type of State highway alignment and construction.

In addition to accommodating all transcontinental traffic entering over the National Old Trails and Arrowhead Trail, this famous old pass is the only outlet to those routes for east-bound traffic from Los Angeles and the San Bernardino Valley as well as a thoroughfare for airways and railways into and out of southern California.

Most Scenic Canyon

Sixteen miles in length with a rise of about 3000 feet, the pass crosses the spectacular San Andreas Fault with its high up-turned cliffs and seemingly loses itself among towering mountains where the upper reaches of the Mojave River flow down to the desert. Cajon or Box Canyon it was therefore called by the early Californians who knew it as an Indian trail, later used by Forty-niners and Mormon settlers.

It is a most scenic canyon with changing views of ever new beauty at every turn and rise, according to the season of the year—snow-capped mountains, violet-colored, misty hills, beautiful spring flowers or red holly berries, groups of sycamore and wild walnut trees, thousands of yucca plants and over all the hillsides a thick, luxuriant growth of chaparral.

The present road was built in 1916 and was a marvelous improvement on the old ox-cart trail which meandered up the pass and then turning off to one side into Horse Thief Canyon continued its tortuous way across a creek and over a narrow grade up the gorge to the summit. Horse Thief Canyon was abandoned for the present route directly up the pass, which was taken over by the State ten years ago.

Record Height Cuts

In 1930, the upper three and one-half miles were relocated, eliminating a number of

rather steep switchbacks dangerous in wet weather. By means of great cuts, some of them of record-breaking heights in State highway construction, a direct, wide, high-gear grade was provided to the summit.

Now important improvements of the lower portion are to be made and have been let to contract, beginning near Alray, where two undergrade crossings are being constructed to make a safe crossing for the Santa Fe Railroad, which has used the pass for 46 years.

The line for the relocated highway sweeps up the pass in long, easy curves, reducing the number of present sharp turns and curves from 91 to 32. The new curves will be of such great radius as to make them safe and secure for motorists under all conditions of weather and traffic.

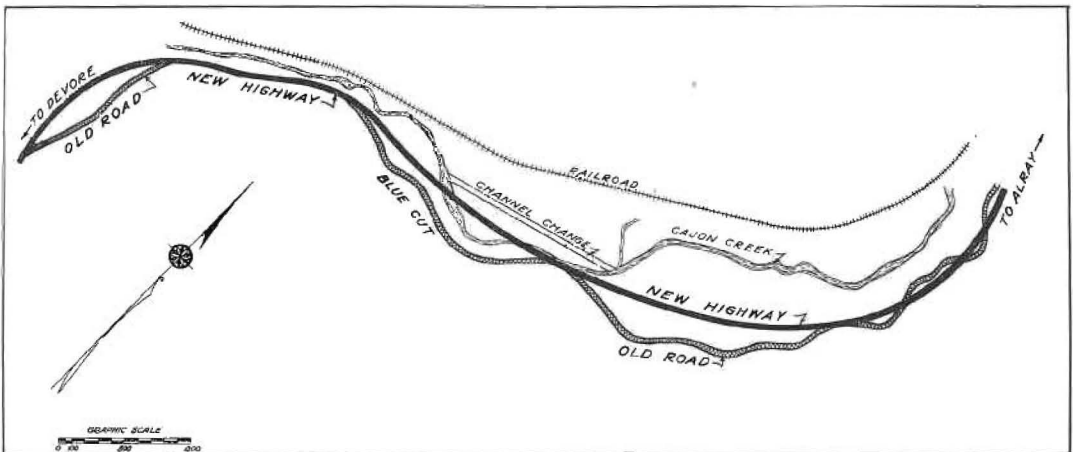
Mountain Playground

These factors will be especially appreciated in the winter when thousands of cars crowd the pass on week-ends bound for the snow sports at Big Pines, the Los Angeles County mountain playground to which the pass affords most direct access. The new highway will also eliminate the famous Blue Cut slide that has been a menace to travel and a block-ade point for many years. This Blue Cut slide is a towering mass of crushed material of beautiful blue-green color, a result of the San Andreas Fault. So unstable is this mass that every rain brings down fresh slides on to the highway, narrowing and frequently entirely blocking the road. For many years the slide has been the cause of considerable expense for extra work entailed in keeping the highway open to traffic.

Moving a Creek

To cure this condition a major surgical operation will be performed upon Cajon Creek, which flows down through the pass. At Blue Cut slide the pass narrows, with the Santa Fe tracks occupying one bank of the creek and the highway running above the other.

Under the plans for the highway improvements the creek will be shifted into a new channel and the highway built on a fill across the old creek bed, thus placing the



CURVES ARE OUT of style with highway engineers, particularly the old-fashioned hairpin variety. Accordingly Cajon Pass, famous southern California gateway for transcontinental traffic through the mountains into the San Bernardino-Los Angeles areas, is to get a utilitarian beauty treatment from the highway doctors by which its curves will be reduced from ninety-one to thirty-two. The operation involves moving Cajon Creek out of its channel to permit location of the new highway a safe distance from Blue Cut slide, a mountainous mass of soft material that for years has been a menace to traffic, washing down upon the road during every rainstorm. The upper picture shows the new route near the slide, indicated by arrow. The diagram map shows the general route eliminating many curves and the location where Cajon Creek will be moved.

road at a safe distance of several hundred feet from the slide.

Then no longer will every rain bring a call from the Blue Cut slide for the maintenance crews to come and pull cars through the muck and rock debris blocking the road.

If, as an optometrist estimates, 72 per cent of the American people suffer from eye strain, it probably is due to looking for a place to park.—*Macon Journal*.

ROAD INTO ALASKA

From an engineering standpoint construction of roads in British Columbia and the Pacific Coast States in the proposed International Highway, is a feasible project. This is the statement of George Black, Canadian legislator and chairman of the Canadian-American Alaska Highway Committee. Existing roads in British Columbia and the Pacific Coast States form part of the proposed highway, eventually to be extended into South America.

Six Southern Delegations Heard by Highway Commission in Los Angeles

THE CALIFORNIA Highway Commission held its regular December meeting in Los Angeles on Friday, December 11, the second meeting in southern California following the first one held in San Diego in October.

Six delegations from various sections of the Southland and one from the North appeared before Commissioners Earl Lee Kelly of Redding, chairman; Timothy A. Reardon of San Francisco; Phillip A. Stanton of Anaheim; Harry A. Hopkins of Taft and Frank A. Tectley of Riverside. Sitting with the Commission were Colonel Walter E. Garrison, Director of Public Works; C. H. Purcell, State Highway Engineer; C. C. Carleton, Chief of the Division of Contracts and Rights of Way; District Engineer, S. V. Cortelyou of District VII and District Engineer, E. E. Wallace of District VI.

With the Commission's meetings open to the general public a number of citizens attended as spectators as was the case at San Diego and the hall on the second floor of Los Angeles headquarters in the Associated Realty Building was a busy scene from 10 a.m. to 5 p.m. with delegations and spectators coming and going.

JOINT HIGHWAY PROJECT

A delegation from Alameda and Contra Costa counties representing Joint Highway District No. 13 organized for the construction of a highway from Oakland with a tunnel at the Contra Costa County line asked a reconfirmation of an agreement for a \$300,000 State contribution to the project made when the district was organized. The delegation consisted of Redmond C. Staats, president of the district; Oscar Olsson, secretary; H. L. Hinman, treasurer; Archibald B. Tinning, attorney; George A. Posey, engineer and Ralph R. Arnold, associate engineer. On motion of Commissioner Reardon the Commission made \$150,000 available when the district is ready to commence work and the balance at a later date.

A delegation including Speed B. Leas, Cal. H. Antrim and F. M. Stuart of Fresno submitted figures for rights of way, relocation of a canal and construction of a turn-out on

the proposed State highway realignment between Fancher Creek and the southerly limits of the city on the railroad routing. As the figures came within the amount set as the maximum for that route as compared with an alternative route, the railroad routing was adopted on motion of Commissioner Hopkins.

ACTION DEFERRED

Mayor John Knox of Santa Monica, Mayor M. J. Johnson of Newport Beach, J. P. Greeley and Lew Wallace directors of the Newport Chamber of Commerce asked the Commission to arrange for the early beginning of construction on the highway and grade separation known as The Arches or Branagan Crossing at Newport Beach. The project is at the junction of the Coast Highway and the extension of Route 43 to Newport Beach and has been planned as a cooperative project with State, city and county participating. Mayor Johnson said the city could furnish the State with right of way but could not contribute funds. Action on the matter was accordingly deferred pending agreement on a new basis of cooperation.

A delegation headed by Mayor Clark of Redondo and including City Engineer Leonard of Torrance, Miss Smith of Lomita, Clifford Reid of Redondo, Ralph Graham, Mrs. Parkhurst and Miss Parkins of Wilmington appeared to inform the Commission that 85 per cent of the 100-foot right of way for the cooperative paving of State street between Wilmington, Lomita and Redondo had been secured and urging beginning of work. They were advised it was necessary for the cities to secure total right of way before the State could fulfill its obligation.

ALIGNMENT SOUGHT

Guy E. Leonard and R. V. Bashore of Bellflower asked the adoption of the Somerset avenue alignment through Bellflower in the event the connecting road link from Long Beach to Foothill Boulevard, east of Pasadena, is recommended to the Legislature for inclusion in the secondary road system.

A. C. Hardison and John Thille representing the Santa Clara Water Conservation dis-

New Acts Give Highway Rights Over School Lands; Other Procedure Aided

By FRANK B. DURKEE, General Right of Way Agent

THE RIGHT OF WAY Division in recent months has moved forward in several directions in its never-ending effort to acquire adequate rights of way for California State highways. Statutory authority now exists for the first time for grants of right of way across State school lands; procedure for acquiring easements over lands in probate has been shortened and made less expensive; advantage is being taken of Federal legislation to secure reservations of the public domain for highway purposes; securing of permits for rights of way within the national forests has been simplified.

In the first two instances, the procedure is based on acts of the Legislature which were approved by Governor James Rolph, Jr., last spring: 1. Acquisition of school lands for highway purposes. (Statutes of 1931, Chapter 672; Important Statutes, page 255.) 2. Dedication of property for highway purposes by executors, administrators and guardians (Sections 587 and 1515 of the Probate Code; Statutes of 1931, Chapter 1046, Important Statutes, page 256).

OVER SCHOOL LANDS

To understand the situation which has existed heretofore with reference to State school land, it should be borne in mind that these lands are grants to the State of Federal lands for the purpose of sale for the benefit of the common schools.

It has been the practice heretofore to construct State highways across school lands without authority. No definite width of right of way was secured because there was no means by which one might be obtained. Maps were filed with the Surveyor General to give notice of construction, but he had no authority to dispose of such lands except by outright sale to individual purchasers. He had no authority to make grants of either the fee or an easement to any department of the State government.

The statute referred to above authorizes the Division of State Lands, of the Department of Finance, to grant easements and rights of way to the Department of Public Works to or over the State's school lands "for the purposes of rights of way for high-

ways and for use in protecting highways from damage or destruction by natural forces."

NECESSARY PROCEDURE

A form of application, to be accompanied by the necessary descriptions and maps, has been agreed upon by the two departments concerned and the procedure to be followed in filing applications was outlined in a memorandum sent to all District Engineers and District Right of Way Agents, in October, 1931. The application must set forth a definite width of right of way defined by a center line description tied into a section corner.

The easements to be acquired will be executed by the Chief of the Division of Lands and will be placed of record the same as other similar grants of right of way acquired by the Department. Any patents issued upon the subsequent sale of the parcels crossed by a right of way so acquired will set forth the State's easement as a reservation.

Such reservation of the right of way in subsequent patents should obviate future disputes with school land purchasers over highway boundaries and widths, since such easements are now granted under statutory authority and hereafter will be a matter of record in the respective counties and in the Division of Lands as well.

CLEAR UP TITLES

Division Engineers have been urged to review all existing State highway in their respective divisions and to make application as soon as possible for right of way over any parcels of school land crossed by completed construction.

A number of applications already are on file with the Division of State Lands which has assured the Department of its desire to cooperate to clear up titles to highway right of way across all school land areas under its jurisdiction. Future construction, of course, may be similarly cleared as the highway program progresses.

The importance of this statute may be judged when it is understood that the State of California is the owner of approximately 750,000 acres of unsold school lands.

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State Research Experts Develop Durable Traffic Line Paint Formula

By THOMAS E. STANTON, JR., Materials and Research Engineer

THERE is nothing which gives more comfort to the expert as well as the timid driver on our highways, day or night, than the traffic stripe which directs traffic along well defined lanes and which has caused such a unanimous demand on the part of the motoring public for more and better stripes that the Maintenance Department of the Division of Highways, under the direction of Maintenance Engineer T. H. Dennis, is now spending close to one hundred thousand dollars a year for this purpose alone.

The average layman looks upon the problem of maintaining such a stripe as comparatively simple and inexpensive.

It is true that the mechanical problems involved in the economical construction of the line have reached a high degree of perfection and that with a relatively small and inexpensive outfit it is now possible to apply many miles of a neat and accurately aligned stripe per day at a very low cost.

The labor of painting the stripe, however, represents less than 20 per cent of the entire cost, the other 80 per cent being the cost of the paint.

Not only does the paint constitute the great bulk of the cost of striping but so also does this material constitute the biggest problem the highway engineer has to face because it must have certain well-defined characteristics to make it of value for the purpose.

DRIES QUICKLY

In the first place, it must dry to such an extent in approximately one-half hour or less that it will not be injured by traffic. This accelerated drying requires that the lacquer type of paint be used instead of any of the well known oil paints, the quality of which have been developed to a high stage through

the use of now well understood standard high grade materials and methods of manufacture.

The use of oil, however, makes the paint slow drying and this drying time can not be shortened to the extent required for traffic lines without injury to the paint.

As a substitute for the oil paint there has, during recent years, been an extensive development and use of the lacquer type wherever accelerated drying is desired such as for example in painting automobiles, furniture and traffic stripes.

The lacquer vehicle in which the white or colored pigment is ground consists of a nitro cellulose or a gum dissolved in some highly volatile solvent such as alcohol, benzol, acetone, etc. When spread on a surface in a thin sheet the solvent evaporates rapidly and leaves a hard residue.

Some solvents dissolve asphalt and, therefore, this type of solvent can not be used in the manufacture of traffic lacquers.

PAINT FLAKES OFF

Some gums leave a brittle residue which flakes readily after evaporation of the solvent. This type of gum can

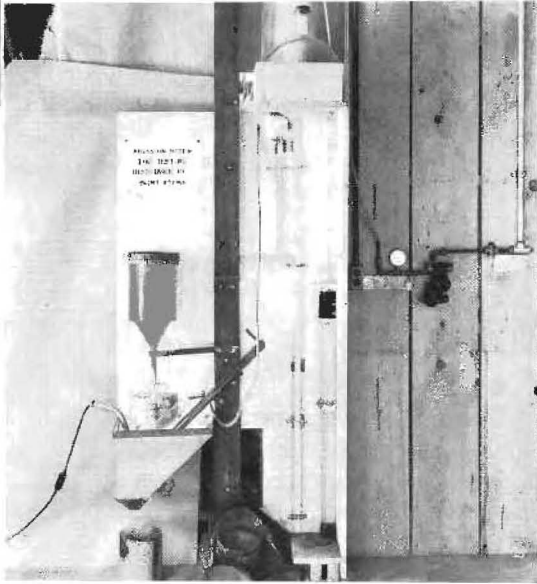
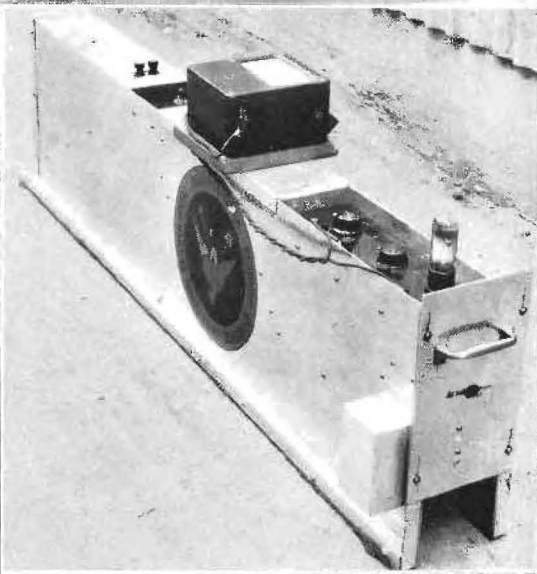
not be used unless it is possible to add some ingredient which will act as a toughener. Any such adulteration produces a slower drying material and when used to excess may so lengthen the drying time as to render the product unusable as a traffic lacquer.

On the other hand, the residue, after the solvent has evaporated, must not be soft or sticky in the slightest degree; otherwise it will be readily discolored by dirt, grease and oil from the traffic which passes over it.

The residue must also be highly resistant to abrasive action, otherwise it will wear out in three to six months time and rapidly lose its value as a safety guide, thereby requiring



THOMAS E. STANTON, JR.



STUDYING WHITE LINES calls for chemical research and inventive genius. In the top picture, Retfa Alter, junior testing engineer at the Department of Public Works laboratory, is shown directing lamp rays into the aperture at bottom of an apparatus he designed for testing the light-reflecting properties of different paints used for striping traffic lines. Fred T. Maddocks, senior engineer, is reading and recording measurements shown by meter dials. Below at right is a close-up of the apparatus revealing some of the electrical equipment that records light-reflecting properties by means of a photo-electric cell. Below is an abrasion meter apparatus. At left is a view of the broad white lines on Foot-hill Boulevard in Los Angeles County and below traffic is seen using the lanes on Bayshore Highway, San Mateo County.

Two Camps for the Unemployed Opened by Department of Public Works

AT THE INSTANCE of Governor Rolph a new departure in relief employment work has been started this month by the Division of Highways with the establishment of two camps for men who are willing to do part-time work for their meals and board. Each of the camps will care for 250 men and is located where the men can be used at hand labor on highway construction.

The first camp was started in Plumas County at Rich in the Feather River Canyon, using buildings that were put up last year for the relief employment camp at this point. The camp is operated by the State and the men are used in extending the work which was opened by the previous camp. Superintendent A. N. Lund, who directed this camp last year, is in charge with a small crew of regular foremen to supervise the work.

ON TOPOCK ROAD

The second camp is in San Bernardino County between Needles and Topock on State Route 58. In this camp the housing and feeding is being handled by a supply company of Los Angeles under contract with the State. The camp is in charge of Superintendent E. S. Gripper who handled the relief camp in Arroyo Seco near Los Angeles last year. The men are being used to widen cuts and improve the alignment on the highway near the camp.

Men for the Rich camp are being furnished by the City of San Francisco, and the City of Los Angeles is sending out the men for the Needles location. Under the agreements made by Col. Walter E. Garrison for the Division of Highways with the officials of these places, the cities are picking the men for the camps, paying their transportation to the camps, are responsible for medical care in case of sickness, and furnish clothing to needy cases. **The men must be American citizens and go to the camps voluntarily. The State uses the men for six hours a day on highway work and gives them their meals and board and an issue of tobacco. If a man does not work he is dropped from the camp.**

QUARTERS HEATED

The Rich camp is entirely of wood construction and the men are housed sixteen to a room.

The Needles camp is of tent construction with wood floors and side walls screened at the top, the quarters caring for eight men to a tent. In both camps the quarters are heated with stoves and electric lighted. Each man is given a spring cot, mattress, blankets, sheet blanket and pillow. Hot showers are provided with stationary tubs for washing clothes. The State maintains a man in the camp who is a registered nurse competent to administer first aid in case of accident and attend to the minor troubles of the men. The meals are of the standard served in all State camps, of good wholesome food and well cooked.

WILLING HANDS

With conditions in California better than in other parts of the country, and men figuring that they may be hungry but they will not freeze when they get here, there has been an enormous increase this year in the number of transient laborers entering the State who flock to the cities and become dependent on the free kitchens for their existence. A large percentage of these men are able and willing to work if they can only get the chance and it is for this type that the camps have been established. No one camp can begin to meet the problem that has developed, but similar camps are being operated by the cities and the State Department of Forestry; it is hoped that the combined efforts will result that men who are willing to work will not suffer.

NEW SIGNS PLACED

Since the new law became effective August 14, more than 2100 new State speed limit signs have been put in place by the signposting department of the Automobile Club of Southern California, it is revealed in a report just issued. These markers so far have been posted in 57 different communities or counties which have ordered them to date. In this special job more than 13,000 miles of highway have been covered by a fleet of 10 trucks engaged in this rush work to inform motorists of the new 20-25 and 45-mile speed limit regulations.

First Contractor: "I've just arranged to give a man \$3,000 if he will take all my worries off my hands."

Second Contractor: "That ought to be fine, but where are you going to get \$3,000 in this day and time for that?"

First Contractor: "Well that will be the first thing he will have to worry about."



IN A SCENIC PARADISE, the labor camp for unemployed at Rich is located on the banks of the Feather River. Opened and maintained by the Department of Public Works, the men have comfortable quarters in substantial, heated two-story bunk houses close to their highway work.

Experts Develop Durable Traffic Line Paint Formula

(Continued from page 8)

renewals at two or three times the ultimate cost per year of a line painted with a high grade, non-brittle abrasion-resisting lacquer which retains a high degree of visibility from nine months to a year.

RENEWAL PERIODS

Practically all lines where traffic is reasonably heavy require renewal in from nine months to a year. In many cases, where the traffic is exceptionally heavy and consists of a large percentage of truck traffic, renewals must frequently be made at intervals of three to six months.

The traffic line should also retain its color throughout its life. Thus, if a white line is desired it should remain white and not change to a yellow or dirty color through the action of the sun and other natural elements.

Because the use of lacquers for traffic lines is a comparatively recent development and no standard specifications have as yet been formulated which will insure a material complying with all of the desirable characteristics outlined above, the Materials and Research Department of the California Division of Highways has been conducting an extensive research of this problem for some

time. As a result of this investigational work a standard lacquer specification has been developed which, it is expected, will insure a high grade product with the resultant saving of thousands of dollars in cost and increase in utility.

G. H. P. Lichthardt, chief chemist at the laboratory, who is highly expert in his profession, has been carrying on an extensive investigation into the relative value of the commercially available gums and the proper solvents which must be used with these gums. Under Lichthardt's direction extensive tests have been made of the abrasive resistance of different lacquers when tested on the abrasion machine constructed at the laboratory.

To pass the specifications drawn up by Lichthardt, lacquer must not only pass a severe abrasive test, but must dry in from 15 to 30 minutes, have good flowage and covering properties, resist cracking under a severe bend test, resist disintegration in water and must not dissolve the asphalt in the pavement surface.

Further investigations have been conducted by Retla Alter of the laboratory staff to devise equipment for measuring the relative visibility of different surfaces by means of the photo electric cell. Very encouraging progress has been made in the development of equipment for this purpose which it is hoped may be perfected to such an extent that information of value can be secured which will enable a more intelligent selection to be made of the material best suited for specific cases.

Highways Not a "Cost of Government"

(Continued from page 1)

The gas tax does not become a burdensome surplus. It is not permitted to become an object of manipulation in the money market. It is cheerfully paid by the people, and then quickly returned to them in improvements.

Increasing demands for improved highways as well as the vast obligations already assumed by the State, render utterly untenable any proposition that, directly or indirectly, would reduce full gas tax accruals to the Highway Division.

The gas tax carries no bond interest. The roads go forward on a cash basis. There is an orderly plan working toward an ultimately completed system. There is a daily solvency of funds and a frank, open accounting with a satisfied public.

Highway expenditures are not a "cost of government"; they are for improvements aided by all and essential to the life of the State. The pay-as-you-go plan lays no burdens on the property of today or tomorrow. The disbursing of 85% of these millions to the ultimate laborer pays but does not increase taxes. An alert public opinion will continue to assure an undivided gas tax to the highways of California.

SOME BIG JOBS

Some of the outstanding features of the construction program during 1931 are of state-wide interest. On the Ridge Route alternate, Los Angeles County, the highway connecting Southern California with the San Joaquin Valley, between Castaic School and Tejon Pass and following the canyon to the west of the present road—work has progressed steadily. This section of the existing Ridge Route is 36.5 miles in length.

The new alignment will reduce it to 27 miles. Seven miles of grading has been accomplished. The new route will have large radius curves and easier grades. The grading is underway on the remaining 20 miles. Some idea of the immensity of this job may be indicated in the fact that it involves the moving of 4,000,000 cubic yards of earth in a mountainous region.

Another big job is the San Juan Grade alternate, in Monterey and San Benito counties. This is a link in the coast road connecting Los Angeles and San Francisco. It involves construction from 2 miles north of

Salinas to the Pajaro River, passing through San Miguel and Langley canyons. The existing road via San Juan Grade is 18 miles.

INCLUDES TWO BRIDGES

The new route will be only 16.6 miles and will be a vast improvement both in alignment and grades. The construction includes grading, paving and the building of two bridges. The work will be completed in 1932. The contract involves the moving of 800,000 cubic yards of earth and placing about 41,000 cubic yards of Portland cement concrete pavement.

On the Redwood Highway between Sausalito and San Rafael, Marin County, the Alto to Waldo link is the scene of interesting construction. The new line obviates the use of the Corte Madera Grade. This latter section was open to traffic November 22, 1931. The construction involved the building of an overhead crossing and bridge above the tracks of the Northwestern Pacific Railroad and across an arm of Richardson Bay; the construction of new road bed and the placing of bituminous macadam pavement. The unstable marsh lands adjacent to the bay necessitated the use of tons of dynamite to blast away the muck in order that a firm foundation could be found for the exceedingly heavy fills.

BUILDING LONG TUNNEL

The Newcastle tunnel on the Sacramento-Truckee road is an improvement of outstanding interest. It provides for a realignment of the highway at Newcastle by tunnelling under and through the solid granite hill on which the town is situated. The tunnel is 531 feet long. It has a 30-foot width pavement and a 3-foot sidewalk on either side. The tunnel is 21 feet high and is lined with Portland concrete cement. It eliminates one of the most tedious and dangerous points on the highway.

Another scheduled job on the Sacramento-Truckee road is that of the Gold Run to Airport link in Placer County. This is a new alignment between Gold Run and the Airport west of Emigrant Gap. The project will be the last link in the modernizing of the old pioneer trail into California via Donner Summit. It will run to the southeast of the present highway and follow the course of Canyon Creek and will be 11.5 miles in length. The bids for grading on this project were

(Continued on page 29)

Figures Tell Story of Year's Work

Last January Governor Rolph gave the command "full speed ahead." The Department of Public Works responded at once. The mechanism of its vast organization was set in motion. There has not been a let down of pressure during the year. Public improvements for the people and tens of millions of dollars distributed to labor have won public approval. All records have been broken. In the face of the "depression," the Department has built more highways, more new buildings and done more work of all kinds than in any other year. Eighty per cent of the cost has been met by the gas tax. The turnover has been rapid. Last month's tax pays for this month's work.

Here are some facts worth remembering:

Employed directly through departmental activities.....	46,000
Total business by Highway and Architectural divisions....	\$50,779,617

DIVISION OF HIGHWAYS

Work contracted and under way.....	\$24,648,200
Work awarded during December.....	1,593,200
Work carried over from 1931.....	9,402,600
Work, maintenance, all kinds.....	6,910,000
Highway Division grand total.....	\$42,554,000

MILEAGE RECORD FOR 1931

Asphalt concrete pavement.....	75 miles
Portland cement pavement.....	138 miles
Bituminous macadam pavement.....	7 miles
Bituminous crushed rock pavement.....	454 miles
Untreated crushed rock pavement.....	59 miles
Graded and prepared.....	70 miles
Total completed, progressing or contracted.....	803 miles

DIVISION OF ARCHITECTURE

Work let to contract in December.....	\$1,194,000
Work completed by December 16, 115 projects.....	4,420,098
Total construction (Jan. 1-Dec. 31—177 projects).....	8,225,617

DIVISION OF WATER RESOURCES

Estimated cost of private or corporate dams approved or supervised.....	\$19,000,000
New dams approved.....	50
Enlargements authorized.....	11

Highway work is on a pay-as-you go basis. It is not money collected by the tax collector; it bears no interest and does not lie idle in vaults. As fast as it accrues, it is put back in circulation, 85 per cent of it going ultimately to labor.

By-Pass Considered Logical Plan for Routing Through Traffic in Cities

By FRED J. GRUMM, Engineer of Surveys and Plans

When through traffic meets local traffic, then comes the tug of war—paraphrasing the old saw about the Greeks. The conflict is seen at the gates of every city, with resultant congestion where both classes of traffic are crowded into "Main Street." This perplexing problem of routing through traffic in urban areas and the relationship of the State Division of Highways and local planning bodies in solving it are discussed in the following paper delivered before the California League of Municipalities at Del Monte.

IN PLATO'S utopian scheme of government there was not included, to my recollection, a plan of the ideal city. Of course such concrete considerations should probably not be included in an abstract dream. Nevertheless, Plato's time would have been none too early to organize a planning commission, and it might have induced earlier and more earnest consideration of the problem.

Any planner today knows that in his planning work hindsight is not better than foresight. It may be easier to recognize the needs or more simple to decide what facilities will satisfy them, but it is more difficult to supply the solution and much more costly.

Like many other difficult problems, the problem of planning can be more readily solved by cooperation of the various agencies on whom these duties devolve. Especially so where responsibilities overlap, where the city and county or the State's obligations meet—and that is quite frequently.

CONFLICTING STREAMS

To plan for the State-wide traffic in the open country is relatively simple, but it is in the urban and city areas that all of the various organizations must work together to supply the necessary facilities. It is here that through traffic which has moved freely along the open highway begins to meet and mingle with the local traffic gradually accumulated by the main highway. It is at this point that the accumulation of traffic begins to present the more perplexing problems, where the travel artery

must function to satisfy various requirements, and the problem does not diminish in perplexities as traffic reaches the streets and avenues of the city.

Let us consider these various classes of traffic and their needs. Generally we may speak of two classes: local and through traffic. Other kinds are substantially grouped under these two general classes, at least, their characteristics are essentially similar to those which can be ascribed to either local or through traffic.

LOCAL TRAFFIC DEMANDS

Requirements of local traffic, the operation of vehicles in the transaction of business within communities, are decidedly different from those of through traffic. Local traffic wants to transact business at the establishments fronting on the thoroughfares. It moves slowly for shorter distances, enters and departs from parking areas in front of such establishments. Through traffic wishes to proceed speedily, directly and unmolested on its way.

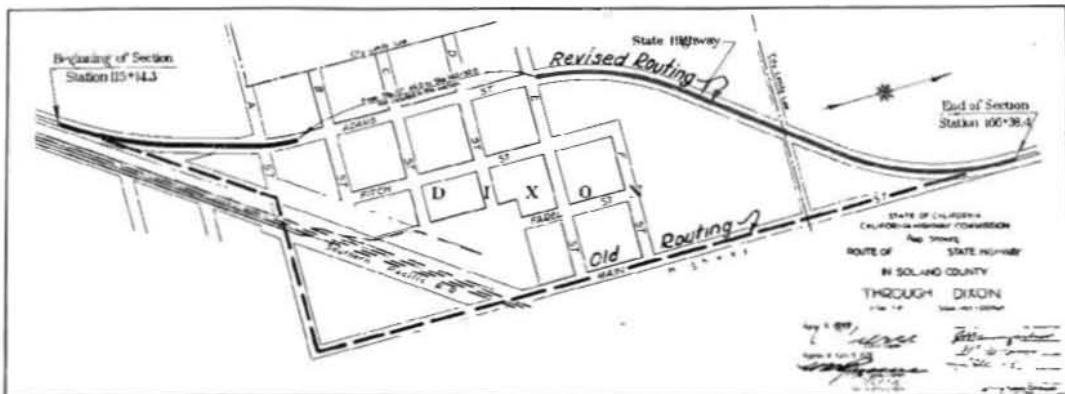
The merchants and business men of a community are dependent on the people in

that community and the surrounding territory for support. These people are their customers. They constitute the local traffic. How many pairs of shoes does the merchant in Salinas or Fresno sell to the motorist traveling from San Francisco to Los Angeles? How many pounds of sugar the grocer, or even nuts and bolts, which might be used on a car, does the hardware merchant dispose of to the man driving through town?

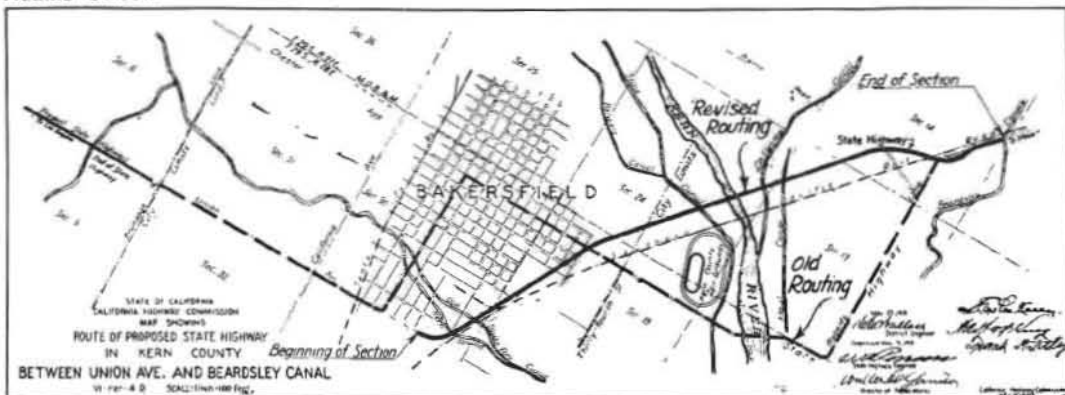


FRED J. GRUMM

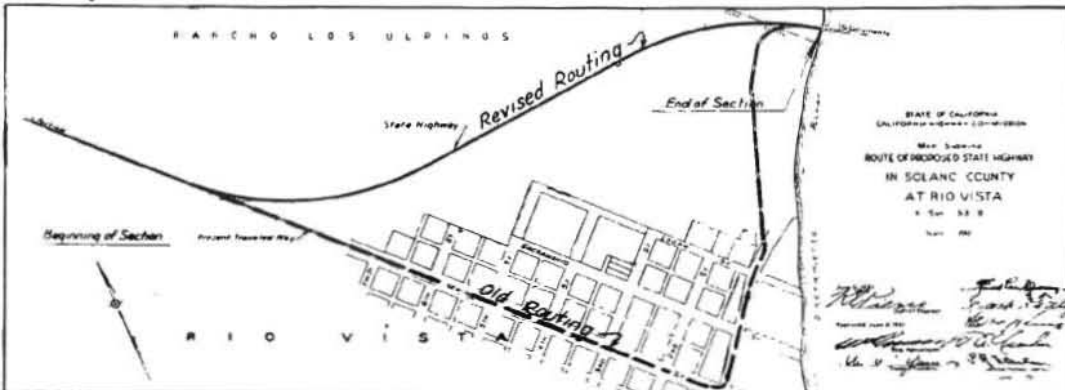
Revised Routes in Three Municipalities



THE OLD STATE HIGHWAY brought traffic into Main Street of the city of Dixon, Solano County, in a roundabout way necessitating two crossings of the Southern Pacific railroad tracks. The new route opened last year avoids the railroad tracks and Main Street and leads traffic through town by way of Adams Street.



THE PRESENT STATE HIGHWAY into Bakersfield leads from Union Avenue with a right-hand turn into the heart of the city where another right-hand turn is made. The proposed routing as shown above skirts the thickly built section and leads in an almost straight line from Union Avenue to the Beardsley Canal.



AT RIO VISTA in Solano County the through traffic to Sacramento that now goes through Main Street will by-pass the town in the new routing which has been accepted by all parties concerned. Work will begin in the Spring.

Donner Yearly Snow Averages 25 Feet

(Continued from page 2)

present year between Airport and Soda Springs made practical the consideration of keeping this road open between storms during the present winter. Donner Summit is 7135 feet above sea level, and extremely heavy snowfall and severe weather conditions may be expected any winter.

The snowfall area extends from west of Colfax to the California-Nevada State line, a total distance of nearly 90 miles. The elevation varies from 2500 feet at Colfax to 7135 feet at Donner Summit, and 5125 feet at the State line. Records of snowfall during the past sixty years show a maximum season's fall of 783 inches in 1879 to 1880, a minimum of 145 inches in 1880 to 1881, and 402 inches as an average winter fall for the entire period. A study of these records shows that some twenty to twenty-five feet of snowfall may be expected even in moderate winters.

There are records of snow falling at a rate of eight inches an hour at the higher altitudes and, if such a snowfall is accompanied by a wind of high velocity and low air temperatures, the situation becomes hazardous for anyone stranded in that area. From Colfax to Truckee accommodations for the traveling public are limited, particularly during the winter season. Although Emigrant Gap and Norden are railroad stations and there is a hotel at Soda Springs, accommodation could naturally not be expected for any large number of snowbound travelers.



Front view of an auger blower type rotary plow boring its way through the drifts on the Donner Grade.

Plan Made Feasible

An appreciation of these facts has caused the Maintenance Department to approach the problem with care and without undue optimism as to the ease of the task. As indicated above, information has been collected and experience gained during the past five years, anticipating the time when the work might be undertaken with fair prospects of success. When the plan was first considered, the road was of a comparatively low standard. It was unsurfaced, with sharp curves, steep grades, and many miles of narrow roadway.



Auger blower type heavy duty plow widening cut through deep drift during storm on the Summit.

Any attempt to keep such a road open was impracticable, since even if the snow was removed it would not have been feasible to maintain the surface in condition for traffic.

Each season has seen an advance in the reconstruction of this road to higher standards. The plans of each project were reviewed with the thought to provide a road section most favorable for snow removal work. Wherever possible the grade was established sufficiently above the adjoining surface so that advantage could be taken of the scouring action of the wind. Where it was necessary to go through cuts, the normal ditch section was widened and storage space thus provided for the snow which would be pushed off the traveled way.

This widened ditch section also provides additional drainage when the snow melts, thus aiding in the upkeep of the road. As mentioned previously, the surfacing placed on the road must be adequate not only to carry traffic, but support the heavy snow removal equipment with a minimum of winter maintenance. In addition, the shoulders beyond the pavement must be of crushed rock to permit equipment to operate off the pavement when clearing snow.

One Poor Unit

There still remains one unit not yet constructed to present day standards. This section is approximately twelve miles long, extending from Gold Run to Airport. The alignment is fair and a good oil surface has gradually been developed under maintenance which will carry traffic until the unit is reconstructed, starting early next year. However, the width and slopes make removal operations on this section more difficult than elsewhere on the road.

Snow removal work requires not only proper equipment and organization, but also proper facilities for caring for both men and equipment. The cold weather and constant strain from removing wet or frozen snow causes frequent breakdowns of equipment. Lack of repair facilities and spare parts at

Crews and Motors Man Four Stations

(Continued from preceding page)



Rear view of auger blower rotary clearing a wide swath through the Donner Summit forests.

the scene of action means a snow-blocked road. This side of the work has been brought forcibly to attention during several storms of the past two winter seasons.

The housing and shop facilities now available to carry on the work on this road are as follows:

COLFAX—At Colfax there is the regular maintenance station, which is headquarters for the Maintenance Superintendent. There is a standard bunk house and office and an eight-stall truck shed with oil house and blacksmith shop.

Truck Shed Heated

EMIGRANT GAP—At Yuba Pass Station, three miles east of Emigrant Gap, there is a truck shed 43' by 143' in size and a bunk house capable of housing sixteen men. The truck shed is sealed and a steam heating plant installed to heat not only the bunk house but the truck shed as well. Provision for making minor repairs to equipment is included in the truck shed layout at this point.

DONNER SUMMIT—The main headquarters of the snow removal work is located at Donner Summit about seventeen miles from the Yuba Pass maintenance site. The truck shed at this point is of the roundhouse type and includes a repair shop with pits and tools to handle major equipment repairs. A sixteen-man bunk house, similar to the Yuba pass layout, is connected to the truck shed by a covered passage. Both of these buildings are constructed to withstand the coldest weather and are steam heated.

TRUCKEE—At the Truckee Maintenance Station there is a 30' by 100' truck shed with steam heating plant, a standard oil house, and dwelling which is used as a bunk house.

The snow removal on the section of road from west of Colfax and east to Airport is handled from the Colfax site. The equipment assigned here consists of two 3½-ton trucks equipped with 10 foot straight blade push plows, and a dual drive tractor grader equipped with a 10-foot grader blade and "V" type plow.

Heavy Equipment

The crew at the Yuba Pass Station removes snow from Airport to a point midway between that station and Donner Summit. Their present equipment consists of one "V" type and two straight blade speed plows mounted on heavy four-wheel drive trucks, as well as one auger blower type of plow mounted on a 5-ton four-wheel drive truck.

The outfit at Donner Summit handles the section from nine miles west of the summit to the junction with the Tahoe City road, a short distance west of Truckee. The equipment here consists of one "V" type and two straight blade one-way speed plows, all mounted on 3½ ton four-wheel drive trucks, together with a shovel type rotary plow with "V" type blade mounted on a four-wheel drive truck and, in addition, an auger blower type of plow similarly mounted.

The Truckee crew removes snow on the section of road immediately west from Truckee to the State line and, in addition, takes care of the road between Truckee and Tahoe City, as well as a portion south of Tahoe City on the west side of Lake Tahoe. A truck shed and living quarters are also available at Tahoe City as an auxiliary to the Truckee layout. The equipment operated out of Truckee consists of two straight blade push plows and one shovel type rotary plow, all mounted on 3½ ton trucks.

Start With Storm

Effective snow removal work requires that the equipment start with the storm and continue until

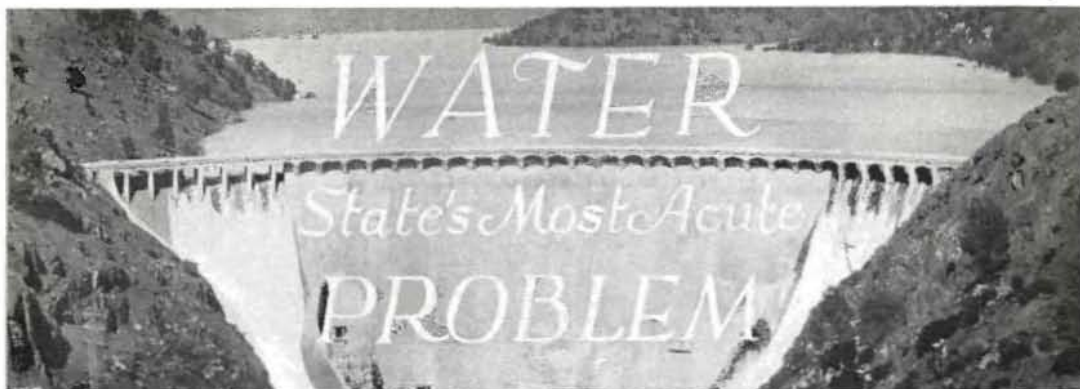


Shovel rotary type truck plow doing its stuff on the Ridge Route near Caswells in Los Angeles County.

the storm has ceased and the road is clear. This means that the crews must be ready and equipment serviced, all in readiness for continuous operation for the duration of the storm. This fact accounts for the care and expense taken for the comfort of the men and facilities for housing and care of equipment.

Early in November, two sets of gates were erected across the highway—one at Airport and one just west of Truckee. Watchmen's shanties were in place

(Continued on page 38)



This is the fifth of a series of articles on the State's water problem. The first dealt with Governor Rolph's call for the united efforts of all sections of the State to help reach a solution. The second, third and fourth articles described, respectively, the situation in Sacramento Valley, Sacramento-San Joaquin Delta, Los Angeles and San Joaquin Valley regions. This is the first installment of the article discussing estimated costs of the immediate initial and complete initial developments of the State Water Plan for the Sacramento-San Joaquin Valley project. The second installment, dealing with the anticipated revenues and possible methods of financing the project, will appear in the next issue.

By A. D. EDMONSTON, Deputy State Engineer

IN EVOLVING a program for any project, whether it be a private or public enterprise, the financial feature is generally most important and one which should be most closely scrutinized. The capital and annual costs of the project and the anticipated revenues therefrom which would accrue to the project from its inception to the time when the project would be completely paid for are highly important and necessary features which should be ascertained as accurately as possible before the project is declared economically sound and financially feasible.

In Bulletin No. 25, "A report to the Legislature of 1931 on State Water Plan," issued by the Division of Water Resources of State Department of Public Works, and prepared under the direction of Col. Walter E. Garrison, Director of Public Works and Edward Hyatt, State Engineer, three projects are proposed for immediate development, namely; Colorado River Aqueduct, as outlined by the Metropolitan Water District of Southern California, Santa Ana River project and Great Central Valley (Sacramento-San Joaquin Valleys) project.

PROJECTS ADVANCED

Steps have been taken toward the construction of the first two projects. The Metro-

politan Water District of Southern California, on September 29, 1931, voted bonds in the sum of \$220,000,000 to bring water from the Colorado River. The Legislature of 1931, appropriated \$400,000 of state money to be matched by funds from San Bernardino, Riverside and Orange counties which would be used for the conservation and utilization of the flood waters of the Santa Ana River and its tributaries and for flood protection.

The California Water Resources Commission, appointed by Governor James Rolph, Jr., and the Joint Legislative Water Committee are studying the financial as well as other phases of the State Water Plan, including those of the Great Central Valley (Sacramento-San Joaquin Valleys) project. In this article, the discussion will be confined to the financial aspects of the latter project.

The project proposed for initial development in the Great Central Valley has been set up as a progressive development. It has been proposed to finance the entire project but defer construction of two of the units until such time as it may be necessary and desirable to build them. The first step is designated as the immediate initial development and the next step, which includes the two deferred units as the complete initial development.

Initial Water Plan Cost Estimates

(Continued from preceding page)

IMMEDIATE UNITS

The construction and operation of the units proposed for immediate development would solve the navigation and irrigation problems on the Sacramento River, salinity problem in the Sacramento-San Joaquin Delta and water supply problem in the industrial and agricultural areas on the south shore of Suisun Bay and relieve the stress in the irrigated areas in the Upper San Joaquin Valley.

The construction of the two deferred units would permit the delivery of additional water supplies to the Upper San Joaquin Valley for replenishment of underground storage, for perfecting the supplies in those areas in which there has been a temporary deficiency in surface supplies and the expansion of irrigated acreage when desired. It also would afford an opportunity for the restoration of navigation on the San Joaquin River for a distance of more than 90 miles.

COST OF THE PROJECT

In estimating the cost of any project, two factors are of prime concern. One is the prices paid for construction materials, labor, rights of way and water rights, and the other, the cost of money which is borrowed to finance the project. The costs of the first items are of more importance than is the second in the effect on the capital or first cost, because they represent about nine-tenths of the total whereas the second item only represents about one-tenth because of the relatively short period of construction. On the other hand, the interest charges, after the completion of the project, represent from one-half to three-fourths of the total annual charges.

The estimated costs of the physical works for this project are based on the costs of labor and material which prevailed in 1928 and 1929 and are somewhat higher than those prevailing at the present time. The interest rate for state financing was assumed at 4½ per cent per annum which is about ½ per cent higher than the rate which has usually prevailed but is about the rate for recent State bond issues.

The items for the immediate and complete initial developments are shown in the following tabulation. The figures include 25 per cent of direct costs for overhead charges and contingencies and interest at 4½ per cent per annum during the period of construction.

Item	Capital Cost	
	Immediate Initial Development	Complete Initial Development
Kennett Reservoir, dam and power plants.....	\$84,000,000	\$84,000,000
Sacramento-San Joaquin Delta Cross Channel (deferred).....		4,000,000
Centra Costa County Conduit.....	2,500,000	2,500,000
San Joaquin River Pumping system (deferred).....		15,000,000
Friant Reservoir, dam and power plant.....	15,500,000	14,500,000
Madera Canal.....	2,500,000	2,500,000
San Joaquin River-Kern County Canal.....	27,300,000	27,300,000
Magunden-Edison Pumping System.....	100,000	100,000
General Expense and Water Rights.....	7,000,000	7,000,000
Totals.....	\$138,900,000	\$157,900,000

In order to show the effect of different rates of interest on the capital cost of the project, the following tabulation has been prepared for six rates as follows:

Annual Rate of Interest in per cent	Capital Cost	
	Without Deductions for State or Federal Contributions	Complete Initial Development
3	\$134,500,000	\$152,900,000
3½	136,000,000	154,700,000
4	137,400,000	156,200,000
4½	138,900,000	157,900,000
5	140,400,000	159,600,000
6	143,300,000	162,900,000

A review of the figures in the foregoing table shows that a saving of \$4,400,000 could be made in the capital cost of the immediate initial development if the interest rate were reduced from 4½ to 3 per cent per annum and that there would be an added cost of \$4,400,000 if the interest rate were increased to 6 per cent per annum. These differences in capital cost due to the use of 3 and 6 per cent interest rates instead of 4½ per cent, represent about 3 per cent of the capital cost based on a 4½ per cent rate. The corresponding differences in the capital cost for the complete initial development represent about the same per cent.

FEDERAL-STATE CONTRIBUTIONS

The foregoing estimates of the project are gross total costs without allowances for contributions from any source. In connection with the Kennett unit, contributions from both the Federal and State Governments may well be expected. In House Document No. 791, 71st Congress, 3d session, the Chief of Engineers of the War Department, recommends that the Federal Government contribute \$6,000,000 directly to the construction of the Kennett Dam in the interest of navigation on the Sacramento River.

Additional contributions from the Federal Government in the interest of flood control on Sacramento River and navigation and flood control on San Joaquin River could be anticipated which would reduce further the capital cost of the project. Also, it is generally assumed that the cost of relocating the State Highway at the Kennett Reservoir would be paid out of State Highway funds. The estimated cost of this work is \$3,400,000. The capital costs of the project with deduction for probable Federal and State contributions totaling \$9,400,000 would be as follows:

Annual Rate of Interest in per cent	Capital Cost	
	Immediate Initial Development	Complete Initial Development
3	\$125,100,000	\$143,500,000
3½	126,600,000	145,300,000
4	128,000,000	146,800,000
4½	129,500,000	148,500,000
5	131,000,000	150,200,000
6	133,900,000	153,500,000

ANNUAL COSTS

The annual costs in operating the project would include the following items:

1. Interest on invested capital.
2. Amortization of investment.
3. Depreciation of physical works.
4. Operation and maintenance charges.

(Continued on next page)

U. S. Contribution Set at \$6,000,000

(Continued from preceding page)

The gross annual costs for rates of interest varying from 3 to 6 per cent per annum are given in the following tabulation. It was assumed in estimating these annual costs that an aggregate direct contribution to the project of \$9,400,000 would be made by Federal and State governments and it was assumed also that sinking fund bonds would be issued, which would be amortized in 40 years.

Annual Rate of Sinking Fund Interest in per cent	Interest Rate in per cent	Gross Annual Cost (40-year Amortization Period)	
		Immediate Initial Development	Complete Initial Development
3	3	\$6,416,000	\$8,676,000
3½	3½	7,333,000	9,748,000
4	4	8,241,000	10,791,000
4½	4	8,982,000	11,660,000
5	4	9,737,000	12,543,000
6	4	11,284,000	14,345,000

In the foregoing estimates, the gross annual costs are based on sinking fund bonds which would be amortized over a period of 40 years after completion of the project. If the amortization period were extended over a longer time the annual cost of the project would be substantially reduced. The State constitution permits the issuance of State bonds for a maximum maturity of 75 years.

DEPRECIATION FUND

There are included also in the estimates, amounts for the depreciation of the physical works. These amounts vary with the lives of the respective structures, but in all cases, the sinking fund established would be adequate to replace any particular structure at the end of its estimated life.

By providing such a depreciation fund, it might be possible to omit the inclusion of the provision for amortization of the capital investment. Such a procedure, however, would result in the issuance of refunding bonds, which, in the case of financing by State bond issue, would require an amendment to the State constitution.

The following table gives the annual costs of both the immediate initial and complete initial developments, calculated on State financing at a 4½ per cent interest rate with 75-year sinking fund bonds amortized over a 70-year period, and with refunding bonds. Direct contribution of \$9,400,000 from Federal and State governments was considered to have been made.

	Capital Cost	Gross Annual Cost Interest at 4½ per cent and 75-year sinking fund bonds	Interest at 4½ per cent and refunding bonds
Immediate Initial development...	\$129,500,000	\$7,975,000	\$7,622,000
Complete Initial development...	148,500,000	10,505,000	10,101,000

After all, the difference between learning to drive a car and learning to play golf is simply that when you are learning to play golf you don't hit anything. —*Union Oil Bulletin.*

First garage mechanic: "There was a fellow in here from Potter County with his car. He had an interesting story."

Second garage mechanic: "An old timer?"

First garage mechanic: "Naw, a new generator." —*Motor Land.*

Good Use Found For the Maligned Back-seat Driver

The back-seat driver, while regarded as a meddling nuisance by many motorists, has at last found a strong and authoritative champion.

This defender is no less than Dr. Miller McClintock, director of the Erskine Traffic Bureau at Harvard University and formerly of San Francisco, who says that the inactive driver provides "four eyes instead of two and two attentions instead of one."

The Erskine Traffic Bureau specializes in surveys of new problems growing out of the automobile in modern life. The director claims that increasing speeds and the steadily growing number of cars on the highways make more and more eyes necessary. But what is needed is coordination of the front and back-seat drivers.

They should develop teamwork, the director says. Instead of "razzing" the one at the wheel and shouting at him, the rear pilot should serve in an advisory capacity, if the best results are to be obtained from their combined faculties for safety.

Moynahan Assistant Highway Patrol Chief

George F. Moynahan, veteran member of the State traffic force and a police officer for more than twenty years, has assumed his duties as Assistant Chief of the California Highway Patrol.

Moynahan, whose appointment was made by Chief E. Raymond Cato with the approval of Daniel J. O'Brien, Director of the Department of Motor Vehicles, and confirmed by Governor James Rolph, Jr., succeeds H. R. Youngblood, resigned.

The appointment was promotional in character, Moynahan having been serving as Assistant Supervisor of Traffic.

"Is there any truth in the report that Angus McTavish bought the corner filling station?"

"Well, I don't know for sure, but the 'free air' sign has been taken down."

Santa Claus Gives Governor Rolph a Beautiful Airplane

GOVERNOR JAMES ROLPH, JR. stole the limelight from Santa Claus at the afternoon Christmas tree party given to the children of the Department of Public Works "family" and in the evening led the dance for the grown-ups with Mrs. Rolph as his partner.

Children are a never-failing source of delight for the Governor wherever and whenever he meets them and he in turn has a happy faculty of fraternizing with them like a jolly big brother. He helped Santa Claus despoil the big Christmas tree of its bright baubles, toys and candies and had a merry time handing out gifts to the "family" children numbering nearly a thousand.

SURPRISE FOR GOVERNOR

Then Santa Claus turned the tables on the Governor. Pushing aside the thickest branches of the tree he extricated a large blue and gold airplane and presented it to "Sunny" Jim. The sides of the plane were decorated with the name "James Rolph, Jr." The Governor was as surprised and happy as any of the kids. The arrangements and expenses of the festivities given at the Elks Temple were handled by a committee of 150 hosts and hostesses comprised of Department of Public Works officials and their wives. A women's committee of 20 supervised the children's party, buying and wrapping all the gifts, toys and candies and regaling the tots with all the ice cream they could eat. Excess toys and goodies were later given to charitable organizations. The tree and pine garland decorations were provided by the Donner Summit maintenance crew of snow fighters.

In the evening the older folks enjoyed themselves with dancing and cards till the wee small hours. The first annual Christmas Party of this "one big family" of the Department of Public Works will go down in history labeled "a great success" with earnest wishes for many happy returns of the day.

OVER HISTORIC ROUTE

Country dotted with crumbling ruins of stage line stations and post offices of the pony express era half a century ago will be made more accessible to motorists by Riverside county's newly announced highway program in the Aguanga-Anza-Temecula region.

Commission Allots Cooperative Funds to Several Projects

(Continued from page 5)

triet of Ventura County protested against the location of the alternate Ridge Route in Piru Canyon on the ground that it passes through the Piru reservoir dam site. Mr. Hardison was heard in detail at great length on the matter.

In response to a request from City Attorney D. B. Roberts of Holtville that the State contribute to the paving of a portion of Palm avenue on the State highway from Yuma to El Centro through Holtville, about a block in length, at an estimated cost of \$1,590 for a 24-foot pavement, the Commission agreed to cooperate to that amount on motion of Commissioner Tetley.

COOPERATION GRANTED

A request of the Commission of the city of Fresno for a cooperative contribution of \$70,000 as the State's share in the construction of a subway under Southern Pacific tracks at Belmont crossing presented by Jean Vincenz, Commissioner of Public Works was granted on motion of Commissioner Hopkins.

Preceding the Los Angeles meeting the directors of the Automobile Club of Southern California entertained Commissioners, Director of Public Works Garrison and State Highway Engineer Purcell at dinner in the club headquarters building on Thursday evening. Following the session on Friday the Commission with members of the legal, engineering and clerical staffs attended the annual banquet and dance of the Los Angeles Chapter of the State Employees Association at which Governor Rolph was the guest of honor.

RISE OF REGISTRATION

The rapid rise of the motor vehicle since the beginning of this century is clearly shown by comparative automobile registration and population figures, according to statistics received by the California State Automobile Association. The population of the United States in 1900 was approximately 89,000,000 and the automobile registration only 8000. At the beginning of 1931 the population was 120,000,000, in round numbers, while the motor vehicle registration had grown to more than \$28,000,000.

Prospective Maid: I'd like to work for you, ma'am, but you've only got a two-car garage. Where'd I put my car?

Mistress: Oh, well, you'd never do at all. We're in the habit of employing only servants who have their private chauffeurs.

Coast Highway Projects Completed or Under Way in Four Counties

By L. H. GIBSON, District Engineer

ON THE COAST HIGHWAY in San Benito County, from the Monterey County line to the San Benito River, 5.5 miles in length, a new road is being constructed via the Pincate 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 being completed, will eliminate the old San Juan grade from the main Coast Highway.

Within the limits of the above work, a new reinforced concrete bridge across San Juan Creek and a new steel and reinforced concrete bridge across the San Benito River are under construction.

On the lateral highway from three miles north of Hollister to the Pacheco Pass road the road has been resurfaced with bituminous treated crushed stone surface.

Monterey County

A new steel and reinforced concrete bridge across the Salinas River at Bradley has been completed. The approaches to this bridge, 0.5 miles in length, are now under construction. The roadbed is 36 feet wide with a 20' Portland cement concrete pavement.

On the Roosevelt Highway along the coast 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 being constructed. The roadbed is 24 and 30 feet in width, with a selected material surface 20 feet wide by 8 inches thick.

On the Roosevelt Highway south of Carmel three reinforced concrete arch bridges are under construction at Garrapata Creek, at Granite Creek and at Bixby Creek. These bridges are all under the supervision of the Bridge Department.

San Luis Obispo County

On the Coast Highway north of Paso Robles a reinforced concrete bridge across San Marcos Creek has been completed under the supervision of the Bridge Department.

Work has been completed on 9.8 miles of the Coast Highway between Atascadero and

one and one-half miles south of Santa Margarita. The roadbed is 36 feet wide with a 20-foot asphaltic concrete pavement.

On the Coast Highway between Arroyo Grande and Los Berros Creek the road is being reconstructed with a 36-foot roadbed and a 20-foot reinforced Portland cement concrete pavement. New bridges across Arroyo Grande Creek and Los Berros Creek will be advertised soon to complete this project.

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

Santa Barbara County

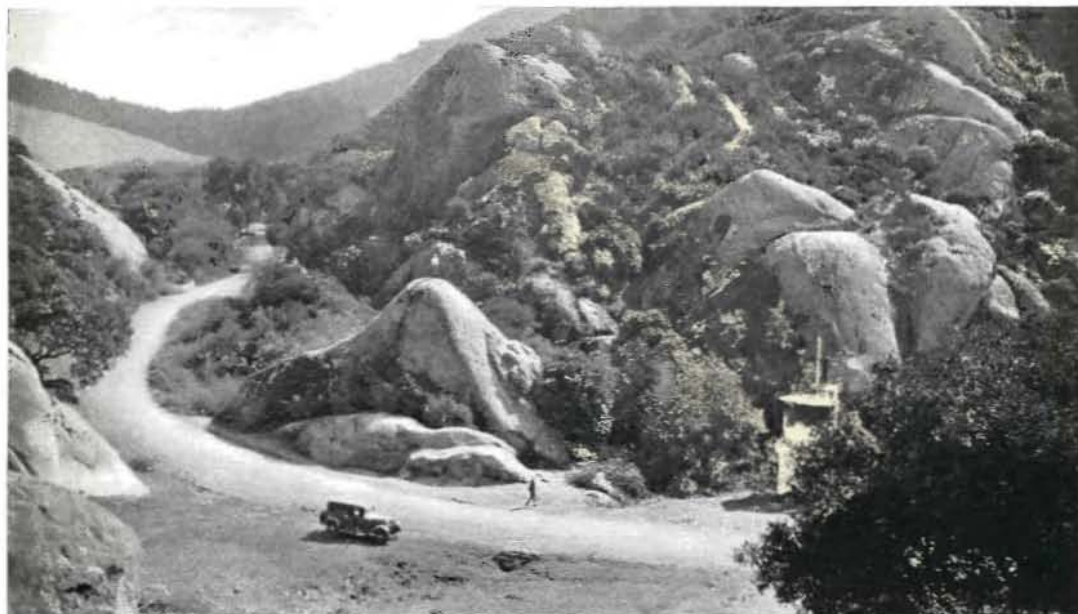
A major change of line is under construction on the Coast Highway between Los Alamos and one and one-half miles south of Santa Maria on a route through Solomon Canyon. The roadbed is 36 feet in width with a 20-foot reinforced Portland cement concrete pavement. The portion from Los Alamos to two miles north of Solomon Summit, 9.7 miles in length, is under way and bids on the portion from two miles north of Solomon Summit to one and one-half miles south of Santa Maria, six miles in length, were received on November 25, 1931. The road is very close to an air line between Los Alamos and Santa Maria and will be several miles east of the town of Orcutt.

Oiled rock borders on each side of the concrete pavement have been constructed on the Coast Highway between Gaviota Canyon and Tecolote Creek, a distance of 9.6 miles.

Work has been completed on surfacing with crusher run base and oiled rock surface 18 and 20 feet wide, 38 miles of the Cuyama lateral from the second crossing of the Cuyama River to the Kern County line.

Retail spending for automobiles and accessories ranks second only to food in the average family budget, according to reports of the Department of Commerce. Nearly 20 cents out of each dollar spent in retail establishments in 1929 went for automobiles or automotive products, it is revealed. The per capita sales of retail food stores amounted to \$92, while an average per individual during the year for automotive products was \$78.

Then there is the fellow who already thinks he knows the sure substitute for gasoline. He calls it shoe leather.—*Texas Highways*.



BOLD BANDITS of the olden days lurked in these picturesque Pincate Rocks located on a portion of the new road being built in San Benito County to eliminate the tortuous San Juan Grade. Bandit Rock, the conical mass in the foreground provided them a natural vantage point for a lookout. The new road has been carefully aligned to preserve all the scenic and historic values of the locality.

Courtesy An Aid to Safety on Highways

Highway courtesy, such as granting the right of way, signaling for turns and stops, having lights in proper adjustment, and remaining a safe distance behind the car ahead, will go far toward reducing the toll of deaths and injuries, according to a statement by the Public Safety Department of the Automobile Club of Southern California. An analysis of driving faults which contributed to automobile accidents in 1930 is cited in support of the statement.

More than 30 per cent of those involved in accidents last year did not have the right of way. This circumstance alone caused 173,909 accidents and resulted in 4085 fatalities and the injury of 202,795 persons.

Failing to give signals caused more than 7 per cent of the 1930 accidents, while cutting in caused a similar proportion of smashups.

Follow other vehicles only as closely as is reasonable and prudent and will permit you to stop safely if an emergency or other unusual condition is met on the road.

Jerry—I hear you've been studying for months how to increase your salary. How did it turn out?
Freddy—Poorly. The boss was studying at the same time how to cut down expenses.—*Chelsea Record*.

Two Billions Plus Saved by Surfacing

Allowing 15 miles travel on a gallon of gasoline, the 15,000,000,000 gallons consumed in 1930 carried motor vehicles 225,000,000,000 miles, according to the American Road Builders' statistical department. If half the travel is on the 700,000 miles of surfaced roads and the saving is 2 cents a mile, the saving to the public each year amounts to \$2,500,000,000, a sum in excess of the amount expended on highway maintenance and capital investment in better roads.

She drives a pretty car,
Does pretty rockless Maizy,
And another thing she drives,
Is other drivers crazy.

CALIFORNIA CARS INCREASE

California is one of the eight states out of 36 reported showing an increase in passenger car registration during the first six months of this year as compared with a similar period in 1930. Other states sharing in this indicated return of better business conditions include Connecticut, Florida, Maine, Maryland, Massachusetts, New Jersey, and Rhode Island.

"Doesn't anybody know anything about this car?"
asked the stalled motorist in exasperation.
Bystander: "Nothing but some bum jokes."

"Why Not a Minor Improvement?" Says Engineer at a Loss for Funds

By H. A. WATERMAN, Assistant Construction Engineer

IN THE reconstruction budget for each biennium, there is always included an item which has varied from \$1,000,000 to approximately \$1,500,000 for minor project allocations, or what are more commonly known as "Minor Improvements." While most unassuming in title, these funds are of extreme importance to State highway operations and are rapidly increasing in popularity with the district engineers as time goes on.

Because of the nature of the work, the Construction Engineer has always been held responsible for the administration of this money and the results obtained; whereas the work is actually performed, for the most part, by maintenance forces, which are in a sense loaned to the Construction Department for the time being for that purpose.

MINOR IMPROVEMENT DEFINED

When the idea was first put into practice, it was necessary for the Construction Department to do considerable missionary work to see that the projects proposed by the districts came truly within the definition of such work, and that they were not confused with general or specific maintenance. While a certain amount of overlap with the latter is unavoidable, the Construction Department has always adhered strictly to the definition as outlined by the American Association of State Highway Officials, for "Additions and Betterments," which, in effect, is that such work must always add to the capital investment in the highway system and should not be temporary in nature.

Installations of new culverts or lengthening existing ones, widening and day-lighting dangerous mountain roads, placing the higher type of pavement borders, constructing short sections of highway on new alignment, etc., are typical examples of this type of improvement. At the present time, the funds expended on minor improvements are coming in particularly handy to certain of the districts in assisting the unemployment relief being conducted by the Division of Highways through the Maintenance Department. Authorizations for such work, however, are allowed only when it can be classed strictly as minor improvement.

TENTATIVE PROGRAMS REQUIRED

After the approval of the highway budget by the Legislature, the total amount of the minor project allocation shown in the reconstruction budget is apportioned to each district in accordance with its needs, as indicated by work done in previous years. Individual allotments are then authorized as requested and in line with yearly programs submitted in advance to the Construction Department. The districts are not required, however, to adhere exactly to these programs, providing emergencies arise, or more important work must be substituted for that originally planned. Proper explanations for the latter procedure, however, are always required.

The size of the allotments varies from a few hundred to as high as thirty or thirty-five thousand dollars, but, in general, the larger projects are not looked upon with favor, and, if such allotments are made, the work is let to contract, if possible, rather than performed by day labor forces, as heretofore explained.

Projects costing in the neighborhood of \$5,000 are more in agreement with the Minor Improvement policy, and the average of the projects throughout all the districts is generally not far from that figure. During the eighty-first-eighty-second biennium, for example, a total expenditure of \$1,006,660 was authorized, distributed among 254 work orders; the average being \$3,963 per project.

POPULAR WITH ALL

When one considers the flexibility of these funds, and the fact that there is nowhere else in the budget to which a district engineer can turn for small unbudgeted construction expenditures, arising either as emergencies or simply because they have been inadvertently overlooked, it is no wonder that minor improvements are popular. And small as the projects are in comparison with the usual run of highway contracts, there is no part of the biennium set-up so well adapted to correcting small and oftentimes irritating defects in the highway as the Minor Improvement fund.

Strangely enough, these small projects seem to make a great impression on the average motorist.



SURE TO PLEASE motorists, is this minor improvement on the State highway near Deadman's Springs, Amador County, where a sharp open curve was flattened out for safer driving.



"BLIND BUT DANGEROUS" would have been a fitting warning sign for this curve on the State highway east of Jackson, Amador County, before a rectifying operation classed as a minor improvement corrected it.



A FLOOD VICTIM, this culvert in Orange County, though widened and deepened, was almost washed out.



NOW IT STANDS UP, having been rebuilt as a minor improvement without interrupting traffic.

Many Notable By-Pass Routes Cited

(Continued from page 14)

The streets and roads in the area where business establishments have congregated are there primarily for the service of the customers of these establishments—local traffic. This traffic, by the manner in which it moves and operates, causes more or less congestion depending on the capacity of the street and the bargains offered. Why then force through traffic—one requiring entirely different accommodations—on to the streets designed and devoted to the purpose of serving business? It only interferes with and hinders local traffic, must consequently detract from the volume of business transacted and occasions delay and aggravation to through traffic.

Widening the artery is only temporary relief—a palliative, not a cure. Widening introduces additional complications involving pedestrians and cross traffic. Separation of the two types of traffic is indicated as the proper ultimate solution. It will result eventually, if not by planning, then by a gradual change in the character of business.

As through traffic increases and finds no other provision for its accommodation, it discourages local traffic and finally forces it and the business supported by it from the thoroughfare.

Planning and designing a separation of these classes of traffic is certainly much more desirable than creating economic loss. The first, local traffic, is already provided for. The logical plan then is to make additional provision for the second, through traffic. Its requirements are freedom from congestion and interference, directness, speed.

BY-PASS LOGICAL

The by-pass route is the logical solution. The by-pass does not necessarily mean the by-passing of the entire community. It means a route which will avoid the congested areas, direct and free from interference. There should be afforded ample opportunity to enter or depart to or from the business and commercial area for vehicles desiring to do so.

The by-pass road should probably diverge from the main thoroughfare entering the congested area at a point which will avoid the bulk of the local traffic.

Various types of by-pass routes have been constructed and are in use today. A notable

example is the main highway from St. Louis to Kansas City. Practically every town along the route is by-passed for through traffic and, at the same time, easy access is provided for traffic to reach these communities. In our own State we have numerous examples. The Newhall-Saugus by-pass route, avoiding the smaller towns of Newhall and Saugus, saves a distance of at least four miles for the through traveler. A by-pass of the town of Carlsbad, on the Coast Highway between Los Angeles and San Diego, takes through traffic out of the congested area and, at the same time, effects a marked improvement in alignment. By-pass of the business district in Dixon not only avoids the congested main street but also eliminates two hazardous railroad crossings of a main line railroad.

Mr. E. E. East, Chief Engineer of the Automobile Club of Southern California, suggests the following as a basis for studies having to do with by-passing a city or town:

BASIS FOR STUDIES

"For a town of appreciable size, our studies have developed the following facts, which in most instances may be taken as the basis for studies having to do with by-passing any particular city or town.

First, by far the greater number of all vehicles entering or leaving any given town or city are local.

Second, these local vehicles are entering the town or city for the purpose of transacting business, or as their destination.

Third, this local travel entering and leaving the city, together with vehicles operating within the city boundaries, represents the automobile purchasing travel, and as such should be afforded a maximum of convenience.

Fourth, the remainder of the motorists have a destination in view, and forcing them down 'Main Street' inconveniences purchasing travel, to the ultimate loss of business on the street."

The Automobile Club of Southern California has analyzed traffic movements in Los Angeles County. Dividing the county into five concentric areas, observing and analyzing movements of motor vehicles over the several boundaries, they found:

"The movement during the year 1930, expressed in number of vehicles daily, is in round numbers as follows: in and out of the county, 75,900; in and out of the metropolitan area, 305,900; in and out of the residential area, 705,700; in and out of the outer congested area, 618,700; in and out of the central business area, 531,500. Cars entering the county represent about 11 per cent of those entering the residential area."

Action Needed to Secure Coast Routes

(Continued from preceding page)

PRESENTS PROBLEM

Here is presented a problem for consideration of the county or regional planning commission. The large volume of traffic encountered at the outskirts of the city in what is still urban area must be collected or dispersed. It must be brought to or carried away from the main highway, the State highway, leading to other centers of population. Provision must be made to send it expeditiously to the destinations which it desires to reach.

If our main thoroughfares, designed for the expeditious movement of traffic over long distances, are to continue to function in that capacity, the improvements and establishment of enterprises along the highway should be so controlled that the minimum interference will result. Establishing setback lines may be one remedy, at least a preventive.

A plan of highway improvement, such as is being considered for a section of State highway in Santa Barbara County through Montecito, offers an excellent solution. Essentially, it is planned to carry through traffic on the central portion of the right of way and to provide for local traffic on side roads separated from the through traffic lanes by planted parking strips.

ZONING POSSIBLE

Zoning restrictions may be the means which will prevent the conversion of the highway into a congested business street at least so long as it does not hinder the natural growth and development of the territory. When the natural development envelopes a section of highway to such an extent that it must be given over to business, a by-pass road for through traffic should be ready for relief of congestion.

To preserve the aesthetic values, regulations of the character of improvement are needed. Hot dog shacks, dilapidated, fantastic structures housing every kind of enterprise certainly do not soothe the eye, although their products may temporarily cheer the stomach. The State and federal government are cooperating for the preservation of scenic, aesthetic and recreational values through the national forests.

A policy recently promulgated by the national Forest Service contemplates ac-

complishment of this object by reserving a 400-foot wide strip of land along the highway on which no encroachments will be permitted. Special use permits, issued for locations along the highway, will provide restrictions and regulations concerning the type of improvement to be installed.

COAST VALUES LEAPING

Reference to scenic and recreational values suggests another matter of interest: California has a thousand miles of coast line wondrously beautiful and picturesque. If properly preserved and developed, it will be of great value to the people of this State.

Along one of the State highways, sections of this coast have reached the astounding value of \$1,000 and more per foot of ocean front, or \$5,000,000 per mile. Speculators, inspired by these values, are buying up attractive sections of coast ahead of highway construction. Establishment of such values forces acceptance of location and alignment decidedly inferior to what might be obtained if timely action is taken. There is still opportunity along many miles of coast to obtain a location for highways returning maximum value to the public, but such action must not be too long delayed.

In the planning and designing for these various needs, one of the most important factors is a thorough and definite knowledge of traffic movement. It is not sufficient that we know only the amount, but we should also determine the origin, destination and character. Such data are most vital in determining the location, standard, character or type of the highway.

RESPONSIBILITY REALIZED

The problems above briefly outlined have come to our attention as those in which the State, the cities and counties have a common interest. Their solution requires cooperative action. Existing legislation makes it possible for local authority to amplify State efforts and to protect the rights of the public.

The State Division of Highways realizes that its responsibility does not cease when it has built the State highway to the city's door. But it also realizes that the local planning commission is in closer touch with the needs of its community.

At the Second Pillar of Architecture

By **FREDERICK M. GREEN**, Assistant Structural Engineer

THE THREE great pillars that support architecture may be named Wisdom, Strength and Beauty.

The architect by wisdom contrives the plan of the building to the end that it may serve the purpose for which it is intended. In modern parlance this element of the design is called Utility.



Frederick M. Green

Strength has reference to the stability of the structure; the capacity of the foundation soil to sustain the weight of the building, the capacity of each column, beam and girder safely to carry the loads imposed upon it, the ability of the materials entering into the structure to resist year after year the stresses induced by the loads imposed.

BEAUTY AND STRENGTH

Beauty—well we all know what beauty is—but who shall succeed in expressing in mere words that intangible elegance and harmony that we call beauty.

It is the duty of the structural engineer to attend at the second pillar, that called Strength. The architect must be left free to solve the problems of utility and, as an artist, to capture and imprison in the dense matter of the building as much of beauty as circumstances permit. It is the function of the structural engineer to design a structure that will embody in the form conceived by the artist, the strength needed to sustain that form.

ALWAYS A PROBLEM

At a wedding the bride is supposed to wear "something old and something new, something borrowed and something blue." Some architectural designs are a bit like that. Often they contain something old, something new, and something borrowed—and sometimes something blue, but in the kaleidoscopic com-

The Thinker

Back of the beating hammer
By which the steel is wrought,
Back of the workshops' clamor
The seeker may find the thought.
The thought that is ever master
Of iron and steam and steel,
That rises above disaster
And tramples it under its heel!

The drudge may fret and tinker,
Or labor with lusty blows,
But back of him stands the thinker,
The clear-eyed man who knows;
For into each plow or saber,
Each piece and part and whole,
Must go the brains of Labor
Which gives the work a soul!

Back of the motor's humming,
Back of the belts that sing,
Back of the hammer's drumming,
Back of the cranes that swing,
There is an eye which scans them,
Watching through stress and strain,
There is a mind which plans them—
Back of the brawn, the brain!

Might of the roaring boiler,
Force of the engine's thrust,
Strength of the sweating toiler,
Greatly in these we trust,
But back of them stands the schemer,
The thinker who drives things through;
Back of the job—the dreamer,
Who's making the dream come true!

—By **BERTON BRALEY**
—in *California Engineer*

bination of these old and new, there results always a new problem for the structural engineer.

As no two artists ever dreamed the same dream, so no two building designs are ever exactly alike. The variety is infinite. There is always something new to which the basic principle of structural engineering must be applied, always a new search for the answer to the problem "How to make the artist's dream come true" to the end that neither weight nor load, wind nor shock, heat nor cold, or any other thing shall prevail against the strength of the building but rather that it shall stand for all the years of its usefulness—a safe and serviceable creation.

Major Projects Reaching Completion

(Continued from page 12)

opened December 23. With the paving of this section, the project will present a modern pavement from Sacramento to the State line near Reno.

The Governor's relief employment program, financed by an allocation of \$1,500,000 for extra maintenance work, is well under way. With variations in totals due to personal or local conditions, between 3200 and 3600 men have been given employment and the quotas are now in the process of being brought to their maximum of 4000.

ARCHITECTURE DIVISION

The year's story of the Division of Architecture is one of activity. A condensed statement shows:

By December 30, the Division of Architecture will have had under actual construction since January 1, 1931, a total construction of \$8,225,617, representing 177 projects.

At this time, December 16, 115 of these projects have been completed at a construction value of \$4,420,098.

During the current month, the Division of Architecture will have placed on the bidding market, building projects of a construction value in the total of \$1,194,000. These will include the new hospital building for the Veterans' Home.

In January, bids will be called on projects having an additional construction value of \$681,000.

WATER DIVISION ACTIVITIES

As a result of a ten years investigation of the water resources of California, the State Engineer filed a summary report on the State Water Plan with the 49th Session of the California Legislature, accompanied by texts of supplementary reports containing the detail and bearing on water resources conditions in various sections of California.

One of Governor Rolph's first declarations was that the water problem is paramount.

In furtherance of the State water conservation plan, and following up the results of ten years investigation of resources, the Governor appointed a water conservation committee of seven members to proceed at once to Washington and confer with the federal authorities with the view of securing their cooperation with the State government. The committee proceeded to Washington in Febru-

ary. The result of their efforts was reflected in the tour made through California by the congressional committee on appropriations for the Department of the Interior. The congressmen were attended by several federal officials and members of the legislative committee, and during July, traversed the State from south to north.

COMMISSION APPOINTED

Two months later a corps of U. S. engineers for rivers and harbors made a close inspection of the situation. Anticipating the need of enabling legislation for the State plan, the Governor appointed the California Water Resources Commission, with six ex-official members from among State officials. Likewise, the Governor appointed sixteen honorary advisory committees representing practically all interests and localities.

In addition to these bodies, a joint legislative committee of fourteen members has been in collaboration with the commission appointed by the Governor. The meetings have been harmonious, and it is believed that constructive progress has been made.

The Water Resources Division is not a State disbursing agency. The work of its staff is advisory and supervisory. However, they pass on a vast amount of work financed by corporate and private investors.

During 1931, dams proposed carried an estimated cost of \$19,000,000. Since August 1929, the staff has passed on about \$34,000,000 of this class of improvements. During the same period, 787 dam applications have been offered for approval, and 214 applications for repairs or alterations. Of these, 181 have been approved. For the year, 61 applications have been approved, 50 being for new dams and 11 for enlargements.

OUTLOOK BRIGHTER

In connection with the supervision of irrigation districts by the State Engineer, the year has brought authorization by the California Districts Securities Commission for the funding of \$15,931,250 of bonds. A critical situation in the districts was met and the outlook is much brighter than for years. In addition, bonds of the par value of \$629,000 were validated and expenditures in the sum of \$987,100 approved, and certification given to \$650,000 of current issues.

Highway Bids and Awards for November

HUMBOLDT COUNTY—Reconstructing bridge across Bel River at Robinson's Ferry, consisting of twenty-two 24' timber spans, three 250' steel truss spans and twenty-three 19' timber spans. Dist. I, Rt. 1, Sec. E, Fred J. Maurer & Son, Inc., Eureka, \$23,260; Smith Bros. Company, Eureka, \$24,966; W. J. O'Neil, San Francisco, \$29,985; C. W. Wood, Stockton, \$27,040; Pacific Bridge Co., Portland, Oregon, \$29,225. Contract awarded to Mercer-Fraser Co., Eureka, \$20,752.

MONO COUNTY—From Casa Diablo Hot Springs to Crestview, 5.3 miles grading and surfacing bituminous treated gravel. Dist. IX, Rt. 23, Sec. EF. Daniel Bayles, Biggs, \$164,872; Southern Calif. Roads Co., Los Angeles, \$154,117; Hemstreet and Bell, Marysville, \$177,205; Jack Casson, Hayward, \$215,045; W. H. Hauser, Oakland, \$176,496; Larsen Bros., \$163,961; A. Teichert & Son, Sacramento, \$159,714; Skeels & Graham, Roseville, \$161,854; Fred W. Nighbert, Bakersfield, \$195,375; Gist & Bell, Arcadia, \$182,755; C. C. Willis & Sons, Los Angeles, \$206,402; Mecca Const. Co., Clearwater, \$189,985; Isbell Const. Co., Carson City, Nev., \$193,168. Contract awarded to Morrison-Knudsen, Boise, Idaho, \$142,169.

RIVERSIDE COUNTY—At the Shaver's Summit Maintenance site, water supply well to be drilled and furnished complete. Dist. VIII, Rt. 64, Sec. B, A. A. Barnett, Temecula, \$7,600; Roscoe Moss Co., Los Angeles, \$4,030. Contract awarded to Lyon Bros., Los Angeles, \$3,000.

SAN BENITO COUNTY—Two bridges 8 miles south of Gilroy, a reinforced concrete girder bridge across San Juan Creek consisting of one 34' and two 23' spans; the other across San Benito River, consisting of three 100' steel and ten 40' reinforced concrete spans. Dist. V, Rt. 2, Sec. B, Force Construction Co., Piedmont, \$102,120; Rocca & Caletti, San Rafael, \$102,096; M. B. McGowan, San Francisco, \$94,995; Gutleben Bros., Oakland, \$90,095; Bodenhamer Construction Co., Oakland, \$92,825; Smith Bros. Company, Eureka, \$102,756; Healy-Tibbitts Construction Co., San Francisco, \$91,015; A. W. Kitchen, San Francisco, \$92,471; A. J. Raich, San Jose, \$90,639; Neves & Harp, Santa Clara, \$103,733; C. W. Wood, Stockton, \$101,928; Lord and Bishop, Sacramento, \$99,868; Oberg Bros., Los Angeles, \$109,481. Contract awarded to George J. Ulrich Construction Co., Modesto, \$87,966.

SAN BERNARDINO COUNTY—At the Baker Maintenance site, water supply well to be drilled and furnished complete. Dist. VIII, Rt. 31, Sec. K. Contract awarded to J. W. Burkhardt, Victorville, \$747.

SAN BERNARDINO COUNTY—Devore to Alrav, about 10.9 miles to be graded and surfaced with selected oil-treated material. Dist. VIII, Rt. 31, Sec. B, Hemstreet & Bell, Marysville, \$448,986; von der Hellan & Pierson, Castaic, \$367,923; Gist & Bell, Arcadia, \$424,686; Lang Transportation Co., Los Angeles, \$333,418; Granfield, Farrar & Carlin, San Francisco, \$397,682; Gibbons & Reed Co., Burbank, \$379,413; Macco Construction Co., Clearwater, \$358,146; Griffith Co., Los Angeles, \$341,964; H. W. Rohl Co., Los Angeles, \$349,251; Lewis Construction Co., Los Angeles, \$330,838; Jahn & Bressi Construction Co., Inc., Los Angeles, \$353,697; Southern California Roads Co., Los Angeles, \$341,730; Morrison-Knudsen Co., Boise, Idaho, \$361,471; George Pollock Co., Sacramento, \$342,640. Contract awarded to Healy-Tibbitts Construction Co., San Francisco, \$321,514.

SAN DIEGO COUNTY—Between Del Mar and Solano Beach, about 0.6 mile to be graded and paved with Portland cement concrete. Dist. VII, Rt. 2, Sec. A, Basich Bros. Construction Co., Torrance, \$42,660; E. Paul Ford, East San Diego, \$39,940; Steele Finley, Santa Ana, \$41,349; Yglesias Bros., Inc., San Diego, \$37,921; C. R. Butterfield, San Pedro, \$44,512; Oberg Bros., Los Angeles, \$43,945. Contract awarded to B. G. Carroll, San Diego, \$37,480.

SAN DIEGO COUNTY—About 0.25 mile of roadbed to be widened and heavy fuel oil to be applied through Encinitas between "D" and "A" Streets. Dist. VII, Rt. 2, Secs. A & F, H. E. Cox & Son, Pasadena, \$3,564. Contract awarded to Cozens & Hammond, Encinitas, \$2,607.

SANTA BARBARA COUNTY—Between Los Alamos and 2 miles north of Solomon Summit, 9.7 miles to be graded and paved with Portland cement concrete.

Dist. V, Rt. 2, Secs. C, M & L, Matich Bros., Elinore, \$337,349; Thomas C. Rogers, Los Angeles, \$376,585; Sander Pearson, Santa Monica, \$371,726; McCray Co., Los Angeles, \$341,649; Griffith Co., Los Angeles, \$344,422; Morrison-Knudsen Co., Boise, Idaho, \$345,460; Hanrahan Co., San Francisco, \$332,111; Peninsula Paving Co., San Francisco, \$316,343; C. W. Wood, Stockton, \$312,375; Macco Construction Co., Clearwater, \$325,409; N. M. Ball, Porterville, \$338,229; Basich Bros., Torrance, \$307,216; Granite Construction Co., Ltd., Watsonville, \$320,998; Jahn & Bressi Construction Co., Inc., Los Angeles, \$313,477; Southern California Roads Co., Los Angeles, \$337,947; Kovacevich and Price, Inc., Southgate, \$343,956; Frederickson & Watson Construction Co., and Frederickson Bros., Oakland, \$335,285; Healy-Tibbitts Construction Co., San Francisco, \$332,030. Contract awarded to M. J. Bevanda, Stockton, \$306,711.

SHASTA COUNTY—Reinforced concrete girder bridge at Clear Creek, about 18 miles west of Redding, consisting of four 52' spans on concrete piers and bents. Dist. II, Rt. 20, Sec. A, M. B. McGowan, San Francisco, \$22,445; R. B. McKenzie, Red Bluff, \$24,493; John Berlinger, Orland, \$22,655; Smith Bros. Co., Eureka, \$27,622; Fred J. Maurer & Son, Inc., Eureka, \$24,990; Rolla Arbutkie, Anderson, \$21,136; Skeels & Graham Co., Roseville, \$24,582; Holdener Construction Co., Sacramento, \$27,753; Peter McHugh, San Francisco, \$26,734; Whited & Whited, Santa Rosa, \$22,172. Contract awarded to J. P. Brennan, Redding, \$20,822.

SISKIYOU COUNTY—Bridge across Beaver Creek 15.5 miles west of Junction Rt. 3, consisting of three 50' steel beam spans on concrete bents. Dist. II, Rt. 46, Sec. D, J. P. Brennan, Redding, \$31,242; F. J. Maurer & Son, Inc., Eureka, \$33,847; Gist & Bell, Arcadia, \$34,230; J. Berlinger, Orland, \$37,430; Albert Young, Yreka, \$39,300; R. B. McKenzie, Red Bluff, \$24,910. Contract awarded to J. W. Hoopes, Sacramento, \$31,035.

SISKIYOU COUNTY—Bridge across Klamath River at Walker, consisting of one 330' steel truss span on concrete piers and six 19' timber approach spans. Dist. II, Rt. 46, Sec. D, Smith Bros. Co., Eureka, \$29,119; John Berlinger, Orland, \$27,518; M. B. McGowan, San Francisco, \$27,555; C. W. Wood, Stockton, \$30,585; J. P. Brennan, Redding, \$27,167. Contract awarded to Gutleben Bros., Oakland, \$20,728.

TRINITY COUNTY—Between Weaverville and Grass Valley Creek, crushed gravel or stone in stock piles. Dist. II, Rt. 20, Secs. A-B, James W. Bertram, Weott, \$12,112; E. B. Bishop, Sacramento, \$12,612. Contract awarded to S. R. Eastwood & S. Eastwood, Redding, \$12,015.

VENTURA COUNTY—Reinforced concrete girder bridge across Arroyo Calleguas 1 mile east of Camarillo, consisting of one 60' span and two 30' spans. Dist. VII, Rt. 2, Sec. B, Nead Construction Co., Warrington, \$28,426; Gist & Bell, Arcadia, \$28,639; R. R. Bishop, Long Beach, \$28,848. Contract awarded to Merritt-Chapman & Scott Corporation, San Pedro, \$25,755.

Why some motor vehicle drivers continually have accidents while other drivers rarely, if ever, have any is one of the puzzling problems for consideration by the annual Safety Congress in Chicago. The material for this subject came from a recent study of a group of commercial fleet operators. This revealed that about one-third of the drivers checked had no accidents whatever; another one-third averaged two accidents each; while the remainder of the group ranged from three to ten accidents each.

"Which do you like better, balloon tires or high pressure tires?"

"Why, I like balloon tires better."

"But they claim that balloon tires reduce the power of the car."

"Well, I don't care if it does—I am a pedestrian."

—Texas Highways.



Favorable action on the State water plan by the California Irrigation Districts Association, approval of the sale of irrigation district bonds and new contracts, by the District Securities Commission, and a series of joint meetings in Southern California by Governor Rolph's California Water Resources Commission and the Joint Legislative Water Committee are features of the monthly report of the Division of Water Resources under State Engineer Edward Hyatt. The report includes details of flood control, reclamation and maintenance work and news of the increased flow of the Sacramento and San Joaquin rivers as follows:

The California Irrigation Districts Association held its biennial meeting at Marysville on November 13 and 14. Most of the time of the session was given to the discussion of the State Water Plan and to an explanation of procedure under the irrigation District Act as amended by the 1931 Legislature.

The State Water Plan was briefly explained by State Engineer Hyatt and discussed at some length by Senators Crittenden, Rich and others. The Association unanimously adopted a resolution favoring the "ultimate conservation of the water resources of the State through cooperation of the Federal government and the State of California with local agencies to carry out progressively a comprehensive plan, said plan to be fair, just and economically sound, and to preserve to each area having surplus water a sufficient supply for its future development and not to interfere with existing water rights." The association also pledged its cooperation to Governor Rolph and his water commission and to the Joint Legislative Committee in working out the plan.

REQUESTS APPROVAL

At a meeting of the Districts Securities Commission on October 27, favorable action was taken on requests for approval as follows:

Cordua Irrigation District—Sale or exchange of \$64,000 principal amount of district refunding bonds at \$0.90.

Nevada Irrigation District—Private sale of \$50,000 principal amount of district bonds at \$0.90.

Turlock Irrigation District—New contracts with the San Joaquin Light and Power Company and the Pacific Gas and Electric Company from the sale and purchase of power.

Lindsay-Strathmore Irrigation District—Contracts for the purchase of 230 shares of stock of the Peoples Ditch Company.

Visits for the purpose of considering matters in their interests were made to the following districts:

Waterford irrigation district, Stanislaus County; West Side and Linden irrigation districts, San Joaquin County; Carpenter and Serrano irrigation districts, Orange County; Vista, Santa Fe and San Dieguito irrigation districts, San Diego County.

DAMS

To date 780 applications have been received for approval of dams built prior to August 14, 1929; 87 applications for approval of plans for construction or enlargement; and 203 applications for repairs.

Applications Received for Approval of Plans for Enlargement of Dams

Dam	Owner	County
McGowan	First National Bank	Tehama

Applications Received for Approval of Plans for Repairs or Alterations

Dam	Owner	County
Greenleaf	City of Whittier	Los Angeles
Lawler	Calif. Water Service Co.	Sonoma
Shelton	A. A. Curtis	Modoc
Lower St. Helena	Town of St. Helena	Napa
Jimison Lake	Carnation Gold Mining Co.	Plumas
El Casco	G. C. Trautzettel	Riverside
San Pablo	East Bay Municipal Utility District	Contra Costa

Plans for the construction of the Bouquet Canyon Dam, to be built by the city of Los Angeles, were approved on October 29, 1931. This will be a large earthfill structure 170 feet high with a storage capacity of 36,200 acre feet.

Sixteen applications for approval of plans for repairs or alterations were approved during this period. Repairs necessary to place dams in shape for the winter season have been completed.

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento Flood Control Project.

Routine maintenance work has been carried on, including the conditioning of the drainage pumping plants and painting the buildings at these plants.

Maintenance clearing operations in the Sutter and Tisdale by-passes have been continued with two crews of twenty men each. As an unemployment relief measure, these crews are operating on a five-day week basis and each man is permitted a total of ten days actual work at \$4 per day.

A gang of nine men is engaged in leveling a portion of the area recently cleared and stumped in the Sacramento By-pass, so that it can be plowed and cultivated as a means of permanently doing away with maintenance costs.

The Reclamation Board has granted a lease to the Division for 3.18 acres one mile from Sutter City, on

(Continued on page 40)

November 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 November, 1931.

TULARE COUNTY—Application 7110. U. S. Sequoia National Forest, c/o Frank P. Cunningham, supervisor, Porterville, for 1296 gallons per day from unnamed spring tributary to South Fork of Middle Fork Tule River to be diverted in section 34, T. 20 S., R. 31 E., M. D. B. and M., for domestic purposes. Estimated cost \$200.

MODOC COUNTY—Application 7111. E. G. Scammon, Herman Schadler, Curtis Mathews, W. J. Wadlams, C. A. Molster and H. E. Bennett, c/o E. G. Scammon, mgr. Land Dept. Red River Lumber Co., Westwood, for 25 c.f.s. from Cowhead Creek tributary to Cowhead Lake to be diverted in section 16, T. 47 N., R. 17 E., M. D. B. and M., for irrigation purposes. (2990 acres.)

NEVADA COUNTY—Application 7112. Edward Bickel, P. O. Box 881, Nevada City, for 2099 gallons per day from unnamed spring tributary to Osborn Creek, thence Little Greenhorn Creek, Greenhorn Creek and Bear River to be diverted in section 5, T. 16 N., R. 10 E., M. D. B. and M., for mining and domestic purposes.

NEVADA COUNTY—Application 7113. Edward Bickel, P. O. Box 881, Nevada City, for 15 c.f.s. from Little Greenhorn Creek tributary to Greenhorn Creek, thence Bear River to be diverted in section 4, T. 16 N., R. 10 E., M. D. B. and M., for mining and domestic purposes.

BUTTE COUNTY—Application 7114. Richvale Irrigation District, Richvale, for 15 c.f.s. from Dry Creek tributary to Butte Creek to be diverted in section 6, T. 19 N., R. 2 E., M. D. B. and M., for irrigation purposes. (600 acres.) Estimated cost \$2,000.

INYO COUNTY—Application 7115. Standard Oil Company of California, a corporation, c/o W. F. Vane, 225 Bush St., San Francisco, for 49,900 gallons per day from Last Chance Springs (3 springs) tributary to Death Valley Watershed to be diverted in section 2, T. 8 S., R. 39 E., M. D. B. and B., for mining and domestic purposes. Estimated cost \$500.

HUMBOLDT COUNTY—Application 7116. Arthur McBride, Winford Ottley, Ralph Peters and Geo. W. Smith, c/o Allen and McNamara, attys., Yreka, for 10 c.f.s. from Five Mile Creek tributary to Klamath River to be diverted in section 16, T. 11 N., R. 6 E., H. B. and M., for power purposes. (681 h.p.) Estimated cost \$1,300.

CALAVERAS COUNTY—Application 7117. Claude Rogers, P. O. Box 43, Station A, Berkeley, for 7.8 c.f.s. from Mokelumne River tributary to San Joaquin River to be diverted in section 1, T. 4 N., R. 9 E., M. D. B. and M., for mining and domestic purposes.

TRINITY COUNTY—Application 7118. Calvin H. Barkdull, 417 Mutual Life Building, Seattle, Washington, for (1) 20, (2) 4, (3) 6, (4) 6, (5) 4, total 50 c.f.s. from (1) Mosquito Creek, (2) Big Lake, (3) Ammon Creek, (4) White Sides, (5) Bear Trap Creek tributary to South Trinity River to be diverted in sections 33, 26, 27, 11 and 14, T. 5 N., R. 5 E., M. D. B. and M., for mining and domestic purposes.

KERN COUNTY—Application 7119. Harold B. Hersman, c/o Leonard E. Weisenburg, 4816 Cramer Ave., North Hollywood, for 5 c.f.s. from Red Rock Canyon tributary to Mojave Desert Drainage Area to be diverted in section 2, T. 30 S., R. 37 E., M. D. B. and M., for mining and domestic purposes.

SIERRA COUNTY—Application 7120. Walter Hayter, Comptonville, for 3.0 c.f.s. from Big Humbug Creek tributary to N. Fork Yuba River to be diverted in section 15, T. 19 N., R. 9 E., M. D. B. and M., for mining and domestic purposes. Estimated cost \$1,500.

TUOLUMNE COUNTY—Application 7121. Milo H. Neidig, c/o R. C. Bauermeister, Sonora Inn, Sonora, for 3 c.f.s. from South Fork of Stanislaus River tributary to Stanislaus River to be diverted in section 24, T. 3 N., R. 15 E., M. D. B. and M., for mining and domestic purposes. Estimated cost \$2,500.

MONO COUNTY—Application 7122. Governor F. B. Balzar, Carson City, Nevada, for 200 gallons per day

from small unnamed stream tributary to Lower Twin Lake to be diverted in section 5, T. 3 N., R. 24 E., M. D. B. and M., for domestic purposes.

SISKIYOU COUNTY—Application 7123. William M. Clark, Happy Camp, for 1.0 c.f.s. from Tanners Gulch tributary to S. Fork Indian Creek, thence Indian Creek and Klamath River to be diverted in section 13, T. 17 N., R. 6 E., H. B. and M., for mining purposes. Estimated cost \$100.

SAN JOAQUIN COUNTY—Application 7124. Hunt Bros. Packing Company, c/o Chlekering and Gregory, attys., Merchants Exchange Building, San Francisco, for 3.9 c.f.s. from Mormon Slough tributary to San Joaquin River to be diverted in section 7, T. 2 N., R. 9 E., M. D. B. and M., for irrigation purposes. (313.5 acres.) Estimated cost \$5,000.

EL DORADO COUNTY—Application 7125. B. W. Stone, 161 Ellis St., San Francisco, for 5000 c.f.s. and 125,000 ac. ft. per annum from (1) Rubicon River, (2) Pilot Creek, (3) Garie Creek, (4) Loon Lake (5) Buck Island Lake, (6) Rock Bound Lake, (7) Little S. Fork Rubicon River tributary to American River Drainage to be diverted in section 9, T. 13 N., R. 16 E., section 11, T. 12 N., R. 12 E., section 24, T. 13 N., R. 13 E., sections 11, 31 and 34, T. 14 N., R. 14 E., section 4, T. 13 N., R. 15 E., section 2, T. 13 N., R. 14 E., M. D. B. and M. for municipal purposes.

SAN DIEGO COUNTY—Application 7126. John Allen and Almira B. Crawford, Box 54, Potrero, for 36 ac. ft. per annum from Camp Creek tributary to Tecate River to be diverted in section 24, T. 18 S., R. 4 E., S. B. B. and M. for recreational and domestic purposes. Estimated cost \$1,000.

SAN BERNARDINO COUNTY—Application 7127. H. C. Zech, 116 E. 31st St., Los Angeles, for 9,925 c.f.s. from unnamed spring tributary to Bear Valley or Baldwin Lake to be diverted in section 31, T. 2 N., R. 2 E., H. B. and M., for domestic purposes. Estimated cost \$2,500.

BUTTE COUNTY—Application 7128. O. J. Laing, Paradise, for 3.0 c.f.s. from Springs tributary to Coon Hollow Creek, thence W. Branch N. Fork Feather River, N. Fork Feather River, Feather River and Sacramento River to be diverted in section 9, T. 25 N., R. 5 E., M. D. B. and M., for mining purposes. Estimated cost \$16,000.

SIERRA COUNTY—Application 7129. H. L. Berkey, c/o Jas. P. Sweeney, 68 Post Street, San Francisco, for 60 c.f.s. from Canyon Creek tributary to Yuba River to be diverted in section 18, T. 21 N., R. 10 E., M. D. B. and M., for mining purposes. Estimated cost \$30,000.

Permits to appropriate water issued by the Department of Public Works, Division of Water Resources during the month of November, 1931.

TEHAMA COUNTY—Permit 3812, Application 7078. Thomas J. Pellew, 409 45th St., Oakland, November 7, 1931, for 6.037 c.f.s. from unnamed stream, tributary to Elder Creek, thence Sacramento River in section 34, T. 25 N., R. 7 W., M. D. B. and M., for irrigation of 1 acre. Estimated cost \$300.

INYO COUNTY—Permit 3813, Application 6896. Leo Kikut, Olancha, November 12, 1931, for 0.12 c.f.s. from unnamed spring, tributary to Owens Lake in section 26, T. 18 S., R. 36 E., M. D. B. and M., for irrigation of 10 acres. Estimated cost \$400.

RIVERSIDE COUNTY—Permit 3814, Application 6932. R. A. Merchant, 224 Oak St., Monrovia, November 19, 1931, for 0.12 c.f.s. from seepage water tributary to Santa Ana River in section 9, T. 3 S., R. 5 W., S. B. B. and M., for irrigation of 10 acres.

STANISLAUS COUNTY—Permit 3815, Application 7071. Joe V. Cordoza, Rt. 2, Box 1254, Modesto, November 19, 1931, for 1.00 c.f.s. from Stanislaus River, tributary to San Joaquin River in section 29, T. 2 S., R. 8 E., M. D. B. and M., for irrigation of 80 acres. Estimated cost \$1,500.

TRINITY COUNTY—Permit 3816, Application 6953. L. E. Wheeler and W. M. McCumber, Denny, November 21, 1931, for 1.00 c.f.s. from S. Fork of East Fork of New River, tributary to Trinity River in section 8, T. 36 N., R. 12 W., M. D. B. and M., for mining. Estimated cost \$700.

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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 November, 1931.

LASSEN COUNTY—Emerson Dam No. 255. Tro Emerson, Susanville, owner; earth, 17 feet above streambed with a storage capacity of 200 acre feet, tributary to Susan River in section 16, T. 29 N., R. 12 E., M. D. B. and M., for storage purposes, for irrigation use.

ORANGE COUNTY—Basin "A" Dam No. 795. Union Oil Company, Los Angeles, owner; earth, 14 feet above streambed, located in section 10, T. 3 S., R. 10 W., S. B. B. and M.

ORANGE COUNTY—Basin "B" Dam No. 795-2. Union Oil Company, Los Angeles, owner; earth, 13 feet above streambed, located in section 10, T. 3 S., R. 10 W., S. B. B. and M.

ORANGE COUNTY—Basin "C" Dam No. 795-3. Union Oil Company, Los Angeles, owner; earth, 12 feet above streambed, located in section 10, T. 3 S., R. 10 W., S. B. B. and M.

ORANGE COUNTY—Basin "D" Dam No. 795-4. Union Oil Company, Los Angeles, owner; earth, 13 feet above streambed, located in section 11, T. 3 S., R. 10 W., S. B. B. and M.

TEHAMA COUNTY—McGowan Dam No. 262. First National Bank, Santa Ana, owner; earth, 10.5 feet above streambed with a storage capacity of 20 acre feet, situated on Battle Creek, tributary to Sacramento River in section 9, T. 29 N., R. 4 E., M. D. B. and M., for storage purposes, for recreation use.

Applications for approval of plans and specifications for construction or enlargement of dams filed with the State Department of Public Works, Division of Water Resources during the month of November, 1931.

TEHAMA COUNTY—McGowan Dam No. 262. First National Bank, Santa Ana, owner; 12.5 feet above streambed with a storage capacity of 35 acre feet, situated on Battle Creek, tributary to Sacramento River in section 9, T. 29 N., R. 4 E., M. D. B. and M., for storage purposes, for recreation use. Estimated cost \$500, fees paid \$20.

SAN DIEGO COUNTY—El Capitan Dam No. 8-7. City of San Diego, San Diego, owner; earth and rock, 197 feet above streambed with a storage capacity of 118,000 acre feet, situated on San Diego River in section 7, T. 15 S., R. 2 E., S. B. B. and M., for storage purposes for municipal use. Estimated cost \$3,225,595.25, fees paid \$7,726.60.

Applications for approval of plans and specifications for repair or alteration of dams filed with the State Department of Public Works, Division of Water Resources during the month of November, 1931.

NAPA COUNTY—Lower St. Helena Dam No. 16-2. Town of St. Helena, St. Helena, owner; earth, situated on tributary of York Creek, tributary to Napa River, located in Rancho Carne Humana.

PLUMAS COUNTY—Jamison Lake Dam No. 201. Carnation Gold Mining Co., Ltd., Blairsden, owner; earth, situated on Little Jamison Creek, tributary to Jamison Creek in section 1, T. 21 N., R. 11 E., M. D. B. and M.

RIVERSIDE COUNTY—El Casco Dam No. 822. G. O. Trauzettel, Redlands, owner; earth, situated on San Timoteo Creek, tributary to Santa Ana River in section 20, T. 2 S., R. 2 W., M. D. B. and M.

CONTRA COSTA COUNTY—San Pablo Dam No. 31-6. East Bay Municipal Utility District, Oakland, owner; earth, situated on San Pablo Creek, tributary to San Francisco Bay in Rancho El Sobrante.

SAN DIEGO COUNTY—Cuyamaca Dam No. 56. La Mesa, Lemon Grove and Spring Valley Irrigation District, San Diego, owner; earth, situated on Boulder Creek, tributary to San Diego River in T. 13, R. 4 E., S. B. B. and M.

SAN DIEGO COUNTY—Helix Dam No. 56-4. La

Mesa, Lemon Grove and Spring Valley Irrigation District, San Diego, owner; earth, located in section 21, T. 16 S., R. 1 W., S. B. B. and M.

SAN DIEGO COUNTY—Larger Lemon Grove Dam No. 56-7. La Mesa, Lemon Grove and Spring Valley Irrigation District, San Diego, owner; earth, located in section 25, T. 16 S., R. 2 W., S. B. B. and M.

SAN DIEGO COUNTY—Smaller Lemon Grove Dam No. 56-8. La Mesa, Lemon Grove and Spring Valley Irrigation District, San Diego, owner; earth, located in section 30, T. 16 S., R. 1 W., S. D. B. and M.

LAKE COUNTY—Bucksnot Dam No. 392. Richard Detert, San Francisco, owner; earth, situated on Bucksnot Creek, tributary to Putah Creek in section 9, T. 10 N., R. 6 W., M. D. B. and M.

SAN MATEO COUNTY—Filoli Dam No. 617. Filoli, Inc., San Mateo, owner; earth, situated on branch of Laguna Creek, tributary to San Mateo Creek in section 30, T. 5 S., R. 4 W., M. D. B. and M.

PLANS 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 November, 1931.

LASSEN COUNTY—Loosely Pool Dam No. 258. T. H. Vestal, et al., Pittville, owner; concrete, 4 feet above streambed with a storage capacity of 120 acre feet, situated on Pit River, tributary to Sacramento in section 18, T. 37 N., R. 6 E., M. D. B. and M., for diversion purposes, for irrigation use.

Plans for the repair or alteration of dams approved by the State Department of Public Works, Division of Water Resources during the month of November, 1931.

SONOMA COUNTY—Lawler Dam No. 581-3. Calif. Water Service Co., San Francisco, owner; earth, situated on Adobe Creek, tributary to Petaluma Creek in section 12, T. 5 N., R. 7 W., M. D. B. and M.

LOS ANGELES COUNTY—Greenleaf Dam No. 18. City of Whittier, Whittier, owner; earth, tributary to San Gabriel River in section 16, T. 2 S., R. 11 W., S. B. B. and M.

PLUMAS COUNTY—Eureka Dam No. 283. Plumas Eureka Corp., Grass Valley, owner; earth and rock, situated on Eureka Creek, tributary to Feather River in T. 22 N., R. 11 E., M. D. B. and M.

NAPA COUNTY—St. Helena Dam No. 16-2. Town of St. Helena, St. Helena, owner; earth, tributary to Napa River, located in Rancho Carne Humana.

CONTRA COSTA COUNTY—San Pablo Dam No. 31-6. East Bay Municipal Utility District, Oakland, owner; earth, situated on San Pablo Creek, tributary to San Francisco Bay, located in Rancho el Sobrante.

SHASTA COUNTY—Baldwin Dam No. 97-85. Pacific Gas and Electric Company, San Francisco, owner; earth, situated on no stream.

MODOC COUNTY—Upper Caldwell River Dam No. 156-5. G. L. Kramer, Beber, owner; flashboard, situated on Pit River, tributary to Sacramento River in section 34, T. 42 N., R. 10 E., M. D. B. and M.

PLUMAS COUNTY—Jamison Lake Dam No. 284-3. Carnation Gold Mining Co., Ltd., Blairsden; earth, situated on Little Jamison Creek tributary to Jamison Creek in T. 21 N., R. 11 E., M. D. B. and M.

MEETING OF RESEARCH BOARD

The eleventh annual meeting of the Highway Research Board, National Research Council, met December 10 and 11, 1931, in Washington, D. C. The sessions were devoted to discussions of reports of research activities in relation to highway finance, transportation, design, materials and construction, maintenance and traffic.

How State Cares for 130,000 Trees Privately Planted Along Highways

THE PLANTING of many live Christmas trees on lawns and roadsides during the Christmas season brought requests for information as to the practice of the Department of Public Works relative to tree-planting by individuals and evidenced the widespread interest in this phase of roadside beautification.

The extent of this public interest in the arboreal beauty of our highways is best exemplified by the fact that since 1920, civic or other public bodies of California have planted nearly 700 miles of highway roadsides to trees. This represents nearly 70,000 trees. In addition, there were about 60,000 older trees which had been planted by tree lovers, making a total of 130,000 trees to be cared for by the maintenance forces.

The initial expense of planting and maintenance during the first year is borne by the parties interested. At the end of this period the State assumes their entire care, and replacement in event of loss.

The extent of this responsibility is appreciated, when it is known that some \$71,500 was expended during the past year for the care and replacement of the plantings, a sum representing 1.3 per cent of the total annual maintenance allotment.

AN EXACTING TASK

Generally the trees are spaced at 50-foot intervals, being placed alternately on the right and left sides of the roadway, with necessary elimination for visibility at crossings and road intersections. The care of these trees is very exacting and is usually assigned to the individual foreman in whose territory they occur. Assisting in the direction of this work is the arboriculturist, reporting to the maintenance engineer.

Special tree watering equipment having a movable discharge pipe enables watering to be done from the driver's seat, a tank truck of 1200 gallons usually being sufficient to water some thirty to forty trees. This watering must be performed every four to six weeks during the period from June to October. Aside from irrigation and cultivation many precautions are necessary for the protection

of young trees against insect pests, damage by squirrels, gophers, moles and loose stock driven along the highway. The hazard of fire is also great.

LOCATION IMPORTANT

Particular attention is given the location of plantings to eliminate any possible interference with the ultimate development of the pavement. With this in mind, new plantings are discouraged on rights of way less than eighty feet wide. On eighty-foot rights of way the trees are planted between the curb and right of way line, thirty-one feet out from the pavement center.

All roadside trees are inspected at intervals and particular note made of any trees within reach of the traveled way that are in any way a menace. Wherever hazard exists the trees are either removed, or trimmed and dangerous limbs cabled back to insure safety.

As load clearances require a clear height of 13½ feet above the pavement, systematic pruning and trimming are being followed to provide this clearance and at the same time develop a symmetrical, worth while tree. Where power or telephone lines occur within rights of ways planted to trees, the tree height is limited to 40 feet and all trimming for wire clearance is done by the utility company under permit and inspection of the Division of Highways.

SUITABLE SPECIES

Observations extending over a period of years indicate the suitability of the following tree species for the localities specified:

Valley sections: European Sycamore, California Black Walnut, Black Locust, Arizona Ash.

Coastal section: Coast Redwood, European Sycamore, Black Walnut, Blue Gum, Red Gum, Coast Live Oak, Silver Maple.

Desert section: Black Locust, Arizona Ash, Blue Gum, Red Gum, Black Acacia, Athol.

In addition to the care of trees, the Division of Highways organization is planting shrubs and vines on cuts and fills, particularly at subways and similar structures. In many cases, this work will reduce the upkeep cost at such locations.

State-wide Highway Developments Discussed at Annual Conference

THE MEETING of the State-wide Highway Committee of the California State Chamber of Commerce in connection with the annual conference at Los Angeles November 5-6, was one of the most comprehensive gatherings for discussion of highway development problems in California that the State has yet seen. With all sections of the State represented the meeting presented a cross section of all interests concerned in highway construction.

A roll call showed 84 in attendance including more than 30 county supervisors and representatives of the automobile clubs, various civic organizations and State and federal departments.

Earl Lee Kelly, chairman of the California Highway Commission, and Charles H. Purcell, state highway engineer, discussed the program and progress under the biennial budget.

FEDERAL AID MOTION

Dr. L. J. Hewes, deputy chief engineer of the U. S. Bureau of Public Roads, made a very complete report on the federal aid system, and Bruce B. Burnett, forest highway engineer, reported on the forest system. Following Dr. Hewes' report on the federal aid system, a resolution was passed as follows:

"That the State Chamber of Commerce urge the continuation of the present annual appropriation for federal and forest roads, and to take such measures as the Board of Directors may approve to aid in the accomplishment of this purpose."

Under the subject of additions to the secondary system, the method of procedure and the report of the progress made to date was explained by Mr. Purcell. Reports from Regional Councils indicated that the present policy of orderly additions based upon engineering studies, was being supported generally throughout the State, and that the regional highway committees are working in close cooperation with the Highway Department in the study of local projects.

Reports of the grade crossing study were made by W. K. Etter, manager of the Santa Fe Railroad Company; J. B. Hunter, trans-

portation engineer of the California Railroad Commission, and Harry A. Mitchell, president of the Sacramento Northern Railroad Company.

Mr. Mitchell made a notable report on the effective law enforcement in connection with grade crossings which resulted in a reduction of 16 per cent in grade crossing accidents for the first six months of this year compared with the same period last year. Following Mr. Mitchell's report, a resolution was passed commending him on the work done and the character of the report.

Orra E. Monnette, Colonel Charles Wing and Earl Lee Kelly reported very definite progress made by this committee on its present program for the designation and registration of historical land markers and the erection of suitable highway diversion signs. The committee is hopeful that historical highway diversion markers in California will have been erected prior to the 1932 Olympiad and is coordinating the work of various civic organizations engaged in this endeavor throughout the State.

BILL HURTS CALIFORNIA

A number of other important items such as the question of the State taking into the State highway system all city streets forming a direct connection to the State system, the inclusion of county roads in the State system, etc., were discussed. A number of these matters were referred to the State-wide Highway Committee for further study and recommendation.

A special subcommittee was appointed to study the effect of the Scott-Levitt Bill, which bill now provides that 90 per cent of the road on which expenditures can be made must be on public lands. This bill is working a particular hardship on approach roads to California national parks. In view of the immediate urgency for action on this matter, the committee requested that its chairman be authorized to take such action as necessary to protect California's interests.

Sunday School Teacher: Does any boy know what the children of Israel were looking for when they went into the wilderness?

Willie: Yes, ma'am. Parking space.—*Arizonian*.

Trunk Highway Protection Assured

(Continued from page 7)

Clearing of title to rights of way over lands involved in probate proceedings and over the property of minors always has been troublesome. Condemnation often has been resorted to even in friendly cases in order to clear the title to the easement desired. An executor, administrator or guardian could execute a valid grant of right of way only after securing a court order authorizing a sale, advertising and taking of bids. Such procedure not only has increased the cost of rights of way which in numerous instances should have been donated, but has delayed many a highway project unnecessarily.

The two sections of the new Probate Code cited above permit executors, administrators and guardians to grant rights of way without consideration, whenever such a grant is for the advantage, benefit and best interests of the estate. The grant may be made upon an order of court after notice. Advertising and taking of bids, in the cases of such donations, is not necessary.

Such procedure will save much time and expense in many instances; right of way agents in the field should not fail to call these sections of the code to the attention of attorneys and other representatives of estates when dealing for such rights of way.

FEDERAL PROVISIONS

Section 17 of the Federal Highway Act, commonly called the Federal Aid Act, provides for the reservation of areas of public lands of the national government for rights of way and for sources of materials for federal aid highways, of which California has nearly 5000 miles.

As far as rights of way are concerned, in the past, advantage has not been taken of this offer of the federal government. Highways have been constructed across the public domain under the old act of 1866 which provides no definite width or method of giving notice to the Land Office that the grant has been accepted.

The General Land Office, in the Department of the Interior, recently announced that reservations of rights of way of a width of four hundred (400) feet would be made across unappropriated and unreserved federal lands whenever applications are submitted under Section 17.

The district offices were instructed by memorandum, in August, 1931, to clear the title to rights of way for all federal aid highways in California located across the public domain by submitting to headquarters necessary data for making such applications. This work is now under way and such applications are being forwarded to the Department of the Interior, through the Bureau of Public Roads of the Department of Agriculture, as provided by the federal statute.

Protection of the great interstate trunk highways from future encroachments and interference will thus be assured.

WITHIN NATIONAL FORESTS

Permits for the construction of highways through the national forests is another matter which has been given consideration. Formerly, applications for such permits were prepared in the district offices and forwarded to Sacramento for signature and submission to the Regional Office of the United States Forest Service in San Francisco. From the Regional Office they were returned to the local Forest Supervisor for review and recommendation before action was taken by the Regional Forester.

After a discussion of the matter with officials of the Forest Service, it was agreed that applications for such permits might be made by the district engineers and submitted directly to the supervisors of the forests involved. Thus, when the application arrives at the Regional Forest Office, it is accompanied by the report of the local Forest Supervisor.

PERMITS SPEEDED

Permits for use of road building materials to be obtained within the forests are handled in the same way. This procedure has relieved the central office at Sacramento of considerable unnecessary routine and has speeded up the issuance of such permits.

Cooperation also has been given to obtaining rights of way across Indian lands and various other Federal reservations, including reservoir and power site withdrawals. Federal rulings relative to such matters are being obtained and studied to the end that the procedure required by the Federal Government shall be followed in all cases.

Way to Kill the Goose That Lays Gold Highway Eggs

STATE SENATOR BREED does well to fight any suggestion to dip into the gas tax for purposes other than those agreed upon between the State and the motorists. The gas tax is going to need careful safeguarding or the goose that lays the highway eggs will be killed.

Hungry eyes turn constantly on the gas tax. Plots are being laid all the time. This tax turns out so much money, is collected so easily and so far has been extracted with so little pain to the subject that it is a great temptation to politicians seeking money to spend.

The vital point to remember is this: The gas tax is painless only because it is spent for the motorists. The moment any portion of the money is filched away from the highways the tax will become not only painful but tyrannical. The tax is a contract. The motorists agreed to it willingly on the explicit understanding that it was to be used solely for the roads. They will have a right to revolt if the money is diverted. The way to kill the gas tax is to load it with burdens for which the motorists, as motorists, have no proper responsibility.—*San Francisco Chronicle.*

Car's Serial Number Needed for License

A change in the forms of 1932 automobile registration certificates is announced by Russell Bevans, registrar of the Department of Motor Vehicles, to comply with a new section of the law requiring that the serial number and number of cylinders be stated on all applications for license renewal, transfers of secondhand cars and registration of new cars.

In applying for new plates the motorist should write in the number of cylinders after the line "Make" on the old certificate. The serial number should be written in below the line "Date Issued."

The city banker stopped at the village filling station for gas and then chatted with the proprietor while a young boy checked his tires and radiator.

"I suppose this hired man is your boy?" he said.
"That's not a hired man," said the villager, who had read of city banks, "that's our first vice president in charge of air and water."—*Exchange.*

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

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Vol. 9 DECEMBER, 1931 No. 12

HEALTHY ROADS

A report to the American Chemical Society states that silicosis, an illness due to breathing dust, is more widespread than was hitherto believed.

Silicosis is caused by silica, a white crystalline substance composed of oxygen and silicon, the two most abundant elements in the earth's crust. They are believed either to dissolve in the lung or to form a colloid, a substance of glue-like consistency which floats in the lung tissue fluids. The resulting irritation creates scar tissue, and once established silicosis is permanent. The disease is usually progressive and frequently culminates in the dreaded tuberculosis.

Silicosis, of course, is most prevalent among industrial workers such as drillers and muckers in subways. But this menace to our health is faced, to a lesser degree, by all of us when we travel over dusty roads—and silica is especially plentiful in sand, of which many roads are partly composed.

This is just one more reason for pushing the good roads movement. Eliminating the dust and dirt by even inexpensively bound top surface, we have always known adds much to comfort, and we now learn it is an aid to health.—*Los Angeles Journal of Commerce.*

HER MISTAKE

Highway department stenographer: "Now, before we start this ride, I want to tell you that I don't smoke, drink or flirt, I visit no wayside inns, and I expect to be back home by 10 o'clock."

The new date: "You're mistaken."

Highway department stenographer: "You mean that I do any of those things?"

The new date: "No. I mean about starting for this ride."—*Texas Highways.*

"Honestly, that husband of mine is so exasperating! He asked me to meet him here with the car and I've been waiting ever since six o'clock—it's seven now!"
"What time were you supposed to meet him?"
"At five o'clock."—*Motor Land.*

Steam Heated Plant Protects Crew and Motors on Donner

(Continued from page 17)

at these locations and telephones installed. With the first sign of a severe storm, the gates are closed to all traffic and the equipment is lined up and ready to start.

It has been found that traffic not only is seriously in danger on Donner Summit during a storm, but that its movement interferes with the progress of snow removal work, as the equipment must be operated at high speeds and there is scant time to lend aid to motorists who get into difficulties at this time. When the storm is over and the roadway clear, the gates are opened.

At Other Points

While the severe conditions on Donner Summit require special equipment and organization, modern equipment is also maintained and operated as required at a number of other locations in addition to those mentioned. Snow is cleared on the main line of the Pacific Highway, the Ridge Route south of Bakersfield, the Redwood Highway east of Crescent City, and the State Highway between San Diego and El Centro, as well as the Red Bluff-Susanville, Redding-Alturas, Downieville and Trinity laterals.

For the benefit of those living in the valley who wish to enjoy the winter sports of the foothill region, an open road is maintained to Big Trees on the Ebbetts Pass road, to Riverton on the Placerville-Lake Tahoe road, and from Pooleys to Long Barn on the Sonora Pass road. Removal is also performed on the Crest Drive out of San Bernardino for those who seek their winter sports in the vicinity of Lake Arrowhead and Big Bear Lake, both lakes being above an elevation of 7000 feet. The equipment used on these routes varies from ordinary grading equipment to truck and tractor plows, both straight blades and rotaries.

Cost Per Inch

In all, twenty 4-wheel and ten 2-wheel drive trucks, seventeen 5-ton and seven 10-ton tractors are used, operating thirty-two push plows and seven rotaries of various types. During the past season over \$92,000 has been expended for the removal of snow at an average cost per inch mile of \$1.27.

The equipment and facilities provided cover some 600 miles of heavy snowfall area where there is normally sufficient snowfall to require the use of this equipment each winter to keep traffic moving.

At any time of severe storms we may be called upon to plow snow on an additional 1400 miles. The entire maintenance organization, with trucks, tractors, and graders, is available for such an emergency

One of the best authorities on vacations advises that he would rather be sunburned on his vacation any time than get tanned on a week-end, especially if the latter is taken on a ranch.—*Texas Highways*.

And then there was the sweet young thing, taking the examination for a driver's license, who was asked: "If your brakes suddenly failed to work while you were going downhill, what would you do?"

She hesitated only a moment, then smiled brightly and answered: "Why that's easy; I'd jump out and put a big stone under the wheel."—*Motor Trades*.

New Alto-Waldo Road and Bridge Dedicated With Gala Pageantry

CALIFORNIA highway commissioners, officials and engineers took an active part in the double highway and bridge dedication ceremonies and celebrations Sunday, November 22d, when the new Alto-Waldo unit of Route 1, Redwood Highway over Richardson Bay was formally opened to traffic, following which the new hard surfaced portion from Tamalpais Valley to Marin Beaches was dedicated.

Earl Lee Kelly, chairman of the California Highway Commission and personal representative of Governor James Rolph, Jr., headed the official State party, which included Highway Commissioners Timothy Reardon of San Francisco and Harry A. Hopkins of Taft; Bridge Engineer Charles E. Andrew; District Engineer John H. Skeggs; Maintenance Engineer Fosgate and others.

Dedication and opening to traffic of these important highway units was the occasion for a colorful and spectacular celebrations in which several thousand men and women and hundreds of automobiles participated together with state, federal and county officials, representatives of chambers of commerce and civic organizations, and leaders of the entire San Francisco and north bay area.

Jointly Sponsored

The dedication was jointly sponsored by the Redwood Empire Association, the California Redwood Association, Marvelous Marin, Inc., and the Stinson Beach Progressive Club.

An outstanding feature of the dedicatory program was the christening of the Richardson Bay California Redwood bridge, built of California redwood timbers, which spans Richardson Bay, two miles north of Sausalito, by Mrs. Harry Lutgens of San Rafael, wife of the president of the Redwood Empire Association.

Under the direction of Charles Kenyon, chairman of a special committee named by the sponsors of the highway fete, a pageant depicting the evolution of highway transportation was staged as the crowning feature of the day's activities.

Indians on horseback, mounted Spanish vaqueros, cowboys, covered wagons, ox teams and other primitive means of transportation led the line of march.

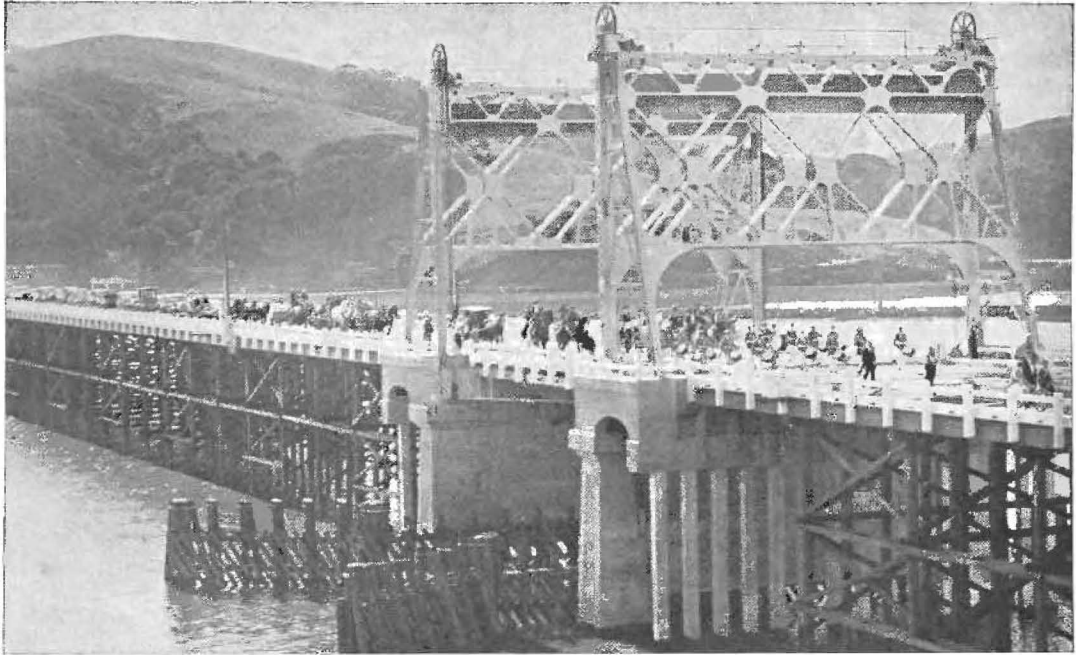
Lunched at Beach

Harry G. Ridgway, president of Marvelous Marin, acted as master of ceremonies at the Alto-Waldo sector dedication.

Following the dedication of the Alto-Waldo sector a caravan of more than 200 automobiles was convoyed by a detachment of State highway patrolmen, under Captain A. F. O'Connor over the newly paved Shoreline unit to Stinson Beach, where a picnic luncheon was served under the willows and a second dedicatory program staged, with Newman Fitzhenry, of the Stinson Beach Progressive Club, garbed as a Spanish Don, acting as master of ceremonies.

Music was furnished at both programs by the bands of the Tamalpais Union High School and the San Rafael High School, while the uniformed drum corps of the Native Sons and the Native Daughters of the Golden West added to the color of the occasion.

Participants in the pageant included students of the two high schools, members of the Order of Red Men, the American Legion and of various Marin County service clubs and organizations.



A MONUMENT OF REDWOOD is this new bridge across an arm of Richardson Bay on the recently opened Alto-Waldo unit of Route 1, Redwood Highway. Most appropriately, it is built almost entirely of redwood timbers. More than 2,000,000 feet of this fine product of California's forests was used in its construction, only the central drawbridge span requiring resort to steel. The road was opened with appropriate dedication ceremonies on November 22 and the bridge duly christened Richardson Bay California Redwood Bridge by Mrs. Harry Lutgens wife of the president of the Redwood Empire Association.

Plan Better Roads for Baja California

Proposed highway improvements in Lower California, Mexico, are set forth in a announcement by Governor Augustin Olachea, the recently appointed head of Mexico's peninsula state.

Among the road projects named by the Mexican executive are construction of a highway between Tijuana and Ensenada; improvement of 850 miles of road between Tijuana and La Paz; paving of roads below the border in accordance with San Diego County highway standards, to conform to that county's highway system; and to provide extensions into the northern part of Lower California.

Salesman: Do you prefer a sedan or a roadster?
Customer: I really can't say.
Salesman: I understand. I'm married myself.

First bridge player: But I understand that Jane married a model husband.

Second bridge player: That's what she thought at the time, but he turned out to be a sport model.—*Exchange.*

ARCHITECTURAL AWARDS

For Month of November

State Printing Plant, Sacramento—Addition to plant; ventilating work to Carpenter and Mendenhall, Sacramento \$53,330; for complete plumbing, heating and ventilating work to Carpenter and Mendenhall, Sacramento, \$11,900; for electrical work to M. P. Canon, Sacramento, \$10,475.

Sonoma State Home, Eldridge—Repairs to boiler setting, awarded to Dee Engineering Company, San Francisco, \$595.

Sonoma State Home, Eldridge—Fire house: contract for general work to Petaluma Construction Company, Petaluma, \$10,975; for complete plumbing and heating to Ray Kynoch, Petaluma, \$1,999; for electrical to Karl F. Stolting, Santa Rosa, \$558.

Pacific Colony, Spadra—Water well, contract to Lyon Bros. of Los Angeles, \$2,800.

Agnews State Hospital—Water tower, to J. F. Shepherd, Stockton, \$22,900.

Norwalk State Hospital—Ward No. 20; contract for general work to W. J. Esser, Long Beach, \$39,675; for plumbing to Hickman Bros. San Pedro, \$5,058; for electrical to Walter H. Smith, Long Beach, \$1,515; for heating to Walter H. Smith, \$8,495.

Mendocino State Hospital, Talmage—Laundry building; for general work to The Minton Co., Palo Alto, \$20,576; for combined heating and plumbing, to The Turner Co., San Francisco, \$3,523; for electrical work to Superior Electric Co., San Francisco, \$1,880.

The difference between Lot's wife and the lady driver is this: The former looked back and turned into a pillar of salt. The latter looked back and turned into a telegraph pole.—*Laughing Gas.*

Ten Parties to Measure Flood Control

(Continued from page 31)

which a maintenance headquarters will be erected at an estimated cost of \$10,500. The work of grading is to be commenced at once.

Sacramento Flood Control.

The Reclamation Board has requested this department to undertake clearing work in the Yolo By-pass along the Southern Pacific railroad at a cost of \$1,000, under section 21 of the Reclamation Board Act.

Emergency Flood Control and Rectification of Rivers.

Work has commenced on the continuation of the river rectification on the San Jacinto River, to cost about \$6,000, two-thirds of which is contributed by local interests.

Arrangements have been made for immediate commencement of clearing in the channel of the Santa Ynez River, in cooperation with the county of Santa Barbara. A total of \$3,000 will be expended.

Mokelumne River.

Clearing in the Mokelumne River channel, under Chapter 447, Statutes of 1929, has been carried on in collaboration with San Joaquin County. A total of about \$5,000 will be expended.

Pajaro River.

Clearing in the Pajaro River channel, under Chapter 524, Statutes of 1929, has continued during this period. The total cost of this work will be \$4,000.

Russian River Jetty.

The construction of a 12-ton derrick in the quarry has been completed and two 20-ton gear dump rock cars have been secured. Stones ranging in size from 6 to 12 tons are now being placed in considerable numbers in the jetty, most of the rock, however, ranging in size up to 5 tons, being handled in the old 6-ton cars. The rock work has continued during the entire period.

Flood Measurements and Gages.

Preparations are complete for taking flood flow measurements if they are required, equipment being complete for ten field parties. Routine care of the water stage recorders maintained by the office is being continued.

WATER RIGHTS

Applications to Appropriate.

During the month of October, 24 applications to appropriate water were received, 16 were canceled, 19 were approved and 8 permits were revoked.

The applications received included one by Consolidated Irrigation District proposing an appropriation from San Joaquin River in Fresno County for power purposes at an estimated cost of \$10,000,000. Another application of unusual importance was one filed by John W. Bergin, proposing an appropriation from Willow Creek, tributary of Trinity River, in Humboldt County, for mining purposes at an estimated cost of \$150,000. A rather unusual application was received from Stanislaus National Forest proposing appropriations by means of storage in Lower Buck Lake, Long

Lake, Emigrant Meadow Lake, Emigrant Lake, and Bigelow Lake at the head waters of tributaries of Tuolumne River in Tuolumne County for the purpose of increasing the summer flow at the headwaters of these streams for the maintenance of fish life and other recreational purposes. The application of J. L. Blossom and F. M. Lamb, proposing to appropriate from North Canal, a branch of the Middle Branch of the San Joaquin River in San Joaquin County, for the irrigation of 1200 acres at an estimated cost of \$14,000 was approved as was also an application by O. C. Cutts proposing an appropriation from San Joaquin River in San Joaquin County for the irrigation of 79 acres at an estimated cost of \$10,000.

In response to the request for progress reports forwarded to permittees and licensees a total of 851 reports were received during the month.

ADJUDICATIONS

Shasta River (Siskiyou County). Case pending in the 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). The North Cow Creek case came up for hearing in the Superior Court of Shasta County on October 26, 1931. The matters at issue were settled by stipulation and entry of the Court's decree is now pending.

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.

Clover Creek (Shasta County). The Clover Creek case has been set for hearing January 18, 1932, in the Superior Court of Shasta County.

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

Davis Creek (Modoc County). A tentative decree has been circulated among counsel and is now under consideration by the Superior Court.

Mill Creek (Modoc County). The Division's report as referee, containing a proposed decree, was filed with the Superior Court of Modoc County on November 17, 1931.

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, is in the course of preparation.

Franklin Creek (Modoc County). The Division's report on the distribution of the water of Franklin Creek for the 1931 season is being prepared.

New Pine Creek (Modoc County). The report on the water supply and use of water on New Pine Creek, covering the field investigation conducted on that stream during the 1931 season, has been commenced.

Eagle Creek (Modoc County). The report on the water supply and use of water on Eagle Creek is being prepared.

Pit River (Modoc and Lassen Counties). The reports on the supervision of diversions from Pit River

Sacramento Delta Salinity Recedes

(Continued from preceding page)

in South Fork Valley, Hot Springs Valley and Big Valley for the 1931 season are being prepared.

Little Shasta River and Lower Shasta River (Siskiyou County). Reports covering water master service on these streams during the 1931 season have been partially completed.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

The regular field work comprising measurements of all diversions, stream flow and return water throughout the Sacramento-San Joaquin territory, was practically completed at the first of November and the office work in preparation of the 1931 report is now in progress.

The special field investigation to determine the extent of damage both in the up-river territory and throughout the Delta due to the 1931 water shortage and salinity, is still in progress. The obtaining of production and yield data required to complete the investigation and the necessity for contacting the large number of landowners throughout the Delta have prolonged this work.

On November 1 the flow of the Sacramento River at Sacramento had increased to 6900 second-feet and the San Joaquin River near Vernalis was flowing 600 second-feet, making a total discharge of 7500 second-feet to the Delta.

The salinity has been slowly receding in the lower Sacramento River Delta but has remained almost at a standstill in the middle San Joaquin Delta. During the past month the recession in salinity has permitted the discontinuance of sampling at Howard Ferry, Sutter Slough, Little Holland Ferry, and Tyler Island Ferry in the Sacramento Delta and at Durham Ferry Bridge, Brandt Bridge and Whitehall in the upper San Joaquin Delta. At present, sampling is being conducted at forty-seven channel stations and six interior drainage stations. The accompanying table shows the comparison between the salinity at the middle of October and November of this year and at the middle of November, 1924.

SALINITY—SACRAMENTO-SAN JOAQUIN DELTA

Station	Parts of Chlorine per 100,000		
	10/14/31	11/14/31	11/14/24
O and A Ferry	1140	815	166
Collinsville	830	525	66
Three Mile Slough Bridge	375	246	16
Rio Vista Bridge	292	128	5
Isleton Bridge	177	4	4
Antioch	785	535	70
Webb Pump	400	185	88
Central Landing	99	73	16
Middle River Post Office	229	198	114
Rindge Pump	155	84	32

CALIFORNIA COOPERATIVE SNOW SURVEYS

During the past month, all field work in contacting the various cooperating agencies, stocking shelter

cabins, distribution of equipment and forms, and laying out of new snow survey courses in preparation for the 1932 Spring surveys has been completed.

A trip was made to Mono and Owens rivers basins to check over, re-mark and prepare sketches for permanent record, all snow courses surveyed in cooperation with Southern Sierras Power Company.

In the Yuba and Feather basins a trip was made to complete the stocking of shelter cabins and the Webber Lake and Webber Peak courses were brushed out, re-marked, and sketched.

Contact was made with the personnel of the Nevada cooperative survey to complete the arrangements for the Nevada-California surveys.

A reconnaissance was made in the American River Basin and new snow survey courses were established in the Silver Creek drainage at Icehouse and on the Silver Creek-Rubicon divide at Loon Lake, Gorle, Orelli's and Long Meadow. Arrangements were completed for the initial survey of these courses in 1932.

WATER RESOURCES

Ventura Investigation. The principal feature of this work during the month has been the drilling of dam sites. Drilling has been completed on the Devil and French Flat reservoir sites and work is now in progress on the Blue Point site.

Salinas Valley Investigation. A large amount of preliminary data have been gathered on water levels, locations of wells, reservoir sites and methods best adapted to prosecuting the work.

Pit River Investigation (Modoc and Lassen counties). Work on the report covering the three years investigation, October 1, 1928, to October 1, 1931, was continued throughout the month. Compilation of the stream flow and diversion records collected during the 1930-1931 season has been completed.

Napa Valley Investigation. This investigation continued throughout the month in a routine way with the reading of typical wells throughout the valley and the measurement of stream flow.

Santa Clara Valley Investigation. A resurvey of the ground water level throughout Santa Clara Valley was made on November 5, 6 and 7, which indicated a recovery of 0.8 foot on the average since September 17. There was, however, a considerable variation in different wells, the maximum recovery recorded in any instance being 40.3 feet and the maximum recession 15.4 feet.

STATE WATER PLAN

The members of the California Water Resources Commission have been actively engaged during the past month in a study of the State-wide plan for conserving California's water resources, and an orderly method for their distribution and utilization.

The Commission met at the State Building, Civic Center, San Francisco, on October 23 and arranged a series of public meetings. These meetings were held jointly with the California Joint Legislative Water Committee in the U. S. Grant Hotel, San Diego, November 2; Mission Inn at Riverside, November 3; and in the Railroad Commission Courtroom, Los

Water Meetings in South Bring Out Large Attendance

(Continued from preceding page)

Angeles, on November 4 and 5. In addition to these meetings, on November 3 members of the California Water Resources Commission and the Joint Legislative Water Committee were guests of the San Gabriel Associated Chambers of Commerce at a dinner given at the Elks Club, Monrovia, and at a dinner as guests of the Water Committee of the California State Chamber of Commerce held at the Hotel Alexandria on November 5.

These meetings were programmed by the two bodies in order that they might hear from the citizens of the southern part of the State regarding their local problems of water shortage and receive recommendations as to methods by which the water resources of this area may be conserved and utilized. Evidence that the critical nature of California's water problem is being widely recognized and that the solution must come from a State-wide program of water conservation was shown by the public interest and attendance at these meetings held in southern California by the Governor's Water Commission and the Joint Legislative Water Committee on November 2, 3, 4 and 5.

SAN DIEGO SUPPLY

At San Diego, data were submitted on the flood control and domestic water supply problems of San Diego and the surrounding area.

Representatives of Fallbrook irrigation district and La Mesa irrigation district, both adjacent to San Diego, presented the difficulties encountered in their efforts to secure additional water supplies.

At Riverside on November 3, representatives appeared in behalf of water conservation for Orange, San Bernardino, Riverside and Imperial counties.

Problems of the Mojave River Basin were presented by the San Jacinto Flood Control Association. The problems of the Santa Ana River Basin were presented by Mr. Francis Cuttle, president of the Water Conservation Association of San Bernardino, Riverside and Orange counties, while Mr. Chas. Childers, attorney for the Imperial irrigation district, explained the problems confronting Imperial County and the Imperial irrigation district.

LOS ANGELES MEETINGS

On November 4 and 5, the last of the series of joint meetings was held in Los Angeles. At these hearings water problems in the region of Ventura, Santa Barbara, San Luis Obispo, Mono County, Inyo County and Los Angeles County were heard.

The Honorary Advisory Committees recently appointed by Governor Rolph for a study of the State-wide plan have given excellent cooperation and made rapid progress. Conferences were held in the State Engineer's office on November 16 and 17 with the subcommittee of the Honorary Engineering Advisory Committee, consisting of Messrs. J. B. Lippincott, B. A. Etcheverry and R. V. Meikle. Engineering data and recommendations included in the report to the Legislature of 1931 were reviewed and a report will be rendered by this subcommittee to the Honorary Advisory Committee of Engineers.

Studies are being continued on a tentative draft of a proposed constitutional amendment under which the State Water Plan may proceed to realization.

Governor Wields a Shovel at Ground- Breaking Ceremony

GOVERNOR James Rolph, Jr., stepped down from the speakers' platform to turn the first shovelful of earth in the official ground-breaking ceremony for an addition to the State Printing Plant on O Street, Sacramento.

He peeled off his coat, seized a shovel and dug in. Before he could lift the shovelful, an official of a local labor union stepped from the crowd and stopped him. He asked the Governor if he had a union card. The Governor, not a bit nonplussed, pulled out a wallet, extracted a union card and showed it. He added with some pride that he could show cards of a number of other unions and that every garment he wore bore a union label.

Governor Rolph then proceeded to load a wheelbarrowful of earth, haul it away and dump it.

The ground-breaking ceremony on December 23d was attended by a crowd of citizens, print shop employees and city, county, State and Federal officials including Mayor Bidwell of Sacramento; City Manager James S. Dean; Postmaster Harold J. McCurry; Director of Agriculture Dudley Moulton; Director of Public Works Walter E. Garrison; Deputy Director James I. Herz; Chief E. Raymond Cato of the California Motor Patrol; State Architect George B. McDougall and J. M. Welsh, superintendent of the State Printing Plant, representing Harry Hammond, State Printer.

Colonel Garrison acted as chairman and introduced the Governor and the other speakers. In his speech Governor Rolph said it was an inspiration to be present at the commencement of construction of a building that would give employment to hundreds of men and women at a time when the hearts of men were sorely tried and public officials were being tested as they never had been before in trying to perform the duties placed upon their shoulders in the State capital.

He was hopeful that the occasion also marked the turning of the tide toward better times when men would again be prosperous and happy in their work.

The new building will be a three-story steel and concrete structure costing \$120,000.

Judge: You know you were traveling less than 25?
Defendant: I know I was—I didn't hear a word from the back seat.

How a Good Barber Became a Better Blue-print Maker

FROM head barber to head blue-print maker for the State of California is some leap vocationally speaking but it was successfully made by Frank J. Butler presiding genius of the blue-print room on the fourth floor of the Department of Public Works headquarters. His story is a romance of politics.

Butler started in the barbering business in Sacramento in 1876, opening the old Ale Vaults Barber Shop near the southeast corner of Third and J streets. Later he ran the Golden Eagle shop and subsequently the Capital Hotel shop. He was a good barber and a good "mixer." His shops became a rendezvous for the social and political celebrities of the day. Especially during legislative sessions were they the meeting-place for men whose names were as familiar as household words in the Golden State. Frank knew them all and called most of them by their first names.

CALLS HIM HIRAM

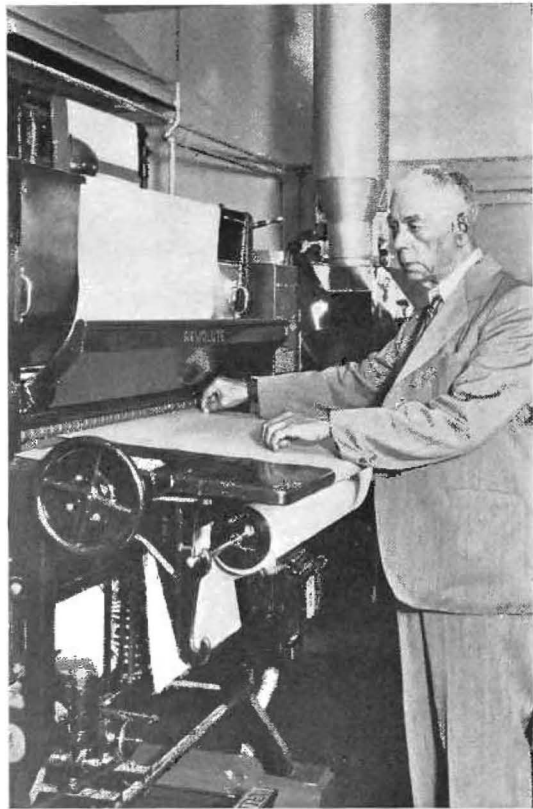
Among them was Hiram Johnson. Frank had given him his first hair cut as a boy and his first shave. When Johnson became Governor he insisted that Frank give up barbering and become his office messenger at the Capitol.

"I told Hiram I was doing very well and didn't think I'd like the job," says Frank. "'Well, you come on over. I know you'll like it, and I want you,' he said. Well, I didn't like the office work and told Hiram I wanted to quit. 'Go up and try the blue-print room. I think you'll like it up there,' replied Hiram.

"I didn't know anything about blue-prints but I went down to a big firm in San Francisco and learned all about how to make them. Then I came back and told Hiram if he'd fix me up with a modern continuous press I'd take the job and save money for the State."

HE MADE GOOD

That was twenty-one years ago. Butler took the job, got the press and made good both in word and deed. It was costing the State twenty cents a sheet and he reduced the cost to eight cents. Work piled up and he got a second press and an assistant. Now both can't keep up with the growing demand.



BLUE PRINTER but he's not blue. Frank J. Butler, chief of the blue-print room in the Public Works Department, is as cheery and genial as he was twenty-one years ago when his friend Hiram Johnson, then Governor, induced him to close his barber shop and accept service with the State.

WATER PERMITS ISSUED

(Continued from page 32)

SIERRA COUNTY—Permit 3817, Application 7001. John J. Connell, c/o R. F. Taylor, Downieville, Sierra Co., November 24, 1931, for 0.10 c.f.s. from Swansea Tunnel, tributary to Swansea Ravine, thence to Middle Fork of Yuba River in section 3, T. 18 N., R. 10 E., M. D. B. and M., for mining and domestic purposes. Estimated cost \$200.

MENDOCINO COUNTY—Permit 3818, Application 7017. Miss Frieda Parnett, Gualala, Mendocino Co., November 24, 1931, for 237 gallons per day from Sea Side Stream, tributary to Pacific Ocean in section 21, T. 11 N., R. 15 W., M. D. B. and M., for domestic purposes. Estimated cost \$500.

TUOLUMNE COUNTY—Permit 3819, Application 7025. State of California, Division of Highways, Dist. No. 10, Sacramento, November 24, 1931, for 0.005 c.f.s. from Stoddard Spring. Estimated cost \$200.

INYO COUNTY—Permit 3820, Application 7014. John Amick, Independence, Inyo Co., November 23, 1931, for 0.50 c.f.s. from Barrel Spring tributary to Mazourka Canyon, thence to Owens River in section 20, T. 12 S., R. 36 E., M. D. B. and M., for mining and domestic purposes. Estimated cost \$800.

INYO COUNTY—Permit 3821, Application 6428. C. H. Darenso and Edward Schober, 514 Commercial Exchange Bldg., Los Angeles, November 30, 1931, for 0.50 c.f.s. from unnamed spring, Grape Vine Spring, tributary to no stream in sections 10 and 15, T. 21 S., R. 39 E., M. D. B. and M., for domestic and irrigation of 40 acres. Estimated cost \$5,000 to \$8,000.

District Six Reports Progress of Varied Road Improvements

By E. E. WALLACE, District Engineer

THE construction of three bridges and an overhead grade separation are among the important improvements now under way in District Six which embraces six counties. The projects advanced in the various counties are as follows:

KERN COUNTY—Improvement between Grapevine and Bakersfield, a distance of 30 miles, consisting of widening roadbed to 36 feet and placing 6-foot cut-back shoulders on each side of the 20-foot pavement has been completed.

PAVEMENT WIDENED

TULARE COUNTY—Placing of 3½ miles of cut-back rock borders from the west line of Tulare County on Route No. 10 about nine miles east of Hanford has been completed and is considered a desired improvement. This resulted in widening the old 15-foot pavement to a width of 21 feet.

Between Tipton Crossing and Tulare, a distance of 7.6 miles, work is progressing on new location east of the Southern Pacific Railroad, which is designed to eliminate two grade crossings.

Bridges and concrete structures are progressing very rapidly and grading is in progress.

Contract between Goshen and Kingsburg, involving widening of roadbed to 36 feet, and resurfacing to 20 feet, has been practically completed with the exception of the shoulder oiling. This improvement has greatly increased safety to traffic due to the widened roadbed and pavement and the elimination of the dangerous shoulder conditions.

SAFER HIGHWAY

The southerly half of the project passes through alkali land and the soil is extremely dangerous during wet weather. As the new improvement involved a large amount of embankment, it was possible to import a better grade of soil for the shoulders and by oiling the shoulders 8 feet in width beyond the pavement edge, there is practically 36 feet of roadway which is in good condition for travel, even in wet weather.

FRESNO COUNTY—Work is progressing with satisfactory speed on Kings River Road, even in the face of adverse weather conditions. Over 5 feet of snow has fallen in the higher elevations, although there is considerably less at the point where construction operations are in progress. A new 1½-yard Diesel shovel arrived at Camp No. 19 on December 10, 1931, and will soon be in operation. Very low temperatures have prevailed, the camp having reported 8 degrees below zero on several occasions.

COMPLETING BRIDGE

MADERA COUNTY—New bridge over the Fresno River north of Madera is practically complete and is understood will be ready for acceptance in the very near future.

Bids were opened for completing the line change and approaches on December 9, 1931.

MERCED COUNTY—Work of constructing an

In Memoriam

W. B. MATHEWS, member of the California Water Resources Commission, passed away December 9, 1931.

Mr. Mathews was appointed by Governor James Rolph, Jr., on August 24, 1931, to this Commission, known as the Governor's Citizens Water Commission. The State's loss occasioned by the passing of this eminent citizen has been fittingly expressed by the Governor.

"In the death of Mr. W. B. Mathews, the Nation and the State have suffered an irreplaceable loss. No man has contributed more to the solution of the tremendous water problems of California and indeed of the entire Southwest than Mr. Mathews.

"As general counsel of the Bureau of Water and Power of the City of Los Angeles he bore a vitally important part, in the face of apparently unsurmountable obstacles, in obtaining for that city its present water supply.

"When it became evident that this supply was inadequate for future needs, he was a leader in the organization and successful development to date of the great Metropolitan Water District, formed to bring into Southern California from the Colorado River a supply of water adequate for its needs for all time.

"With all of these tremendous problems of more or less local interest he still found time to contribute of his great ability and energy to the solution of the entire Colorado River development and the project for State-wide development of the water resources of California.

"He served as a Member of the Colorado River Commission, the Federal-State Water Commission for California, and at the time of his death was actively engaged as a member of the present State Water Resources Commission. In February last he was a member of the Commission sent by me to Washington to present the general water problem of California to the Federal Government.

"To all of these great services he brought splendid ability, untiring energy, and a high ideal of civic duty and responsibility. It will be difficult, if not impossible to replace him in the work which remains to be done, but he leaves behind accomplishments priceless to his community and the State."

overhead grade separation 2 miles east of Merced on the Yosemite Lateral, Route No. 18, is nearing completion and will probably be open to traffic on January 1, 1932.

Work of constructing three bridges at the San Joaquin Overflow and High Line Canal, east and west of Los Banos is now in progress under supervision of the Bridge Department.

MARIPOSA COUNTY—Good progress is being made in grading new location between Orange Hill School and Pain Flat.

STATE OF CALIFORNIA
Department of Public Works

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FRANK B. DURKEE, General Right of Way Agent

C. R. MONTGOMERY, General Right of Way Agent

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Port of San Jose—Not appointed

Port of San Diego—Edwin P. Sample

