

CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



Grading the Angeles Crest Highway in San Gabriel Mountains

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Western Highway Officials

in Annual Convention Are Told Highway Development Is at Crossroads

Resolutions Oppose Gas Tax Diversion

By **HARRY A. HOPKINS**, Chairman, California Highway Commission

THE fifteenth annual meeting of the Western Association of State Highway Officials met at Phoenix, Arizona, April 29 and 30, 1936. All the twelve western states were represented. While Texas does not have any Federal public lands, it joined the association because its problems in highway construction are similar to those of the public land states.

Excellent addresses featured the sessions, including talks by Dr. L. I. Hewes, Deputy Chief Engineer, U. S. Bureau of Public Roads, San Francisco; R. E. Toms, Chief, Division of Design, Bureau of Public Roads, Washington, D. C., and Gibb Gilchrist, president of the American Association of State Highway Officials and State Highway Engineer of Texas.

An outstanding address that was received with the greatest interest was given by Col. Willard Chevalier, president of the American Road Builders Association and vice president of the McGraw-Hill Publishing Company in charge of civil engineering and mining publications, who spoke on the subject "Highway Development at the Crossroads." In appreciation of his interest in highway matters and his contribution to the meeting, the Western

Association of State Highway Officials presented him with a certificate of life membership.

Reviewing highway development from 1900 when only 8000 motor vehicles were on the roads in this country to 1936 when 26,000,000

are in use, Col. Chevalier traced the history of highway development through these stages of progress: (1) the good roads era, when the big problem was to build roads, with "no time for anything except to get a negotiable mileage of some kind of a surface capable of supporting the auto"; (2) the period when the Federal government became interested in highway development, giving a "tremendous impetus to sound, technical improvement"; (3) the development of highway design and construction into a definite science, and (4) the establishment of the gas tax principle for highway financing.

Colonel Chevalier sketched in detail the situation existing during the past few years when highway construction has been taken out of the field of recognized engineering procedure and transformed into an agency devoted to unemployment relief and made-work.



HARRY A. HOPKINS

Twenty Grade Separation Projects Being Built in Southern California

By STEWART MITCHELL, Bridge Construction Engineer

TWENTY railroad grade separation projects are under construction in southern California financed through funds provided by the Federal Emergency Relief Act of 1935 supplemented by highway gas tax funds.

Nine of these projects are important railroad grade crossing separations in the Los Angeles metropolitan area. This area, noted for its traffic density, is a prolific field for worth while projects of this kind, but it also presents many difficulties on account of excessive right of way and property damage costs which naturally arise in all locations where the population is relatively dense and the traffic is heavy.

These nine grade separations are all located where main line railroad tracks are crossed by heavy traffic arteries and where the removal of hazard and delay to traffic has long been desired by the railroads concerned, as well as the Los Angeles Planning Commission and other traffic bodies.

FIGUEROA STREET VIADUCT

The most costly of these projects is the construction of a viaduct on the extension of Figueroa Street, just north of the three tunnels under Elysian Park, which were recently built by the city of Los Angeles. At this point, the proposed boulevard must cross the Los Angeles River, which is paralleled on each side by railroad tracks of the Southern Pacific Company.

In order to provide a crossing of the river and railroad tracks, as well as the heavily traveled San Fernando Boulevard north of them, a concrete and steel structure somewhat over 800 feet long and carrying 4 lanes of traffic is being built on a high speed alignment. The width of the roadway between curbs is 44 feet, and there is a 7-foot sidewalk on each side of it.

The plans for this structure were prepared jointly by the Division of Highways and the city of Los Angeles, the architecture being in keeping with the monumental structures that have been built by the city over the Los Angeles River.

A difficult problem in the design and con-

struction of the viaduct arises from the fact that, in order to provide the length of span over the river which the Los Angeles Flood Control Commission desired, it was necessary to place the piers very close to the railroad tracks and over, or around, important city sewer lines.

Two other large grade separation projects in Los Angeles City will eliminate two very heavily traveled grade crossings on the Pacific Electric Railway, one of which will carry Mission Road under the 4-track Pasadena line over which 560 trains pass a day. At this location Mission Road joins the double roadway of Huntington Drive and is intersected a short distance beyond by Soto Street, a through artery leading to the south, thus forming a complicated and hazardous traffic situation.

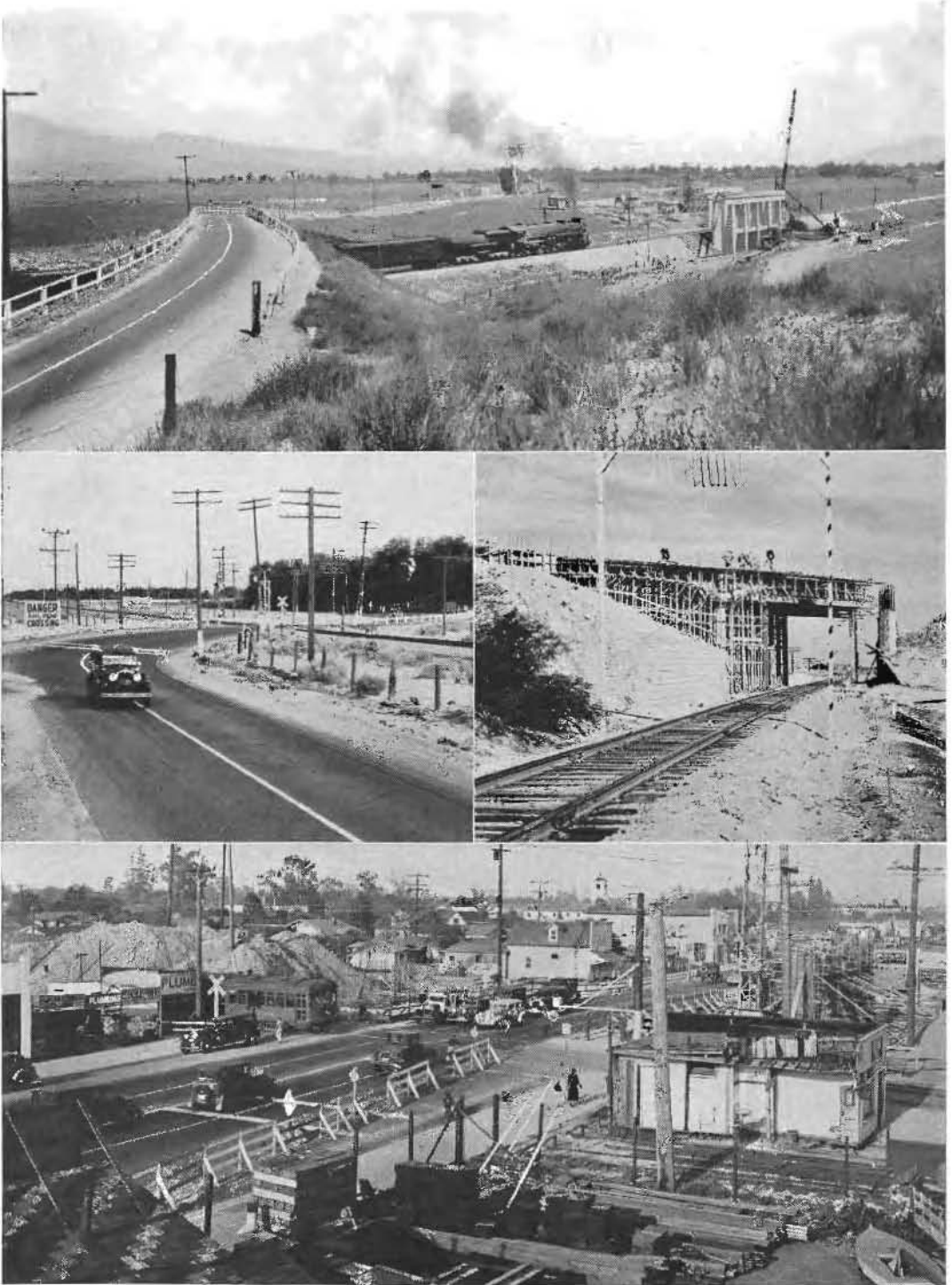
To construct this separation without becoming involved in the relocation of the existing streets and having to face large right of way costs and property damage, the railroad tracks are being raised in their present location. This requires that the structure over Mission Road, with its long earth approach fills retained by concrete walls, must be built under this heavy train traffic.

THREE TRAFFIC STREAMS

Traffic from Mission Road to the southerly roadway of Huntington Drive carries the major portion of the traffic at this location and will be taken care of by two openings each 32 feet in width. In addition, two other openings of similar width will serve traffic traveling between Mission Road and Soto Street and between the two roadways of Huntington Drive.

The other separation of the highway and the Pacific Electric Railway is on the Long Beach line and is located on Firestone Boulevard in the town of Graham. At this crossing the railroad traffic is practically as heavy as at Mission Road and consists of 472 passenger and 18 freight trains a day. It is necessary to follow the same procedure here as at Mission Road and construct this separation by raising the railway tracks, except that it was possible to by-pass the trains during con-

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GRADE SEPARATIONS UNDER CONSTRUCTION—At top crossing on State Highway Route No. 19, (Jack Rabbit Trail) near Beaumont showing narrow existing overhead and new structure construction over railroad. Center—Present "s" curve crossing near Indio and new highway overhead structure under way. At bottom—Firestone Boulevard overpass being built in Los Angeles where 490 Pacific Electric trains will daily cross above highway.

Governor Merriam Breaks Ground for Marin Approach to Golden Gate Bridge

FIVE thousand persons gathered on a green knoll at Waldo Point on Sunday afternoon, May 10th, saw Governor Frank F. Merriam pull the throttle of a huge steam shovel that made the first excavation for the Waldo approach highway to the \$35,000,000 Golden Gate Bridge.

The Governor's act climaxed colorful ground-breaking ceremonies participated in by high Federal and State officials, representatives of the United States Army, representatives of county governments of the San Francisco Bay area and the Redwood Empire and officers of the Golden Gate Bridge and Highway District and Marvelous Marin, Inc.

Director Earl Lee Kelly headed a delegation of officials from the State Department of Public Works and its agency, the Division of Highways, under whose supervision the State Highway approach to the Marin County terminus of the bridge will be constructed.

PICTURESQUE PAGEANT HELD

A luncheon at Fairfax, a program of speech making and a picturesque pageant depicting various eras of travel in California preceded the actual breaking of ground. Music was furnished by the Marvelous Marin Band.

George A. Corwin was general chairman and introduced H. G. Ridgway, of the Redwood Empire Association, who acted as master of ceremonies. The speakers reviewed all phases of the years of work that made possible the Golden Gate Bridge and led up to the start of the Marin approach, final highway link between the north coast counties and the huge structure spanning the Golden Gate.

Greetings from Mayor Angelo J. Rossi of San Francisco were extended by his secretary, Eneas Kane, and congratulatory remarks made for the Army by Major Charles D. Ostrom, Ninth Corps Area; for the U. S. Bureau of Public Roads by District Engineer C. H. Sweetzer; for the U. S. Forest Service by B. B. Burnett, Forest Highway Engineer.

JOINT HOSTS REPRESENTED

As joint hosts of the occasion with the Redwood Empire Association, Marvelous Marin, Inc., welcomed the guests through its president, Harry N. Christensen.

Brief talks were made by Harry A. Hopkins, chairman of the California Highway Commission; Paul Jasper of Fortuna and Ray Judah of Santa Cruz, newly appointed members of the commission, and Timothy A. Reardon of San Francisco, retiring commissioner; Robert A. Trumbull, vice president of the Golden Gate Bridge and Highway District, and others.

Director of Public Works Kelly expressed his pleasure at being a participant in the ground breaking which signalized the start of construction on the Marin approach over which millions of motorists in the future will travel to and from the Golden Gate Bridge.

Governor Merriam followed Director Kelly, being introduced by George P. Anderson, president of the Redwood Empire Association.

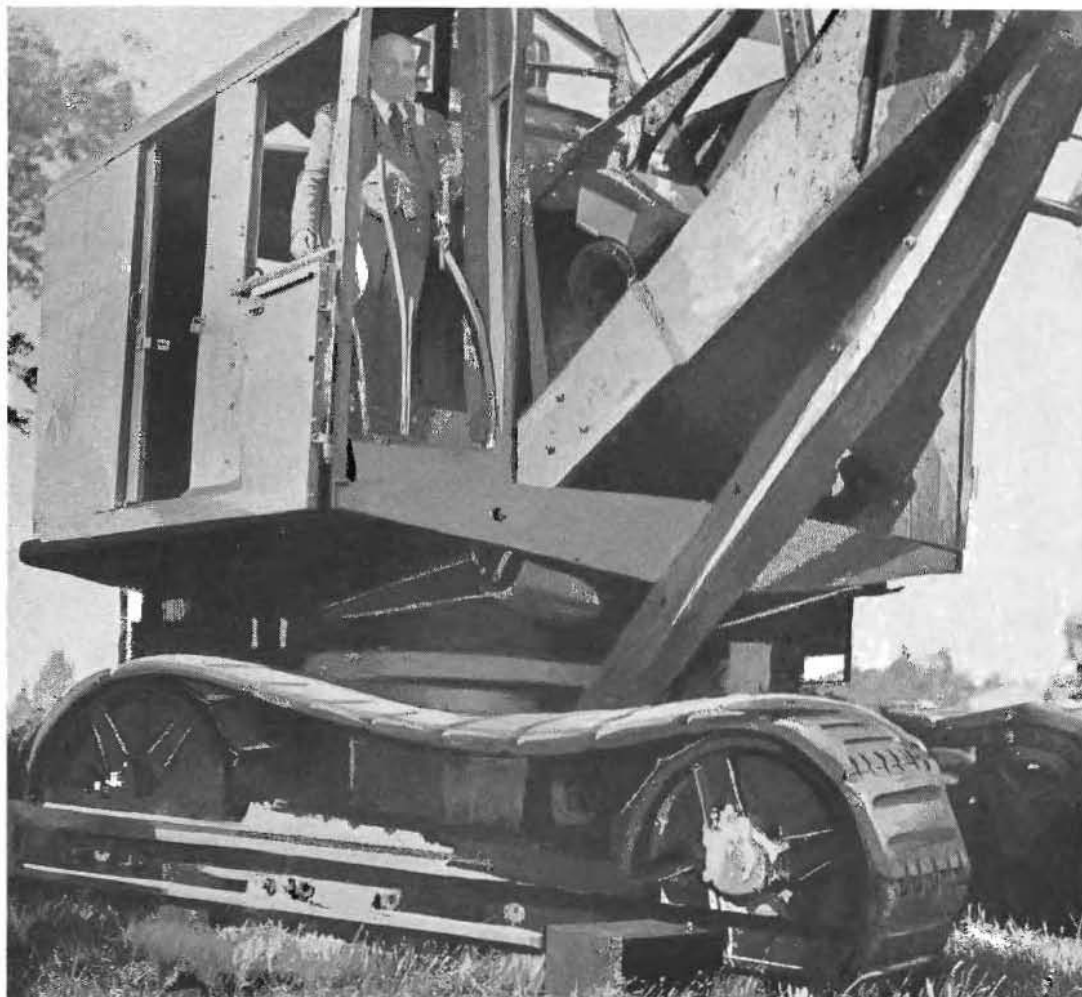
GOVERNOR MERRIAM SPEAKS

"This Marin approach project," the Governor said, "is the most costly and one of the most important units of construction ever undertaken by the Division of Highways. Its completion will not only mean much to the great Redwood Empire area, but to the State of California as well. As a means of creating employment it will help materially in restoring economic normalcy in our State.

"With the Golden Gate Bridge it will serve to open up more widely the great empire to the north and bring our north coast counties closer to the great metropolitan centers of California. Because of all that it means to the development of California, I am glad that today I have a small part in the building of the Marin approach."

The ceremonies were concluded with the Marvelous Marin pageant under the direction of Al Walker and renditions by the band.

Participating in the ground breaking as representatives of the Department of Public Works were Edward J. Neron, Deputy Director of Public Works; C. H. Purcell, State Highway Engineer; Col. John H. Skeggs, District Engineer; Fred J. Grumm, Engineer, Surveys and Plans; C. S. Pope, Construction Engineer, and T. E. Stanton, Materials and Research Engineer, all of the Division of Highways.



**GOVERNOR MERRIAM OFFICIATING AT
GROUNDBREAKING CEREMONIES OF
MARIN APPROACH TO GOLDEN
GATE BRIDGE**

At the throttle of a big steam shovel, California's Chief Magistrate turns the first earth on the largest excavation job for a 3.7 mile highway project in the annals of the Department of Public Works.

**EPOCHAL EVENT IS CELEBRATED WITH
FETE AND SPEECHMAKING IN A
BEAUTIFUL ARBOREAL SETTING**

Governor Merriam at the microphone tells a large gathering of officials and citizens what this great bridge and highway traffic improvement means to the future prosperity of San Francisco, the Redwood Empire and the State.



Marin Approach to Golden Gate Bridge Involves Tunnel and Record Grading Job

By JNO. H. SKEGGS, District Engineer

IN RECENT years no phase of highway design has received more study than the construction of the radiating arterials over which traffic is concentrated and distributed in metropolitan areas. Of the larger of such districts, the San Francisco area has presented one of the most difficult problems.

For three-quarters of a century the City of San Francisco, situated on the southern peninsula between the bay and the Pacific, has been forced to depend upon shuttling ferries for contact with the terminals of eastern transportation in Oakland and Berkeley across the bay, and with the southern terminus of the Redwood Highway, which extends along

Golden Gate Bridge and the Redwood Highway.

The Redwood Highway is an arterial of major importance in the California State highway system officially designated as State Route No. 1 and U. S. 101. It not only serves as a commercial outlet for the fertile agricultural areas in the valleys of Marin, Sonoma, and Mendocino counties, but leads into the heart of the great Redwood Empire of the northern California coast country in Mendocino, Humboldt, and Del Norte counties.

Construction of this route to modern standards of alignment, grade, and width of surfacing has been one of the foremost items in the general program of the Division of



SKETCH OF STATE HIGHWAY Marin approach route showing location of tunnel through Sausalito Hills.

the California Coast to its southern terminus at Sausalito on the northern side of the Golden Gate.

The pressure of rapidly increasing traffic and steady growth in population has compelled the construction of two of the world's greatest engineering achievements: the San Francisco-Oakland Bay Bridge, connecting the metropolis with the East Bay area, and the Golden Gate Bridge, spanning the world famous harbor entrance.

IMPORTANT LINK CONNECTION

An important unit in the development of adequate traffic facilities to the north is the three and one-half mile section of State highway now under construction that will serve as a connection between the north end of the

Highways with the result that the entire route has now reached a high standard, especially the southern portion on the 100 miles between Sausalito and Hopland. With the construction of the Golden Gate Bridge, a marked increase in travel to the north coast country must be anticipated.

TUNNEL THROUGH RIDGE

To meet the demands of this anticipated traffic over the bridge the Division of Highways has located a new link from the existing highway at Madrona street, near Waldo Point northerly of Sausalito. This new route passes along the rugged hillsides rising behind the city of Sausalito with a 1000-foot tunnel designed to carry it through the long ridge at the southerly limits of the city and

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MARIN APPROACH alignment to Golden Gate Bridge through rugged Sausalito hills is shown by dotted lines. At top—Location of tunnel through high ridge. Center—General view of route from Bolinas Street. At bottom—Alignment from present State Highway at Waldo Point and Richardson Bay.

H. R. Judah of Santa Cruz Becomes Member of State Highway Commission

H. R. JUDAH, newspaper publisher and a leading citizen of Santa Cruz, has been appointed a member of the California Highway Commission to fill the vacancy created by the resignation of Commissioner Timothy A. Reardon.

Although exceedingly active in public affairs in Santa Cruz, for many years, Mr. Judah's main inclination and efforts have been directed toward highway matters in the central coast section of the State and as a member of civic delegations he has made frequent appearances before the highway commission in behalf of many proposed highway improvements.

In accepting his appointment Mr. Judah said: "I appreciate the great honor that Governor Merriam has conferred upon me and the opportunity he has given me to serve with men who have so ably carried on the development of our highway system. In this connection I want to state that I am unalterably opposed to any diversion of the gas tax funds for any purpose other than for the use of construction and maintenance activities on California highways.

OPPOSED TO DIVERSION

"I am hopeful that members of the State Legislature at the forthcoming session will turn a deaf ear to any organized groups in this State requesting diversion of gas tax moneys of the State in any other direction away from the uses for which gasoline taxes are gladly paid—the building of highways."

H. R. Judah was educated in the old St. Matthews Military School in San Mateo, graduated from there in 1900 and entered the University of California, where he spent two years. Immediately after that he went into the home office of the Northern Commercial Company, then the controlling interest of all commercial business done on the Yukon River in Alaska.

In 1905, he entered the advertising business with his brother, F. S. Judah. They purchased the old business of Peck and Garrett and formed the Peck-Judah Company,



H. R. JUDAH

and H. R. Judah became the manager of the southern branch with headquarters in Los Angeles. The company had at that time only the two informative and advertising bureaus, one in San Francisco and the other in Los Angeles.

Following the San Francisco earthquake of 1906, he returned to Santa Cruz where he had formerly resided and resumed his old position as manager of the Chamber of Commerce.

In 1907 he became acquainted with E. J. Devlin, then managing editor of the *Sacramento Bee*, and on November 1 of that year they formed a partnership and started the Santa Cruz *Evening News* as a daily newspaper and they have been operating that business together ever since that date on the same spot at 29 Walnut Avenue, Santa Cruz.

He has played a prominent part in newspaper organization work in California particularly in the formation of the California Newspaper Publishers Association.

Paul G. Jasper, Publisher of Humboldt County, Named Highway Commissioner

NEWSPAPER publisher, good roads advocate, veteran of the World War and active participant in the civic affairs of his community, Paul G. Jasper of Fortuna, Humboldt County, has been appointed by Governor Frank F. Merriam to succeed Ray Ingels, resigned, as a member of the California Highway Commission.

The vacancy on the commission which Mr. Jasper fills has existed since Mr. Ingels was made Director of the Department of Motor Vehicles by Governor Merriam. Mr. Ingels hails from Mendocino, neighboring county of Humboldt.

The new member of the Highway Commission is owner and editor of the Humboldt Beacon, a newspaper published in Fortuna. He has been prominently associated with the California Newspaper Publishers Association and the California Press Association for years.

KNOWS HIGHWAY NEEDS

For the past ten years he has also been a member of the Republican State central committee and is a member of the Republican county central committee of Humboldt.

Mr. Jasper has not confined his activities in public matters to his home county. He has traveled extensively throughout California and being intensely interested in everything pertaining to highways he is familiar with highway needs in many sections of the State. His business letterheads bear a picture of a highway scene.

Born in Santa Rosa on April 27, 1891, Mr. Jasper moved to Fortuna when a boy and has resided there for 33 years, except for a year in newspaper work in San Francisco and a period of 18 months during the World War, when he served as a sergeant in the U. S. Army. He is married and has two children, a daughter, Ardis, 16 years old, and a son, Richard, age 12 years.

ACTIVE IN VETERANS' AFFAIRS

The new Highway Commissioner has taken an active part in affairs of the American Legion and is a charter member and past commander of Walker Bailey Post, as well as an honorary member of the Veterans of Foreign Wars.



PAUL G. JASPER

Equally active in civic affairs Mr. Jasper is a past president and secretary of the Fortuna Rotary Club, of which he is also a charter member, and has attended numerous district and international conventions of the Rotarians.

In his capacity of newspaper publisher, Mr. Jasper long has been an advocate of the extension and high standard construction of California's State Highway system.

"Don't you think, Doctor, that you overcharged when Jimmie had the measles?"

"You must remember, Mrs. Brown, that includes twenty-two visits."

"Yes, but you remember, he infected the whole school."

"That kid's over 6 years old," said the grouchy car conductor, "you'll have to pay the fare."

"Why, conductor," the mother protested, "I've only been married 5 years."

"All right Lady—I won't tell, I just want the kid's fare."

Calexico Celebrates Completion of Highway Link Across Desert Sands

By JULIEN D. ROUSSEL, Secretary California Highway Commission

CONTRIBUTING color and international spirit to the occasion, General Gabriel Gavira, Governor of the northern territory of Lower California, and his military staff, resplendent in gold-braided white uniforms, participated on Sunday, May 3d, in the dedication by Governor Frank F. Merriam of the new alignment of the old Calexico-Yuma Highway in Imperial County.

Three thousand persons witnessed the ceremonies and attended a barbecue close to the banks of the East Highline Canal which marks the eastern rim of Imperial Valley's irrigated area near Calexico.

The new road crosses the desert from the eastern edge of Imperial Valley, joining Highway No. 80 at Midway Wells. It parallels the All-American Canal on the north for twelve and a half miles. The Midway Wells junction is 10 miles west of the rolling sand dunes which are well known to motorists entering California over the southern transcontinental highway.

GOVERNORS EXCHANGE AMENITIES

Governor Merriam and Governor Gavira, the principal speakers exchanged amenities and their expressions of mutual good will further cemented the cordial relations existing between their respective countries.

Accompanying the Mexican territorial chief were his Secretary of State, Jose Maria Mendoza Pardo, his chief of staff, General Miguel Molinar, and army officers. Representing California with Governor Merriam were Assistant Director of Public Works Justus F. Craemer, Harry A. Hopkins, chairman; Timothy A. Reardon, member, and Julien D. Rousset, secretary of the California Highway Commission; E. E. Wallace, State Highway Division Engineer; Senator Ed Fletcher of San Diego; Senator Ben Hulse of Imperial; Chairman Ed Hastings of the San Diego Board of Supervisors; Assemblyman Charles W. Stream, San Diego, chairman of the Assembly Highway Committee; Assemblyman Clarence R. Walker of Imperial; Judge Ralph H. Clock of Long Beach, and other officials of San Diego and Imperial counties.

Governor Merriam accepted an invitation



JULIEN D. ROUSSEL

extended by Governor Gavira to attend the opening of the new Tia Juana-Ensenada highway in the near future.

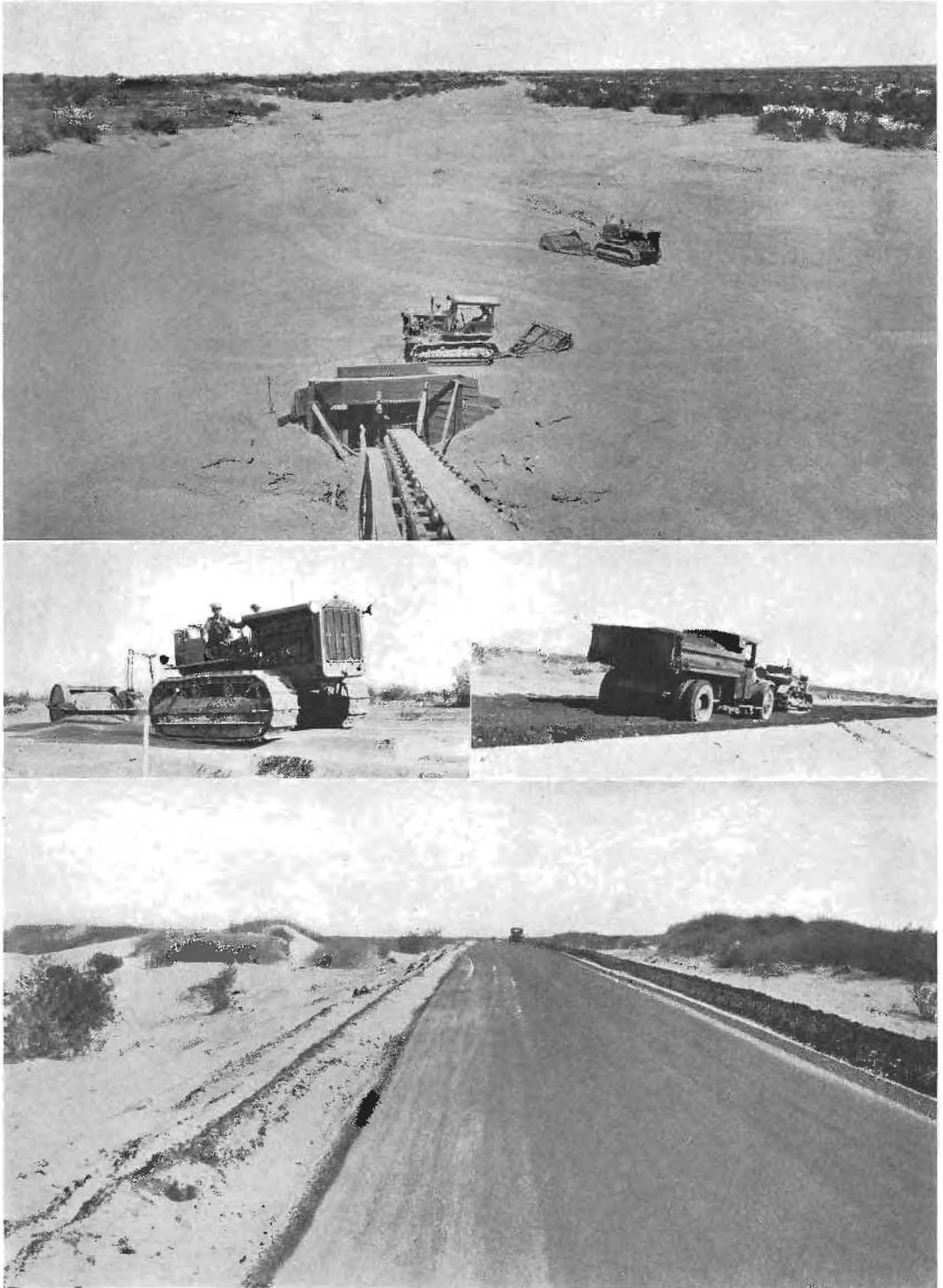
An ancient beach line, formed by a great inland body of water, which once occupied the Imperial basin, furnished the rock and sand used to pave the new link in the State Highway System, which is known as Section D of Route 202.

Imperial Valley's silt soil produces amazing crops of alfalfa and winter vegetables, but for road building purposes it is worse than a total loss. The discovery of this old beach line with its ample supply of hard gravel and sharp sand was a fortunate incident for valley road builders. Located within three miles of Route 202, it has made possible the construction of a high class road at comparatively low cost.

ONCE INLAND SEA

Geologists have an explanation for the presence of this ancient beach at a point 260 miles from the Pacific Ocean and nearly 100 miles

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BUILDING DESERT HIGHWAY NEAR CALEXICO. Top—Excavating thousands of tons of ancient beach gravel to provide surfacing material. Center—Grading by tractor and roller scraper and, at right, oil mix subgrade provides substantial base for trucks delivering plant mixed asphalt surfacing. Bottom—Finishing surface course through sand dunes. Roadsides not completed.

Ancient Beach Makes Desert Highway

(Continued from page 10)

from the headwaters of the Gulf of California. Tens of thousands of years ago, they say, the gulf extended its long arm far inland to the base of San Jacinto Mountains. The Colorado River, entering this original gulf at a point not far from the present site of Yuma, Arizona, poured millions of tons of silt into the salt waters annually, and eventually erected a huge dike across the basin. At a later date the water evaporated from the inland sea which had been created above the silt barrier, leaving the Imperial basin of today.

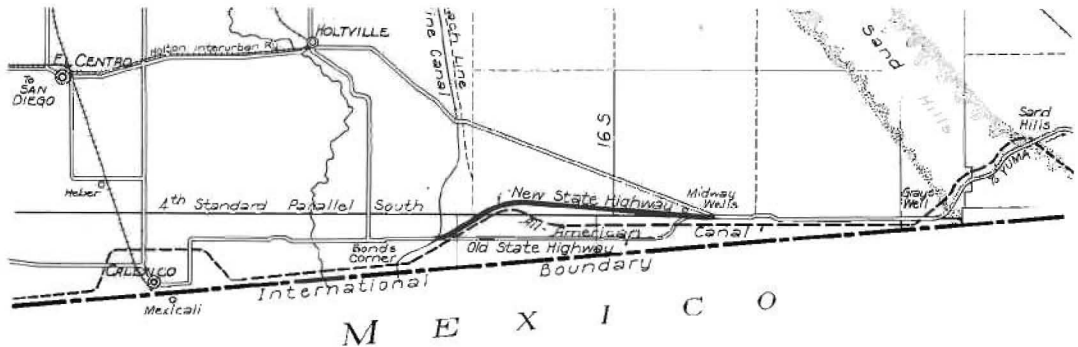
The original beach line of the gulf can still be traced around the rim of the valley by the presence of sea shells, and water marks on rocks.

The contract for the building of this unit of highway was awarded on October 22, 1935,

The surfacing material, composed of gravel from the old beach line, was mixed in a large plant with medium curing liquid asphalt and spread in three courses of two inches each. This, with the oiled base, makes a highway nine inches thick. The new work as it was pushed forward across the desert had to stand the test of the loaded construction trucks and trailers, the heaviest allowable on the highways.

With 1900 tons of liquid asphalt used in the surfacing and a like amount of road oil in the base, a total of 3800 tons or 110 tank cars, it is believed that a high record has been made for asphaltic products per mile in California highway building.

A screening plant was erected with 1000-ton capacity every 8-hour shift, from which by



the final cost of which will be approximately \$163,000.

The soil conditions on the project instead of being valley silt are almost entirely fine blow sand, as part of the project traverses the sand dune country where drifting sands are continually encountered.

A rather novel feature of the project was the treating of the loose sand with SC-2 oil in order to bind it sufficiently to provide a suitable subgrade for the bituminous treated surfacing. One thousand nine hundred tons of oil were required to convert the fine desert sand into a substantial base to carry the trucks delivering the plant mixed asphalt surfacing.

The grading consisted of moving 134,000 cubic yards of sand for a 30-foot highway, 20 feet of which is being paved. The 5-foot shoulders are to be oiled.

a 24-inch belt conveyor the gravel was fed to the cold elevator of a steel asphalt mixing plant of the same capacity. The plant was erected astride the old beach line, which is a strip of gravel and sand varying in width from 100 to 200 feet. The gravel deposit is from 8 to 12 feet deep.

All rolling on the subgrade and surfacing is done by pneumatic tires, a special "roller" having been devised with a 4-wheel drive truck equipped with three 40 x 8 tires on each rear wheel. This roller has navigated the treacherous sand without difficulty and furnished compaction per square inch equal to that of an 8-ton tandem roller.

The project is under the supervision of E. E. Wallace, district engineer at San Diego; E. E. Sorenson, construction engineer, and R. C. Payne, resident engineer.

Timothy A. Reardon Resigns from California Highway Commission Board

IN ORDER to devote his entire time to the State Division of Industrial Accidents and Safety, of which he is the chief, Timothy A. Reardon, of San Francisco, resigned as a member of the California Highway Commission on May 6th.

Mr. Reardon received one of the first official appointments of the late Governor James Rolph, Jr., being named to the Highway Commission in January, 1931.

At the time he accepted the post of Highway Commissioner, Mr. Reardon had behind him a distinguished record of twenty years as president of the board of public works of San Francisco and a long tenure as superintendent of public works of that city. He was elevated to the presidency of the San Francisco Board of Public Works when James Rolph was first elected mayor of the bay metropolis and throughout the lifetime of the late California governor they were intimate friends.

REBUILT SAN FRANCISCO

In the great rebuilding program in San Francisco following the fire of 1906, Mr. Reardon had an active part. His long familiarity with public work coupled with an intense interest in good roads caused Governor Rolph to appoint him a member of the California Highway Commission.

As a young man, Mr. Reardon decided that he would forego a college education and devote himself to learning a trade. He became an apprentice boilermaker. He early took a leading part in Union Labor affairs and became nationally prominent in labor movements. His long years of endeavor in this direction won him his appointment as head of the California Division of Industrial Accidents and Safety.

RESOLUTION ON RETIREMENT

At the meeting of the Highway Commission at Monterey on May 6th, the following resolutions were adopted and ordered spread upon the minutes:

WHEREAS, the Honorable Timothy A. Reardon is retiring as a member of the California Highway Commission to devote his entire time to his increasing duties as Director of the



TIMOTHY A. REARDON

Department of Industrial Relations of the State of California, and

WHEREAS, Mr. Reardon has served with distinction as a member of the California Highway Commission for a period of about six years, having brought to that position a ripe and valuable experience by reason of his service for the period of twenty years as President of the Board of Public Works of the City and County of San Francisco, and a life devoted to the cause of labor, and

WHEREAS, Mr. Reardon has always rendered to the other members of the Commission the most kind, courteous and helpful assistance in analyzing and solving the highway problems of the State at large,

NOW, THEREFORE, BE IT RESOLVED, that the members of the Commission do hereby express their regret that Mr. Reardon is severing his connection as an active member of the Commission, but extend to him their best wishes for the fullest measure of success in his important position as Director of the Department of Industrial Relations, and cordially invite Mr. Reardon to attend the meetings of the Commission whenever he has the opportunity to do so and to afford to them the benefit of his long experience and wise counsel.

Highway Planning Report Adopted

(Continued from page 1)

"We have come thus far," said Colonel Chevalier. "The question now is whether to accept highway improvement as a logical place for the solving of unemployment, or to go back to the policies we pursued from 1900 to 1929. It is my belief that the time has arrived when our national and state highway programs must be removed from the category of unemployment relief and returned to the status of legitimate engineering and construction development.

"As we approach the crossway shall our work be an experiment or be a progressive development? The expenditure of funds should be controlled by business philosophy and conducted through business principles and methods."

The speaker said that among phases of highway development calling for extensive study at this time are: (1) the underlying economics of integrated highway transportation, (2) methods of conserving present investments in our highway systems, (3) logical extensions of present systems with the development of new routes to meet future traffic needs, (4) increasing the safety of highway transportation, and (5) education of the public to a proper appreciation of highway problems.

"One of the important means of bringing about this public recognition of the importance of motor transportation and highway development in our national affairs," Colonel Chevalier said, "is the establishing of a common understanding among all the industries and agencies which have a common interest in motor vehicle transportation.

"This group is far more extensive than is evidenced at first glance and includes a long series of industries and individuals from producers of raw materials to the proprietors of filling stations and garages. There are now employed in the motor vehicle industry 4,200,000 people, a number that places it next to agriculture. Let it not fall lower."

Colonel Chevalier declared that highways and the businesses directly connected with them represent one-tenth of the national income and one-tenth of the gainful employment in America today. He attacked the idea that a highway once built never should need rebuilding and scoffed at the claim that the country has all the roads it needs. He said

highway commissioners should not hesitate to ask, in the interests of the people who pay for the highways, that new roads be built and old ones be reconstructed to meet modern conditions.

"No private business," asserted Colonel Chevalier, "would think of running with obsolete equipment, and the public business of motor transport artery building should not.

MUST REBUILD HIGHWAYS

"We must rebuild our highways. They must be larger and thicker to handle the increased traffic load. The U. S. Steel Company wrote off \$280,000,000 of surplus to replace equipment that had not reached its life of expectancy. They may have made a poor guess but the men at the head of that organization are supposed to have the brains of the country."

He urged a return to state support of highways, adding that "accepting Federal funds is being paid for in terms of sacrificing of autonomy and the states are enslaving themselves to the Federal government by depending too much upon it financially for highway building.

However, Federal aid is a part of our national program in highway construction. It should be kept up. It is written into the programs of the states. To stop regular Federal aid for a few years as an economy program is like keeping the sun from rising to save heat.

The Phoenix meeting was presided over by Preston G. Peterson, chairman of the Utah Road Commission and president of the Western Association of State Highway Officials. In opening the session, he called attention to the regional character of highway problems in the west and the need for the continued activity of the association in studying highway management, design and construction in the public-land states.

PARALLEL ROADS RECOMMENDED

A report of a special committee appointed to study standardization of state highway planning work in the west was adopted, the association approving its recommendations, which included:

State Control of All Roads Favored

(Continued from preceding page)

"In the classification of roads for the purpose of estimating necessary improvements, roads shall be divided into three types: 4-lane highways, 2-lane highways, and single-lane highways."

The committee recommended against more than 4 lanes of pavement, favored the building of parallel roads in such cases where traffic requirements are in excess of 4-lane requirements, and, under the classification of 2-lane highways, further divided the classification into 9 divisions for each of the subheads "flat, rolling and mountainous," based on such features as safe speed, width of surfacing, curvature and grade.

Highway financing was reviewed by Gibb Gilchrist through the period of local bond issues popular fifteen years ago, through the state bond issues, Federal aid and the present gas tax era.

ALL ROADS UNDER STATE

"In my opinion," said Mr. Gilchrist, "highway financing has about completed a cycle, through local, state and Federal agencies and, if we are not to return again to a demand for local financing of farm-to-market roads, the states must begin to take over and operate the present local road systems."

Mr. Toms took for his subject "The Function of a State Highway Department in the Field of Highway Transportation."

"The present trend," he said, "is toward state control of all public roads, and the expansion of the state systems makes the problem more complex because available funds must be allocated with the greatest care."

HIGHWAY MANAGEMENT IN INFANCY

He concluded by pointing out that highway design and construction have now passed into the field of established technique, but the problems of highway management are in their infancy and will be one of the major considerations for state highway departments during the coming years.

An interesting paper on "Highway Practice in Germany" was read by Dr. Hewes. He described the design and construction of the national highway system now being built in Germany.

The association passed resolutions urging the appropriation by Congress of \$20,000,000

for the fiscal years 1938 and 1939 for the construction of forest roads and highways, also endorsed appropriations by Congress for elimination of railroad grade crossings, secondary roads for 1938 and 1939 and a continuance of the past policy of Federal aid for highways and the building of forest roads, Indian roads, park roads and public highways.

PROTEST AGAINST DIVERSION

The diversion of gasoline funds again was protested and legislatures were asked to guard against any such tragedy as using gasoline funds for other purposes than actual highway use. In this connection a resolution was passed protesting the sale of motor vehicle fuels other than for government uses on government military and other reservations upon which no state tax was paid.

In connection with a discussion on safety, a resolution was passed pointing out to state regulatory bodies that engineering and construction of highways are not responsible for accidents or deaths where modern standards in construction are used; that these accidents and deaths are caused by a nonobservance of rules, regulations and laws on the part of motor vehicle operators and pedestrians.

In the election of officers, R. H. Baldock, State Highway Engineer of Oregon, was elected president; Harry A. Hopkins, Chairman, California Highway Commission, vice president; and K. C. Wright, State Highway Engineer of Utah, secretary.

Denver, Colorado, may be the next place for the meeting.

\$31.50 PER "HORSE" IN 1925 REDUCED TO \$7.80 TODAY

Back in the more or less gay nineties, a team of horses that would create at least a favorable impression when drawing the family rig up Main Street cost approximately \$300. If breeders and dealers in horses had been able, in the course of a decade, to effect great improvements in horse flesh and at the same time reduce the price of a team from \$300 to less than \$80, amazement and a great acclaim would have risen throughout the land.

The point is that a comparable result has been attained by designers, manufacturers and sellers of automobiles.

The man who bought an automobile in 1925 paid an average price of \$31.50 per horsepower for his vehicle. Today, the price per "horse" is \$7.80.

Blast Opens Last Tunnel Barrier on Feather River Highway Project

By G. M. WEBB, Resident Engineer, Division of Highways

MARKING an event of major importance in the progress of construction on the Feather River State Highway, Route 21, engineers of the Division of Highways on May 7th supervised the setting off of a dynamite charge that opened up the heading of Tunnel No. 3, near Pulga, one of the two tunnels through Grizzly Dome on the picturesque new route.

The blast removed a rock wall that constituted the last barrier on the road project. When the work of enlarging and clearing the northernmost entrance to Tunnel No. 3 is completed, heavy equipment will be enabled to pass through the great bore for the task of grading the last two mile section remaining to complete the Feather River Highway.

The blast was set off by Construction Engineer C. S. Pope of the Division of Highways. Other officials present included Assistant District Construction Engineer Perry Loudon; District Equipment Superintendent George Siebert; Superintendent Edward Rawson of Camp 30; Superintendent George Waste of Camp 28, and the writer.

THREE TUNNELS REQUIRED

There are three tunnels on the Feather River Highway. No. 1, about 33 miles east of Oroville on the Arch Rock section of the road, is 265 feet in length. Nos. 2 and 3 under Grizzly Dome, a monumental pile of granite towering from 1000 to 2000 feet, are 390 feet and 1172 feet in length, respectively.

Rapid construction progress is being made on the new highway. Approximately 35 miles of the project from Oroville to Grizzly Dome are practically completed. About 2.3 miles of heavy grading between Grizzly Dome and the Rock Creek bridge remains to be done. Between this bridge and the Storrie bridge 2.6 miles of road have been practically finished, and between Storrie bridge and Tobin bridge 1.5 miles are under construction. A stretch of 30 miles between Tobin bridge and Keddie is almost completed.

Excavation in Tunnel No. 2 will be completed about June 1.

The construction of the three highway tunnels in the most rugged section of the Feather

River Canyon, between Oroville and Quincy, has been under way since December 17, 1934. A center heading is completed through tunnel No. 1, and the enlargement is in progress. Tunnel No. 2, has been completed through the solid granite of Grizzly Dome. Tunnel No. 3 heading was broken through the north portal by the blast of May 7th.

DETAILS OF CONSTRUCTION

The finished cross section of the tunnels will be 30 feet, 4 inches in width and 22 feet, 2 inches in height, which includes sufficient space for lining should it become necessary. The spring line is 7 feet above profile grade.

The first step in the construction of Tunnel No. 1 was boring a center heading 14 feet wide and 8 feet high. Drilling for blasting was accomplished with four drifting drills mounted on two eight-foot columns with three-foot arms. The muck was removed by hand methods with cars and track. Two crews, working eight hour shifts, one drilling and blasting and the other mucking, advanced the heading an average of five feet per day.

Excavating the enlargement consists of removing a ring of rock, 6 to 8 feet in thickness. This is being done in one operation by ring drilling and vertical down holes. Two eight-foot columns, supporting four drifting drills, are set up in a vertical position in the previously completed center heading, 3½ feet on each side of the tunnel center line.

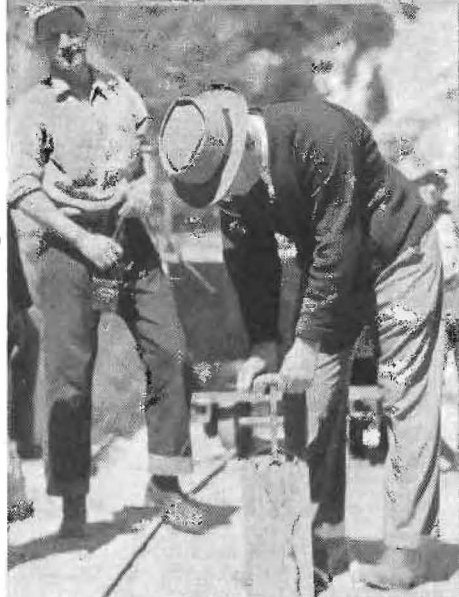
From this setup, holes are drilled radially in the sides and top at the proper angle to space the ends of the holes at two-foot centers.

FULL RING BLASTED

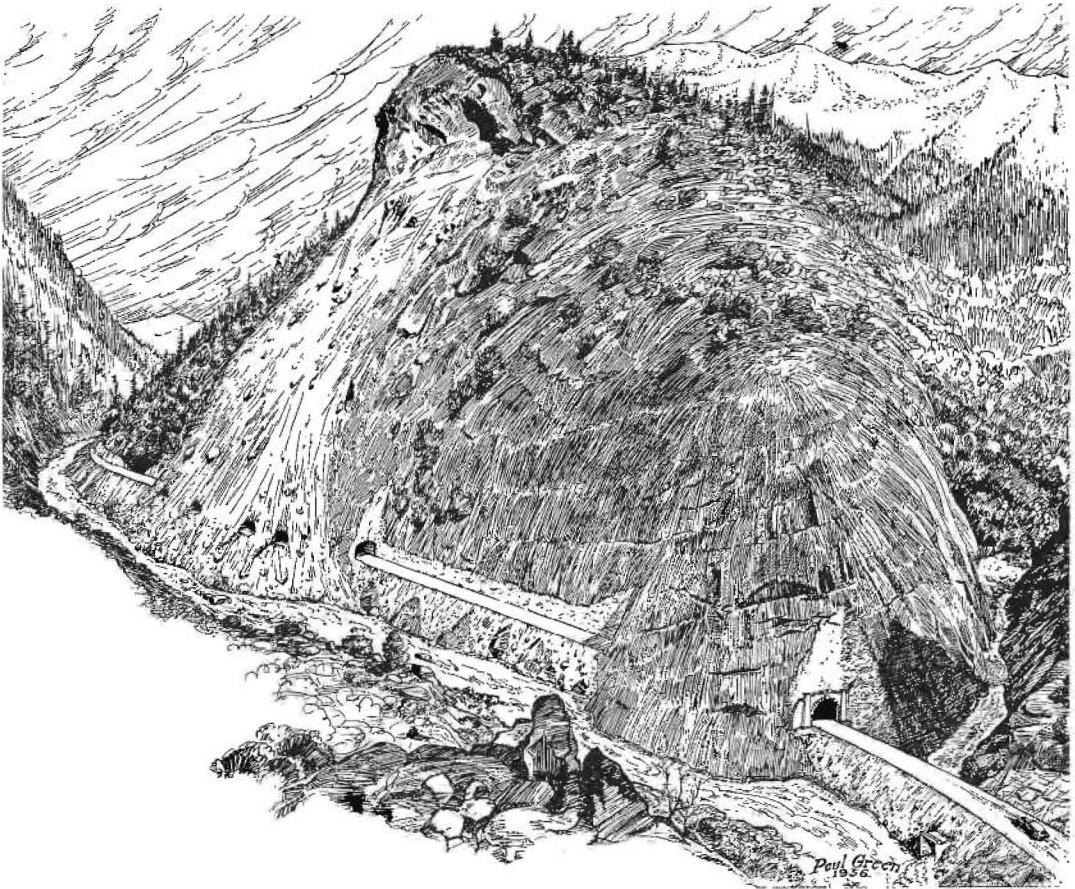
Two rings, three feet apart, are drilled without moving the columns. Vertical down holes are drilled in the bottom section with hand held rock drills in advance of the ring drilling. A full ring is blasted in each shot. The top and sides are fired with instantaneous detonators and the bottom with delays in order to throw the muck away from the face and avoid obstructing the heading.

The correct angle of the drills to accurately space the radial holes is determined by means

(Continued on page 18)



FEATHER RIVER TUNNEL BLAST scenes when bore No. 3 was holed through May 7th. Top picture, left to right, shows District Equipment Superintendent Siebert, Superintendent Rawson and Resident Engineer Webb being greeted by Superintendent Waste, Assistant District Construction Engineer, Lowden and State Highway Construction Engineer Pope as they crawled through hole after blast. Center—Mr. Pope setting off blast and cloud of smoke and debris caused by explosion. Bottom—Dynamite charges in heading ready to fire showing: 1—Breast holes; 2—Lifters; 3—Cut holes.



GRIZZLY DOME TUNNELS of the Feather River Highway officially designated as No. 2 and No. 3 are shown in the above sketch by Paul Green, Assistant Highway Engineer of District II. Tunnel No. 3 was blasted through May 7th. It is 1172 feet long with 4 adits or windows. Tunnel No. 2 is nearly completed.

Drilling Methods on Feather River Bores

(Continued from page 16)

of a clinometer devised on the job. Muck from the enlargement is being removed with a 75-h.p. diesel tractor and scraper.

The enlargement of Tunnel No. 2 was excavated by a different method. A top heading, 14 feet wide and 7 feet high, was driven in the same manner as the center heading in Tunnel No. 1. After which, four operations were required to complete the tunnel.

The first two operations consisted of removing benches approximately six and nine feet in depth, and fourteen feet wide, the first being completed before the second was started. Thus, a section in the center of the tunnel, fourteen feet in width, was completed. Following the last bench by about fifty feet, the upper halves of the blocks of material remain-

ing on the sides were taken out to full width. Widening the sides to grade was completed in the last operation.

Hand held rock drills were used on the vertical holes in the benches, spaced two feet apart transversely and three feet longitudinally. Four transverse rows of holes were fired in each blast with delay detonators.

Holes for blasting the sides to full width were drilled twelve feet in depth and approximately parallel to center line and grade, with four drifting drills, two on each side.

The number and spacing of these holes were varied according to the condition of the rock encountered.

A 60-h.p. tractor and scraper were used to remove the muck from the enlargement.

Four portable compressors, having total rated capacity of 1660 cubic feet per minute, furnish compressed air for 12 rock drills. The compressors are connected to one four-inch air line, 3200 feet in length.

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

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Vol. 14 MAY, 1936 No. 5

GOOD ROADS PAY PUBLIC

Highways pay their way by reducing the operating costs of vehicles using them, and on heavily traveled roads they return substantial profits to the public, says the Bureau of Public Roads after a study of the mileage of vehicle travel in three states in comparison with highway expenditures. Annual payments for highways, the bureau reports, amount to slightly more than one cent per mile of vehicle travel on all highways in Wisconsin, Michigan and Minnesota, according to figures collected by this bureau of the U. S. Department of Agriculture. In Wisconsin and Michigan, the payment is 1.08 cents per mile, and in Minnesota 1.1 cents per mile.

Analysis of highway costs and travel on the state systems, which include Federal-aid roads, of Wisconsin and Michigan shows that payments amount to .83 cent and .86 cent per mile of travel respectively. The figures for county roads are 1.23 cents in Wisconsin and 1.66 cents in Michigan.

The lower costs for main highways agree with the well established rule that large volumes of traffic make possible the construction and maintenance of high-type surfaces at a very low cost per mile of travel.

The actual saving in vehicle operating cost resulting from replacing a dirt road with a smooth, hard surface has been variously estimated and is probably not less than 3 cents a mile. On this basis, says the bureau, a large mileage of highways is paying tremendous profits to highway users. Actual payment of gasoline taxes and motor vehicle fees, when distributed in proportion to travel on different roads, show that many highways are earning substantial profits for the public.

—*Earth Mover.*

13,000,000 Workers Normally Employed on Construction Jobs

"In connection with the value of public works as a stimulant to recovery," Congressman A. F. Beiter of New York said in a speech before the House on March 24, 1936, "much data has been published to show the direct gainful employment furnished through the construction industry. This has been broken down into man-hours, total cost per man-year, Federal cost per man-year, and number of people put to work directly, but little has been said regarding those finding employment indirectly. It is true that indirect labor has been mentioned by those who have pondered the problem, but the references are mainly vague.

"The ramifications of the construction industry are so numerous and important that they affect every corner of the country. The business and social activities of our country are mutually interdependent, and all must be functioning properly to create a balanced economic life. When a stimulant is applied to aid recovery, it must be injected into the blood stream of our interdependent existence. We can not hope to effectively aid recovery unless this course is pursued.

"Fortification of the construction industry does this very thing. For instance, the raw materials used in construction have widespread occurrences in nature and they must go through many stages of processing and transportation before actual use in construction works. Stone must be quarried, crushed, separated into sizes, and mixed with other materials in proper amounts. Limestone and gypsum must be quarried and converted into cement and plaster. Iron ore must be mined, shipped, smelted, and converted into structural and reinforcing steel. Cotton must be grown, ginned, shipped, and woven into fabric for tires, belts, and containers. It is definitely a progression affecting every important factor of our economic structure.

"According to figures published by the Bureau of Public Roads, approximately 122,000,000 people (1925-33) are normally supported by 47,000,000 gainful workers, 13,000,000 of whom are directly in the construction industry and related producer-goods industries. The remaining 34,000,000 are in the consumer field producing and distributing goods consumed by the entire 122,000,000.

Nine Grade Separations in Los Angeles

(Continued from page 2)

struction by means of a "shoo fly" track along Graham Avenue, which parallels the railroad.

Retaining walls are being constructed to retain the approach fills and thus avoid encroachment on the abutting property and streets. The opening for the highway under the railroad will consist of a single 64-foot roadway between piers with sidewalk opening on each side of it.

On Soto Street, which runs in a general northerly and southerly direction and crosses the important boulevards leading east from the business district of Los Angeles, two separations are being built.

MAIN LINE CROSSING

At the point where Soto Street crosses the main line of the Southern Pacific Company the street dropped down to a grade crossing with both the railroad tracks and Valley Boulevard. An overhead structure is being built here to separate these grades and a connection is being provided between the two highways. This structure will have a roadway width of 44 feet, thus providing for 4 lanes of traffic.

Farther to the south on Soto Street, where it crosses the main and the Butte Street lines of the Union Pacific Railroad, a subway under the railroad tracks is being constructed. The street is being depressed to pass under the two railroad tracks through a single 56 foot opening with sidewalks on each side of it. It was necessary to relocate a considerable portion of the railroad's track layout at this point in order to provide a practicable means of separating the grades.

Atlantic Boulevard is being carried beneath The Atchison, Topeka and Santa Fe Railway tracks where it crosses them in the vicinity of Hobart. This subway will have two 34 foot roadway openings and is being built on alignment which will rectify the curves existing at this point. A similar subway is being built at the north edge of Buena Park, under The Atchison, Topeka and Santa Fe Railway tracks, to take care of traffic on State Highway Route 171, and the LaMirada Road. This subway will have a single 44 foot opening.

Plans have also been prepared for a subway under The Atchison, Topeka and Santa Fe Railway tracks on San Gabriel Boulevard.

This location is on State Highway Route 168 running from Long Beach to Pasadena along the easterly side of the metropolitan area. The finally constructed route will follow Ceritos Avenue, San Gabriel Boulevard, and Rosemead Boulevard, the present roads will be brought up to modern standards for a heavy traffic artery and new connections built wherever these are necessary. A 56 foot roadway with two sidewalks will be provided to take care of the expected traffic when this route is completed.

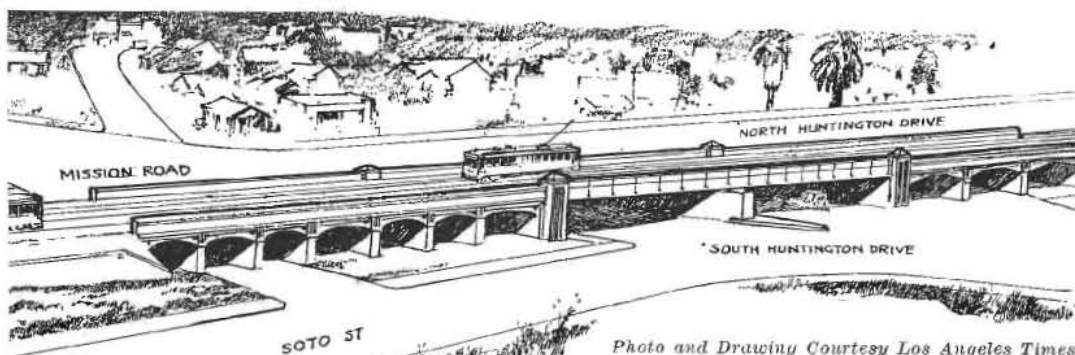
In addition to the separations which are being built within the limits of the metropolitan area, there are several grade separations under construction on major highways in the southern section of the State. On the Golden State Highway in Kern County, a separation with the Southern Pacific Company tracks at Delano has just been completed and another one at Famoso is under construction. The subway at Delano was financed from regular Federal Aid and gas tax funds. The one at Famoso is financed from emergency relief act funds and is well under way.

The completion of these two projects will remove all main track grade crossings from the Golden State Highway as far north as Fresno, and leave only three more main line crossings to be separated throughout its entire length.

TWO OVERHEAD STRUCTURES

State Highway Route No. 19, known as the "Jackrabbit Trail," is being constructed to modern standards between Riverside and Beaumont. At the westerly end near Riverside an overhead structure carrying the highway over The Atchison, Topeka and Santa Fe Railway tracks is to be built, and at the easterly end near Beaumont an existing narrow overhead structure crossing the main line of the Southern Pacific Company is being replaced by a new structure built to proper width and alignment. This latter structure is well along towards completion.

At Verdemon, just north of San Bernardino, an overhead is being built to carry the Cajon Pass Highway over the double track railroad of The Atchison, Topeka and Santa Fe Railway which tracks are also used by the Union Pacific Railroad.



MISSION ROAD GRADE SEPARATION eliminates one of the busiest and most dangerous traffic crossings in Los Angeles where 560 trains daily pass a triple highway intersection on the four-track Pasadena line of the Pacific Electric Railroad.

Just to the north of Indio the highway is being rerouted to provide a proper alignment for the approach to an overhead over the main line of the Southern Pacific Company now under construction.

At Java, which is a short distance west of Needles, the existing old timber subway with its narrow roadway and low clearance is being replaced by an overhead structure over The Atchison, Topeka and Santa Fe Railway on a relocation of the highway which provides suitable alignment and width of roadway.

STATE CONTRIBUTION NECESSARY

Since the Federal regulations limit the length of highway reconstruction which can be included in the cost of the separation to be financed from Federal funds, it has been

necessary for the State to supply an additional amount of gas tax funds to complete the highway relocations necessary at the Java and Indio Separations.

In addition to the above main line highway separations a subway has just been completed on Route 43 to the south of Colton, which was financed from regular Federal aid and gas tax funds, the existing concrete overhead over The Atchison, Topeka and Santa Fe Railway at Del Mar has been widened on improved alignment and plans are ready for a reconstruction of an old wooden overhead structure on Palm Avenue north of Riverside, which highway provides a short cut between that point and Redlands.

When the new route of the coast highway was constructed through Santa Barbara a

(Continued on page 30)

State Highway Right of Way Men Hold Three Day Conference in Sacramento

A CONFERENCE of right of way attorneys, agents and engineering assistants, engaged in the acquisition of lands and rights of way for the development of the State highway system and the construction of the San Francisco-Oakland Bay Bridge, was held at the headquarters office in Sacramento April 29, 30 and May 1, 1936.

This was the first meeting of the entire right of way group in several years, and consequently the time had become opportune for such a meeting to discuss, analyze and standardize, as much as possible, right of way and condemnation practice and procedure applicable to the various sections of the State of California. The sessions were both intensive and instructive and actively participated in by the personnel, all of whom are now under civil service.

RANGE OF DISCUSSION

Among the subjects discussed were: the right of way agent's part in the preparation and trial of condemnation cases; rights of way over State and Federal lands; problems of special interest encountered in the right of way work relating to the San Francisco-Oakland Bay Bridge; legislative changes affecting right of way acquisition; the acquisition of drainage easements; rights of ingress and egress; consequential damages; relocating improvements to permit construction; proper property descriptions; condemnation maps; publication of summons; appraisal problems; escrow instructions; clearance of taxes and special assessments; rights of public utilities in highways; exchanges of property; forms and their possible improvement; cooperation in right of way work with counties and cities; dedication of subdivision streets and highways; abandonment and relinquishment of rights of way; escrows, and numerous other matters relating to right of way, appraisal and condemnation practice, procedure and technique.

CHIEF CARLETON PRESIDED

C. C. Carleton, Chief of the Division of Contracts and Rights of Way of the Department of Public Works, Sacramento, presided, and C. R. Montgomery, General Right of Way

Agent, Sacramento, acted as secretary at the sessions.

Others in attendance were: Clarence W. Morris, Assistant Chief of Division, San Francisco; Frank B. Durkee and Robert E. Reed, General Right of Way Agents, Sacramento; Holloway Jones, Clifford D. Good and Lincoln V. Johnson, Condemnation Investigators, San Francisco; C. A. Marsh, Supervising Right of Way Agent, San Francisco-Oakland Bay Bridge, San Francisco; S. W. Elliott, Right of Way Agent, District I, Eureka; Leland L. Rose, Right of Way Agent, John W. White and John R. West, Assistant Right of Way Agents, and W. J. Thompson, Assistant Highway Engineer, District II, Redding; Herman D. Jerrett, Right of Way Agent, and J. F. O'Hara, Assistant Resident Engineer, District III, Marysville; James B. Woodson, Right of Way Agent, Roy C. Teel and E. Kenneth Rogers, Assistant Right of Way Agents, District IV, San Francisco, and G. J. Grohman, Highway Engineering Draftsman, Sacramento.

The southern part of the State was represented by E. W. Carson, Right of Way Agent, C. L. Slusher and J. M. Sorenson, Assistant Right of Way Agents, District V, San Luis Obispo; Henry A. Sellers, Right of Way Agent, and Will Kelly, Assistant Right of Way Agent, District VI, Fresno; Frank C. Balfour, Supervising Right of Way Agent, E. N. Whittemore, Ernest M. MacDonald, Leo J. McCarthy, Neil C. Brown and Joseph F. Walsh, Assistant Right of Way Agents, District VII, Los Angeles; Edward P. Jones, Right of Way Agent, Charles L. Flack and R. M. Olson, Assistant Right of Way Agents, District VIII, San Bernardino; F. R. Baker, Associate Highway Engineer, and Serge Ray, Highway Engineering Draftsman, District IX, Bishop; B. J. Perry, Right of Way Agent, and Louis J. Malatesta, Assistant Right of Way Agent, District X, Stockton; George S. Pingry, Right of Way Agent, and A. J. Razeto, Assistant Right of Way Agent, District XI, San Diego.

He: "May I take you home?"
She: "Sure, where do you live?"



RIGHT OF WAY GROUP AT CONFERENCE—Back row, standing from left to right: Will Kelly, A. J. Razeto, Louis J. Malatesta, John R. West, E. N. Whittemore, Serge Ray, C. L. Slusher, G. J. Grohman, Ernest M. MacDonald, John W. White. Second row from back: Leo J. McCarthy, Neil C. Brown, W. J. Thompson, Joseph P. Walsh, J. M. Sorenson, F. R. Baker, E. K. Rogers, Roy C. Teal, Charles L. Flack, R. M. Olson, Frank B. Durkee, C. R. Montgomery, Holloway Jones. Seated at table, rear: Frank C. Balfour, E. W. Carson, C. A. Marsh, James B. Woodson, Herman D. Jerrett, Leland L. Rose, S. W. Elliott, Lincoln V. Johnson, Clifford D. Good, Clarence W. Morris, J. G. Standley, C. C. Carleton, Robert E. Reed. Seated at table, front: Edward P. Jones, George S. Pingry, B. J. Perry, Henry A. Sellers.



HERE'S RIGHT OF WAY "BEEF TRUST"

These four members of the group rejoice in the possession of an avoirdupois ponderosity that has won them both fame and fortune, as the ill-concealed envy of some of their slimmer confreres contributes to the fortune of good humor displayed by the weighty ones.

The collective weight of this quartette of Falstaffian Right of Way gentlemen is only one thousand and twenty pounds or sixteen thousand three hundred and twenty ounces of too, too solid flesh and the usual quota of bones.

The members of this smiling poundage galaxy are, left to right: Clifford D. Good of San Francisco, 240 pounds; B. J. Perry of Stockton, 265 pounds; Frank C. Balfour of Los Angeles, 225 pounds; Henry A. Sellers of Fresno, 290 pounds.

An old lady, in London for the first time in her life, saw on the front of a high building a glaring sign, which read: "The Smith Manufacturing Co."

"Lawds a mercy," she remarked to her nephew, "I've heard of Smiths all my life, but I never knew where they made 'em."

Transplanting of Roadside Trees and a Reforestation Project Described

By E. S. WHITAKER, Assistant Arboriculturalist

CONSERVATION of growing trees bordering State highways where widening and realignment work are necessary and reforestation along such public roads are matters to which the Division of Highways gives studied attention.

Exemplifying the care taken to maintain natural and artificial beautification of California's highways are two projects in District 11, one of which involved an experiment in transplanting roadside shade trees and the other an attempt to augment natural reforestation.

On State Highway No. 7 (U. S. 99W), between Corning and Red Bluff, where widening and realignment work is in progress, the State twelve years ago planted oak, black walnut, ash and plane trees along both sides of the highway. It was found necessary to remove a number of these trees and they were carefully dug up and replanted in groups in wide right-of-way areas.

COST \$15 PER TREE

Work was begun on March 18 under the direct supervision of Maintenance Superintendent E. L. Stump, and was carried out in a manner that allowed the entire job to be accomplished at a cost of \$15 per tree.

Due to the advanced season and the type of soil, in which water available to plants was rapidly reaching the wilting point, it was necessary to first soak the tree basins so that as many roots as possible could be saved. A three-quarter-yard power shovel then dug around each tree, leaving a ball approximately 4 feet in diameter.

Roots within this ball were carefully combed free of as much soil as possible and the tree was lifted free of the soil by means of a beam fastened in a dump truck, the bed of which was raised and lowered as desired to use the beam as a hoisting lever.

With roots well covered with wet burlap, the tree was transported to a previously prepared hole and replanted. In this last operation, roots were pruned, good top soil was placed around the roots, and the tree was well watered in to insure against air pockets in the soil.

NEW LEAVES OUT

The tree crowns were also heavily thinned out, but not topped; in this way leaving terminal growth, while removing a portion of the crown growth to compensate for the loss of root area. In their new locations, the trees were basined around and mulched with straw, and they will be watered once each week during the dry season.

New leaves have already been forced out, the oaks and walnuts responding equally to the treatment. It remains to be seen, however, whether this is a last effort towards reproduction by a dying tree or the definite continuance of retracted spring growth.

However, the work, even if only 80 per cent successful, will be considered well worth the cost and will be conducive to further efforts in this type of conservation under similar conditions in the future.

BURNED AREA PROBLEM

Reforestation, under which head the second project may be listed, is a ticklish undertaking under the best of conditions. Too many times, plantings have been developed only to find natural growth springing up and completely overshadowing the imported shrubs and trees.

On State Highway route 20 which is the entrance to Lassen National Park from Redding, a forest fire several years ago destroyed native growth over a considerable area that the highway skirts and at one point passes through.

All dead trees have been felled and removed from the right of way along this stretch as a safety measure, but natural growth, due to destruction by fire of the seeds and root crowns of trees and shrubs, has been slow to reappear; and the effect to the traveler is that of passing through a devastated, denuded area.

Planting along this road would necessarily have to consist mainly of indigenous trees and because of the number required, it was believed not advisable to buy stock but to chance transplanting seedling trees direct from the forest. Even with the loss suffered by moving this native growth, the expense would not be so

(Continued on page 30)



TRANSPLANTING AND REFORESTATION OPERATIONS—Pictures 1, 3 and 4 show tree being transported and placed in new location by dump truck and lever and replanted and pruned. No. 2 group of replants in roadside area. No. 5—Burned area on State Route 20. White stakes mark transplanted forest seedlings.

Marin Approach to Cost Over \$1,750,000

(Continued from page 5)

the north boundary of the United States Military Reservation at Fort Baker.

In order to secure satisfactory line, grade, and width through the rough topography on the Marin County hillsides, it was necessary to design one of the heaviest grading projects in the annals of the Division of Highways for the distance of three and one-half miles.

For convenience and facility in construction, the work was divided into two portions which were let as separate contracts; one portion involving the grading and surfacing of 3.4 miles of the highway and the other providing for the 1000-foot tunnel bore and lining with the construction of the necessary tunnel approaches. This tunnel contract covers a distance of approximately three-tenths of a mile.

1,752,000 CUBIC YARDS EXCAVATION

On April 21 the Director of Public Works awarded a contract for grading and surfacing the 3.4 miles between Waldo Point and the bridge. The major item of this contract involves the moving of over 1,752,000 cubic yards of roadway excavation, with an estimated overhaul of 13,100,000 station yards.

Other large items of the contract include 12,500 cubic yards of structure excavation, drainage structures involving 475 cubic yards of portland cement concrete, 46,000 pounds of bar reinforcing steel and nearly 12,000 lineal feet of corrugated metal pipe. The heavy duty bituminous treated crushed rock surfacing which is to be placed on the newly graded roadbed will require over 51,000 tons of crushed rock and 325 tons of various types of liquid asphalt. It is estimated that the total cost of this contract will amount to about \$895,400.

The contract for construction of the tunnel, was likewise awarded by Director Earl Lee Kelly on April 21st. The estimated total cost is about \$620,900.

This tunnel contract provides for the boring of a tunnel 1000 feet in length, with a reinforced concrete lining. The tunnel design provides a roadway 42 feet in width between curbs, with a 3½-foot sidewalk on one side. The total height on the center line of the tunnel will be 28 feet 9 inches and the height from the spring-line will be 23 feet 6 inches.

The design for the tunnel lining provides

for two cross-sections. The heavier type of tunnel ring, designated as Section "A," consists of a ring with a crown thickness of 3 feet, the thickness at the spring-line being 4 feet 5½ inches, while the foundation is 6 feet 10 inches wide at the base. This heavy type section will be used for a short distance at each end of the tunnel.

The "B" cross-section consists of an arch ring 2 feet thick at the crown, 3 feet 5½ inches thick at the spring-line, and the foundation is 5 feet 10 inches wide at the base. This lighter section will be used throughout the greater portion of the length of the tunnel where the excavation is in solid rock.

The engineer's estimate of the quantities of work items required on the tunnel contract includes 60,000 cubic yards of roadway excavation with about 600,000 station yards of overhaul, 9000 cubic yards of structure excavation and about 51,000 cubic yards of tunnel excavation. The lining and portals involve about 2800 cubic yards of portland cement concrete and the pavement about 1050 cubic yards. The reinforcing steel necessary in both the pavement and lining includes about 370,000 pounds of bar reinforcing steel and 1,000,000 pounds of structural steel.

These two contracts, which will provide California motorists with a four-lane approach to the gigantic bridge across the Golden Gate, will be completed at a total cost to the State of approximately \$1,750,000 or nearly \$500,000 per mile for the entire project.

HIGHWAYS BANISH ISOLATION

"In considering the advantages that have resulted from the development of motor vehicle transportation, no less an authority than the Interstate Commerce Commission reports that 45,000 of the approximately 125,000 communities of appreciable size have no rail service or lack a freight station," according to a statement by A. L. Cricher as Chief, Transportation Division, U. S. Department of Commerce.

"Some 10 per cent of the population is found in such communities. In the absence of the bus or truck, these communities would be completely shut off from outside travel, or compelled to rely on more primitive means of transport."—*Highway Highlights*.

"Albert, bring that new radiator ornament along with you this evening. I forgot to buy a bridge prize again!"

Death of Charles D. Hamilton Leaves a Vacancy on Highway Commission

AMID a floral setting of surpassing beauty, funeral services were conducted in Banning, Riverside County, on April 27th for Charles D. Hamilton, a member of the California Highway Commission, who died at his home in that city on April 24, 1936.

Rites were held under the auspices of the Masonic fraternity and were attended by a host of friends of the dead man. Assistant Director of Public Works Justus F. Craemer and Julien D. Rousel, secretary of the Highway Commission, represented Governor Frank F. Merriam at the services.

The following resolution extolling Mr. Hamilton and expressing its sympathy for the bereaved members of his family was adopted by the California Highway Commission at its regular meeting at Del Monte on May 8th:

WHEREAS, it was with profound sorrow that the members of the California Highway Commission since their last meeting learned of the passing of the genial Charles D. Hamilton, an honored member of the Commission, and

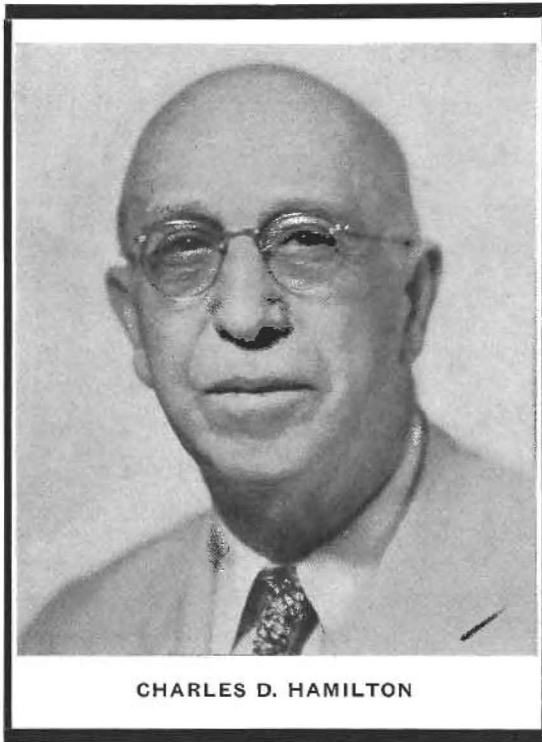
WHEREAS, his associates on the Commission had come to admire and esteem the ability, energy and sound judgment that he contributed to their counsels and labors, and had become greatly attached to him by reason of his gracious, courteous and generous personality, and

WHEREAS, the valuable service that Mr. Hamilton rendered to the People of the State of California during his incumbency of the position of California Highway Commissioner was but the culmination of fifty years of loyal and devoted public service to his State, County and local community,

RESOLVED, that the Commissioners hereby express their deep regret on account of the loss of such a faithful friend and fellow member, and extend their heartfelt sympathy and condolence to Mrs. Hamilton and the other members of the bereaved family, and

BE IT FURTHER RESOLVED, that this resolution be spread upon the official minutes of the California Highway Commission as a memorial, and that the Secretary be directed to forward duly certified copies thereof to Mrs. Hamilton and the family, and the press of his

home county, as an expression of the high regard in which Mr. Hamilton was held by the members and staff of the California Highway Commission.



CHARLES D. HAMILTON

Although Mr. Hamilton had suffered from a chronic heart ailment for some time, his passing was unexpected and was a shock to his home community and a legion of his friends throughout the State.

Mr. Hamilton was appointed to the Highway Commission by Governor Merriam on July 24th last.

Born on a farm in Macon County, Illinois, July 15, 1865, Mr. Hamilton came to California as a youth of 20. He settled in San Bernardino County, establishing

himself in business at Banning with Hugh Carpenter, who also was a native of Macon County. They engaged in extensive farming operations.

Before the area that now is Riverside County was separated from San Bernardino and San Diego counties, Mr. Hamilton, in 1892, was elected county clerk of San Bernardino. During his term of office, Riverside was created and Banning was taken into the new county. Mr. Hamilton always took an

(Continued on page 32)



The following monthly report of the State Engineer detailing activities of the Division of Water Resources makes public the important fact that forecasts based on an analysis of snow survey and rainfall reports indicate that the water year 1935-1936 is the best this State has experienced since 1927. The report also states that 57 applications were received during March for appropriation of water, several of them for very large irrigation projects.

News of flood control and reclamation work, transactions of the Districts Securities Commission, progress of the Central Valley Project and other work of the division is contained in the report as follows:

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento Flood Control Project.

The chief activity of the maintenance force during this period has been the repair of bridges and other structures. Many of the timber bridges are now requiring repair on account of the age of the structures rather than damage caused by flood water. All of the bridges have now been in 12 years or longer, and the chief difficulty is occasioned by rotting of the piles at summer water level.

A small amount of pumping was done at the three drainage plants during this period. The three new plants being constructed by the California Debris Commission are nearing completion, pump No. 3 now being practically completed.

Relief Labor Work.

We have at this time approximately 95 relief workers on flood channel clearing in Sutter and Yuba Counties. The number of men available is decreasing rapidly, and it is thought that by June 15th none will be available. From November 12, 1935, to April 18, 1936, the following work has been done on WPA projects supervised by this office:

Project No.	Name	Man.-Hr.
884	Feather River at Nicolaus	19,732
1114	Feather River south of Marysville	4,378
1390	Sacramento By-pass (leveling)	6,776
1426	Feather River north of Yuba City	32,074
1427	Bear River	23,478
1983	Butte Slough By-pass	10,012
2230	Feather River north of Marysville	18,938
Total Man-hours		115,388

Sacramento Flood Control Project.

Incidental construction work in connection with new levee construction has been carried on during the period. All work on the American River levee near Perkins is now completed, with the exception of fence reconstruction. We are now reinstalling a drainage pump discharge pipe at the District 765 plant near Lisbon, on the east levee of the Yolo By-pass.

A field examination over the proposed new construction on the Bear River levee system was made, in company with the U. S. Army engineers.

Flood Measurements and Gages.

Arrangements have been made with the War department to install new water stage stations on the Sacramento River at the Sacramento weir and at Ord's Ferry, and on the Feather River at Shanghai Bend. These stations will be of the most modern type, equipped with automatic continuous record instruments. The installation of a radio sending station at the Ord Ferry gage is contemplated.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR

Office work during the past month has consisted primarily in computing and compiling the data obtained in 1935 from which to render a report showing the diversions, return flow, stream flow and acreage irrigated in the Sacramento-San Joaquin territory and the encroachment and recession of salinity in the Delta during 1935.

The flow of fresh water in the Delta in the Sacramento-San Joaquin drainage basins has been maintained at a high rate and consequently the salinity in Suisun Bay has remained at a low level.

DAMS

Work is under way in the south on the construction of San Gabriel Number 1 dam of the Los Angeles County Flood Control District, the Cajaleo Dam of the Metropolitan Water District and the Grant Lake Dam of the city of Los Angeles, Bureau of Light and Power.

Work on Long Valley dam of the city of Los Angeles will shortly be under way.

Construction has begun on Kent Dam Number 2 in San Mateo County and the construction of the West Valley Dam of the South Fork Irrigation District in Modoc County has been resumed after discontinuance due to weather conditions during the winter months.

Snow Surveys Promise Good Water Year

(Continued from preceding page)

Repairs on the Hodges Dam of the city of San Diego have been started.

Work on the enlargement of the O'Shaughnessy Dam of the city of San Francisco is proceeding satisfactorily, with the excavation of foundations in the streambed underway.

Work on the Arcata Dam of the city of Arcata has been resumed after discontinuance due to weather conditions.

Exploratory work is still under way at the Mad River Dam of the city of Eureka.

The usual maintenance and operation inspections have been carried on during the month in addition to those required for construction and repair work.

CALIFORNIA COOPERATIVE SNOW SURVEYS

At the end of March and early in April snow surveys were made at most of the established snow courses throughout the Sierra Nevada. One-hundred-fifty courses were surveyed by the State and other agencies cooperating with the State on this work. The 5 not measured were at high elevations, mostly above 10,000 feet, where during the measuring period, treacherous storms prevailed, making traveling conditions in these isolated areas so hazardous, that it was considered inadvisable to dispatch men to make the surveys.

Most of the measurements showed that on April 1st this year's snow pack, from the standpoint of water content is superior to that of any year since 1932, while at quite a few places the 1932 snow pack is exceeded. This water content of the snow pack as of April 1st, is in general indicative of the spring run off to be expected in all of the snow fed streams of the Sierra.

Using the data furnished by the snow surveys, supplemented by rainfall figures from all mountain precipitation stations, forecasts of April-July run off and also of seasonal (October-September) stream flow for the year 1935-1936 were prepared. These forecasts together with complete tabulations of the measured supporting data were published in the April 1st Snow Survey Bulletin of the division which was mailed to the public on April 15th.

An analysis of the forecasts contained therein indicate that the water year 1935-1936 approaches very nearly the 1890-1929, 40 year mean and is the best this State as a whole has experienced since 1927.

WATER RIGHTS

Supervision of Appropriation of Water.

Fifty-seven applications to appropriate water were received during the month of March, of which 22 were filed by the Division of Grazing of the Department of the Interior, for stock watering purposes in Kern, Inyo, Modoc and Lassen counties. A committee for the Mojave River County Water District filed an application proposing an appropriation of 200 second

feet from Mojave River for the irrigation of 10,000 acres; Levee District No. 1 of Sutter County filed an application proposing 15,000 acre feet of underground storage by diversion from Feather River for the irrigation of 20,000 acres and Sutter Water District of Yuba City filed an application proposing an appropriation of 75 cubic feet per second from Feather River for irrigation purposes.

Seventeen applications were denied during the month; 15 were approved; 4 permits were revoked and 10 licenses were issued.

ADJUDICATIONS

Middle Fork of Feather River (Plumas and Sierra Counties).

Field work was commenced under the proceeding on April 15, 1936. A survey of irrigated land and diversion systems, and a hydrographic investigation in Sierra Valley will be made in 1936.

North Fork of Pit River (Modoc County).

Field work was commenced under the proceeding on April 15, 1936. A survey of irrigated lands and diversion systems and a hydrographic investigation on North Fork of Pit River will be made in 1936.

Water Distribution.

Water master service for the 1936 season was continued on the following named streams during the past month: Owl, Soldier, Emerson, Cedar, Deep and Mill Creek Water Master Districts (In Surprise Valley, Modoc County.)

Water master service for the 1936 season was commenced in the following named water master districts on April 15, 1936: New Pine, Davis, Franklin, South Fork of Pit River, Pine, Hot Springs Valley and Big Valley Water Master Districts.

Federal Cooperation.

Final sheets of the La Pauza Quadrangle in eastern San Luis Obispo County and western Kern County are now available. This sheet is published on a scale of 1:62,500 with a contour interval of 50 feet. This work was done by the Geological Survey in cooperation with the Division of Water Resources.

IRRIGATION DISTRICTS AND DISTRICTS SECURITIES COMMISSION

Irrigation Districts

The request of Imperial Irrigation District for an investigation of contemplated improvements along the line of the All American Canal was referred by the Securities Commission to the State Engineer in order that data might be assembled for a future report.

Additional information has been assembled in regard to application of the Sutter Water District for approval of a bond issue to construct an irrigation system for lands in the vicinity of Yuba City.

Surveys Progressing at Both Friant and Kennett Dam Sites

(Continued from preceding page)

Districts Securities Commission.

A special meeting of the commission was held in Sacramento March 26, 1936, at which the following requests were given consideration:

Petition of South San Joaquin Irrigation District for approval of a plan of debt readjustment and of a plan to refund outstanding bonds through a loan from RFC, supplemented by district funds, was favorably passed upon.

Naglee Burk Irrigation District was granted permission to expend \$2,388 from the general fund to aid in financing concrete lining of a portion of the canal system.

Approval was given to petition of Lindsay-Strathmore Irrigation District for payment of interest at 4 per cent per annum upon the liquidating value of bonds deposited under the RFC refunding plan.

WATER RESOURCES

South Coastal Basin Investigation.

The South Coastal Basin Investigation has proceeded along routine lines during the present month.

Investigations have been made of the water supply for eight proposed sites under consideration for the Southern California Prison.

Central Valley Project.

Progress has been made by the U. S. Bureau of Reclamation on the preparation of plans for preliminary work preparatory to starting construction on the initial units of the project. Surveys are progressing at Kennett and Friant dam sites and along the proposed route of the Contra Costa Conduit. Appraisers are working in the field evaluating lands and rights of way necessary for the construction of the project. Exploratory operations have continued during the month at Kennett and Friant dam sites under the direction of the Bureau of Reclamation. The Division of Highways is making progress in drilling the proposed site of the combination highway-railroad bridge across the Pit River.

During the month the board of Consulting Engineers engaged by the U. S. Bureau of Reclamation on the Central Valley Project consisting of Charles H. Paul of Dayton, Ohio, Professor W. F. Durand of Stanford University, Dr. Charles P. Berkey, of Columbia University and Roy V. Meikle of Turlock, accompanied by Mr. R. F. Walter, Chief Engineer for the U. S. Bureau of Reclamation, and Mr. J. L. Savage, Chief Designing Engineer, made an inspection trip covering particularly the work being carried on at the Kennett dam site.

The Department of Public Works is assisting the Bureau of Reclamation in every way possible in an effort to speed work on the project.

An Irishman went into a clothing store to buy a shirt and the clerk tried to sell him a trunk also.

"What do you use a trunk for?"

"You keep your clothes in it."

"Shure, do you want me to run around necked?"

Replanting Roadside Trees and Burned Areas on Highways

(Continued from page 24)

great as if nursery-grown trees were purchased for the purpose.

900 SEEDLINGS PLANTED

Accordingly, District Tree Foreman Evans up to the first of March of this year has transplanted over 900 trees of a year or less in age. These were mainly *Libocedrus decurrens*, the incense cedar native to that region. Although all are quite small, it is this feature that will probably decide the success of the work as to attempt to move native trees with a larger root growth would undoubtedly meet with failure unless expensive precautions were taken.

While it is true that conditions all favored this type of work in this area, the resultant growth of the transplanted trees and of any trees that may spring from seed, will be closely observed and results one way or the other will influence the reforestation of similarly affected roadside areas along State highways.

TWENTY GRADE SEPARATIONS IN SOUTHERN CALIFORNIA

(Continued from page 21)

concrete structure carrying Las Positas Road over the highway was built. This structure joined an old and unsightly wooden structure over the adjacent Southern Pacific tracks. This old portion of the structure over the railroad is being reconstructed as a feeder road project and will remove an eyesore on the otherwise attractive route through the city.

Mrs. Jones could only find two aisle seats—one behind the other. Wishing to have her sister beside her, she turned and cautiously surveyed the man in the next seat. Finally she leaned over and timidly addressed him.

"I beg your pardon, sir, but are you alone?"

The man, without turning his head in the slightest but twisting his mouth to an alarming degree and shielding it with his hand muttered:

"Cut it out, Kid—cut it out! My wife's with me."

A man in a hospital for mental cases sat fishing over a flower bed. A visitor, wishing to be affable, remarked:

"How many have you caught?"

"You're the ninth," was the surprising reply.

—Texas Highways.

Highway Bids and Awards

For April, 1936

ALAMEDA COUNTY—Between Folger Ave., underpass and Ninth St., 0.3 mile grade and P. C. C. pavement. District IV, Route 69, Sec. Ber. Lee J. Immel, Berkeley, \$31,278. Contract awarded to L. C. Seidel, Sacramento, \$28,727.70.

COLUSA, YOLO, BUTTE, EL DORADO COUNTIES—Between Route 15 and Rumsey; Forest Ranch and Lomo; Yolo-Colusa county line and Grimes; Placer-ville and Georgetown, about 36.7 miles penetration oil treatment to be applied. District III, Route 50, 47, 88, 93, Section A, C, A, C. F. Fredericksen & Sons, Lower Lake, \$8,429; Ed. F. Hilliard, Sacramento, \$9,232; A. Teichert & Son, Inc., Sacramento, \$10,052; Palo Alto Rd. Mtls. Co., Palo Alto, \$9,576; Oilfields Trucking Co., Bakersfield, \$8,374; Charles Kuppinger, Lakeport, \$8,644. Contract awarded to Lee J. Immel, Berkeley, \$8,300.97.

CONTRA COSTA COUNTY—Between county road to Byron and easterly boundary about 4.1 miles to be surfaced with plant-mixed surfacing and shoulders to be constructed. District IV, Route 75, Section D. E. A. Forde, San Anselmo, \$24,392; Lee J. Immel, Berkeley, \$24,505; W. H. Larson, Oakland, \$25,732; Fredricksen & Westbrook, Lower Lake, \$24,280; Pacific States Construction Co., San Francisco, \$24,040; L. C. Seidel, Sacramento, \$25,954; Independent Construction Co., Ltd., Oakland, \$23,956; Hanrahan Company, San Francisco, \$24,499. Contract awarded to S. M. McGaw, Stockton, \$22,675.

IMPERIAL COUNTY—Between Sand Hills and 1 mile west of Yuma, 12.6 miles furnishing and applying liquid asphalt to shoulders. District XI, Route 27, Section B. Paulsen & March, Los Angeles, \$3,671; Gilmore Oil Co., Los Angeles, \$3,825; Regal Oil Co., Long Beach, \$3,745; Square Oil Co., Los Angeles, \$3,570; Lamb Transfer Co., Los Angeles, \$3,769. Contract awarded to Morgan Bros., Huntington Park, \$3433.50.

KINGS COUNTY—Between Hanford and Dallas School. Road mix surface treatment (shoulders), 13.6 miles in length. District VI, Route 135, Section A. Clyde A. Wood, Stockton, \$6,225; Oilfields Trucking Co., Bakersfield, \$6,537; Square Oil Co., Los Angeles, \$8,010; A. S. Vinnell Co., Los Angeles, \$6,599; L. A. Brisco, Arroyo Grande, \$5,739; Leo F. Piazza, San Jose, \$6,712; Stewart & Nuss, Inc., Fresno, \$6,437. Contract awarded to Palo Alto Road Materials Co., Palo Alto, \$5,291.50.

LOS ANGELES COUNTY—Between Lancaster and Kern County line, 8.1 miles, widen with P. C. pavt and bit. tr. shdr. District VII, Route 23, Section G. Gibbons & Reed Co., Burbank, \$60,503; M. J. B. Construction Co., Stockton, \$56,073; Geo. R. Curtis Paving Co., Los Angeles, \$62,001; Oswald Bros., Los Angeles, \$54,804; Match Bros., Elsinore, \$51,639. Contract awarded to Basich Bros., Torrance, \$47,000.

MARIN COUNTY—Between Sausalito and Golden Gate Bridge 0.3 mile, P. C. C. lined tunnel and approaches. District IV, Route I, Section D. L. E. Dixon Co., Bent Bros., & Johnson, Inc., Los Angeles, \$665,428; Geo. Pollock Co., and Youdall Const. Co., Sacramento, \$743,755; Guy F. Atkinson Co., San Francisco, \$669,066; MacDonald & Kahn Co., Ltd., San Francisco, \$723,848; Utah Const. Co., Paul J. Tyler & Winston Bros. Co., San Francisco, \$654,255. Contract awarded to T. E. Connolly, Inc., San Francisco, \$587,917.50.

MARIN COUNTY—Between Waldo Point and Golden Gate Bridge 3.4 miles, grade and pt.-mix surfacing on cr. run base. District IV, Route I, Section D. Bodenhamer Const. Co. and David H. Ryan, Oakland, \$943,241; Utah Const. Co., Paul J. Tyler and Winston Bros. Co., San Francisco, \$1,196,892; Eaton & Smith, San Francisco, \$930,885; Martin Wonderlich Co., Jefferson City, Mo., \$892,908; Jahn & Bressi Const. Co., Inc., Los Angeles, \$871,534; George Pollock Co., Sacramento, \$1,374,712; John Carlin, Granfield Farrar & Carlin, San Francisco, \$948,994; Guy F. Atkinson Co., San Francisco, \$828,875; D. McDonald & MacDonald & Kahn Co., Ltd., San Francisco, \$836,584; Daley Corp., San Diego, \$1,116,581. Contract awarded to Maceo Const. Co., Clearwater, \$770,204.80.

MARIN and SONOMA COUNTIES—Furnish and apply penetration oil to existing shoulders between

Ignacio Wye and Napa County line, about 18.8 miles. District IV, Route 8, Section A, A. B. Chas. L. Harney, San Francisco, \$3,340; Hayward Bldg. Matl. Co., Hayward, \$2,500; Pac. Truck Service, Inc., San Jose, \$2,716; Palo Alto Road Matls. Co. Ltd., Palo Alto, \$2,330; E. A. Forde, San Anselmo, \$2,390; Basalt Rock Co., Inc., Napa, \$2,660; Oilfields Trucking Co., Bakersfield, \$2,818; C. F. Fredericksen & Sons, Lower Lake, \$2,592; Holwig Constr. Co., Sebastopol, \$2,640. Contract awarded to Chas Kuppinger, Lakeport, \$1,970.

MODOC COUNTY—Between Adin and Rush Creek, about 5.1 miles to be grad'd and surfaced with road mix surf. District II, Route 28, Sec. A. Dunn & Baker, Klamath Falls, Ore., \$30,621; Larsen Bros., Sacramento, \$32,825; J. G. Chigris, San Francisco, \$30,987; M. J. B. Construction Company, Stockton, \$37,822; Isbell Construction Co., Reno, Nev., \$35,657; Hemstreet & Bell, Marysville, \$40,342; Leo F. Piazza, San Jose, \$29,083; Poulos & McEwen, Sacramento, \$35,416. Contract awarded to Fredericksen & Westbrook, Lower Lake, \$25,400.02.

MODOC COUNTY—Between Juniper Creek and Alturas, 6.0 miles, grade and pene. oil treatment. District II, Route 73, Section C, D. Poulos & McEwen, Sacramento, \$29,352; R. R. Carlson, Stockton, \$30,338; Leo F. Piazza, San Jose, \$32,933; Larsen Bros., Sacramento, \$34,399; John G. Chigris, San Francisco, \$37,465; J. V. Galbraith & Don A. Canevari, Santa Rosa, \$38,423; M. J. B. Const. Co., Stockton, \$43,089. Contract awarded to Fredericksen & Westbrook, Lower Lake, \$28,467.70.

ORANGE COUNTY—In the city of Orange, Chapman Ave. and Glassell St., adjacent to the Plaza, about 0.4 mile to be paved with asphalt concrete. District VII, Route 181-182, Section Ora. Oswald Bros., Los Angeles, \$29,317. Contract awarded to C. O. Sparks, Los Angeles, \$23,924.75.

RIVERSIDE COUNTY—Between Bendel's Corner and Imperial County line, about 5.9 miles in length. A storm protection drainage system to be constructed. District XI, Route 26, Section G. Martin Bros. Trucking Co., Long Beach, \$53,744; V. R. Dennis Const. Co., San Diego, \$55,023; George J. Bock Co., Los Angeles, \$46,109; C. W. Caletti & Co., San Rafael, \$71,770; R. E. Hazard & Sons, San Diego, \$55,478; Oswald Bros., Los Angeles, \$72,376. Contract awarded to Mitry Bros. Const. Co., Los Angeles, \$44,090.40.

RIVERSIDE COUNTY—Between Box Springs and 3 miles east of Moreno, about 11.7 miles to be graded and road-mix surface treatment applied. District VIII, Route 19, 194, Section C. V. R. Dennis Const. Co., San Diego, \$162,151; Daley Corp., San Diego, \$192,705; Wood & Bevanda, Stockton, \$174,291; C. W. Caletti & Co., San Rafael, \$185,121; Gibbons & Reed Co., Burbank, \$199,775; J. E. Haddock, Ltd., Pasadena, \$201,462; Sander Pearson & Mundo Engr. Co., Los Angeles, \$197,036. Contract awarded to Oswald Bros., Los Angeles, \$156,069.50.

SAN BERNARDINO COUNTY—At Little Mt. entrance to San Bernardino, 0.7 mile grade and plant-mixed surfacing. District VII, Route 191, Section A. Geo. J. Bock Co., Los Angeles, \$63,965; Sander Pearson & Mundo Engr. Co., Los Angeles, \$87,911; Basich Bros., Torrance, \$60,251; Dimmitt & Taylor, Los Angeles, \$71,999; Guy F. Atkinson Co., Los Angeles, \$70,684; J. E. Haddock, Ltd., Pasadena, \$58,772; Oswald Bros., Los Angeles, \$74,796; A. S. Vinnell Co., Los Angeles, \$64,817. Contract Awarded to Geo. Herz & Co., San Bernardino, \$53,710.30.

SAN BERNARDINO COUNTY—Between Santa Ana R. and Alabama St., 5.1 miles grade and P. C. C. pavement. District VIII, Route 26, Section A. Griffith Co., Los Angeles, \$116,462; Sander, Pearson & Munda Engr. Co., Los Angeles, \$129,122; Geo. R. Curtis Paving Co., Los Angeles, \$106,346; J. E. Haddock, Ltd., Pasadena, \$106,660; Oswald Bros., Los Angeles, \$99,742. Contract Awarded to Match Bros., Elsinore \$93,423.85.

SAN BERNARDINO COUNTY—Construct sidewalk on viaduct over A. T. & S. F. Yards in Barstow. District VIII, Route 58, Section D. Contract awarded to Geo. Herz & Co., San Bernardino, \$3,826.50.

SAN DIEGO COUNTY—Various locations applying penetration oil treatment to the shoulders, 57.1 miles.

(Continued on page 32)

HIGHWAY BIDS AND AWARDS

(Continued from page 31)

District XI, Routes 77, 195, 196, Section A. R. E. Hazard & Sons, San Diego, \$6,993; Morgan Brothers, Huntington Park, \$6,462; Paulsen & March, Inc., Los Angeles, \$7,147; Lamb Transfer Co., Long Beach, \$7,317; Gilmore Oil Co., Los Angeles, \$7,430. Contract awarded to Square Oil Co., Los Angeles, \$6,170.

SAN DIEGO COUNTY—Penetration oil treatment to be applied to shoulders, 35.9 miles in length. District XI, Routes 12, 198 and 200, various locations. Morgan Bros., Huntington Park, \$11,302; Square Oil Co., Los Angeles, \$10,480; Paulson & Marsh, Los Angeles, \$10,781; Gilmore Oil Co., Los Angeles, \$12,151. Contract awarded to Regal Oil Co., Long Beach, \$10,022.50.

SAN DIEGO COUNTY—For applying penetration oil treatment to shoulders 10.2 miles Otay Junction to Coronado. District XI, Route 199, Section A. Gilmore Oil Co., Los Angeles, \$2,499; Paulsen & March, Inc., Los Angeles, \$2,409; Morgan Brothers, Huntington Park, \$2,295; R. E. Hazard & Sons, San Diego, \$2,508. Contract awarded to Square Oil Co., Los Angeles, \$2,025.

SAN JOAQUIN COUNTY—Between Stockton and Linds Airport. About 16 miles to be landscaped. District X, Route 4, Section C & D. Leonard Coates Nurseries, Inc., San Jose, \$9,823; California Nursery Co., Niles, \$9,883. Contract awarded to Rexroth & Rexroth, Bakersfield, \$6,454.80.

SANTA CLARA COUNTY—Furnish and apply liquid asphalt C-2 to existing roadbed between 1 mile east of Alum Rock road and M. L. Hamilton Observatory, about 17.9 miles. District IV, Route 115, Section A, B. Lee J. Immel, Berkeley, \$5,712; A. J. Raisch Co., San Jose, \$7,607; Oilfields Trucking Co., Bakersfield, \$5,720; Palo Alto Mts. Co., Palo Alto, \$5,482. Contract awarded to Pacific Truck Service, Inc., San Jose, \$5,414.50.

SONOMA COUNTY—Furnish and apply penetration oil to shoulders between Lytton and Cloverdale, about 15.2 miles. District IV, Route 1, Section A-Cld. Chas. L. Harney, San Francisco, \$2,490; Hayward Bldg. Matl. Co., Hayward, \$2,175; Pac. Truck Service, Inc., San Jose, \$2,263; Palo Alto Road Mts. Co., Ltd., Palo Alto, \$2,010; E. A. Forde, San Anselmo, \$2,941; Oilfields Trucking Co., Bakersfield, \$2,563; C. F. Fredrickson & Sons, Lower Lake, \$2,325; Helwig Constr. Co., Sebastopol, \$2,157. Contract awarded to Chas. Kuppinger, Lakeport, \$1,872.50.

SONOMA COUNTY—Furnish and apply penetration oil to existing shoulders between Forestville and Cotati and between Petaluma and Lakeville, about 19.1 miles. District IV, Route 104, Sections B, C, D. Chas. L. Harney, San Francisco, \$5,121; Pac. Truck Service, Inc., San Jose, \$4,105; Hayward Bldg. Matl. Co., Hayward, \$3,970; E. A. Forde, San Anselmo, \$4,010; Oilfields Trucking Co., Bakersfield, \$4,573; Helwig Constr. Co., Sebastopol, \$4,428. Contract awarded to Palo Alto Road Materials Co., Palo Alto, \$3,614.

TEHAMA COUNTY—Between Corning and Proberta, 10.2 miles, grade and A. C. pavement. District II, Route 7, Section A, B. Union Paving Co., San Francisco, \$223,116; Hanrahan Company, San Francisco, \$221,918; Eodenhamer Const. Co., Oakland, \$244,612; A. Teichert & Son, Inc., Sacramento, \$246,753; Oswald Bros., Los Angeles, \$249,115. Contract awarded to Peninsula Paving Co., San Francisco, \$218,181.70.

VENTURA COUNTY—Between Route 2 and 1 mile easterly. P. C. curb to be constructed. Road mix surface to be applied to shoulders. Guard rail to be removed and salvaged. District VII, Route 9, Section A. J. E. Haddock, Ltd., Pasadena, \$5,790; United Conc. Pipe Corp., Los Angeles, \$6,586; A. S. Vinneil Co., Los Angeles, \$6,751; Oswald Bros., Los Angeles, \$6,952; J. P. Immel, Ventura, \$7,170. Contract awarded to Robert D. Paterson, Santa Barbara, \$4,684.

There was a young lady named Harris,
Whom nothing could ever embarrass.
Till the bath salts one day,
In the tub where she lay,
Turned out to be plaster of Paris.

—Everybody's.

"Where did you get the plot of your second novel?"
"From the film version of my first!"

Vacancy on Highway Board Left by Death of Chas. D. Hamilton

(Continued from page 27)

active interest in public affairs and in 1914 was elected supervisor from the fourth district of Riverside County, serving three terms in that capacity, the last five years as chairman of the board, from which he resigned to spend a year in travel abroad.

As a supervisor, Mr. Hamilton became an authority on the subject of highways, devoting much of his time to a study of good roads. His selection by Governor Merriam to serve the State as a member of the Highway Commission was considered an ideal one. As long ago as 1921 Mr. Hamilton headed a conference at Phoenix which resulted in an organization of California and Arizona interests out of whose efforts came the development of Highway 60, through Blythe, which now carries a large percentage of the State's interstate traffic.

Mr. Hamilton founded the San Geronio Building and Loan Association of Banning and was its vice president at the time of his death. He also organized the First National Bank of Banning, now a branch of the Citizens National Trust and Savings bank of Riverside. As owner of large farm and orchard lands in the Banning area, Mr. Hamilton was an outstanding figure in the almond industry of the West and for the past ten years was president of the California Almond Growers Exchange.

Mr. Hamilton was a member of the Banning Masonic Lodge and one of the early members of the Banning Kiwanis Club.

In the formative period of Banning, Mr. Hamilton served as a member of the first city council and continued to serve the city in that position for many years as well as giving his time as a member of the grammar school board of that city.

Mr. Hamilton is survived by his widow, Mrs. Theodora Noble Hamilton, whom he married in Riverside in 1921, and by a sister, Mrs. Mary Ellis.

Wife: "The garagemen sent that second-hand car you ordered, and I tried it out."

Hubby: "How many people does it carry comfortably?"

Wife: "None."

She: "Have you heard the latest definition of a 'pedestrian'?"

He: "Yeah. A pedestrian is a girl who doesn't neck."

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