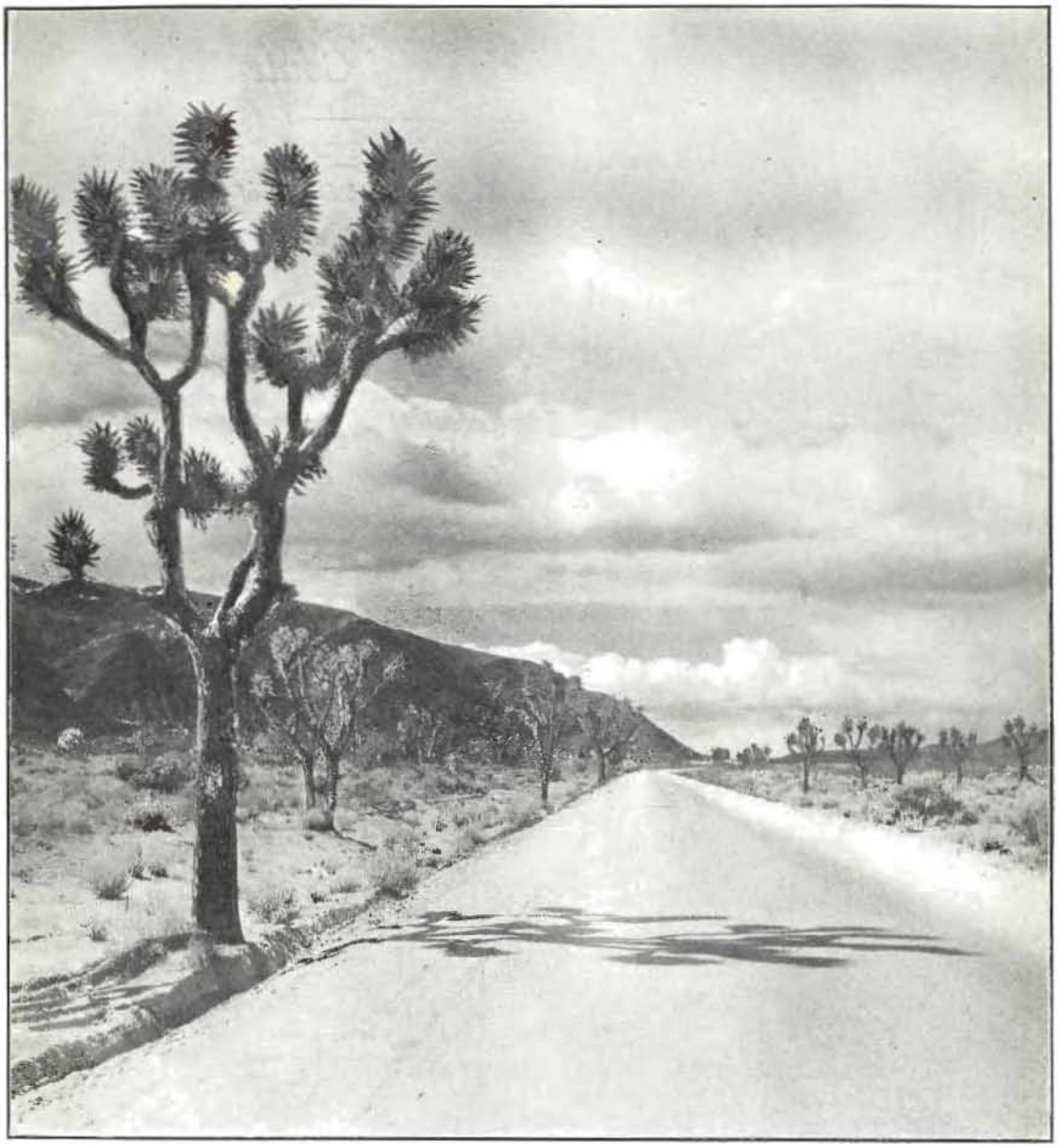
California Highways and Public Works



Official Journal of the Division of Highways
Department of Public Works
State of California

MAY
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1929

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New State Highway Legislation Covers Many Important Subjects

By C. C. CARLETON, Chief of the Division of Contracts and Right of Way

THE California Legislature, that adjourned May 15, 1929, has been most responsive to the needs and suggestions of the Division of Highways, State Department of Public Works, in the matter of forward looking, public serving highway legislation.

All bills initiated or endorsed by the highway division were duly passed by the legislature, but many valuable amendments were added to the original bills by the legislators themselves, indicating the intelligent and abiding interest taken by the members of the legislature in highway affairs which so vitally concern every constituent in their respective districts.

Some of the legislation involved sweeping changes of fundamental bridge and highway policies and traditions in this state and demonstrated that an All-California vision has developed and that the period of selfish and sectional preferences and prejudices is passing, it is to be hoped for all time.

A brief review of legislation affecting state highway activities now becoming new law is given herewith.

C. C. CARLETON.

SCIENTIFIC SURVEY OF SECONDARY HIGHWAY SITUATION

Senate Concurrent Resolution No. 19, Chapter 25, Senator Handy.

A concurrent resolution was introduced in the Assembly by Assemblyman Jespersen, and passed by the Assembly, but Senator Handy and Assemblyman Jespersen, Chairmen of the Roads and Highways Committees of the Senate and Assembly, respectively, agreed to the final advancement of Senate Concurrent Resolution No. 19, which was duly adopted.

This resolution empowers the State Department of Public Works to launch a scientific engineering and economic survey of the state highway system, to the end that a comprehensive report shall be made available to the 1931 legislature, with recommendations as to routes not now in the state highway system which, either by reason of the large volume of state traffic that they are now carrying, or by reason of the relief that they would afford to heavy traffic upon present state highways, or as highways serving as important interstate links, might properly be included in and added to the secondary state highway system.

By the adoption of this resolution a new and unique chapter was written into the state highway history of California.

Genuine constructive statesmanship and individual unselfishness were shown by the unanimous support of this procedure by the members of the 1929 legislature.

The state administration had announced that it was opposed to the policy of adding more roads to the state highway system until present roads were more adequately cared for and until a more thorough study of the entire state-wide situation could be made.

The wisdom of this policy soon became recognized and many bills for specific road projects were permitted to languish and die in committee by their authors, who by their magnanimous action are entitled to great credit.

(Continued on page 28.)

Perils of the Desert Are Conquered by State Highways

By J. P. BAUMGARTNER, Member of the California Highway Commission

EVER since his appointment to the Highway Commission, the writer has been profoundly impressed with the importance, not only to southern California, but to the entire state, of having good roads leading into California from Arizona and Nevada. Fortunately, the other members of the commission and Director of Public Works Meek have been likewise impressed.

Not only do these roads carry most of the transcontinental traffic both ways, but the demands upon them of comparatively local traffic, incident to the industrial and recreational development of the desert country, are very large and increasing constantly.

It will be interesting, therefore, and instructive, to outline the largest desert highway program ever undertaken by the Highway Commission—a program that is now well under way and the extent of which is fully realized by very few people.

J. P. BAUMGARTNER.

PERILS HAVE GONE

A review of recent activities on desert interstate highways of southern California reveals that the peril of the desert road has already become a thing of the past. The waste of dreary sands that menaced the lives of the fathers and mothers of the present generation are now fast becoming transformed into playgrounds for their children. Desert trails have either become or within a few years will be veritable boulevards. Today, instead of repelling travel the deserts of southern California with their strange formations, their beautiful coloring, their fantastic flowers, their spectacular history recorded in rock and sand, are attracting visitors the world over. Once classed as places to be shunned, they are listed now among the attractions de luxe of the wonderful Southland.

The story of the manner in which highways have conquered the desert is one of the great epics, now in the making, in the colorful history of southern California. Notable in this story is the tale of the Imperial Valley-Yuma state highway. Sandstorms and shifting dunes had made this road a terrifying area to travelers forced to attempt it. Tragedy stalked every mile.

Then there came, in 1916, during the earlier days of state highway construction, the old plank road. These tracks of planks were often buried by shifting dunes or covered by sand blown across them in storms. There was always the fear of meeting someone on a section of the road where there was no turnout.

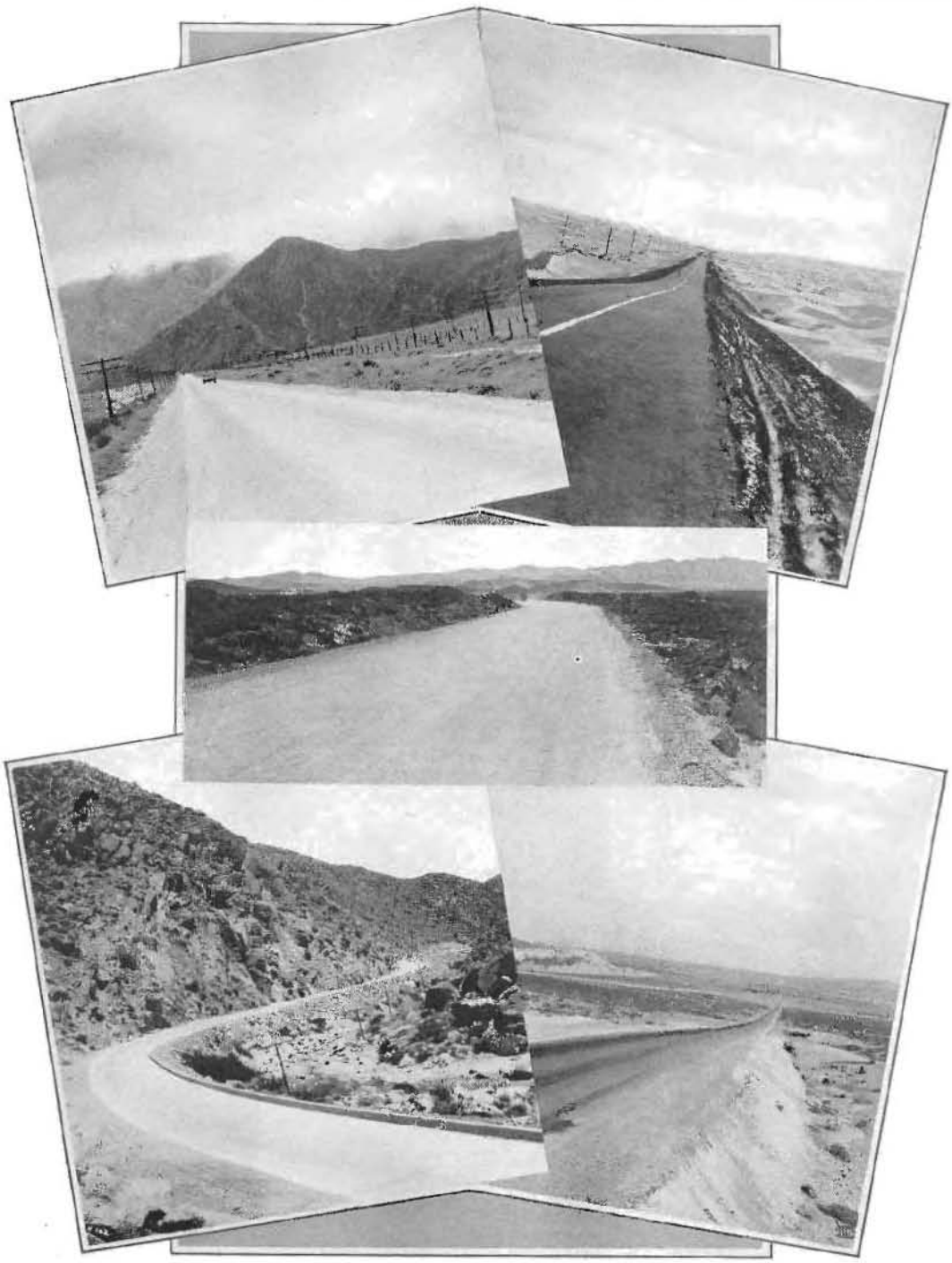
After each storm the planks had to be dug out and raised or lowered to fit conditions imposed by new sand dunes, either created or shifted by the storm. Despite the plank road the desert still reigned supreme.

An intensive engineering study was undertaken by the California Highway Commission to see if some method might not be found whereby a more satisfactory highway could be built across these shifting sand dunes. Many plans were considered and it was finally decided that by building a road on sand fills higher than the fast-moving sand dunes, the problem could be solved.

A record of sand movements was kept over many months. It was found that only the small sand dunes moved fast. Those over thirty feet high were found to move very slowly. The movement of dunes from 200 to

(Continued on page 30.)

Desert Highways of California



Upper left, State Highway south of Banning in Riverside County; Upper right, Across the Sand Dunes in Imperial County; Center, Highway through broken lava in San Bernardino County; Lower left, Mountain Springs Grade in Imperial County; Lower right, Oiled surface near Victorville in San Bernardino County.
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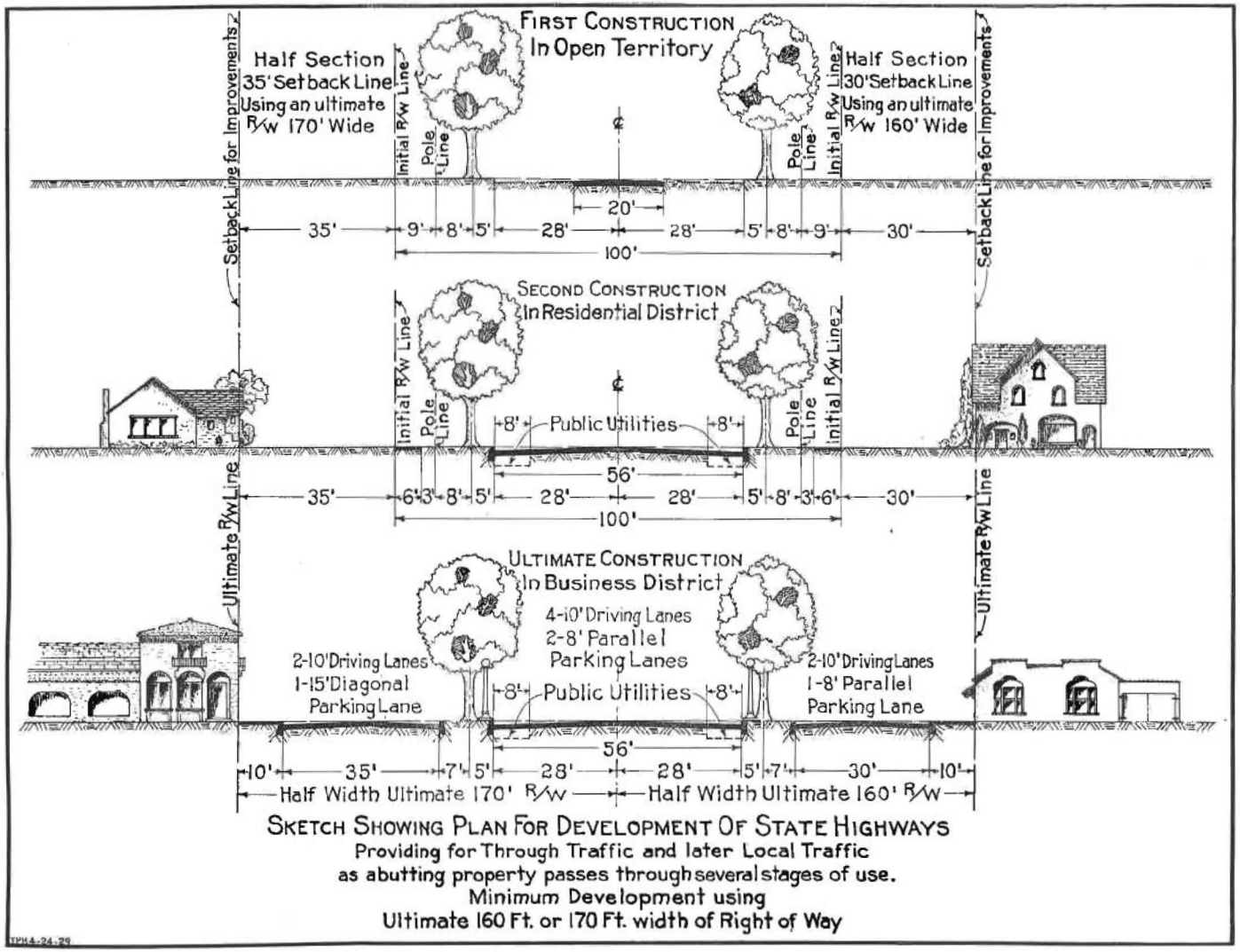


SKETCH SHOWING PLAN FOR DEVELOPMENT OF STATE HIGHWAYS
Providing for Through Traffic and later Local Traffic
as abutting property passes through several stages of use.
Minimum Development using
Ultimate 160 Ft. or 170 Ft. width of Right of Way

TPH 4-24-29

Typical Road Sections

By FRED GRUMM, Engineer of Surveys and Plans

ADOPTION of standard practice, in so far as possible, for the location upon the right of way of trees, pole lines, and other public utility facilities, is not only desirable but practically imperative if we wish to provide economically for the maximum development and use of the right of way looking toward the greatest service to the traveling public. Realization of this fact lead, after considerable study, discussion and conferences, recently, to the adoption of the several typical sections for various widths of right of way. These typical sections will be found illustrated on another page. They may be briefly described as follows:

FRED GRUMM.

(1) A typical roadway grading section for use on valley roads;

(2) A typical section showing utilization of 80-foot right of way;

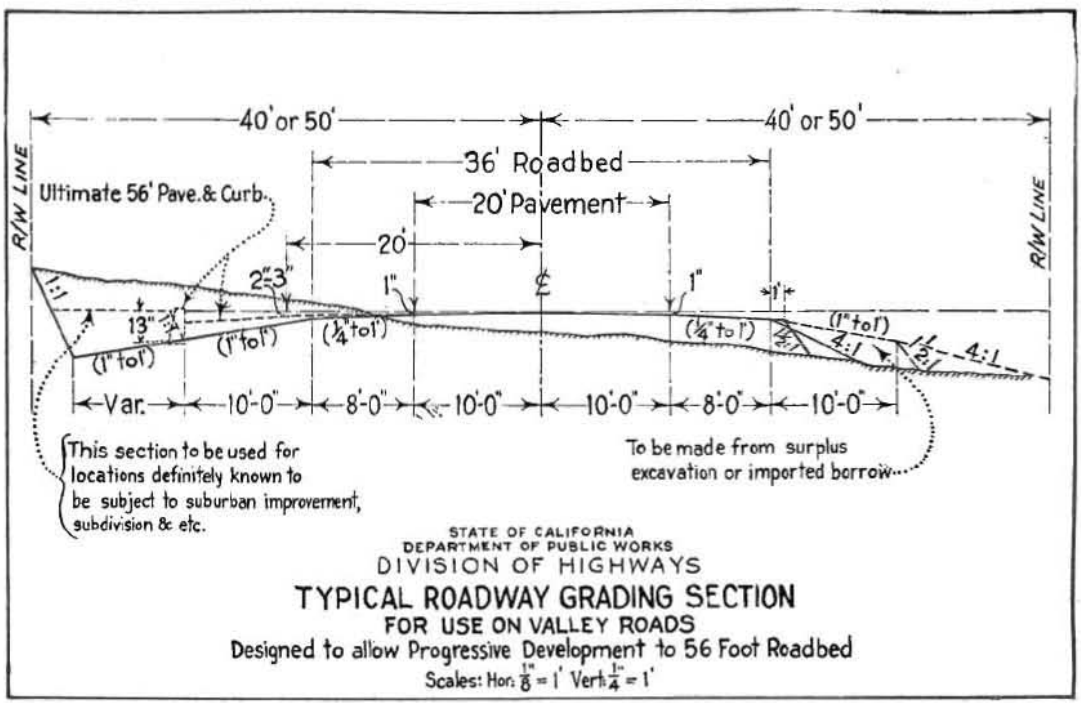
(3) A typical section showing utilization of 100-foot right of way;

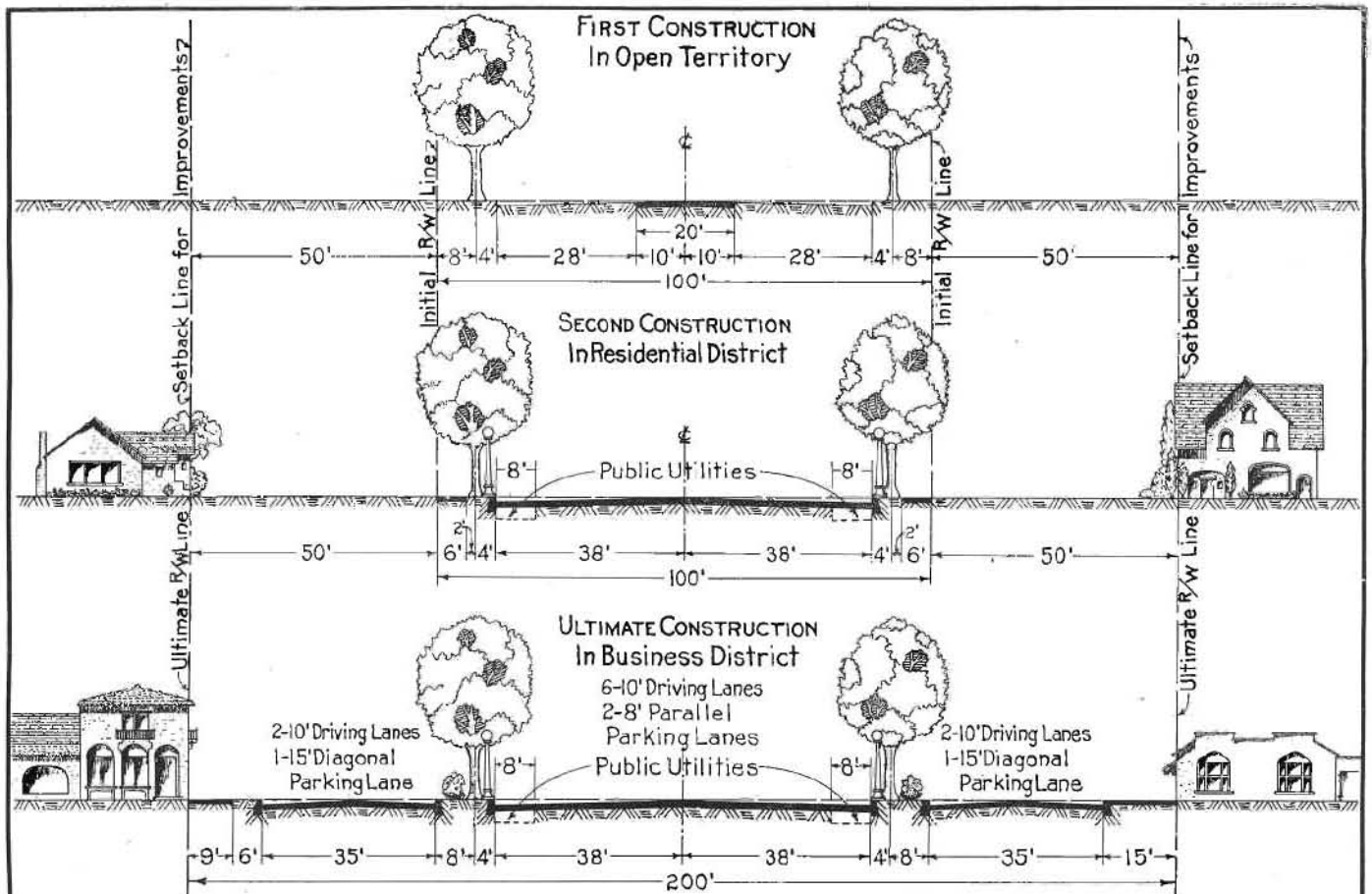
(4) A typical section showing progressive development of roadway and utilization of 90-foot right of way for state highways adjacent to railroad lines;

(5) Sketch showing plan for development of state highways providing for through traffic and later local traffic as abutting property passes through several stages of use. Minimum development using ultimate 160-foot or 170-foot width right of way;

(6) Sketch showing plan for development of state highways providing for through traffic and later local traffic as abutting property passes through several stages of use. Maximum development using ultimate 200-foot width of right of way.

The first, a typical roadway grading section for use on valley roads is so designed as to eliminate borrow pits, substituting therefor a "turnpike section," providing for taking all available excavation material from within the right of way for the construction of the standard 36-foot width of roadbed and still remaining within the lines and limits of the ultimate 56-foot development. It is to be used, wherever applicable, in valley or easy country





SKETCH SHOWING PLAN FOR DEVELOPMENT OF STATE HIGHWAYS
Providing for Through Traffic and later Local Traffic
as abutting property passes through several stages of use.
Maximum Development using
Ultimate 200 Ft. width Right of Way

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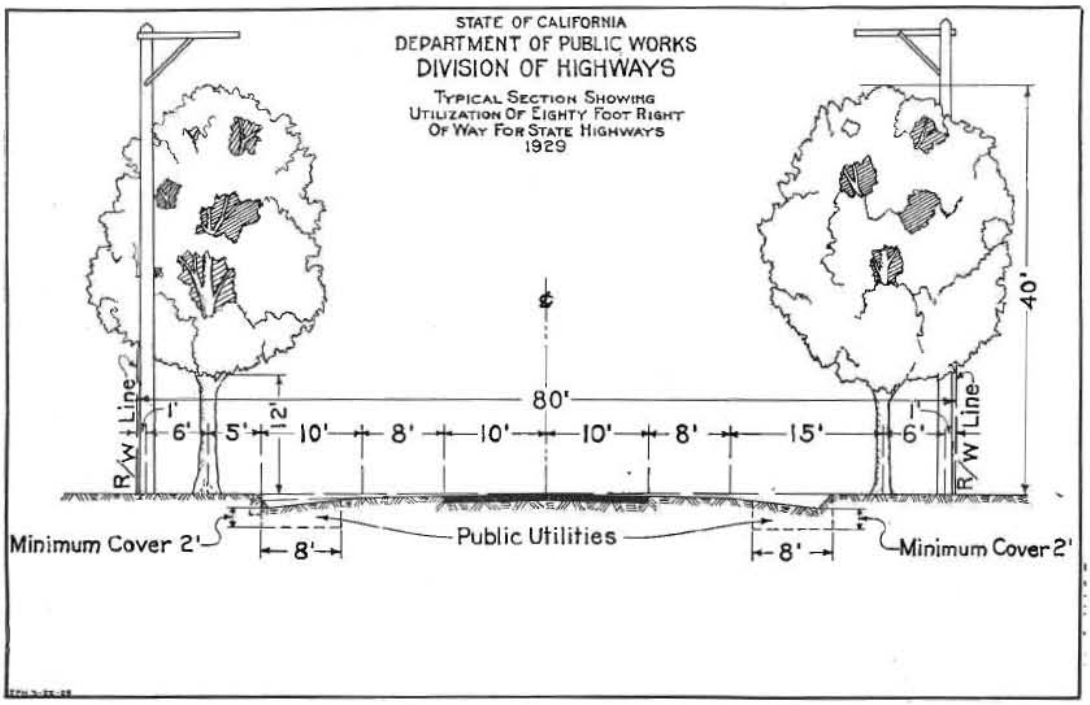
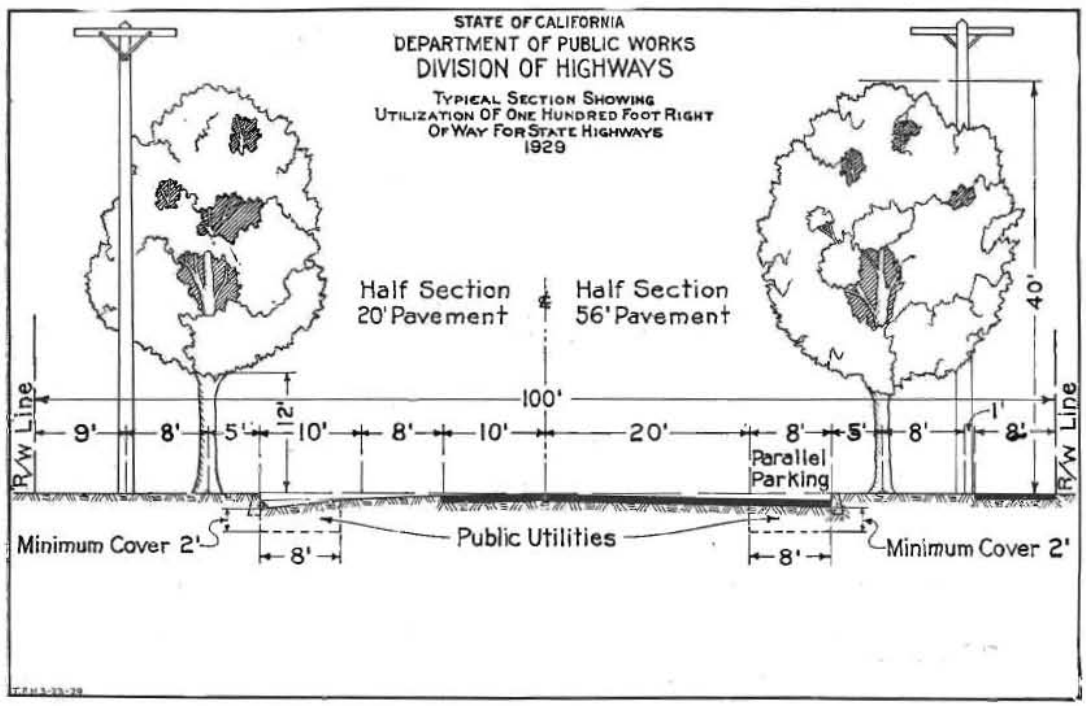




on programmed projects which are being or will be prepared for future improvement. It is particularly applicable to construction and reconstruction projects on routes 3, 4 and 7 in the San Joaquin and Sacramento valleys and on large portions of route 2.

An inspection of a number of the layout plans and cross-sections in the valley country indicate that: (a) The average cut bank near the right of way line is less than two feet; (b) imported borrow is often needed for a 36-foot roadbed; (c) the full utilization of excavation

material within the right of way, as indicated on the section, will usually not result in waste in the construction of a 36-foot roadbed—in fact often will not make the fills and therefore additional imported borrow is necessary.

The section was developed to make use of all of the excavation within the right of way for the construction of the present 36-foot roadbed and was designed so that no excavation would be made below the subgrade elevation of the future 56-foot pavement. Provision is made for taking care of surplus excavation which might develop at certain points. This is to be placed in embankment having slopes similar to those in excavation and to a subgrade elevation for future pavement.

The use of this section in the flat country will provide flat slopes beyond the shoulder of the roadbed, extending in excavation practically to the right of way line, and consequently making this portion of the right of way more easily accessible for maintenance purposes. Where it is definitely known that abutting property is subject to early improvement by subdivision and the construction of business or semibusiness buildings, excavation and embankment can be made, as indicated on the typical section, to provide for placing of curb and sidewalk.

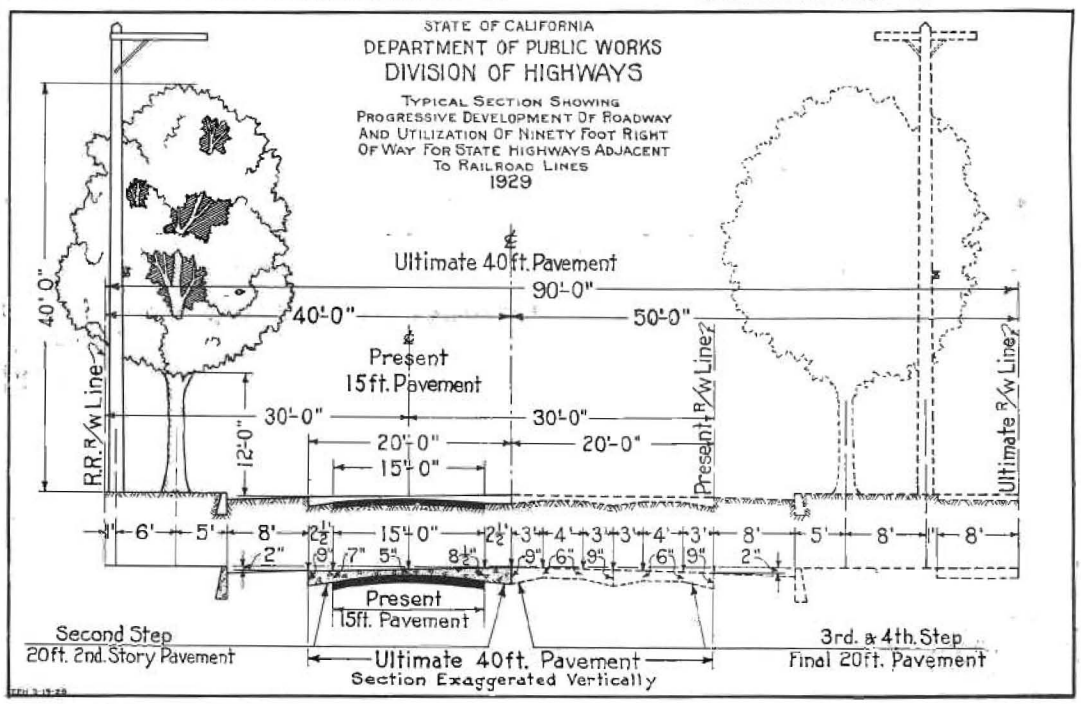
The second typical section shows the utilization of 80-foot right of way. The proper placement of the trees and pole lines is shown which permits of future development of the roadbed to an ultimate 56-foot width.

The third typical section shows the utilization of 100-foot right of way, on which is indicated the location of trees, pole lines, and sidewalks. This section is also designed to permit the construction of an ultimate 56-foot pavement.

The fourth typical section shows the utilization of 90-foot right of way for state highways adjacent to railroad lines. It has been primarily designed to care for the reconstruction and widening of our present narrow pavements in such locations, looking toward ultimate future development of the 56-foot width in a progressive manner without incurring the loss or reconstruction of the first stages of the work. It embodies the idea of sloping the 20-foot pavement, undertaken as the first reconstruction step, in one direction, permitting the addition of future widening without disturbing this original construction.

It is obvious that this method of development preserves the original 15-foot pavement without loss, permits the addition of resurfacing where flush shoulders have been constructed on the old 15-foot pavement, permits the second and third step of development without loss of previous installation or thickening of the same with the attending necessity of continually raising the grade.

(Continued on page 31.)



One Price We Pay for Highways

Grant Merrill, maintenance superintendent for seventeen years in Alpine County, is confined in a Sacramento hospital as a result of a powder explosion on May 17, in which his right hand was blown from the arm.

Mr. Merrill was investigating the depth and condition of snow on the Red Lake grade of the Kit Carson Pass when the accident occurred. Tests were being made, preliminary to instructing maintenance crews to begin the work of snow removal. Premature explosion of a cartridge that he was dropping into a test hole blew Mr. Merrill's hand from the arm and injured him in many places about the body.

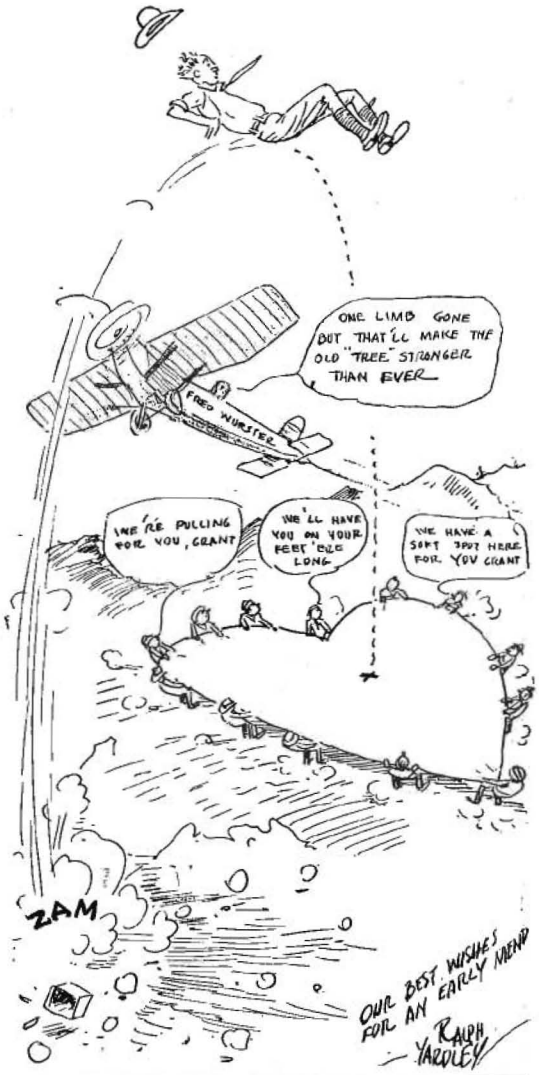
Despite the severity of his injury Superintendent Merrill retained consciousness and directed two Indian assistants to bind up the injured arm with sacks and to tie arteries with string taken from luncheon boxes.

With first aid administered, the difficulty confronted the men of reaching Mr. Merrill's auto fully a mile away. Deep snowdrifts, softened by sunshine, made the going difficult. It proved impossible for the Indians to carry the injured man across the soft drifts. Finally he laid down upon the snow and directed one of the Indians to haul him by the legs across the drifts, while the other steered his head and shoulders. The futility of this method being apparent to him, Mr. Merrill mustered enough strength to walk over the remaining quarter of mile of snow to the car.

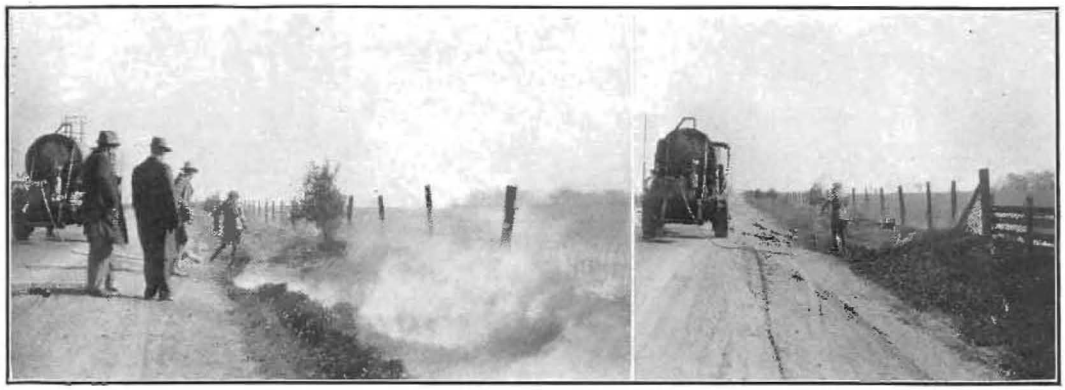
One of the Indians, while not experienced in driving, was able to take the wheel and under Mr. Merrill's direction, his home near Woodfords was finally reached. Physicians 30 miles distant were summoned. After a first aid operation, they advised that Mr. Merrill be rushed to Sacramento. Mrs. Merrill and Mrs. Dangberg, sister of the injured man, drove him to Kyburz over a road that had been cleared of snow but a few days. At Kyburz an ambulance was waiting and Mr. Merrill was brought the remaining distance in it.

Other than the complete loss of his right hand, the other injuries were not permanent and Mr. Merrill is rapidly recovering.

Mr. Merrill is a friend of sportsmen all over northern California, and the news of his injury occasioned widespread regret both among them and in highway circles. Attached is one of the many messages of cheer sent to him. This is by Ralph Yardley, cartoonist of the Stockton *Record*.



COLORADO has 3797 miles of surfaced state highways, of which 343 miles is hard surfaced, according to the latest check-up. For several years the highway department has been extending the surfaced mileage under the slogan "More Miles for Less Money."



Burning the roadside after vegetation has been sprayed with oil.

Protecting Property From Fire Starting Along State Highways

NOTABLE PROGRESS has been made this year in the development of roadside burning methods, intended to protect crops and property adjacent to highways from losses due to fires originating upon the right of way.

Some 750 miles of the highway roadsides were scheduled for spraying and burning this season at an estimated expenditure of $35,000. The greater part of this work has been completed. In some sections it was necessary to stop the work due to fire hazard.

In the Los Angeles territory there was some difficulty in carrying on our operations to meet the requirements of the various hours, generally at night, and a larger crew was required by some wardens than by others. Excellent cooperation has been received from the Division of Forestry and they are much interested in the success of the work.

An inspection of 50 miles of burning did not indicate any fire hazard. Spraying had not been done adjacent to service stations or buildings, and if the dried grass was accidently ignited the worst damage apparently would be a few burned fence posts. The grass on each side of the sprayed strip is still too green to burn and we plan to have our work completed before there is a hazard from that source.

Methods of spraying and burning roadsides were first tried out in District X in February using a mixture of distillate and fuel oil and of gasoline and fuel oil. The grass was burned immediately after the application of the oil. Fair results were obtained.

In the meantime diesel oil had been used in the vicinity of Rio Vista, and it was found that the grass would burn readily after using this material. The diesel oil costs about 4 cents per gallon as against 7½ cents for the gasoline and fuel oil mixture and apparently is just as effective in killing the grass.

The plan adopted as a result of various experiments is as follows:

Diesel oil is spread by tank truck equipped with compressor pump and spray at the rate of 1/16 to 1/10 gallon per square yard on the 5-foot strip adjacent to fence lines opposite grain, pasture or wooded areas where fire hazard exists. It was not felt necessary to spray areas adjacent to orchards or railroads right of way. After the spraying is done it is left for ten days or two weeks before burning, in order to permit as much new vegetation as possible to get a start. The burning operations will then destroy the new growth and the maximum benefit will be secured.

The growth remaining between the shoulder line and the cleared area is mowed or burned. The cleared area wil serve as an effective fire guard.

A program for next season's operations will be worked up this fall. The work done this year will reduce the fire hazards materially but it was necessary to work out the method and develop the equipment as the work progressed. Next season we can apply our experience and improve both equpiment and methods.

A program of clearing roadsides in forested areas is also being planned.

Summary of 1928 Pavement Construction

By E. Withycombe, Assistant Construction Engineer

THE outstanding accomplishment in 1928 was the reduction in roughness on asphaltic concrete surfaces by machine methods. Districts six and seven, with their remarkable records for machine finished work, have set a mark of accomplishment that was considered next to impossible in 1926. Without further mechanical improvements these reductions no doubt represent the ultimate to be obtained. The entire organization attached to this class of work, however, are giving thought to improving existing methods, and and it is not impossible that in the near future just as spectacular further reductions may be accomplished.

PORTLAND CEMENT CONCRETE PAVEMENTS

Mix—Methods of design of mixtures, by the field determined aggregate voidage system, have not been changed in the past season. A more liberal treatment of Water Concrete Ratio (a Construction Department designation), has been countenanced to insure workable concrete. In order to maintain strengths, greater attention has been paid to the combining of coarse aggregate to produce low voidages and thus reduce the amount of sand necessary in the mix. That this course has been justified is evidenced by an increase in average strengths in four of the six districts having this type of construction.

Design—Thickness of slab remains practically the same as in former years. Length of slab has been decreased universally to 20 feet with provision for expansion every 60 feet. The intermediate joints being of the weakened plane type. A double line of one-half-inch bars in a vertical plane circumscribe the entire panel, the longitudinal bars projecting through the joint at one end of the panel, the projection covered with a metal sleeve to break the bond. Metal chairs are used to support the steel and are left in place.

Expansion is provided for with one-half-inch thickness of permoulded sponge rubber. The load is bridged across the slab ends by three three-quarters-inch round dowel steel bars 24 inches in length spaced at intervals between the two sets of marginal bars. Half the length of the dowels and the projecting ends of the marginal bars are fitted with metal sleeves with provision for expansion at the ends. The four marginal bars through the weakened plane joint are considered adequate support as the natural break taken by the slab is more or less irregular and offering some support from direct contact.

Multiple joints have resulted in an increase in roughness, but it is believed the improved appearance of the pavement and the prolonged life will warrant the small sacrifice in riding qualities. Test sections of pavement constructed in the past have demonstrated after three years use that 20-foot panels are practically free from contraction cracking, while increasing this length to 25 feet materially increases the cracking tendency.

Construction—Central proportioning of the three sizes of aggregate remains the same except that proportioning by weight is required on fine aggregate. On future work both fine and coarse aggregates will be proportioned by weight.

Mixing equipment is the same as has been used in past years and average daily output remains practically the same. Use of marginal steel has resulted in construction in 10-foot

CONSTRUCTION RECORDS MADE DURING 1928 ON CALIFORNIA HIGHWAYS

PORTLAND CEMENT CONCRETE

Record for smoothness—Resident engineer, C. M. Butts; Fredrickson & Watson Construction Company, Contractor; contract between Galt and Arno, Sacramento County.

Record for average concrete strength—Resident engineer F. C. Fosgate; Hanrahan Company, contractor; contract between Ignatio and Gallinas Creek, Marin County.

Record for daily yardage—Resident engineer, C. M. Butts; Fredrickson & Watson Construction Company, contractor; contract between San Joaquin River and French Camp, San Joaquin County.

ASPHALTIC CONCRETE

Record for smoothness—Resident engineer, W. D. Eaton; Gibbons & Reed, contractor; contract between Monrovia and Azusa, Los Angeles County.

Record for best hand finished job—Resident engineer, J. F. Knapp; California Construction Company, contractor; contract between the county fair grounds and Hanford, Kings County.

Record for density of pavement surface—Resident engineer, J. M. Hollister; Jahn & Bressi, contractor; contract between Seeley and El Centro, Imperial County.

Record for production—Resident engineer, W. D. Eaton; Gibbons & Reed, contractor; contract between the county fair grounds and Hanford, Kings County.

District	County	Route	Section	Location	Miles	Contract	Contractor
							PORTLAND CEMENT
III	Glenn	7	C	Through Orland	1.09	93TTC1	C. W. Wood
IV	Marin	1	A	Ignacio-Gallinas Ck.	4.60	94EC7	Hanrahan Co.
V	San Luis Obispo	2	E	Pismo-San Luis Obispo	8.10	95FC2	J. F. Knapp
V	Monterey	2	A	Salinas-Santa Rita Road	1.86	95EC2	Chas. Wimmer
VII	Orange	2	E	Anaheim-Fullerton	.84	07FC1	Bartlett & Mathews
VII	Ventura	2	B	4 miles east of Camarillo	.22	07FC2	Silveria & Robbins
VII	Orange	2860	A & C	San Juan Creek-Serra	.57	521	V. R. Dennis Const. Co.
VII	Los Angeles	9	A	South San Fernando-Sunland	0.18	07FFC2	S. W. Gleim
VII	Orange	2	A	West of San Clemente	0.19	07FFC1	Steele Finley
VIII	San Bernardino	26	B	Redlands, ½ mile N. Riverside Co. line	4.80	98FC1	Matich Bros.
X	San Joaquin	5	B	San Joaquin Road-French Camp	6.81	910EC6	Frederickson-Watson Con. Co.
X	Sacramento	4	A	Galt, 1 mile south of Arno	4.24	010EC2	Frederickson-Watson Con. Co.

							PORTLAND CEMENT
IV	Ala-SC1	5	C & A	Warm Springs Jct.-Milpitas	3.41	94EC3	Allied Contractors, Inc.

							ASPHALTIC CON
District	County	Route	Section	Location	Miles	Contract	Contractor
III	Sacramento	3	B	North Sacramento-Del Paso Park	1.20	03EC1	Clark & Henry
IV	Marin	1	B	Through Ross	0.76	94EEC1	Pacific States Const. Co.
IV	Ala-SC1	5	C & A	Warm Springs Jct.-Milpitas	4.02	94EC3	Allied Contractors, Inc.
IV	CC	14	A	Richmond-San Pablo Creek	1.30	04EC2	Warren Const. Co.
VI	Tulare	4	F	Tulare-1½ miles south of Plaza Garage	6.09	06FC1	Valley Paving & Const. Co.
VI	Madera	4	A	Thorsa-Arcola School	6.46	96EC2	Callahan Const. Co.
VI	Kings	10	C	County Fair Grounds-Hanford	0.70	06EC3	California Const. Co.
VII	Los Angeles	9	G	Monrovia-Azusa	3.46	97FC5	Gibbons & Reed Co.
VII	San Diego	12	A	San Diego-La Mesa	2.26	97F5	R. E. Hazard Co.
VIII	San Bernardino	9	A B & C	Cherry ave-San Bernardino	9.29	98FC3	Steele Finley
VIII	Imperial	26	F	Through Imperial	1.00	08FC1	R. E. Hazard Co.
VIII	Imperial	12	C	Seeley-El Centro	7.23	98FC4	John & Bressi
X	Stanislaus	4	A & B	North of Ceres	0.20	910EC4	Standard Paving Co.

widths. With the adoption of marginal steel, pouring from the side became necessary and considerable difficulty was experienced, in all types of pavers, with segregation in the mixer bucket as it was being loaded with the boom inclined at a considerable angle from the axis of the machine. This difficulty threatened to force the use of smaller aggregate or increased amounts of fine aggregate in order to insure dense concrete. Through the efforts of Resident Engineers C. M. Butts of District X and A. N. George of District VII, two devices were perfected to overcome this feature, one or the other of which is applicable to any make of paver and is a standard requirement on California work.

Methods of finishing have not been changed in the past season. With the advent of construction in 10-foot widths, it was found by those contractors pouring the larger average daily yardages that two mechanical finishers were a necessity in order to properly handle the output without delays.

Curing methods remain the same as of the past season with a water period of eight days and opening at 14 days or earlier on special projects where climatic conditions are favorable the exact age of opening depending upon the flexural strength developed by beams cast and broken on the job.

Result of Tests.—The average strength of concrete, as determined by cylindrical casts made on the job and broken in the laboratory, for 28-day age, on individual paving projects ranged from 3190 pounds to 4980 pounds per square inch compressive strength. The average for the state in 1928 was 4235 pounds. This average falls below the 1927 average by 275 pounds and represents an increase in strength in four districts, but a decided decrease in two districts.

One project, which included concrete shoulder construction, was built in 1928 and gave an average strength of 3895 pounds per square inch.

Check cores from pavements are frequently taken after opening. These cores are taken under the direction of the laboratory operating independent of either the district or the construction department. These cores invariably show an increase over the strengths as determined by cylinders cast on the job. The construction department has felt that the job cylinders do not always represent the full strength of the con-

Resident Engineer	Street Assistant	Average strength of concrete at 28 days pounds per sq. inch	Average yardage laid per day	Average daily variation in cement used, per cent	Average interval of designed joints, feet	Vialog index of roughness, inches per mile	Type of equipment used		District
							Mixer	Finisher	
CONCRETE PAVEMENT									
B. T. Millard	J. E. Kinyon	319.0	164.5	2.86	20	9.5	Foote 27E	1 Ord Finisher	III
M. C. Fosgate	R. A. Westbrook	498.0	216.1	1.48	20	8.4	Foote 27E	1 Ord Finisher	IV
T. W. Voss	J. E. Burke	371.5	240.1	0.88	20	11.0	Foote 27E	2 Ord Finisher	V
T. W. Voss	J. E. Burke	424.0	145.8	1.65	20	9.0	Smith 21E	1 Ord Finisher	V
J. B. Hodges	C. J. McCullogh	457.5	215.8	1.27	20	6.7	Koehring 27E	1 Ord Finisher	VII
W. I. Templeton	W. I. Templeton	*414.0	63.8	2.51	20	14.5	Foote 14E	1 Lakewood Tamper	VII
J. B. Hodges	R. D. Kinsey	492.0	106.9	1.14	40	8.2	Rex 21E	1 Lakewood Tamper	VII
L. R. McNeely	L. R. McNeely		219.1	1.17	20	17.7	Rex 21E	1 Lakewood Tamper	VII
W. I. Templeton	O. T. Walkey	*435.0	114.6	1.85	20	13.3	Rex 21E	1 Ord Finisher	VII
R. C. Payne	L. R. McNeely	395.5	204.0	1.08	20	11.0	Rex 27E	1 Lakewood Tamper	VIII
C. M. Butts	F. M. Parrish	457.5	247.2	0.64	20	8.5	Foote 27E	2 Ord Finisher	X
C. M. Butts	V. G. Horton	432.0	232.9	0.18	20	8.0	Foote 27E	2 Ord Finisher	X
CONCRETE SHOULDERS									
M. C. Fosgate	R. A. Westbrook	389.5	196.2	1.11	20	8.6	Koehring 27E	1 Ord Finisher	IV

CRETE PAVEMENT

Resident Engineer	Street Assistant	Type of finish by miles		Average tonnage laid per day	Average relative specific gravity in per cent	Vialog index of roughness, inches per mile		Type of equipment used		District
		Hand	Machine			Hand finish	Machine finish	Mixer	Finisher	
Clyde Rust	E. J. Peterson	0.68	1.20	357.6	96.5	31.2	20.3	Geiger Plant	Ord Finisher	III
H. A. Simord	E. J. Brown	0.76		234.0	96.0	43.3		Geiger Plant	Hand Rake	IV
M. C. Fosgate	R. A. Westbrook	0.52	3.41	250.6	97.4	34.5	18.7	Geiger Plant	Ord Finisher	IV
E. E. Sorenson	H. M. Chapman	1.30		327.4	95.0	23.8		Geiger Plant	Hand Rake	IV
H. B. La Forge	J. A. Whyte—R. Becker		5.09	308.6	95.7		10.5	Geiger Plant	Ord Finisher	VI
P. L. Wilcox	W. B. Reed		6.46	355.1	94.5		10.8	Madsen Plant	Ord Finisher	VI
J. F. Knapp	J. W. Greeley	0.70		260.4	95.0	21.6		Geiger Plant	Hand Rake	VI
W. D. Eaton	L. R. McNeely		3.46	574.3	96.0		8.7	Union Tank Co. Plant	Ord Finisher	VII
J. M. Lackey	J. M. Lackey	2.26		446.0	95.9	34.1		Madsen Plant	Hand Rake	VII
H. O. Ragan	J. M. Hollister		9.29	562.7	96.6		18.3	Madsen Plant	Ord Finisher	VIII
H. O. Ragan	J. M. Hollister—T. B. Landers	1.00		321.5	94.7	25.7		Madsen Plant	Hand Rake	VIII
J. M. Hollister	E. A. Bannister		7.23	355.3	98.0		17.0	Madsen Plant	Ord Finisher	VIII
J. W. Cole	L. E. Ford	0.20		110.7	94.8	29.5		Geiger Plant	Hand Rake	X

crete being produced, and for the coming season propose to have a representative present at the start of each project to cooperate with the resident engineer and make an initial series of casts which will be used as a comparison with the casts made during the progress of the work.

ASPHALTIC CONCRETE

Mix—The design of mix remains the same as used in 1927 using the comparatively high rust content on the surface course. A stability testing machine for the mortar content of mixtures has been adopted by the laboratory and used on the past season's work. As soon as plant mixtures are started, a sample of the mix screened through the 10-mesh is submitted to the laboratory as a check upon the field design. The specimens are molded into cylinders and subjected to pressure at 140 degrees Fahrenheit until they flow through an orifice slightly smaller in diameter than the cylinder. The ultimate load at which they flow is considered a measure of the stability or related to the resistance to displacement under traffic with extreme temperature. Eastern investigations have led to the conclusion that 2000 pounds is sufficient to insure stability of surface mixtures. The last season's work varied between 2000 and 10,000 pounds. At the present time, the laboratory is investigating a machine to determine the shear strength of specimens fabricated from the entire mix.

Design—With the exception of one project, all widening of existing pavement last season, as well as the surfacing, was constructed with asphaltic mixture. For reasons of economical construction where conditions are at all favorable for black base, the mixed type of Portland cement concrete and asphaltic concrete construction is being avoided. Thirty-six per cent of last season's asphalt work was constructed of the black base type.

Where black base is used the typical cross section is very similar to that of Portland cement concrete construction, both edges being thickened. This design was first attempted on our construction across the Sand Hills near Yuma in 1926 and has since been adopted as standard.

Construction—Prior to the perfecting of mechanical means of spreading asphalt mixtures, the output of a

Yearly Comparisons by Districts

District	Miles constructed					Average compressive strength, pounds per square inch, 28-day age					Average roughness, inches per mile				
	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928
PORTLAND CEMENT CONCRETE PAVEMENT															
I		6.6					4,980					11.7			
II	9.9	1.5				3,340	4,055				12.2	29.7			
III		0.6		0.4	1.1		3,425		3,810	3,190		43.0		5.6	9.5
IV	4.3	7.7	7.2	10.5	4.6	3,230	5,110	4,915	4,645	4,980	15.4	29.5	5.7	8.5	8.4
V				5.9	10.0				4,790	3,810				5.1	10.6
VI		5.0					4,070					11.7			
VII	33.9	8.6	44.6	37.2	2.0	3,295	3,690	4,145	4,410	4,735	20.8	10.0	6.8	8.1	9.6
VIII		12.5	3.0		4.8		3,945	3,800		3,955		10.0	15.4		11.0
IX															
X	13.0	9.0	0.5		11.1	2,680	4,490	3,960		4,485	15.9	10.5	6.5		7.5
State						3,150	4,311	4,214	4,510	4,235	19.2	14.3	7.1	7.8	9.3
PORTLAND CEMENT CONCRETE SHOULDERS															
I															
II															
III															
IV	4.3	4.4	0.3		3.4	3,310	4,202	3,920		3,895		27.9	9.4		8.6
V		5.3	1.6				3,580	3,615				17.9	3.5		
VI		5.9	2.1	10.9			3,370	3,254	3,455						
VII			15.1					3,833							
VIII			28.7	9.0				3,965	3,470						
IX															
X	4.0	12.8	7.8			4,200	3,550	4,099				33.9			
State						3,751	3,691	3,867	3,495	3,895		28.9	4.4		8.6

ASPHALTIC CONCRETE PAVEMENT

District	Miles constructed							Average roughness, inches per mile						
	1924	1925	1926	1927		1928		1924	1925	1926	1927		1928	
				Hand	Machine	Hand	Machine				Hand	Machine	Hand	Machine
I														
II														
III		1.8	1.1	3.1		0.7	1.2		30.6	21.4	25.0		34.2	20.3
IV	7.4	1.9	0.7	2.5		2.7	3.4	23.2	24.7	62.0	35.2		31.3	18.7
V		1.6	7.3						27.2	24.2				
VI		8.4	4.5	10.1	12.2	0.7	12.6		18.9	19.2	19.9	14.6	21.6	10.7
VII	2.8			1.0		2.3	3.5	17.3			17.6		34.1	8.7
VIII			21.3	9.0		1.0	16.5			23.3	30.8		25.7	17.7
IX														
X	15.4	2.6	12.8			0.2		32.3	50.4	25.4			29.5	
State								30.1	33.2	24.1	25.2	14.6	30.9	14.7

plant was limited by the speed with which the mix could be handled on the street and there was no incentive to increase the capacity of mixing plants. Now that the machine has trebled the capacity of former hand methods of spreading, plants have been increased in size until double the former average daily output was secured on some projects last season and even larger plants are being constructed for the present season's work.

Depth of surface course has been thickened to two inches through last season's work in place of one and one-half inch as of former practice.

Size of surface finish screenings was increased to passing three-quarter inch and retained on one-quarter inch on one project last season by substituting a three-quarter inch plant screen for the one-half inch formerly used. This size of rock gave a non-skid surface finish superior to anything yet attempted and for the present season's work these screen sizes are to be used throughout.

Results of Tests—Daily samples of the compressed and uncompressed mixture are submitted to the laboratory for determination of relative specific gravity and analysis of the mixture. Average relative specific gravities of surface course on the projects varied from 94.5 per cent to 98 per cent representing voidages of from 2 to 5½ per cent.

In addition to the above tests a measure of the stability is taken during the earlier part of the work and when the design of mix is changed.

SURFACE ROUGHNESS

Roughness of last season's work was determined by the Roughometer device. Several other devices were experimented with during the past season and further work along this line is contemplated.

(Continued on page 22.)

New State Toll Bridge Policy Inaugurated by Governor Young

ON Monday, June 10th, Governor C. C. Young inaugurated a new toll bridge policy in California by signing four measures, known in the Legislature as the toll bridge bills. Governor Young established the policy in California of public ownership of all toll bridges in the state with the end in view of ultimately eliminating all toll charges on bridges along the highways of California.

C. C. YOUNG, Governor.

The four measures signed by Governor Young provide a method whereby the state can finance, by means of revenue bonds, the construction or purchase of bridges which cost can not be defrayed from current state highway or county road funds.

The measures signed by Governor Young provide:

(1) A body designated as California Toll Bridge Authority is established, and this body and the Department of Public Works are authorized by Senate Bill 700 to build, buy, or condemn toll bridges, through the medium of revenue bonds, such bonds not to constitute debts or liabilities of the state, but to be entirely retired by tolls for passage over these bridges;

(2) The authority to issue franchises for future toll roads and toll bridges is transferred by Senate Bill 701 from boards of supervisors to the State Department of Public Works;

(3) The archaic Toll Bridge Act of 1881 is repealed by Senate Bill 702. Under the act of 1881 the State Engineer was required to pass solely on draws and spans in a perfunctory fashion, but was vested with no real authority to pass on the general financial and engineering feasibility of toll bridges;

(4) The California Toll Bridge Authority and the State Department of Public Works are authorized by Senate Bill 538 to lay out, acquire and construct a bill from San Francisco to Alameda County, the cost of which must be borne by the issuance of revenue bonds, or by voluntary contributions of cities, counties, or the city and county of San Francisco.

The California Toll Bridge Authority created by Senate Bill 700 is composed of the Governor, Lieutenant Governor, Director of the Department of Finance, and the Chairman of the California Highway Commission. The Department of Public Works must submit its recommendation and estimate of costs as the acquisition or construction of toll bridges to the California Toll Bridge Authority. This latter body is vested with authority to authorize or to refuse to authorize the issuance of revenue bonds for the purchase or the construction of these bridges. These bonds do not constitute a debt or general obligation upon the state, but are to be retired solely from the earnings of the structure against which they are issued. The law provides that they shall not bear a greater interest than 6 per cent and can not be sold for less than par and accrued interest.

Particular interest attaches to the use of revenue bonds in the purchase or the construction of these structures, inasmuch as it is the first time that this form of financing has been used by the State of California. It has been used, however, successfully in a number of other states, notably New York, Indiana, Kentucky, Ohio, and in many municipalities throughout the nation. It is an old established method of financing in Europe.

The bills constitute some of the most important legislation enacted during this session that has just closed. They were introduced into the Legislature by Senator Fellom of San Francisco. They were drawn with extreme care, Frank English representing Attorney Generel Webb, C. C. Carleton, representing the Department of Public Works, John J. O'Toole, City Attorney of San Francisco and John Dailey his assistant, representing the city and county of San Francisco, participated in the work of drafting them. Judge Matt I.

Sullivan, former Chief Justice of California also advised in the legislation.

The introduction of the bills followed an intensive study of the toll bridge situation in California made by C. H. Purcell, State Highway Engineer, and C. E. Andrews, Bridge Engineer, Division of Highways, Department of Public Works. This study disclosed that the cost and operation of privately owned toll bridges in California is excessive; that tolls being charged are far in excess of the amount necessary to operate and amortize the cost of similar state built and operated structures; that the rates of tolls on the Carquinez and Antioch bridges indicate that the cost of public service on those briages is at least 88 per cent higher than it would have been on similar bridges constructed and operated by the state; that the expense of promotion and organization of a privately owned toll bridge is in many cases a major item in its cost; and that the cost of financing privately owned toll bridges is excessive.

The signature to the four toll bridge bills marks the third major contribution of Governor Young to the highway system of California. The first contribution was his signature to the one-cent gasoline tax by which state highway construction was renewed in California. Second, was his insistence that all roads proposed for inclusion in the state highway system should be first subjected to study, survey, and analysis by the Department of Public Works before their inclusion in the state road system. Ranking with these is his action today in terminating the toll bridge abuse in California.

Governor Young issued the following statement in connection with signing the toll bridge bills:

"The state has spent upwards of $150,000,000 in the construction of our state highway system. It is spending from $25,000,000 to $30,000,000 a year in the maintenance and extension of that system.

"If the state itself is willing to undertake the building of bridges, where toll bridges are necessary, there is no sound reason why private bridge promoters should be permitted to clutter up our highway system with privately owned toll bridges.

"The improvement and extension of the highway system will bring increased traffic over bridges. The state itself should be in a position to take advantage of this increased traffic and retire the outstanding bonds, and thereby hasten the time when all toll charges can be eliminated and the particular bridge be thereafter operated as a free public bridge.

"If the state should construct a toll bridge it will be so located as to best fit into the existing and contemplated highway system. The entrance of the state as a principal should also hasten the construction of a bridge across San Francisco Bay.

"Under these bills the state can purchase existing toll bridges when it appears advisable to do so. The state is also empowered to take under eminent domain proceedings where the parties can not agree on a price.

"The holders of stock in privately owned bridge corporations have no cause for alarm because of passage of this bill. Their interests will be much better served, probably, if the state buys the particular bridge and pays full value therefor than will be the case in many instances where competitive bridges may be built. The history of privately owned toll bridges in this state is yet new, but instances can be pointed out where the stockholders interest in certain bridges are already vitally effected by the later promotion and building of other toll bridges. Those who may purchase the revenue bonds for the acquisition or construction of a state owned toll bridge will be much better protected in their investments than are the stockholders in the companies now owning and operating toll bridges in this state."

GOVERNOR—DEPARTMENT ARE COMMENDED FOR SAFER STATE ROADS

R. E. Pfaeffle, State Publicity Chairman in the T. P. A. (Travelers) Magazine.

It is noted with interest that the State of California is out to improve highway safety, for in his 1929 message to the State Legislature, Governor C. C. Young states: "Increased attention is being given to make the highways of this state safer for travel. This is being accomplished through the elimination of dangerous curves; the separation of railroad grade crossings; striping the highways and thus providing defined travel ways; the abatement of the dust danger on such roads through oiling; betterment in alignment; more adequate protective signing; reduction in the crown of roads; increase in road widths; more guard rails; etc." The T. P. A. is ever interested in public welfare, and we congratulate Governor Young and the Public Works and Highway Departments.

MISSOURI—Employees of the Missouri state highway department have been issued badges for identification to be worn while they are working. The badge, elliptical in shape, carries the number of the employee and the words "Courtesy—Free Service." The purpose of the words is so that tourists may feel free to ask for information.

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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Editors of newspapers and others are privileged to use matter contained herein. Cuts will be gladly loaned upon request.

B. B. MEEK.....Director
GEORGE C. MANSFIELD.....Editor

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

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Remembering State By Camps it Keeps

James R. Griffith, Assistant Professor of Civil Engineering at the Armour Institute of Technology, Chicago, has an article in the June issue of *The Highway Magazine* entitled, "A community is remembered by the camp it keeps." In this article Professor Griffith given opinions of forty-one automobile camps where he stayed while on an 8000-mile trip from Chicago to the southwest, up the Pacific coast, through the northwest and back to Chicago. He describes a California camp as "Unquestionably the camp we found having the most convenient facilities" and under a large photographic reproduction of another California camp is the caption, "Will last year's tourist again stop at your city, or motor through your state or county? Such neat, comfortable roadside camps as this one invite tourist business." Unfortunately, Professor Griffith encountered many insanitary camps in other states. He concludes his article with the significant statement, "The poor camps are always complaining that they are unable to supply conveniences due to their lack of trade. The good camps are usually full. I believe that when municipal and highway authorities appreciate the impression fixed by the auto camp, they will take pains to control them. Possibly state laws controlling the wayside camp would still better conditions."

California automobile camps are inspected regularly by the Sanitary Inspection Division of the State Department of Public Health, and the regulations for their sanitation, promulgated by the State Board of Public Health, are enforced rigidly.

SPECIAL TRUCKS BUILT BY STATE TO FIGHT FIRES

Specially designed and equipped fire-fighting trucks are being constructed in the Sacramento shops of the State Highway Division for use in southern, central and northern California.

Four two-ton trucks, geared to travel at a speed of 40 miles an hour, with 200 gallons of water, 2000 feet of hose, camping outfits, tools for 20 men and other equipment, will be ready July 1.

One of the trucks will serve Riverside, San Bernardino and Orange counties; a second is for Tulare and Fresno counties; a third for Butte, Placer, Yuba and Nevada counties, and the fourth for Lassen, Shasta and Trinity counties.

There was a sign, "Fine for parking automobiles." That's fine thought the farmer, so he parked in a fine place.

New Herndon Bridge is Dedicated

WE dedicate today this structure of cement and steel which we call the Herndon Bridge. But this bridge is not constructed of cement and steel alone. A thought, an idea first spanned this stream. There was Man Thinking. And then came Man Working and poured into this mould of thought the cement and wrought into it the steel, and out of the invisible created the visible thing upon which our eyes now rest. And as we look, we say it has strength, durability, utility and beauty. But we know it would not be here had there not been a thought, Man Thinking. And we know that the thought would have had no fruition had it not been for Man Working!

"So we dedicate this bridge to Man Thinking and to Man Working, to these two who are ever combining and cooperating to build bridges and market places and schools and temples, and who, together, constitute that strong, durable, useful, beautiful and immaterial thing, the State."

With these words Senator M. B. Harris of Fresno, member of the California Highway Commission, dedicated the new Herndon Bridge over the San Joaquin River, on Thursday, June 6th.

The dedication ceremonies attracted a large throng to the bridge. In addition to Senator Harris, brief addresses were made by Ralph W. Bull, chairman, and Fred S. Moody, member of the California Highway Commission; B. B. Meek, director of the Department of Public Works, and E. E. Wallace, district engineer. Other speakers were Chester H. Warlow, president of the Fresno County Chamber of Commerce; N. Barsotti, president of the Madera County Chamber of Commerce; W. A. Collins, chairman of the Fresno County Board of Supervisors and C. A. Clark, chairman of the Madera County Board of Supervisors.

The bridge was christened by crashing two bottles of San Joaquin River water tied to the opposite ends of a ribbon barrier placed across the bridge on the boundary line between Fresno and Madera counties. Little Joan Lake of Fresno and petite Helen Hosler of Madera severed the ribbon which fell in two sections into the river, thus officially opening the bridge to travel. As the charming little girls performed the ceremony of christening the bridge, chairmen Collins and Clark of the Fresno and Madera County boards of supervisors, and Messrs. Warlow and Barsotti of the chambers of commerce of the two counties, grasped hands along the line dividing the bridge.

The new Herndon Bridge replaces a frame structure erected in 1884 and soon to be demolished as dangerous to heavy traffic. The contract for the bridge was awarded on April 18, 1929, to Carl H. Peterson of Fresno. The cost of the structure was $196,051. In addition to providing a proper crossing over the San Joaquin River, the bridge eliminates two railroad crossings.

The bridge consists of four 162-foot deck steel truss spans, two 83-foot deck girder spans, and one 66-foot deck girder span supported by concrete piers, which in turn rest upon a pile foundation. The deck and curbs and end posts are constructed of reinforced concrete. The structure provides a 30-foot clear width of roadway. The truss being designed so that an additional 10-foot width of roadway may be added when traffic requires it. Special features of the structure are ornamental railings, the lighting arrangements, and pedestrians' retreat at each end. The railing is constructed of iron and cast steel and will be used again when the traffic bridge is widened.

The bridge was designed in the Bridge Department of the Division of Highways.

DESERT LOCATING ENGINEER DIES

(From the Redlands *Facts*, April 15.)

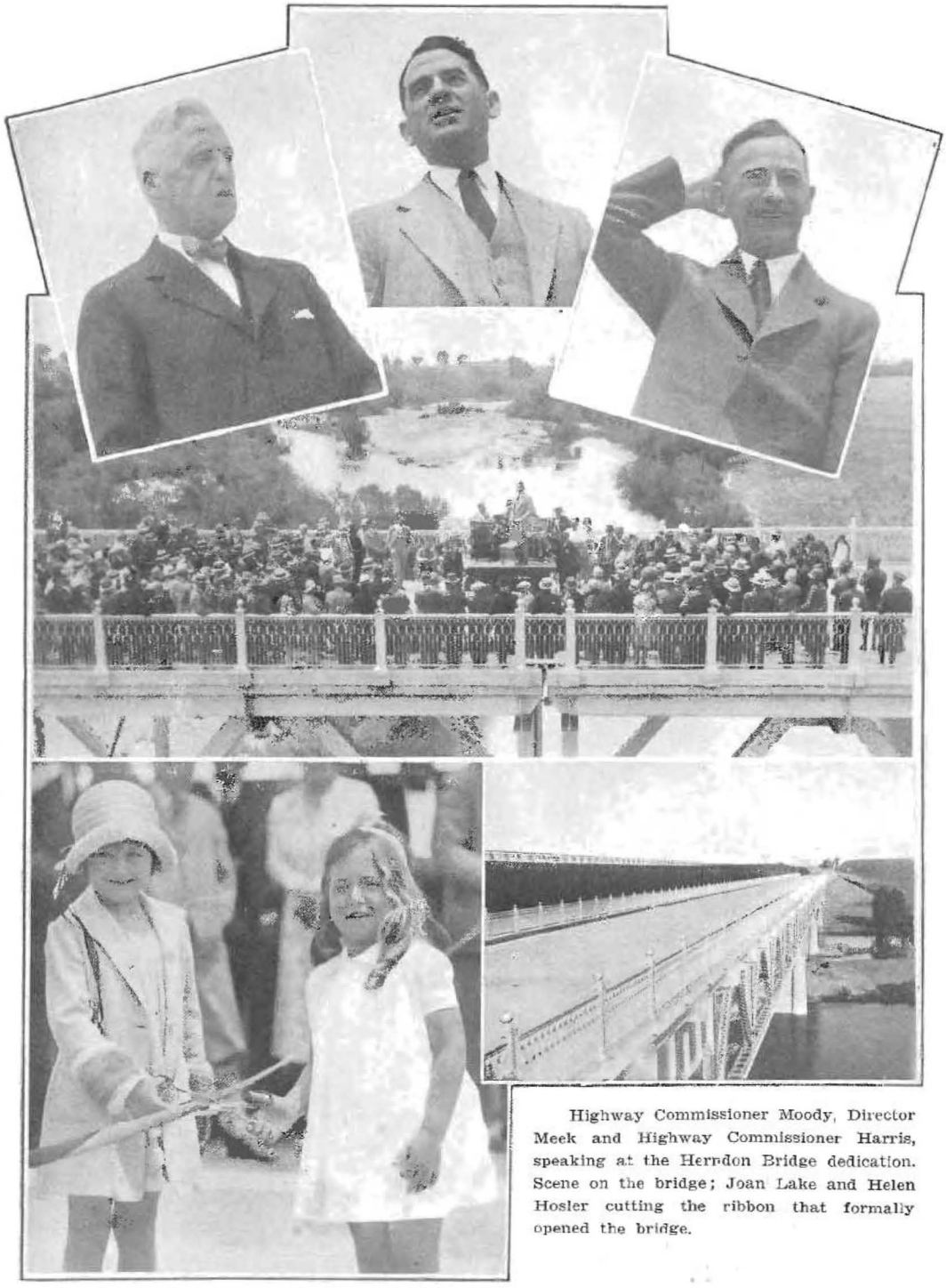
Stricken on Friday night with a sinus infection, Howard (Steve) Noble, a location engineer for the State Highway Department in San Bernardino County for many years, died yesterday morning in the Riverside Community Hospital.

Noble's headquarters were in San Bernardino but he had lived for the past several years in various desert towns while road construction was in progress. He had for the past several months been living in Blythe.

Noble was one of the oldest employees of the State Highway Department, having been associated with the department for the past 10 years. He was considered one of the best desert locaters in the employ of the state. During his service in the county he had lived in Victorville, Barstow and Ludlow.

PENNSYLVANIA—State highway patrolmen in 1928 examined 261,027 people applying for licenses to drive motor vehicles, of which 62,142, or 24 per cent, failed to qualify as safe drivers.

Scenes at Herndon Dedication



Highway Commissioner Moody, Director Meek and Highway Commissioner Harris, speaking at the Herndon Bridge dedication. Scene on the bridge; Joan Lake and Helen Hosler cutting the ribbon that formally opened the bridge.

1929 State Highway Oiling Program Methods Used; List of Projects

OVER ONE THOUSAND carloads of asphaltic road oil will be spread on the state highways by the maintenace department organization during the 1929 season. The work to be done is of three types; dust laying, oil surface treatment and "armor coat" wearing surface. The present plans provide for dust laying application on 1000 miles, oil surface treatment of 160 miles and "armor coat" on 300 miles of highway. This work is in addition to the oiling by contractors in connection with surfacing construction projects.

The use of light asphaltic fuel oil to lay the dust on the unsurfaced earth roads and on traffic-bound rock surfaces wherever volume of traffic justifies the expenditure has added to the comfort, convenience and safety of traffic, and has been of direct benefit to residents and owners of orchards, vineyards and other crops adjacent to the highway through reducing the dust which formerly blew over them with the passing of each vehicle. Two applications of the oil, at the rate of one-quarter gallon for each square yard of surface, are generally required each season. The spreading of dust layer oil does not interfere with traffic as it is quickly absorbed into the road surface.

The oil surface treatment of rock-surfaced roads will be of either penetration or oil mix type, depending on whether the metaled surface is bound or loose. Oil containing a higher percentage of asphalt than the dust layer is used for this work.

The penetration type of work is constructed in two applications of oil and screenings on the bound rock surface after dust and loose material have been swept off. The compacting and sealing of the surface is accomplished by traffic. The mix type of surface is constructed by mixing the oil with the top layer of rock or disintegrated granite by means of harrows and graders. The compacting of the oiled material is then left to traffic with the assistance of a drag which is operated to keep the surface smooth.

Particular care is taken to protect traffic by doing the work one-half width at a time where detours are not available and by establishing one-way controls.

The "armor coat" wearing surface will be placed on sections where the road surface is well bound, either by traffic or previous oil surface treatment, and has been proven stable under traffic. On traffic-bound roads a penetration coat of light oil is applied before placing the heavier oil. The "armor coat" is a thin wearing surface made up of two applications of heavy asphaltic road oil and screenings. Each application of oil is screened and then rolled. This treatment is another stage in the development of our road, and, while it is considered in the nature of a temporary surface, experience indicates that excellent service may be expected where the base has been stabilized. Where base failures develop later repairs may be made with the minimum loss.

The work will be conducted in a manner to insure the least possible inconvenience to traffic.

The location and type of work planned for the various state routes is as follows:

Redwood Highway—Sausalito to State Line.

Between Cloverdale and Ukiah 16 miles of armor coat work will be under way starting about June 15th. The spreading of light fuel oil on the portions of this section recently reinforced with rock is already under way.

Between Forsythe Creek and the northerly county line in Mendocino County 27 miles of "armor coat" will be placed on various sections. This work will start about May 20th. From Laytonville north 1.3 miles of oil mix type surface is to be constructed.

In Humboldt County some 34 miles will be surfaced with "armor coat" on scattered sections. Most of these sections have been recently reinforced with rock. In addition to the "armor coat," dust layer oil will be spread on about 28 miles of road. Part of this dust layer is to carry over sections not ready for "armor coat" and the balance is for sections to be paved late this season.

In Del Norte County dust layer oil is to be placed on the 28-mile section between the southerly county line and Crescent City as a penetration course, and "armor coat" wearing surface is to be placed on this entire section. The 3.8 miles from Crescent City to Elk Valley road is to be armor coated and dust layer spread on the four miles from Elk Valley to Smith River. This latter section is to be paved with bituminous macadam later in the season. From Smith River to the State line some 13 miles of "armor coat" work is now under contract and it is proposed to produce screenings this season so the balance of this section of road can be armor coated next year.

Roosevelt Highway—Crescent City to State Line.

The entire length of this route, 22.5 miles, is to receive an armor coat wearing surface.

Weaverville Lateral—Arcata to Redding.

4.5 miles east from Arcata is to receive an armor coat surface.

McDonalds to the Sea Highway.

38 miles of the section from McDonalds to the Navarro River is to be treated with dust layer oil starting about May 20.

Tahoe-Ukiah Highway.

9 miles of the section between Ukiah and Upper Lake is to be armor coated, starting about June 1.

Between Venado and Hamilton Junction 3 miles of dust layer oil is to be spread.

East of Marysville between Seven-mile House and Rough and Ready dust layer oil will be placed on 27 miles, starting about July 1.

Hopland to Lakeport.

9 miles of this route is to be armor coated.

Beltane to Schellville.

4 miles of this route in Sonoma County is to be armor coated, starting about July 5th.

Alto to Belvedere.

4 miles of resurfacing is planned for this route.

Calistoga to Route 15 near Clear Lake.

In Lake County from county line to Middletown, 6 miles, is to be armor coated. Work is already under way.

From Middletown to junction with the Tahoe-Ukiah route, 23 miles is to be treated with dust layer oil.

Pacific Highway—La Moine to State Line.

The section, 18.8 miles long, in Shasta County from La Moine to Siskiyou County line which was graded last year and surfacing recently completed is to be treated with an armor coat. Work will be under way about May 13th.

From Gazelle to Yreka dust layer oil is to be spread on 18 miles starting about June 10th. Armor coat is to be placed later.

From Shasta River to State line 15 miles of armor coat is to be placed.

Alturas Lateral—Redding to Nevada State Line.

From Redding to Diddy Hill 22 miles of dust layer oil is to be spread, starting about June 1.

From Montgomery Creek to Haines Ranch 17 miles of armor coat wearing surface is to be placed, starting about June 12th.

From Hillside to Bieber in Lassen County 4 miles of oil mix surface is to be renewed and plans are under way for armor coat treatment, from Alturas 12 miles east when this section can be undertaken.

Susanville Lateral—Red Bluff to Nevada State Line.

Dust layer oil is to be spread on this route from 7 miles west of Paynes Creek to Paynes Creek and from Mineral to Mill Creek in Tehama County. In Lassen and Sierra counties from Doyle to 2 miles west of Milford and from Long Valley Creek to State line. This application will cover 60 miles of highway.

Armor coat wearing surface is proposed for the greater part of route 29 as soon as the rock surfacing is in condition to receive it. Plans are under way for production of rock and screenings for work from Paynes Creek to 8 miles east and Battle Creek to Mineral in Tehama County; from Coppervale to Devils Corral in Plumas County; from Susanville to 7 miles east and Johnston to Milford in Lassen County. These plans cover a distance of 54 miles, but base conditions will not permit oiling the entire distance this season.

Oroville to Quincy (via Bucks Ranch).

Dust layer oil is to be spread from Miner's Ranch to the easterly county line, a distance of 30 miles, all in Butte County.

Downieville Lateral—Nevada City to Downieville.

Dust layer oil is to be applied on this entire route, a distance of 46 miles.

Auburn to Truckee.

Armor coat surface is to be applied from Colfax to Gold Run and from Soda Springs to Donner Lake, a distance of 15 miles.

Dust layer is to be applied from Indian Springs to Soda Springs, a distance of 10 miles. This oil will be applied about June 1.

Mother Lode Highway—Auburn to Sonora.

Dust layer oil is to be applied from Auburn to Placerville, a distance of 26 miles; from El Dorado to Plymouth and Jackson to Mokelumne River in Amador County; from County line to San Andreas, Willow Creek to Altaville and Angels Camp to County line, in Calaveras County, and from County line to Sonora in Tuolumne County, a total of 56 miles.

Placerville to State Line.

Dust layer oil is to be applied from Riverton to State line, a distance of 40 miles.

Myers to Nevada State Line via Truckee.

Dust layer oil is to be applied for 12 miles from Myers to Cascade Lake.

Armor coat is to be placed from Emerald Bay to Meeks Bay, 5 miles, and 15 miles of oil mix work is now under way between Tahoe City and Truckee. Oil mix surface will be placed through Truckee, one mile, and armor coat constructed from Truckee to State line, 19 miles, when the base is reinforced.

County Line to Central House in Amador County.

9 miles of road is to be retreated with fuel oil and remixed this season.

Arno to Picketts Junction via Jackson.

Dust layer oil is to be applied from Cooks Station to Tragedy Springs for a distance of 28 miles.

Between Pioneer and Chapmans the base is to be reinforced and light penetration oil coat applied.

Portions of the 8-mile section east of Clay in Sacramento County are to be retreated, and 4 miles of dust layer spread west of Clay.

Lodi to Silver Creek via Angels Camp and Ebbitts Pass.

A one-mile section east of Victor is to be retreated with armor type of surface.

Screenings will be stockpiled for armor coat between Murphys and Big Trees, a distance of 15.5 miles, and dust layer oil will be spread over this section, also for 11 miles from Big Trees to Black Springs.

Salida to Sonora Junction via Sonora Pass.

The surface between Pooleys and Long Barn is being reinforced. Screenings for armor coat will be produced and dust layer oil applied on this 12-mile section.

Dust layer oil will also be applied from Sonora to Pooleys and from Long Barn to top of Strawberry Grade for a distance of 22 miles.

Junction Route 13 to Yosemite Park via Groveland.

A one-mile section from Mountain House to Chinese will be leveled and retreated with armor coat type of surface.

Dust layer oil will be applied on some 40 miles of this route.

Skyline Boulevard—San Francisco to Saratoga Gap.

A 5-mile section in San Mateo County north of La Honda is to be treated with armor coat type surface. This work has already started. The 14-mile section north of Saratoga Gap now under construction will be treated with dust layer as a part of the work.

Bayshore Highway—San Francisco to San Mateo.

Portions of the 8-mile section south of the Underpass will be retreated with heavy oil as required.

Boulder Creek to Redwood Park.

6 miles of this road will be improved with an armor coat surface. Work will start about May 20.

Saratoga Gap Through Redwood Park.

Dust layer will be applied on 20 miles of this road.

Gilroy Through Pacheco Pass.

Armor coat surface will be applied on 9 miles of this route. This is in addition to 16 miles of bituminous macadam which is provided in the Construction budget.

All-Year Highway—Merced to Yosemite.

6 miles of road now under construction between the County line and Cathay, will be oil mixed. Between Mariposa and El Portal 5 miles of regraded road will be oil mixed.

Dust layer oil will be spread on 24 miles of unoiled section in Mariposa County.

San Lucas to Sequoia National Park.

Oil mix surface will be placed on the 15-mile section from Parkfield Junction to Monterey County line.

Junction Valley Highway near Bakersfield to Paso Robles.

Dust layer oil is to be applied from the west County line in Kern County east for 12 miles.

Santa Maria to Freeman via Walker Pass.

5 miles of armor coat surface is to be retreated in Santa Barbara County. This work will start about July 15.

Dust layer oil is to be applied on 10 miles east of Maricopa.

Carmel to Cambria.

Dust layer oil is to be applied on 15 miles from 2 miles north of Cambria to 6 miles north of San Simeon in San Luis Obispo County.

South of Carmel 5.5 miles of armor coat surface is to be placed.

San Diego to El Centro.

From Kitchen Creek to Pine Valley portions totaling 16 miles in length have been programmed for oil mix surface. These are sections for which funds are not available for paving during the next biennium.

Crest Route—San Bernardino to Bear Lake.

Funds have been provided for oil mixing newly graded sections and for retreatment of old oil surface on some 20 miles of this route between Waterman Canyon and Bear Lake. Work is now under way.

Arrowhead Trail—San Bernardino to Jean.

Dust layer oil is being applied on this route for 80 miles westerly from the State line. This will provide an oiled surface from Daggett to the State line.

El Centro to Yuma.

A 7-mile section of the oiled roadway east of Holtville is to be remixed.

Pasadena to Switzers Relay.

Dust layer oil is to be applied to this 4-mile section.

Mojave to Coleville.

10 miles of this road between Big Pine and Bishop and in Round Valley is to be oil mixed.

Dust layer oil is to be applied on 22 miles of this route in Inyo County and on 42 miles in Mono County.

CALIFORNIA SECOND AMONG STATES IN AUTO OWNERSHIP

The total registration of motor vehicles in the United States during 1928 was 24,493,124, a gain of 1,359,883, or 5.9 per cent over the number registered in 1927. The figures include passenger automobiles, taxis, busses, motor trucks and road tractors. In addition 148,169 trailers and 117,946 motorcycles were registered.

New York heads the list for 1928 with 2,083,942 vehicles registered; California is second with 1,799,890; Ohio is third with 1,649,699; Pennsylvania is fourth with 1,642,207; Illinois is fifth with 1,504,359; Michigan sixth with 1,249,221; Texas seventh with 1,214,297; Indiana eighth was 823,806; New Jersey ninth with 758,430; and Wisconsin tenth with 742,135.

In percentage gain, Arizona ranks first with 16 per cent. The District of Columbia is second with 13 per cent. Mississippi and South Dakota each report a gain of 12 per cent; New Mexico, Alabama and Connecticut report 10 per cent; Tennessee and Texas report 9 per cent; and South Carolina, Vermont, Wyoming, North Dakota, Michigan and Delaware report 8 per cent.

Comparison of the registration total with the 1928 estimated population of 120,013,000 indicates that there is now one motor vehicle for every five persons in the United States; or one for every family.

SUMMARY OF 1928 PAVEMENT CONSTRUCTION

(Continued from page 14.)

Portland Cement Concrete—Individual projects varied from 6.0 inches to 17.7 inches per mile with a state average of 9.3 inches. This represents an increase over previous averages in roughness in four of the six districts constructing this type and is an increase of 1.5 inches per mile in state average over that of 1927. This increase is due somewhat to increased number of designed joints but also represents a decided slackening up of inspection of finishing.

Asphaltic Concrete—Individual projects on machine finished work varied from 8.7 inches to 20.3 inches per mile and averaged 14.7 inches. On hand finished work, the range was from 21.6 inches to 43.3 inches averaging 30.9 inches. The general average of both types was 17.4 inches.

OUTSTANDING PROJECTS

Portland Cement Concrete—Smoothness record for the year was obtained by Resident Engineer C. M. Butts on Contract 010EC2, Fredrickson & Watson Construction Company, contractors, with an average of 6.0 inches per mile. This project likewise held the record for cement control with an average daily variation of but 0.18 of 1 per cent.

The record for average concrete strength was obtained by Resident Engineer Mr. C. Fosgate on Contract 94EC7, Hanrahan Company, contractors, averaging 4980 pounds per square inch.

The record for daily yardage produced was obtained by Fredrickson & Watson Construction Company on Contract 916EC6, C. M. Butts, Resident Engineer, with an average of 247.2 cubic yards.

Asphaltic Concrete.—Smothness record was secured by Resident Engineer W. D. Eaton on Contract 97FC5, Gibbons & Reed, contractors, with an average of 8.7 inches per mile. The best hand finished job for the season was secured by Resident Engineer J. F. Knapp on Contract 06EC3, California Construction Company, contractors, with an average of 21.6 inches per mile.

The record for density of pavement surface was obtained by Resident Engineer J. M. Hollister on Contract 98FC4, Jahn & Bressi contractors, with an average of 98 per cent relative specific gravity.

The record for production was obtained by Gibbons & Reed, contractors, on Contract 97FC5, W. D. Eaton, Resident Engineer, with a daily average production of 574.3 tons.

With respect to pavement qualities, it is felt that the assistant resident engineer, in charge on the street, is in a large degree responsible for the results secured and for this reason is being given recognition along with the resident engineer.

TABLES

In addition to the usual Yearly Summary, a table of Yearly Comparisons by Districts has been added. This table gives an interesting comparison of progress within the individual districts.

Son—"Our garage man's got a better radio set than ours, mama."

Mother—"What makes you think that, dear?"

Son—"He said he knew he'd get hell when he went home tonight."

Roadside Advertising Regulations Reported on by U. S. Road Bureau

IN A SURVEY of state laws governing commercial advertising signs along public highways made by the Bureau of Public Roads of the United States Department of Agriculture, it was found that such laws range all the way from the most general of rules and regulations to certain well-defined stipulations. Only seven states are without state regulation—South Carolina, Arkansas, Texas, New Mexico, Oklahoma, Kansas and Wyoming.

Connecticut, Massachusetts and Vermont have the best defined and most rigid laws. Before any agency can erect commercial advertising signs in these states, it must be licensed by state authorities at certain annual fees, and if it does not reside in the state a bond must be furnished. Each license must show a number and the date of expiration.

Connecticut levies a license fee of $100 per year, and an annual permit fee of $3 for every 300 square feet or less of advertising space to $9 for between 600 and 900 square feet. Fees apply to each side of each panel. Signs of more than 900 square feet are not permitted.

In Massachusetts the fee is fixed with regard to administrative costs and varies throughout the state. Vermont levies an annual license fee of 3 cents for each square foot of advertising space.

In Connecticut each application for a permit must bear the written consent of the owner of the property on which the sign is to be erected. Each permit must state the size of display, and each sign must show the name of agency displaying, owning or leasing billboards. No direction or danger sign shall bear advertising.

In Vermont, the application for license shall name the property upon which advertising is to be displayed; the population of the city, village or town; the size, and description of sign and the distance at which it may be read from state highway, railroad or railway track, public park or navigable water.

State authorities of these three states—Connecticut, Massachusetts and Vermont—have the right to exact fines for nonconforming signs and to remove them. The cost of removal, after due notice has been served, is collected from the agencies or from the sureties on bonds. Connecticut imposes a fine of $100 for each nonconforming sign; Massachusetts, a fine of not more than $100 with a further $500 for continued violation; Vermont, a fine of $100, or imprisonment of 30 days, or both.

Also in Connecticut, any person who shall deposit, throw, affix or maintain any advertisement within limits of any public highway or on private property without consent of owners is subject to a fine of not more than $50 or imprisonment of not more than six months, or both.

Advertising signs in Connecticut may not be placed within 15 feet of the right of way of a highway, and in Massachusetts within 500 feet. In these two states, cities and towns may further regulate and restrict advertising signs in a manner not inconsistent with state laws.

Local authorities of the three states may remove nonconforming signs within their jurisdictions.

Laws of the three states, as well as laws of other states, permit certain advertising by manufacturers or landowners located along highways.

Seven other states—Florida, Georgia, Mississippi, Nebraska, Nevada, North Carolina and Tennessee—impose fees for advertising signs. Mississippi collects a fee of 75 cents for each sign of from 10 to 100 square feet of area, $1.50 for an area of between 100 and 300 square feet, and $2.50 for an area of more than 300 square feet.

North Carolina exacts an annual license fee based on population of cities and towns; from $5 in cities of 5000 inhabitants to $50 in cities more than 35,000. Also no advertising signs are placed on private property without consent of owner and no signs are placed within limits of highways on penalty of a fine of $50 or imprisonment of not more than 30 days. Local authorities regulate advertising signs within their jurisdictions.

Tennessee forbids the erection of signs upon the right of way of any state highway, and prohibits erection of signs resembling railroad crossing symbols on any public highway or street or on private property within one-quarter mile of any public road or street.

The state requires an annual license fee for electric signs, according to population; from $10 in cities and towns of less than 5000 inhabitants to $50 in those of more than 50,000. It imposes an additional annual fee of $7.50 upon agencies posting bills or other printed matter in counties of less than 20,000 inhabitants to $75 in counties with 60,000 or more.

In Florida, the state road department prohibits advertising signs on state highways and imposes on agencies in the bill posting business a license tax of $5 in cities and towns of less than 10,000 people to $30 in cities and towns of 10,000 or more.

Nebraska requires a state permit for advertising signs, with a fee of 25 cents to $5 for each sign, and no sign may have more than 10 square feet. Also signs may not be erected within 300 feet of intersection of crossroads, and railroad crossings, and a fine of from $10 to $100 is levied for violation of law. All nonlicensed signs are removed by state authorities.

Georgia levies an annual tax of $1 on each agency for each location, defined as 75 lineal feet. No advertising signs are allowed on the Dixie Highway in Bibb County. Chatham County is empowered to regulate signs within its jurisdiction.

Nevada levies an annual license fee of $5 on advertising agencies, the license to be issued by county clerk of county in which it is to be erected. Money from licenses is apportioned to the road funds of counties. No permit is issued for billboards on any location which may measurably destroy the natural beauty of the scenery or obscure a view of the road ahead. Any agency erecting nonconforming signs is subject to a fine of $25 to $100 or imprisonment of from 10 to 30 days.

In nine other states—Minnesota, Colorado, Maine, Iowa, North Dakota, South Dakota, West Virginia, New Hampshire and Illinois—no advertising agency may erect or maintain upon any highway or right of way any commercial advertising sign. In eight of these states authorities have power to remove all nonconforming signs, and in seven states to exact fines of from $5 to $1,000 or imprisonment of from one to six months. Three of the states regulate distances from railroad crossings, road intersections and from curves at which signs may be placed ranging from 300 to 1000 feet. Minnesota and North Dakota do not permit advertising on directional signs. In South Dakota, no advertising sign outside of city limits may have more than 20 per cent of its surface in red.

The laws of 16 other states—California, Maryland, New York, Idaho, Michigan, Washington, Montana, Ohio, Oregon, Pennsylvania, Louisiana, Missouri, Rhode Island, Utah, New Jersey and Wisconsin—prohibit advertising signs on private property without consent of owners and on rights of way of highways without consent of state, city or county authorities.

The majority of these states designate the distance from railroad crossings, intersecting highways and from curves at which signs may be placed, ranging from 300 to 1000 feet, with fines of from $10 to $500 or imprisonment of from 10 to 60 days for violation of law. A few of the states are empowered to remove nonconforming advertising signs. In others, local authorities may regulate and remove objectionable signs in territory under their jurisdiction. Pennsylvania, Michigan and Idaho permit no advertising on directional signs. Fines collected in Missouri are credited to the state road fund for maintenance.

In six states—Alabama, Arizona, Delaware, Indiana, Kentucky and Virginia—laws governing advertising signs merely state that no person shall erect or maintain upon any highway or right of way any advertising sign without the consent of state authorities.

While Arkansas has no state regulation, authority governing advertising signs is vested in the county courts with no specific legislation. In Texas, cities of more than 5000 inhabitants have power to license, regulate, control or prohibit erection of signs or billboards as may be provided by charter or ordinance. In Oklahoma, county and township boards are charged with improvement of public highways, and have power to remove all obstructions in highways under their jurisdiction.

While Wyoming has no state regulation, the highway department claims jurisdiction over rights of way and assumes authority to refuse permission to erect advertising signs and to remove any in these areas.

In Kansas, county commissioners of each county are authorized to remove all advertising signs exceeding four feet in height within 50 yards of any railroad grade crossing, abrupt corner in the highway, or entrance to driveway off the highway, after notice has been served on owner, and the cost of removal is entered on tax rolls with a penalty of 10 per cent of the cost.

New Jersey prohibits advertising signs on the Palisades along the Hudson River; New York bars advertising signs in Adirondack Park, and Delaware prohibits them for 200 feet of either side of the right of way of any highway entering Wilmington for a distance of one mile from the city limits.

U. S. Reports on Gasoline Tax Collections Throughout The United States

Gasoline taxes amounting to $305,233,842 were collected on the sale of 10,178,344,771 gallons of motor fuel in 1928 in the District of Columbia and the 46 states in which the tax was effective during the whole or a part of the year, according to figures compiled by the Bureau of Public Roads, United States Department of Agriculture.

The figures include the tax collected and the gasoline consumed in Illinois during the month of January only, owing to the fact that the law providing for the state's 2-cent tax was held invalid on February 24, 1928.

Massachusetts and New York were the only states without a gasoline tax in 1928. These two have since passed laws providing, in Massachusetts for a 2-cent tax effective January 1, 1929, and in New York for a 2-cent tax effective May 1. As the Illinois legislature has passed a new law which provides for the collection of a 3-cent tax effective August 1, that date will mark the final adoption of the tax by all states, ten years after its adoption by Oregon and Colorado, the pioneer states.

Changes in the rate of taxation were effected in four states during the year. The New Hampshire tax was increased from 3 cents to 4 cents a gallon on the first day of the year. Virginia added a half-cent on March 19, 1928, making the new rate 5 cents a gallon. The Texas rate was reduced on September 1 from 3 to 2 cents a gallon; and Mississippi raised its rate from 4 to 5 cents a gallon on December 1 last.

The average rate per gallon in 1928 was 3 cents; the highest was 5 and the lowest was 2 cents. At the close of the year the rate in effect was 5 cents in seven states, 4 cents in eleven states, 3½ cents in one state, 3 cents in 14 states, and 2 cents in 12 states and the District of Columbia.

Comparison of the total number of vehicles registered with the total tax collected in the states in which the tax was effective throughout the year shows an average revenue of $15.09 per vehicle.

After deduction of the costs of collection the entire net revenue was used for rural road purposes in 35 states. In the remaining 13 states and the District of Columbia a total of $18,491,754 was devoted to other purposes. In three states a portion of the collections was used for public school purposes. The January collections in Illinois were held at the disposal of the court. In five states a portion of the revenue went to cities for the construction and repair of streets, as did the entire collection in the District of Columbia. In two states small sums were deposited in the general funds of the state; in Mississippi special taxes in addition to those collected at the regular rate were used for the construction of a road-protecting sea wall; in New Hampshire a fourth of the net collection was used for the repair of flood damage; and in one state—New Jersey—a small portion of the receipts was turned over to the State Department of Commerce and Navigation.

Of the portion of the total revenue devoted to rural road purposes, the amount used for construction and maintenance of state highways was $211,046,591; for construction and maintenance of local roads the amount was $57,380,901; and the balance of $17,619,995 was used for payments on state and county road bonds.

The following table shows the total tax earnings and the total number of gallons taxed in the various states:

State	Total tax earning on fuel and miscellaneous receipts	Net gallons of gasoline taxed and used by motor vehicles
Alabama	$6,614,297	162,438,774
Arizona	2,018,238	50,455,046
Arkansas	5,382,782	106,147,481
California	29,566,769	985,558,973
Colorado	3,921,224	130,707,467
Connecticut	3,511,675	173,437,589
Delaware	800,349	26,678,310
Florida	11,257,617	224,704,496
Georgia	8,245,486	206,137,161
Idaho	1,884,023	47,096,637
Illinois*	*836,826	*41,841,273
Indiana	11,177,549	372,584,968
Iowa	8,535,628	284,520,934
Kansas	5,394,841	269,742,067
Kentucky	6,743,224	134,835,629
Louisiana	3,380,931	169,046,556
Maine	3,192,384	79,011,319
Maryland	5,425,873	135,646,826
Massachusetts		
Michigan	18,334,840	611,161,335
Minnesota	5,768,100	288,404,998
Mississippi	5,696,553	136,334,223
Missouri	6,948,229	347,411,433
Montana	1,683,404	56,113,461
Nebraska	3,941,164	197,058,187
Nevada	531,186	13,279,660
New Hampshire	1,884,175	47,079,932
New Jersey	8,470,335	422,346,478
New Mexico	1,852,037	36,738,005
New York		
North Carolina	9,787,011	244,675,269
North Dakota	1,479,469	73,973,434
Ohio	24,885,699	829,523,293
Oklahoma	8,147,901	279,996,597
Oregon	4,008,259	144,284,704
Pennsylvania	21,998,064	733,268,795
Rhode Island	1,182,328	59,116,396
South Carolina	5,518,240	110,364,802
South Dakota	3,158,873	78,965,809
Tennessee	5,134,600	171,153,333
Texas	17,945,037	681,135,373
Utah	1,664,652	47,577,166
Vermont	1,118,882	37,311,088
Virginia	8,616,239	174,800,793
Washington	4,206,515	210,325,734
West Virginia	4,308,109	107,547,068
Wisconsin	6,856,759	342,837,969
Wyoming	954,317	31,810,563
Dist. of Columbia	1,263,148	63,157,367
Totals	305,233,842	10,178,344,771

*Only January tax receipts reported as law was found invalid by Supreme Court, February 24, 1928.

RECORDS SHOW VALUE OF BACK SEAT DRIVING

The much maligned back seat driver has found a champion, according to reports of the California State Railroad Commission.

After reviewing the automobile fatalities report of 1928 the Commisison finds that a motorist and a half in a car constitute one wreck and that five motorists no wreck at all. The majority of automobile accidents occur when an average of 1.5 persons occupy a machine with no back seat driver to guide, and the fewest accidents occur when a machine is well loaded, several of whom presumably are back seat drivers.

Legislature Urges More Federal Aid For Public Land Roads

Urging congressional action to meet the road-building problem across vast areas of public lands in the west, the California legislature unanimously adopted a resolution in support of federal legislation to finance highway construction across unappropriated public lands and other federal reservations. The resolution memorializes the California delegation in congress to support legislation providing appropriations which would be used to build and maintain highways across those large, nontaxable areas which are held by the federal government in western states. California is affected by this problem in that two-fifths of the area of the state still remains in possession of the federal government as unreserved or unappropriated public lands, nontaxable Indian lands or other federal reservations.

The resolution presented to the legislature last week by the motorists' organization was introduced by Senator Thomas McCormack in the senate and by Speaker of the Assembly Edgar C. Levey in the lower house. It was passed by both houses unanimously under suspension of the rules. The resolution reads:

Whereas, More than two-fifths of the area of the State of California still remains with the federal government as unreserved or unappropriated public lands, nontaxable Indian lands and other federal reservations, and

Whereas, These lands are not subject to taxation, and

Whereas, The construction and maintenance of highways through and across these areas should be an obligation of the federal government requiring no financial cooperation on the part of the state or its subdivision; therefore be it

Resolved, That the California representatives in the congress of the United States be and are hereby requested to actively support legislation which will provide for appropriations by the federal government with which to build and maintain highways through and across unappropriated or unreserved public lands and other federal reservations, and be it further

Resolved, That a copy of this resolution be sent to the President of the United States, the Vice President, the speaker of the house of representatives and to each member of the seventy-first congress from the State of California.

APPRECIATION VOICED BY LEGISLATURE FOR U. S. HIGHWAY AID

The following concurrent resolution, introduced by Assemblyman Jespersen, was passed by unanimous vote of both houses of the legislature:

WHEREAS, The United States government, in federal aid, forest road, and national park funds, during the past ten years, has contributed approximately thirty-two million dollars to the highway development of California under the direction of the United States Bureau of Public Roads; and

WHEREAS, The United States Bureau of Public Roads, through Thomas H. McDonald, director, Dr. L. I. Hewes, deputy chief engineer in charge of the eleven western states, and Captain C. H. Sweetser, district engineer in charge in California, has been uniformly helpful and courteous in its participation in highway development in California, and has contributed greatly toward establishing the fine standard of highway construction now in force in California; now, therefore be it

Resolved, That the State of California through its Legislature, by concurrent resolution of the Assembly and Senate, does hereby express its appreciation of the financial aid extended to California in road building by the United States and does hereby further express its appreciation of the fine cooperation supplied by Mr. McDonald, Dr. Hewes and Captain Sweetser representing the bureau of public roads; and be it further

Resolved, That a copy of this concurrent resolution properly engrossed be sent to the President of the United States, the Secretary of Agriculture, Thomas H. McDonald, Dr. L. I. Hewes and Captain C. H. Sweetser.

U. S. Money Allotted To U. S. Forest Roads

In accordance with a joint recommendation by the U. S. Forest Service, U. S. Bureau of Public Roads, and the State Division of Highways, Department of Public Works, the Secretary of Agriculture has approved the expenditure of federal funds for the following road construction program in the National Forests of California, according to announcement by S. B. Show, Chief of the California District, U. S. Forest Service, in San Francisco.

Project	*County*	*Amount programmed*
Quincy-Beckwith	Plumas,	$25,000
Yuba Pass	Sierra,	166,000
Placerville-Lake Tahoe	El Dorado,	175,000
Topaz (Coleville to Nevada state line)	Mono,	100,000
Wawona-Auberry	Madera,	25,000
San Marcos Pass	Santa Barbara,	10,000
Mt. Lassen (Mineral to Lassen Nat. Pk.)	Tehama,	50,000
Idyllwild (Hemet to San Jacinto Mts.)	Riverside,	25,000
Maintenance		20,000
Surveys*		20,000
Total		$616,000

* The survey for the Deer Creek project is now under way, financed from this item.

Twenty-five thousand dollars additional forest highway money will be expended in Nevada for constructing an extension to the California section of the Topaz project, and $77,000 will be expended in constructing and surfacing a section of U. S. Highway No. 50 near Glenbrook.

The State of California will cooperate in the construction of the Placerville-Lake Tahoe project to an amount equaling the federal allotment. The counties of Plumas and Santa Barbara will cooperate in the amount of $75,000 and $10,000, respectively, on the Quincy-Beckwith and San Marcos Pass projects. Either the state or counties will also assume the maintenance responsibilities after the projects have been improved to a satisfactory standard by the Bureau of Public Roads, which will supervise the construction work on all projects.

In addition to the above mentioned expenditure, which is for roads of primary value for public travel, about $350,000 will be expended by the forest service for constructing and maintaining roads of principal value for protecting and administering the national forests in California.

Court Imposes $100 In Fines for Littering Highways

(From the Venice *Vanguard*, May 30.)

Giving notice that he will impose fines upon all persons guilty of dumping bottles, rags or papers on the highways within his judicial jurisdiction, Justice of the Peace John L. Webster of Malibu township, fined Abner Beard and T. R. Hunter of Santa Monica, $50 each, after they had entered plea of guilty to carelessness.

J. A. Stauff, foreman for the State Highway Commission on the Roosevelt Highway north of Santa Monica, was the complaining witness against the two men. A few days ago Stauff was enraged when he found that someone had dumped a load of gin bottles, old rags, papers and other litter on the right of way two miles north of Topanga Canyon. He offered a reward for information that would lead to the arrest of the offenders.

Shortly after his announcement in the press, Stauff learned that Hunter and Beard were the asserted offenders. He obtained warrants for their arrest from Justice Webster.

The state law makes the dumping of bottles and refuse a misdemeanor, with a heavy fine, and the only reason that the two defendants escaped with a $50 fine each, was because the court was convinced that their violation was not intentional, but due to carelessness.

"We must keep the highways safe and it will be the policy of this court to impose fines, and if necessary, jail sentences, to carry out the law," said Justice Webster.

Stauff, who is in charge of the highway from Santa Monica city limits to Ventura County line, states that he is determined to keep the highway free from debris and other menaces to travel and that he will make every effort to arrest those who are guilty of violating the state laws.

NEW DISTRICT EQUIPMENT SHOPS AT SAN LUIS OBISPO

New buildings to house the district and equipment shops are now being constructed in district five at San Luis Obispo on a new site recently purchased by the state for this purpose.

The new site, containing 5.7 acres located on the Coast Highway, at the southerly city limits adjacent to the Pacific Coast Railway freight yards, one mile from the center of the city, is considered to be the most advantageous location to be found in the vicinity whereon to erect the buildings necessary for maintaining highway equipment. It is the ultimate purpose to have all district buildings including administration office, maintenance shops and storage buildings located on the same property.

The first unit of the construction under contract and under way includes a shop building and equipment storage shed, both structures being of timber frame covered with galvanized corrugated metal. Additional small buildings will complete the construction at this time.

Average Mileage More Than Double In Past Decade

Washington, D.C. The average day's run of motor tourists is now 234 miles, as compared with about 100 miles a day ten years ago, according to the National Touring Board of the American Automobile Association.

Outstanding among the reasons advanced for this decided increase in the mileage covered by motorists were the following:

1. Better highways throughout the country.
2. Improvement of the motor car from the standpoint of ease of operation, comfort, safety and stability.
3. More adequate sign-posting and marking of important highways.
4. Improved motoring facilities, including standardized services in all sections and up-to-the-minute reports on road conditions.
5. A nation-wide tendency to liberalize speed laws and the passing of the roadside justice of the peace courts.

TRAVELS 420 MILES TO REACH POINT ONLY 8 MILES AWAY

(From the Redding *Courier-Free Press* Weekly.)

Russell H. Stalnaker of Sacramento, equipment engineer for the State Highway Commission, was in this city Monday as he was returning from Oregon, where he had been to examine some snowplows in operation on the highways of that state.

While in Oregon, Stalnaker had to travel 420 miles by detour to go eight miles.

The first snowplows he saw at work were 80 miles east of Eugene, where they were digging away at the snow that blocks the McKenzie Pass, altitude 5300 feet. To get to see the snowplows at work on the east side of the pass, eight miles away, Stalnaker had to go by way of Portland, The Dalles and Redmond, a roundabout trip of 420 miles.

LOANS OIL TO CHICO TO SAVE FRUIT CROPS

(From the Chico *Record*, April 11.)

In order to save orchard crops in this region, the State Highway Commission this week placed in the hands of J. H. Priel, distributor, 4000 gallons of oil for use in smudging by orchardists. The oil was turned over for orchardists' use when the available supply in Chico and Durham became exhausted. Several cars of oil have been obtained and are available now, however, and orchardists are well supplied. More oil has been used this season than for many years, dealers report.

"Mama," said little Elsie, "I never see any pictures of angels with whiskers. Do men go to Heaven?"

"Well," said the mother, thoughtfully, "some men do go to Heaven, but they get there by a close shave."

NEW HIGHWAY LEGISLATION COVERS MANY IMPORTANT SUBJECTS

(Continued from page 1.)

TOLL BRIDGE LEGISLATION

Senate Bill No. 700, Chapter 763, Senator Fellom.

This measure authorizes the California Toll Bridge Authority and the Department of Public Works to build, buy or condemn toll bridges through the medium of revenue bonds, such bonds not to constitute debts or liabilities of the state, but to be entirely retired by tolls for passage over the bridges themselves.

It is believed that there is ample legal authority for sustaining the validity of such bonds in the State of California and that the time has arrived for the inauguration of the policy of the people financing all their own major toll bridges by the state by the use of revenue bonds, and retiring the same with the tolls in a much more economic and expeditious manner than private companies can do.

Senate Bill No. 701, Chapter 764, Senator Fellom.

This measure, in brief, transfers the authority to issue franchises for future toll roads and toll bridges from boards of supervisors to the State Department of Public Works.

It seems that the time has now come when toll roads and toll bridges, if hereafter permitted at all, should be at points which will best fit in with the state highway system of California.

Certainly the Department of Public Works is the best judge of such strategic spots in their relation to state-wide highway planning.

This act fully protects all existing franchises heretofore granted by boards of supervisors.

Senate Bill No. 702, Chapter 765, Senator Fellom.

This bill repeals the old toll bridge act of 1881, which now requires the State Engineer to pass *solely* on draws and spans, but which does not vest real authority in him to pass on the general financial and engineering feasibility of toll structures.

Moreover, this archaic act will be rendered obsolete by the enactment of Senate Bill No. 701.

Senate Bill No. 538, Chapter 762, Senators Breed, Christian, Hurley, West, Canepa, Crowley, Fellom, Gray, Maloney, Murphy and Tubbs.

This act authorizes the California Toll Bridge Authority and the Department of Public Works to lay out, acquire and construct a bridge from San Francisco to Alameda County.

However, the cost of such a structure must be borne by the issuance of revenue bonds or by voluntary contributions of cities, counties or the city and county of San Francisco.

The effect of this bill is simply to give legislative sanction to the handling of the construction of a San Francisco Bay Bridge as a specific project under the revenue bond plan set up in Senate Bill No. 700.

ADDED POWERS OF CALIFORNIA HIGHWAY COMMISSION

Senate Bill No. 581, Chapter 579, Senator Handy.

Amends section 363b of the Political Code in two respects.

1. The present law provides that the California Highway Commission may relinquish to any county, city or city and county any portion of any state road or highway within said county, city or city and county with the consent of the governing body of such county, city or city and county.

This provision was voluntarily placed in the law some years ago by the Commission, but it has resulted in a few instances that a small town has declined to cooperate with the state and delayed a major line change or improvement.

Ordinarily there is the closest cooperation between the Commission and the counties and cities in the matter of state highway abandonments and relocations. There is no necessity for the present provision. Accordingly the legislature deemed it to be for the best interests of the state highway system to eliminate the requirement, leaving it to the California Highway Commission to determine relative necessities.

2. Under the present section the California Highway Commission is authorized to conduct preliminary surveys for the determination of the advisability of including in or excluding from the state highway system any road or a portion thereof, provided, that not more than one-half the cost of any such preliminary survey shall be paid from state funds available for such purposes.

The amended act eliminates any requirement for county aid, thus enabling the state to bear the entire cost of such preliminary surveys for potential state highways.

This amendment will pave the way for the making of the surveys contemplated by Senate Concurrent Resolution No. 19, for the study by the Department of Public Works of feasible additions to the secondary state highway system during the next biennium.

The act also adds a new section to the Political Code to be numbered 363e and provides that the department of public works is authorized with the consent of the Railroad Commission to abandon any portion of a state highway crossing the tracks or right of way of any railroad, or street railroad.

PREQUALIFICATION OF BIDDERS ON STATE CONTRACTS

Senate Bill No. 754, Chapter 644, Senator Fellom.

This is another enabling act providing that the Department of Public Works may, within its discretion, before furnishing any person proposing to bid on any duly advertised public works with plans and specifications for the proposed public work, require from any such person answers to questions contained in a standard form of questionnaire and financial statement, including a complete statement of the person's financial ability and experience in performing public work.

Whenever the Department of Public Works is not satisfied with the sufficiency of the answers contained in such questionnaire and financial statement it may refuse to furnish such person with plans and specifications on any such duly advertised public work, and the bid of any person to whom plans and specifications have not been issued must be disregarded.

VENDING ON STATE HIGHWAYS

Senate Bill No. 42, Chapter 201, Senator Boggs.

This act provides that any person who sells, displays for sale, or offers to sell any wares, merchandise, fruit, vegetables, produce, food, or any or other goods from any vehicle, motor vehicle, trailer, semitrailer, wagon, push-cart, stand, structure or building standing or situated wholly or in part on the right of way of any state highway, or any part thereof, is guilty of a misdemeanor. The act, however, shall not be deemed to prohibit a seller from taking orders for or delivering any commodities from a vehicle on the part

of the right of way of a state highway immediately adjoining the premises of the purchaser.

PUBLICATION OF BULLETINS

Assembly Bill No. 1134, Chapter 381, Assemblyman Jespersen.

This act adds a new section to the Political Code to be numbered 363*p*. It authorizes the Department of Public Works to prepare, publish and issue such printed pamphlets and bulletins, as the Director of Public Works may deem necessary, for the dissemination of information to the public concerning the work and activities of the several divisions of the department. This act makes it possible to keep the public fully advised concerning the activities of the highway and the other divisions of the Department of Public Works.

TRANSFER OF DIVISION OF MOTOR VEHICLES TO DEPARTMENT OF PUBLIC WORKS

Assembly Bill No. 201, Chapter 318, Assemblyman Feigenbaum.

This act adds new sections to the Political Code numbered 363*k*, 363*l* and 363*m*. The placing of this division in the Department of Public Works will result in closer coordination of the activities of the Division of Highways, which constructs and maintains the state highways, and the Division of Motor Vehicles, a portion of whose duties is to enforce the laws relating to the safety of traffic on the state highway system and the protection of the highways themselves resulting from overloads and other abuses thereto.

MOTOR VEHICLE LEGISLATION

Senate Bill No. 714, Chapter 253, Senator Breed.

This act amends the California Vehicle Act in many particulars. Notably section 30 of the act is amended to provide for the creation of the California Highway Patrol. Traffic officers on the highways of California will hereafter be under the jurisdiction of the Department of Public Works and the present unsatisfactory "double headed" control by state and county authorities will cease.

It is believed that this centralized plan will result in more uniform enforcement and will subserve the best interests of the motorists of the state and of the public officers handling highway traffic and related problems in California.

TRAFFIC OFFICERS UNDER CIVIL SERVICE

Senate Bill No. 869, Chapter 308, Senator Breed.

This act places the California Highway Patrol under Civil Service regulations.

$20,000 MINIMUM COUNTY SHARE GASOLINE TAX

Assembly Bill No. 1060, Chapter 789, Assemblyman Williams.

Fifteen counties, some of the greatest in area yet smallest in population, will benefit under this act.

The act changes the present method of apportioning the counties' money derived from the original 2-cent gas tax by providing that no county shall receive less than $20,000 annually. Based on present returns, the counties which are to be benefited by this act are Alpine, Amador, Calaveras, Del Norte, El Dorado, Inyo, Lake, Mariposa, Modoc, Mono, Nevada, Plumas, Sierra, Trinity and Tuolumne.

SPECIAL LEGISLATIVE STUDIES

The legislature by resolutions provided for several special studies by legislative committees of problems relating to highway and street matters. These are as follows:

STREET IMPROVEMENT LAWS

Assembly Concurrent Resolution No. 23, Chapter 52, Assemblymen Woolwine and Jespersen.

This resolution provides for the creation of a joint committee of the Senate and Assembly to study street improvement laws of the State of California and make recommendations concerning changes in existing laws.

BILL BOARD INVESTIGATION

Assembly Concurrent Resolution No. 27, Chapter 69, Assemblymen Ingels and Scofield.

This resolution provides for the appointment of a legislative committee to investigate the possibility of regulating and restricting advertising signs, bill boards, hot dog stands and unsightly structures by law, and to make recommendations in such behalf to the next legislature.

JOINT HIGHWAY DISTRICT ACT REVISION

Assembly Concurrent Resolution No. 41, Chapter 73, Assemblyman Luttrell.

This resolution provides for the creation of a joint committee of the Senate and Assembly to study joint highway district laws of the State of California, and to make recommendations concerning changes in existing laws to the next legislature.

THE TIMID STENOG

"Now, Miss Blogg," boomed Jasper M. Whurtle, president of the Whurtle Whirlwind Laundry Co., to his new stenographer, "I want you to understand that when I dictate a letter I want it written *as dictated*, and not the way *you* think it should be. Understand?"

"Yes, sir," said Miss Blogg meekly.

"I fired three stenogs for revising my letters, see?"

"Yes, sir."

"All *right*—take a letter."

The next morning, Mr. O. J. Squizz, of the Squizz Flexible Soap Company, received the following:

"Mr. O. K. or A. or J. something, look it up, Squizz, President of the Squizz what a name Flexible Soap Co., the gyps,

Detroit, that's in Michigan, isn't it?

Dear Mr. Quizz, hmmm:

You're a h—of a business man. No, start over. He's a crook, but I can't insult him or the bum'll sue me. The last shipment of soap you sent us was of inferior quality and I want you to understand, no scratch out I want you to understand. Ah, unless you can ship, furnish, ship, no furnish us with your regular, soap you needn't ship us no more period or whatever the grammar is and please pull down your skirt. This d— cigar is out again pardon me and furthermore where was I? Nice bob you have.

Paragraph. The soap you sent us wasn't fit to wash the dishes no make that dog with comma, let alone the laundry comma and we're sending it back period. Yours truly. Read that over, no never mind, I won't waste any more time on that egg. I'll look at the carbon tomorrow. Sign my name. We must go out to lunch soon, eh?"—*Judge*.

NEW MEXICO—Discovering that approximately 1800 standard marker signs had been destroyed in the year 1928 the state highway department has embarked on an educational campaign to combat this vandalism.

PERILS OF THE DESERT ARE CONQUERED BY STATE HIGHWAYS

(Continued from page 2.)

300 feet in height was scarcely perceptible. Accordingly, the new road was built on sand fills made level with the top of the thirty-foot dunes. In order to keep the high sand fills of the new road from blowing away these fills were oiled. The road was also located to avoid the high, slow-moving dunes.

Great as is this improvement, other betterments are planned for the next two years that will complete this work of civilizing the desert. Thus $234,000 is to be spent from the state line at Yuma westerly in grading and paving five miles to the Indian reservation. This is now the worst portion of the highway. Nine miles from El Centro to Holtville also are to be paved during this same period, the allotment for this work in the budget being $482,000. During the present biennium an underpass is being constructed at Araz on this highway, to which the state contributed $25,000.

Route No. 26 of the state highway system extends from San Bernardino to El Centro and most of its 151 miles crosses the desert. On this road also the sands of the desert are yielding to the magic of the engineer. Allotments for this highway from the 1927–1929 budget, which have either been expended or are now in process of expenditure, total $1,117,000. For the 1929–1931 biennium the allotment totals $1,326,600.

On June 30, next, when the present biennium closes, 140 miles of this road will be paved and 11 miles will have an oil-mix surface. Improvements programmed for the 1929–1931 biennium include 10.5 miles of pavement, 31.9 miles of widening and thickening of existing pavement, culverts and grading of adequate shoulders to the extent of 7.2 miles and protection of approximately 20 miles of this highway from the effects of cloudbursts.

WHAT STATISTICS SHOW

Travel statistics again demonstrate how completely this road has robbed the desert of its terror. Traffic count on January 13, last, reveals the following travel: South of San Bernardino, 4864; west of Redlands, 5571; Beaumont, junction with Jack Rabbit Trail, 3657; south of Coachella, 1449; Westmoreland, 2620; Brawley Junction, 3340; El Centro, 5034.

Mecca to Blythe, state highway Route 64, is another road that has entirely changed the travel aspect of the country it traverses. This road was made a part of the highway system in 1919, but like other desert roads the first substantial improvements to be made on it were those authorized in the current budget.

The failure to make any substantial improvement on this until the present highway administration came into power is reflected in its low-travel count.

By no means least in its importance is the work being done upon the route that connects southern California and Boulder Canyon.

In order that southern California may reap the full advantage of the many million dollars that will be expended in the construction of Boulder Dam the California Highway Commission and B. B. Meek, Director of the Department of Public Works, have given orders for "full speed ahead" in the improvement of the highway that connects southern California with this monumental project.

Officially, the road connecting Boulder Dam and southern California is Route No. 31 of the state highway system, with its termini designated as San Bernardino to the Nevada line near Jean. Popularly, the road is known as the Arrowhead Trail. It connects the California highway system with the Nevada state highway system leading to Las Vegas, which in turn extends to Boulder Canyon.

ALLOTMENTS MADE

The allotments made by the California Highway Commission to this highway in the biennial budgets of 1927–1929 and 1929–1931 total $1,180,000. And it may be that increased revenues and savings will make possible additional supplementary allocations during the latter biennium to this and to other desert highways of southern California.

For the biennium which begins July 1, allotments to this San Bernardino-Nevada state line highway total $768,000. The budget provides for grading and surfacing with oiled rock 22.3 miles of the highway. It also provides for major alignment improvement on 6.5 miles and for rebuilding two bridges.

The type of permanent improvement adopted for surfacing the road is that of oil-treated crushed gravel or stone, now becoming known as "California type pavement." The work under way and that authorized for the next two years constitute the first real improvement of major character undertaken by the state on this highway since it was included in the state system. The completion of this program will leave 60 of the 188 miles of this road unimproved. The state, however, plans that the unimproved sections of the road shall be put in a condition to satisfactorily serve travel pending its more permanent improvement. For the unimproved sections the natural surface will be oiled to lay the dust. Certain sections where the surface is rough because of rocks will be treated with selected gravel. Dragging will enable a smoother surface to be obtained over all of the unimproved mileage. This work will be carried on under the general allotment for maintenance made to this highway.

RESIGNS POSITION

Harold T. Avery, office engineer for district five at San Luis Obispo, has resigned to accept the position of director of application with the Marchant Calculating Machine Company of Oakland, which company recently secured his patent rights to a calculating machine improvement. Mr. Avery has been connected with the Highway Commission for the past 16 years except during the period of the war at which time he was in the service as captain with the Engineer Corps.

During the time of his connection with the Division of Highways, Mr. Avery made many friends especially among his coworkers in the district office. As a token of friendship and with best wishes for his future success Mr. Avery was presented with an elaborate desk set by his coworkers.

The stout old lady was struggling valiantly, but against odds of some 200 pounds, to mount the high step of the waiting bus. "Come along, ma," urged the conductor. "If they had given you more yeast when you was a gal, you'd be able to rise better." "Yes, young man," she retorted, as at last she hoisted herself up triumphantly, "and if they had given you a bit more yeast, you'd be better bred."

TYPICAL ROAD SECTIONS

(Continued from page 8.)

Since on the railroad side no development of property is possible, sidewalk space has been omitted, and only sufficient space between the ultimate curb line and the right of way line is provided to place trees and poles. On the opposite side away from the railroad right of way, the same space is provided as on the typical section for the 100-foot width of right of way.

The fifth typical section shows a plan for developing the state highway to an ultimate 56-foot width for through traffic, and by use of setback lines to provide for the later construction of side roads or local service lanes as the abutting property develops.

This plan shows two half-width sections; one for an ultimate 160-foot right of way, the other for an ultimate 170-foot right of way. The difference between the two being in the width of the side road or local service lane, which on the 160-foot right of way is 30 feet in width, consisting of two 10-foot driving lanes, and one 8-foot parallel parking lane, and on the 170-foot right of way of a 35-foot side road or local service lane, consisting of two 10-foot driving lanes, and one 15-foot diagonal parking lane.

The ultimate development as shown provides a 56-foot width for through traffic, designed on the basis of four 10-foot driving lanes, and two 8-foot parallel parking lanes, with the local service lanes, previously described, separated from this through traffic road by parking strips 12 feet in width on which trees and light standards may be placed. It is to be noted that trees which may have been planted during the first construction, will remain undisturbed in the progressive development to the ultimate construction. This section may be considered the minimum development in territory which may be improved and become a business district.

The sixth typical section shows a plan for developing state highways to an ultimate 76-foot width. This is accomplished by establishing 50-foot setback lines from the original 100-foot right of way. This width will provide, in the future when abutting property develops into a business district, for a 76-foot road for through traffic, consisting of six 10-foot driving lanes and two 8-foot parallel parking lanes and local service roads on each side, 35 feet in width, consisting each of two 10-foot driving lanes and one 15-foot diagonal parking lane. These local service roads are separated from the through road, as in the previous section, by 12-foot parking strips.

This last section may be consideerd the maximum deevlopment and probably will apply only to a small mileage of the state highway system.

The various features outside of the roadway section surfacing or pavement, such as the various public utility facilities, pole lines, trees, etc., are placed upon the right of way under permits issued by the Division of Highways. These typical sections indicate the definite location for these various features and will provide that their installation under permit in the future will insure not only sufficient room for the development of our proper roadbed section, but will also obviate the necessity for their removal whenever widening or improvement of the road is undertaken.

The adoption of these definite sections permits the carrying out of a well formed policy relative to stage construction of the highway in an orderly, economical, progressive development keeping pace with the traffic requirements and leading to the ultimate development therein illustrated.

FIGURE THIS OUT

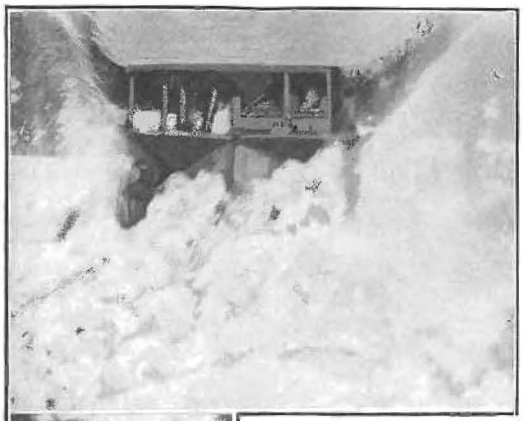
A statistician has been defined as one who knows less and less about more and more until finally he comes to know everything about nothing. Bearing this out please note below the labor of one of the office statisticians:

	Days
In one year	365
If you sleep 8 hours a day that makes	122
That leaves	243
If you rest 8 hours a day that makes	122
That leaves	121
There are 52 Sundays	52
That leaves	69
If you have ½ day Saturdays	28
That leaves	41
If you have 1¼ hours lunch	26
That leaves	15
Two weeks' vacation	14
That leaves	1

And this is Labor Day, no one works. You don't have to work after all.

Perfectly simple, isn't it?

ALBERTA—On the provincial road system, 1140 miles has been brought to grade and provided with culverts, 827 miles given one or two courses of gravel, and 41 miles given clay, shale or other surfacing. Grading has averaged 38 per cent of the cost, surfacing 39 per cent, miscellaneous 10.5 per cent, and drainage 12.5 per cent.



FREEING MOUNTAIN ROADS OF SNOW

UPPER PICTURE, AHEAD OF THE PLOW; CENTER PICTURE, BEHIND THE PLOW; LOWER PICTURE, CLOSE-UP OF EQUIPMENT.

Progress Reports From the Counties

ALAMEDA COUNTY

The construction of more than 3 miles of laminated guard rail on the Dublin Canyon Road between Dublin and Hayward, by Contractor Lee J. Immel of Berkeley, has been completed and the need of same was proven before completion by the fact that several automobiles crashed through the guard rail before the contractor left the job.

The widening of the section of the Oakland-San Jose road between Hayward and Niles is contemplated in the near future, and advertisements for same are expected immediately.

COLUSA COUNTY

The plans and estimates for constructing 15.6 miles of highway from Abbott Mine, Lake County, to Salt Creek Canyon, part of the Ukiah-Tahoe Highway, have been completed, and provide for a 24-foot roadbed. The work will be done by convict labor forces continuing the work done in Lake County by the same labor forces.

CONTRA COSTA COUNTY

The construction of the Martinez Road through Pinole and Hercules is nearing completion. In conjunction with the other work lately completed on this road, this essential link will be much appreciated by the traveling public on this, the second heaviest traveled road in northern California, as the former crooked and narrow road through these two towns has long been an inferior section.

DEL NORTE COUNTY

Parker Schram Company have completed the erection of the steel and are placing the concrete deck on the bridge over Smith River, approximately nine miles east of Crescent City. As soon as this bridge work is completed, it will open up to the traveling public approximately seven miles of new highway which has very little use at present.

It is expected that the Holdener Construction Company will reopen their oil surfacing work on their contract between Smith River and the state line by the middle of May.

The Webber Construction Company were recently awarded the contract for placing crushed rock surfacing and stock piling macadam rock for that portion of the highway between Elk Valley and the new Smith River Bridge being built by Parker Schram Company. It is expected that work will start on this surfacing approximately the first of May.

J. E. Johnston, who has the contract for grading and surfacing between the Klamath River and Wilson Creek, has again resumed operations after the winter shut-down and expects to have the new road open to public travel before the heavy touring season.

Mr. Johnston also has the contract for grading and surfacing between the Humboldt-Del Norte County line and the Head of Richardson Creek, 3.5 miles northerly. The work was practically complete, but owing to numerous slides during the winter, there is considerable excavation and finishing work necessary before the entire job will be complete. Traffic, however, is being carried over the new work and being handled very much easier than when it was carried over the old county road.

The Weber Construction Company has also been awarded the contract for furnishing rock and surfacing that portion of the highway between the Head of Richardson Creek and Klamath River, approximately 2.1 miles. Mr. Weber expects to set up his crushing

outfit near the Head of Richardson Creek at the southerly end of the contract.

EL DORADO COUNTY

Grading of 5.1 mils of the Lincoln Highway along the south shore of Lake Tahoe (Mays Station to the Nevada State line) has begun. This project will greatly favor the rapidly growing resort and summer home districts in this vicinity, and will also invite more of the central California-Reno traffic to use this scenic route. The road will be 36 feet wide with no sharp curves nor steep grades. L. W. Hesse has contracted with the state to do this work.

FRESNO COUNTY

The bridge over the San Joaquin River at Herndon has been completed and main line traffic is now relieved of two railroad grade crossings and a narrow bridge.

A convict camp for road work is being established in the Kings River Canyon by Superintendent D. M. Lee.

Tieslau Bros., were low bidders on the oil mixed surface job from Coalinga west on the Sierra-to-the-Sea Highway.

GLENN COUNTY

The grade widening of 5 miles of roadway from Logandale to Willows is nearly complete, and the work of graveling has begun by E. C. Coates, contractor. This 12-inch gravel subbase is the second step of reconstructing this highway for an ultimate 40-foot concrete pavement, and the elimination of the present pavement failures due to the high water table and adobe soil.

HUMBOLDT COUNTY

The Webber Construction Company is awarded the contracts for furnishing and stock piling macadam rock for 15 miles of highway between Orick and the northerly boundary of Humboldt County. Mr. Webber states that he expects very shortly to set up his plant approximately three miles north of Orick.

W. C. Elsemore was low bidder on the contract for furnishing, crushing and stock piling macadam rock for the 6.3 miles between Mill Creek and Little River. It is expected that operations on this contract will start in the very near future.

Ellison & Smith, Contractors, were awarded the contract for grading and surfacing 0.9 mile of state highway between Mad River and Mill Creek. Ellison & Smith are moving onto the job and expect to immediately start excavation.

The Butte Construction Company have started breaking ground for the construction of the new bridge over Mad River. The new bridge is to have a total length of 700 feet and will have two 150-foot steel truss spans over the main stream.

Kennedy and Bayles have just been awarded the contract for the construction of the highway between Arcata and Mad River. They state that they expect to begin work immediatetly and equipment will be on the ground in the near future.

The state force work on the small line change in the vicinity of Little River is practically two-thirds complete. This line change will straighten out a bad curve in the road and will be a decided improvement at this intersection with the county road leading to Crannell.

Through the town of Wildwood, immediately north of Scotia, the highway is being regraded to a 100-foot width for approximately 500 feet through the portion of the business district. This work is practically completed.

INYO COUNTY

The Southwest Paving Company has completed its contract for grading and surfacing with oil treated, crushed gravel or stone, between Olancha and Cottonwood Creek, 9.3 miles in length. The work on this contract extended from October 12, 1928, to May 7, 1929. With the completion of this project another unit of desert, sandy road with expensive maintenance costs has been eliminated. V. E. Pearson was resident engineer in charge of this work for the state.

Between Cottonwood Creek and Diaz Lake, G. W. Ellis has a contract for grading and surfacing 10.3 miles of state highway. The work is progressing satisfactorily, being about 50 per cent completed. H. M. Hansen is the resident engineer in charge of this work for the state.

Oiling of portions of the state highway were necessary—is being done by state forces.

Surveys are complete and plans in progress for proposed construction between Coso Junction and Olancha.

KERN COUNTY

The Valley Paving Company have completed their contract for an asphaltic concrete surface between Famosa and Wasco on the Cholame Lateral.

Force, Currigan & McLeod are making rapid progress on their contract for grading and surfacing on Route 57, fom Bakersfield to the mouth of the Kern River Canyon.

C. W. Hartman is placing rock base under his contract for grading and rock surfacing east of Maricopa on Route 57.

Between Mojave and 7 miles south of Cinco, a contract for grading a 36-foot roadbed and surfacing with oil treated, crushed gravel or stone is progressing very satisfactorily. The work is being done by Bartlett and Mathews.

S. C. Risley in resident engineer in charge of the work for the state.

A contract has been awarded the Southwest Paving Company for grading and surfacing 7.3 miles of the state highway between 7 miles south of Cinco and Cinco. The contractor has forces and equipment well organized and the work is progressing satisfactorily. Walter Mathews is the resident engineer on this project.

G. W. Ellis, contractor, is working on his contract for grading and surfacing between 7 miles north of Ricardo and Freeman. The work is progressing satisfactorily. E. W. Sharp is in charge of the work for the state.

Bartlett and Mathews, Hagey and Black have been awarded the contract for grading and surfacing 13.5 miles of state highway between Freeman and the northerly county boundary. The approval of this contract by the attorney is pending. Oiling of portions of the state highway were necessary—is being done by state forces. Surveys have been completed between Cinco and 5 miles north of Ricardo and plans are being prepared for the proposed construction.

LAKE COUNTY

The grading of the Ukiah-Tahoe road between Clear Lake Oaks and Sweet Hollow Summit has been completed by convict labor forces. From the Summit to Abbot Mine the 20-foot graded roadbed is being widened to 24 feet.

Hemstreet and Bell have recently contracted to place a 20-foot crushed rock and oil mix surface from High Valley Creek to Abbott Mine, about 15.6 miles.

MADERA COUNTY

Hanrahan Company Contractors, have completed their contracts for resurfacing and paving at Berenda and Herndon.

MARIN COUNTY

This scenic bay county is coming into its own. A million dollars worth of road work is under way and more is to come.

Granfield, Farrar & Carlin, San Francisco Contractors, are doing three pieces of road work; the construction of a 30-foot bituminous macadam on the 3 miles between San Rafael and San Quentin; a similar job on the 0.6-mile connection on the Alto Tiburon Road between the old Sausalito Road and the new location of same; and the grading of the 5½-mile stretch connecting the two other jobs and on the aforementioned new location. The coordinating of these three jobs is noteworthy, in that the grading on the first two jobs finished just as the third and connecting job was awarded, and four steam and gas shovels were available and were put on the job of excavating the 423,000 cu. yds. of material involved, without any loss of time. Also, the contractor was low bidder by a margin of less than $800 on the total price of $293,447.35. This later section is to be surfaced with a 30-foot bituminous macadam pavement as soon as the grading is completed.

A 3½-mile stretch between Alto and Sausalito was recently surfaced with asphalt concrete by the Hollywood Paving Co. and is a very fine piece of road.

Considerable county work is also under way.

MARIPOSA COUNTY

Last oiling and oil mixing work on the Yosemite All-Year-Highway is being pushed and it is expected to have the road in first-class condition by the first of July.

MENDOCINO COUNTY

With the coming of the summer weather, it is expected that the recently advertised contract for the construction of wooden bridges and of several line changes on the McDonald-to-the-Sea Road, between Boonville and Navarro will be awarded and work started immediately to allow of completion before the winter rains, which, as those who are familiar with this section know, start about October and Continue, in capital letters, for some time and in such a way as to prohibit any road work for said time. The improvement of this highway is very desirable as it opens up to the public one of the finest vacation lands in the state, and also brings many of our oldest settlers closer to the heart of the state.

The state force work of widening the present narrow roadway approximatetly five miles north of Lane's Redwood Flat, is well advanced and the widened roadway will be of great benefit to the traveling public during the coming summer. It is expected that this work will be shut down during the heavy touring season.

MERCED COUNTY

Shoulders on Route 18, east of Merced, are being widened by day-labor forces and placing of rock shoulders will start at once.

MONO COUNTY

D. C. Follis is the contractor for the construction of about 1.5 miles of grading at Hilton Creek. The work was slow in getting under way, but is now progressing satisfactorily. T. T. Black is resident engineer in charge of the work for the state.

MONTEREY COUNTY

Plans have been completed for an extensive line change, south of the Salinas River Bridge at San Ardo. Realignment 0.6 of a mile in length will eliminate a blind 300 feet radius curve on practically a right angle turn and on a 6 per cent grade.

Between Greenfield and King City two line changes approximately 0.2 and 0.5 miles in length are now under construction. The work consisting of a graded roadbed 30 feet in width with 20 feet by 6 inches waterbound macadam surfacing. Work is being done under contract with Granite Construction Company. Three bad curves where numerous accidents have occurred are eliminated by this contract.

Between Salinas and Chualar plans have been prepared for an overhead crossing over the Southern Pacific Railroad, at a point locally known as Spence Crossing. The plans prepared involve realignment for a distance of 0.6 miles with an overhead bridge approximately 1000 feet in length.

On the Carmel-San Simeon Highway construction work is in progress both north and south of the Little Sur River and between Salmon Creek and Villa Creek, the work being carried on by the use of state convict labor. A crew of approximately 80 men and two power shovels are working in the vicinity of the Little Sur River and 180 men and two power shovels are building north from Salmon Creek.

In the vicinity of the Carmel Highlands surveys have been completed. Preliminary investigations and studies are now being made to determine possible relocations of the highway in this vicinity.

Between San Ardo and San Lucas the construction of a line change 0.4 miles in length consisting of a graded roadbed 30 feet in width and surfaced with 20 feet by 6 inches waterbound macadam, was recently completed by W. A. Dontanville as Contractor.

This realignment eliminated a bad curve, the cause of several accidents.

Plans are now in progress for the complete reconstruction of the Coast Highway between Salinas and Chualar.

NAPA COUNTY

The Improvement of the highway between Napa and the easterly county border is contemplated immediately, bids to be taken to widen the existing road from Napa to Greenwood Corner with oil treated crushed gravel or stone borders; and also bids to construct a bituminous macadam surface from Greenwood Corner to the easterly boundary.

NEVADA COUNTY

Grading for a state highway has been resumed between Indian Springs and Soda Springs near the summit of the Colfax-Truckee road. Travel is being maintained through the construction with very little inconvenience.

C. R. Adams was awarded the contract for grading and surfacing 11.7 miles between Nevada City and Washington Road, and this work is well under way. This section, consistent with the rest of the Ukiah-Tahoe Highway, will consist of a 24-foot roadbed. An oil mixed crushed rock surface, 20 feet wide, is to be placed by the terms of the contract.

PLACER COUNTY

Overhead crossings of the Southern Pacific Railroad at Bowman and Weimar on the Auburn-Colfax road have been completed. At Bowman two new concrete spans replace the old unsightly timber structures and greatly improve the former alignment. At Weimar a hazardous grade crossing is eliminated. All three structures were built by the Butte Construction Company, and have 24-foot roadways with 5-foot sidewalks on one side.

Fredrickson-Watson Construction Company & Fredrickson Brothers are rapidly completing the approaches to these structures and it is expected they will be completed the latter part of June.

SACRAMENTO COUNTY

Fredrickson-Watson Construction Company & Fredrickson Brothers were awarded the construction of

8.7 miles of Portland cement concrete pavement on the Sacramento-Roseville road between Ben Ali and Sylvan School. This work will involve considerable traffic control as this road carries a major portion of northern California travel, and particularly on account of the Western States Exposition to be held at Sacramento in September. Although several county roads, which are in fair condition, are available for detours, the contractor is required to construct the road in several units so the inconvenience to traffic will be a minimum.

SAN BENITO COUNTY

Preliminary surveys for an improved road connecting Hollister and Pinnacles National Forest by way of Paicines are nearly complete and plans for construction are now being prepared in the district office. This work is being carried on to cooperate with the board of supervisors of San Benito County.

On the Coast Highway, north of San Juan, a non-skid surface is now being placed. South of San Juan and over the San Juan grade the traffic stripe is being renewed. Work being done by the district maintenance.

SAN LUIS OBISPO COUNTY

On the Coast Highway between Arroyo Grande and Pismo the construction of 3.3 miles of grading and paving has recently been started by the Cornwall Construction Company.

Extending from Pismo to San Luis Obispo on the Coast Highway, the construction of a project 10.8 miles in length including grading and paving was recently completed in a satisfactory manner by J. F. Knapp, Contractor.

This project involved considerable realignment and resulted in a highly improved roadway connecting San Luis Obispo and the beach.

North from the city limits of San Luis Obispo the highway is to be realigned for one mile and graded to a roadbed width of 36 feet and surfaced with water-bound macadam 20 feet by 6 inches in width with an oil treated surface. Contract for this construction was recently awarded to the Ariss-Knapp Construction Company.

At Santa Margarita, survey and plans have been completed for reconstruction on a line change at the north end of the town. The proposed construction will eliminate a sharp curve on which is located a narrow concrete bridge of early design. The proposed work will include the construction of a new bridge with a change in the existing creek channel.

Surveys and plans are in progress for the reconstruction of the Coast Highway over a distance of 10.2 miles, between Atascadero and Paso Robles. The work contemplated consists of widening the existing roadbed to an overall width of 36 feet, and the paving reconstructed to a width of 20 feet. Changes in alignment will eliminate several dangerous curves.

On the Cholame Lateral, from a point 1.7 miles west of Shandon to the San Luis Obispo-Kern County Line, a distance of 15.4 miles, the existing highway is now being regraded to a roadbed width of 24 feet and surfaced with bituminous macadam 20 feet in width. The construction is being carried on under contract with A. Teichert and Son.

On the Carmel-San Simeon Highway two wooden bridges are now under construction, one 266 feet long across the Arroyo la Cruz Creek and one 171 feet long across the San Carpojo Creek. These bridges are being built by Chas. and F. W. Steffgen under the supervision of the Bridge Department.

The approaches to both the above bridges involving the grading and surfacing of approximately one mile of roadway, on realignment, is being handled under contract with W. J. Taylor.

Construction of the new equipment shops and storage sheds in San Luis Obispo is progressing under contract with W. J. Smith.

South of San Luis Obispo a reinforced concrete bridge 266 feet in length over the San Luis Creek was recently completed by Chas. and F. W. Steffgen as Contractors. The completion of this bridge opens to traffic the entire project between San Luis Obispo and Pismo.

South of Santa Margarita plans are in progress covering extensive realignment and grade changes extending north from the foot of Cuesta Grade 1.9 miles.

SAN MATEO COUNTY

H. W. Rohl's contract on the Bayshore Highway between San Francisco and South San Francisco is assuming a shape where the bigness of the work is plainly seen. A long concrete under pass to accommodate a railroad spur and a double 8-foot by 9-foot concrete box in piles and heavy concrete mat floor, also a heavy rubble masonry wall have been completed. The heavy cut through Visitation Point fill across Guadalupe Canal and much of the Sierra Point Cut with a maximum centerline cut of 84 feet, stand out as massive sections of a stupendous project. Costing close to a million dollars, and standing as its does, the throat of the main business artery out of San Francisco, this road may well be said to control much of the life of that great city. Progress on the work has been good and it can be seen that by the time the city of San Francisco has finished its portion of the work to the city limits, this work will be ready to take its share of the rapidly increasing traffic.

This work has been carried on with little inconvenience to traffic, as it does not use much of the old road, and where it does, great care has been taken, in one place a wooden structure being built to carry operations over the traveled road. The public have coordinated with the contractor and state to a marked degree on this work, accepting it as their own and treating it as such.

SANTA BARBARA COUNTY

On the Coast Highway between Benham and Carpinteria a line change over the Rincon Hill is under construction, which involves the grading of a roadbed 46 feet wide, to be paved with concrete 30 feet in width. This work is being carried on under contract with McCray Company.

Included in the above line change a steel and concrete overhead bridge 570 feet in length is being constructed over the main line tracks of the Southern Pacific Railroad. A reinforced concrete arch culvert 20 feet by 17 feet 5 inches of special design is being constructed at the Rincon Creek. The two structures are being built under contract with Paul M. White and are being handled under the supervision of the Bridge Department.

South of Montecito 0.3 miles of construction is under way involving the grading of a roadbed 46 feet in width to be paved with concrete 30 feet wide. The work is being carried out under contract with the Cornwall Construction Company.

Between Goleta and Naples, for a distance of 3.5 miles, construction is in progress involving the grading of a roadbed 36 feet in width, to be paved with second story asphalt concrete 20 feet in width. This work is being carried on under contract with San Hunter. In the Gaviota Canyon between Las Cruces and Gaviota, surveys for an extensive realignment of the existing highway have been completed and plans for construction are now in progress in the district office.

SAN MATEO, SANTA CLARA AND SANTA CRUZ COUNTIES

The Skyline Boulevard between La Honda Road and Saratoga is nearly complete, grading is done except daylighting some fine observation points and some slope trimming. The placing of crushed rock surface is nearly completed.

It is planned to place an armor coat of oil and screenings before opening it to traffic and this work is to start soon.

SONOMA COUNTY

The 11.44 miles of second story concrete pavement between Santa Rosa and Willow Brook, E. Paul Ford, Assignee of H. H. Peterson, Contractor, is open to traffic and needs only shoulder work to be completed. This concrete has been placed in record time and in highly satisfactory manner, and the entire job is a fine section of one of the scenic roads of the state, the Redwood Highway.

The cross road from the coast counties to the central counties, the Black Point Cutoff, is being resurfaced for 7.3 miles with bituminous macadam by Teichert & Sons, Contractors of Sacramento. This will put the entire road from the Redwood Highway to Napa County line in fine shape, except for a mile of poor alignment near Fairville, which section it is hoped to relocate and reconstruct in the near future.

TULARE COUNTY

Day labor forces are constructing a masonry wall at a dangerous point on Route 10 east of Lemon Cove.

Fred W. Nighbert has completed his contract for an oil-mixed surface at the connection of the Sierra-to-the-Sea Highway with the Generals Highway in Sequoia National Park.

Record of Bids and Awards

BUTTE COUNTY—Between Oroville and Feather River, grading and surfacing with untreated crushed gravel or stone, 4.1 miles. Dist. II, Rt. 21, Sec. B. Paul J. Tyler, Oroville, $229,838; Guy F. Atkinson Co., San Francisco, $117,948.50; Utah Construction Co., San Francisco, $202,514; Finnell Co., Inc., Sacramento, $206,284; Arris-Knapp, Oakland, $167,073; Lord & Bishop, Oroville, $254,331; A. J. & J. L. Fairbanks, Inc., South San Francisco, $212,809; Contoules Const. Co., San Francisco, $179,715; John F. Collins, Stockton, $204,349; T. E. Connolly, San Francisco, $203,266; W. H. Hauser, Oakland, $206,916. Contract awarded to Arris-Knapp, Oakland, $167,073.

DEL NORTE COUNTY—Between head of Richardson Creek and Klamath River, furnishing rock. Dist. I, Rt. 1, Sec. A. J. E. Johnston, $12,890. Contract awarded to Webber Const. Co., $10,175.

DEL NORTE COUNTY—Between Elk Valley and Smith River, 3.8 miles crushed gravel or stone surfacing. Dist. I, Rt. 1, Sec. C. Smith Brothers, Eureka, $21,340; Tieslau Bros., Berkeley, $25,100. Contract awarded to Webber Const. Co., Crescent City, $21,294.

DEL NORTE COUNTY—Bridge across Hardscrabble Creek. Dist. I, Rt. 1, Sec. C. Parker-Schram Co., Portland, Oregon, $16,452; Webber Const. Co., Crescent City, $15,112; Calvert & Schroder, Grants Pass, $16,547; Smith Bros., Eureka, $16,425. Contract awarded to Webber Const. Co., $15,112.

EL DORADO COUNTY—Mays Station to Nevada state line, grading 5.1 miles. Dist. III, Rt. 2, Sec. K. L. W. Heese, Merced, $30,075; Finnell Co., Inc., Sacramento, $34,254; Isbell Const Co., Carson City, $38,162; Tieslau Bros., Berkeley, $42,701; Charles Miles, Sacramento, $38,369. Contract awarded to L. W. Heese, $30,075.

FRESNO COUNTY—From 3 miles east of Parkfield Junction and Coalinga, 6.7 miles to be surfaced with oil treated crushed gravel or stone. Dist. VI, Rt. 10, Sec. C. W. J. Taylor, Palo Alto, $44,272; Montfort & Amstrong, Sacramento, $45,613; Tieslau Bros., Berkeley, $41,158; Fred W. Nighbert, Bakersfield, $45,698; Tiffany, McReynolds, Tiffany, San Jose, $43,550. Contract awarded to Tieslau Bros., $41,158.

GLENN COUNTY—Between Logandale and Willows, 5 miles surfaced with pit run gravel. Dist. III, Rt. 7, Sec. A. E. C. Coats, Sacramento, $30,022.50; Hansen, Sutton & Griffin, Anaheim, $64,901; G. E. Finnell, Sacramento, $39,471; Pacific Const. Co., San Francisco, $41,943; Chittenden & Hein Bros., Napa and Petaluma, $52,760; Hemstreet & Bell, Marysville, $35,321; L. C. & W. E. Karstedt, San Jose, $30,243; D. McDonald, Sacramento, $49,185; W. C. Colley, Berkeley, $46,358; A. F. Giddings, Sacramento, $40,177; Homer G. Johnson, Roseburg, $63,798; J. F. Collins, Stockton, $33,554; J. R. Reeves, Sacramento, $40,729; Deysher & La Fargue, San Anselmo, $49,669; Tiffany, McReynolds, Tiffany, San Jose, $33,113. Contract awarded to E. C. Coats, $30,022.

HUMBOLDT COUNTY—Between Mad River and Mill Creek, 0.9 mile grading and surfacing with crusher run base. Dist. I, Rt. 1, Sec. I. Pyle & Hall, Eugene, Oregon, $42,088; J. E. Johnston, Stockton, $46,868; Tieslau Bros., Berkeley, $43,552; Pacific Const. Co., San Francisco, $53,067; Smith Bros. Co., Eureka, $49,330; Mercer-Fraser Co., Eureka, $47,295; H. J. Kennedy & Daniel Bayles, Oakland, $44,847; Englehart Paving & Const. Co., Eureka, $41,802; W. H. Hauser, Oakland, $57,323; Ellison & Smith, Fort Bragg, $34,914; G. E. Finnell, Sacramento, $42,081; E. C. Coats, Sacramento, $44,597. Contract awarded to Ellison & Smith, Fort Bragg, $34,914.

HUMBOLDT COUNTY—Between Arcata and 0.3 miles north of Mad River, 3 miles grading and surfacing with crusher run base. Dist. I, Rt. 1, Sec. I. W. H. Hauser Co., Oakland, $95,385; G. E. Finnell, Sacramento, $107,819; E. C. Hall, Eugene, Oregon, $110,346; H. J. Kennedy & Daniel Bayles, Oakland, $84,705; G. D. Contoules, San Francisco, $96,229; Guy F. Pyle, Eugene, Oregon, $106,549; Geo. Mitchell Co., Huntington Park, $104,117; Tieslau Bros., Berkeley, $113,787; E. C. Coats, Sacramento, $87,241; Larsen Bros., Sonoma, $88,291; Mercer-Fraser Co., Eureka, $119,352; R. L. Oakley Palo Alto, $119,825; Smith Bros. Co., Eureka, $105,565. Contract awarded to H. J. Kennedy and Daniel Bayles, Oakland, $84,705.

HUMBOLDT COUNTY—Between 1 mile south of Orick and Russ Grove, producing and stockpiling crushed gravel. Dist. I, Rt. 1, Sec. K. Englehart Paving & Const. Co., Eureka, $26,468; Harold Smith, St. Helena, $24,835; Smith Bros., Eureka, $20,769; Wm. C. Elesmore, Eureka, $24,922; Tieslau Bros., Berkeley, $26,857. Contract awarded to Webber Const. Co., Crescent City, $20,560.

HUMBOLDT COUNTY—Between Russ Grove and northerly county boundary, producing and stockpiling crushed gravel. Dist. I, Rt. 1, Sec. K. Tieslau Bros., Berkeley, $26,295; Smith Bros. Co., Eureka, $19,440; Webber Const. Co., Crescent City, $17,249; Harold Smith, St. Helena, $21,230; Englehart Paving Co., Eureka, $22,194. Contract awarded to Webber Const. Co., $17,240.

HUMBOLDT COUNTY—Between Mill Creek and Little River, producing and stockpiling broken stone and screenings. Dist. I, Rt. 1, Sec. 1. Harold Smith, St. Helena, $20,885; Kern & Kibbie, Portland, $20,363; Englehart Paving & Const., Eureka, $11,789. Contract awarded to Wm. C. Elsemore, Eureka, $17,367.

HUMBOLDT COUNTY—Between Little River and Trinidad, 4.3 miles surfacing with crushed gravel or stone. Dist. I, Rt. 1, Sec. I. Chittenden & Hein Bros., Napa and Petaluma, $35,852. Contract awarded to Kern & Kibble, Portland, $27,750.

HUMBOLDT COUNTY—Between Loleta and Beatrice, 3.7 miles to be graded. Dist. I, Rt. 1, Sec. G. Newport Construction, Portland, $83,381; W. H. Hauser, Oakland, $86,650; Contoules Construction, San Francisco, $100,100; G. E. Finnell, Sacramento, $98,247; A. J. & J. L. Fairbanks, Inc., South San Francisco, $108,561; E. C. Hall, Eugene, Oregon, $88,777; L. W. Heese, Merced, $105,889; Smith Bros., Co., Eureka, $109,273; Mercer-Fraser Co., Eureka, $112,813. Contract awarded to E. C. Coats, Sacramento, $83,114.

HUMBOLDT COUNTY—Between Big Lagoon and Orick, 3.3 miles to be surfaced with untreated crushed gravel or stone. Dist. I, Rt. 1, Sec. J. Harold Smith, St. Helena, $35,661. Contract awarded to Englehart Paving & Const. Co., Eureka, $32,740.

HUMBOLDT COUNTY—Between 1 and 3½ miles north of Arcata, 1 overhead crossing and 7 timber bridges. Dist. I, Rt. 1, Sec. I. M. B. McGowan, San Francisco, $67,564; Mercer-Fraser Co., Eureka, $56,257; Butte Const. Co., San Francisco, $66,363; Fred J. Maurer & Son, Eureka, $63,949; Smith Bros., Eureka, $64,606. Contract awarded to Mercer-Fresar Co., $56,257.

HUMBOLDT-DEL NORTE COUNTIES—Hauling heated asphaltic road oil and fuel oil from state plant at Trinidad to state maintenance yard at Crescent City. Dist. I, Rt. 1. John Weast, Redding, $15,295; A. G. Raisch, San Francisco, $13,127; Deysher & La Fargue, San Anselmo, $14,110; Hess Bros., Weott, Humboldt Co., $11,144; Harry H. Howell, Arcata, $14,000; Basalt Rock Co., Inc., Napa, $10,740; R. L. Hansen and Wm. Kern, Eureka, $14,829; E. H. Baker, Santa Rosa, $10,091; Webber Const. Co., Crescent City, $10,951. Contract awarded to E. H. Baker.

KERN COUNTY—Between 7 miles south of Cinco and Cinco, 7.3 miles to be graded and surfaced with oil treated crushed gravel. Dist. IX, Rt. 23, Sec. B. Bartlett & Mathews, Mojave, $76,014; Fred W. Nighbert, Bakersfield, $95,841. Contract awarded to Southwest Paving Co., Los Angeles, $74,532.

KERN COUNTY—Between Freeman and Northerly boundary, 13.9 miles to be graded and surfaced with oil treatetd crushed gravel. Dist. IX, Rt. 23, Sec. E. Finnell Co., Inc., Sacramento, $217,923; George Herz Co., San Bernardino, $149,986; Southwest Paving Co., Los Angeles, $147,212; G. W. Ellis, Glendale, $156,532. Contract awarded to Bartlett & Mathews-Black & Hagey, Mojave, $137,274.

LAKE COUNTY—From High Valley Creek to Abbott Mine, 15.6 miles to be surfaced with oil treated crushed gravel. Dist. III, Rt. 15, Sec. B.C. Larsen Bros., Sonoma, $162,872; Tieslau Bros., Berkeley, $113,282; A. J. Grier, Oakland, $114,100; T. E. Connolly, San Francisco, $118,011. Contract awarded to Hemstreet & Bell, Marysville, $104,101.

LASSEN COUNTY—Between Doyle and Long Valley Creek, 5.5 miles grading. Dist. II, Rt. 29, Sec. E.

Dovering & Co., Klamath Falls, Oregon, $57,954; J. F. Collins, Stockton, $49,562; G. E. Finnell, Sacramento, $63,505; Tieslau Bros., Berkeley, $65,650; Charles Miles, Sacramento, $49,747; Meyer Rosenberg San Francisco, $45,942; Dodge Bros., Inc., Fallon, Nevada, $46,890; C. A. Bayles, Biggs, $68,747; T. E. Connolly, San Francisco, $74,550; Isbell Const. Co., Fresno, $49,373; Arthur Jones, Newhall, $52,654; J. P. Brennan, $62,366. Contract awarded to Meyer Rosenberg, San Francisco, $45,942.

LASSEN COUNTY—Seven timber bridges across Long Valley Creek and 4 timber cattle passes, near Doyle. Dist. II, Rt. 29, Sec. E. Smith Bros., Eureka, $38,132; A. W. Kitchen, San Francisco, $42,446; C. C. Gildersleeve, Felton, $41,985; Bodenhamer Const. Co., San Diego, $39,668; Ben C. Gerwick, Inc., San Francisco, $44,220; Healy-Tibbitts Const. Co., San Francisco, $40,685; Lord & Bishop, Oroville, $39,500; E. B. Skeels, Roseville, $43,865; R. B. McKenzie, $39,234; E. M. McGuire, Davis, $45,598; J. A. Bryant, San Francisco, $46,470; H. C. Whitty, Sanger, $41,945; M. B. McGowan, San Francisco, $44,010. Contract awarded to F. H. Nielson, Orland, $33,741.

LASSEN COUNTY—Near Doyle, undergrade crossing under the Western Pacific R. R. tracks. Dist. II, Rt. 29, Sec. E. F. H. Nielson, Orland, $22,929; Tieslau Bros., Berkeley, $28,755; A. P. Brady, San Francisco, $23,460; Stephenson Const. Co., San Francisco, $23,132; E. B. Skeels, Roseville, $23,635; H. E. Whitty, Sanger, $24,077; The Adams Co., Angels Camp, $24,943; Healy-Tibbitts Const. Co., San Francisco, $22,252; Lord & Bishop, Oroville, $22,098. Contract awarded to C. C. Gildersleeve, Felton, $20,941.

MARIN COUNTY—4.5 miles to be graded between San Rafael and Alto. Dist. IV, Rt. 1, Sec. C. Ariss-Knapp Co., Oakland, $315,171; Guy F. Atkinson Co., Valley Springs, $380,241; Twohy Bros. & J. F. Shea Co., San Francisco, $391,763; Granfield-Farrar & Carlin, San Francisco, $293,447; George Mitchell Co., Huntington Park, $295,013; H. W. Rohl Co., Los Angeles, $294,237; Ruggio & Sartoris, San Francisco, $302,445; T. E. Connolly, San Francisco, $246,483; Wren & Greenough, Portland, $305,709; Marsh Bros. & Gardenier, Inc., San Francisco, $326,303; Nevada Const. Co., Fallon, Nevada, $331,429. Contract awarded to Granfield-Farrar & Carlin, $293,447.

MARIN COUNTY—Overhead crossing over the Northwestern Pacific R. R. near Alto. Dist IV, Rt. 52, Sec. A. Fredrickson Bros. and Fredrickson & Watson Const. Co., Oakland, $45,880; D. S. Clinton, San Francisco, $51,208; McWilliams & Ritchey, Los Angeles, $47,238; The Adams Co., Angels Camp, $40,984; Rocca & Caletti, San Rafael, $44,598; Leibert & Trobock, San Francisco, $46,598; M. D. Gowan, San Francisco, $39,610; A. W. Kitchen, San Francisco, $41,620; Butte Const. Co., San Francisco, $44,426. Contract awarded to Healy-Tibbitts Co., San Francisco, $37,705.

MENDOCINO COUNTY—Between McDonald and Navarro, 1.6 miles to be graded and surfaced with screened gravel, also timber bridges. Dist. IV, Rt. 48, Sec. A.B & C. A. J. Grier, Oakland, $101,533; Tieslau Bros., Berkeley, $89,687; Smith Bros., Eureka, $92,756; Healy-Tibbitts Const. Co., $102,488; Marsh Bros. & Gardenier, Inc., San Francisco, $114,912; J. P. Holland, Inc., San Francisco, $133,883; Deysher & Lafargue, San Anselmo, $83,510; M. B. McGowan, San Francisco, $87,554; A. W. Kitchen, San Francisco, $91,883; Charles R. Perkins, Fort Bragg, $88,209; T. E. Connolly, San Francisco, $90,798. Contract awarded to W. C. Colley, Berkeley, $84,791.

MONO COUNTY—At Hilton Creek, 1.6 miles grading. Dist. IX, Rt. 23, Sec. C. G. E. Finnell, Sacramento, $20,949. Tom Meagher, Calexico, $19,132; Wm. C. Colley, Berkeley, $20,982; S. H. Palmer & Co., San Francisco, $30,866; Lambert & Wood, Fresno, $18,999. Contract awarded to D. C. Follis, Compton, $14,089.

ORANGE COUNTY—At Irvine, 6.7 miles to be graded and paved with Portland cement concrete. Dist. VII, Rt. 2, Sec. B. C. G. Willis & Sons, Inc., Los Angeles, $70,229; Griffith Co., Los Angeles, $87,181; Sander Pearson, Santa Monica, $87,670; Wells & Dressler, Santa Ana, $74,979; George Herz Co., San Bernardino, $91,086; Watson & Sutton, San Diego, $96,383; B. W. Kahn Co., Los Angeles, $90,178; C. T. Malcom, San Simeon, $93,943; McCray Co., Los Angeles, $79,631; Geo. Mitchell, Huntington Park, $98,852; Martter & Bock, Los Angeles, $79,228; Butterfield Const. Co., San Diego, $82,096. Contract awarded to Steele Finley, Santa Ana, $66,822.

PLACER COUNTY—Between Auburn and Colfax, 13.8 miles to be surfaced with bituminous macadam. Dist. III, Rt. 37, Sec. A.B. Fredrickson & Watson, Oakland, $80,820; A. Teichert & Son, Sacramento, $95,364; E. B. Skeels, Roseville, $90,175; Heafey-Moore Co., Oakland, $81,922; J. A. Casson & Lee, Hayward, $81,550. C. W. Wood, Stockon, $74,270.

SACRAMENTO COUNTY—Between Ben Ali and Sylvan School, 8.7 miles grading and paving with Portland cement concrete. Dist. III, Rt. 3, Sec. B. Hanrahan Co., San Francisco, $344,570; E. Paul Ford, San Diego, $327,434; C. W. Wood, Stockton, $329,036. Contract awarded to Fredrickson & Watson, Oakland, $323,686.

SACRAMENTO-EL DORADO COUNTIES—Between Folsom and Placerville, 28.3 miles to be widened with oil treated rock borders. Dist. III, Rt. 11, Sec. A.B.C. Tiffany, McReynolds, Tiffany, San Jose, $51,982; S. M. McGaw, Stockton, $53,769; McGillivray Const. Co., Sacramento, $71,240; Fred W. Nighbert, Bakersfield, $55,959. Contract awarded to W. H. Larson, Sacramento, $46,208.

SAN BERNARDINO COUNTY—Between Alray and Summit, 3.8 miles to be graded. Dist. VIII, Rt. 31, Sec. B. Isbell Const. Co., Carson City, Nevada, $183,072; George Pollock, Sacramento, $139,237; A. J. & J. L. Fairbanks, San Francisco, $144,744; C. G. Willis & Son, Los Angeles, $139,033; Nevada Contracting Co., Fallon, Nevada, $170,885; J. M. De Luca, Oakland, $213,255; M. S. Ross, Los Angeles, $133,394; Martter & Bock, Los Angeles, $128,452; Dimmitt & Taylor, Los Angeles, $134,943; Schelling & Schelling, Burbank, $139,650; Geo. Mitchell Co., Huntington Park, $149,859; Twohy Brothers Co., & J. F. Shea Co., San Francisco, $186,951; Sharp and Fellows Contracting Co., Los Angeles, $172,389; John F. Collins, Stockton, $161,684; Edson J. Davis, Venice, $132,285; H. W. Rohl Co., Los Angeles, $166,364; Wm. C. Horn Co., Puente, $198,003; J. G. Donovan & Son, Los Angeles, $142,065; Triangle Rock & Gravel Co., San Bernardino, $127,896. Contract awarded to Gist & Bell, Arcadia, $127,029.

SAN DIEGO COUNTY—Between La Posta Creek and Miller Creek, 4.5 miles to be graded. Dist. VII, Rt. 12, Sec. F. Isbell Const. Co., Carson City, Nevada, $261,288; Nelson & Sloan, Chula Vista, $322,300; C. G. Willis & Son, Inc., Los Angeles, $276,369; M. S. Ross, Los Angeles, $338,548; McWilliams & Ritchey, Los Angeles, $297,625; Geo. Mitchell Co., Huntington Park, $289,731; Twohy Bros. & J. F. Shea Co., San Francisco, $346,438; Sharp & Fellows Const. Co., Los Angeles, $400,429. Contract awarded to Nevada Constructing Co., Fallon, Nevada, $233,658.

SANTA CLARA COUNTY—Between Sunnyvale and Santa Clara, 4.6 miles to be graded and paved with Portland cement concrete and asphalt concrete. Dist. IV, Rt. 2, Sec. A. Hanrahan Co., San Francisco, $224,244; Peninsula Paving Co., San Francisco, $232,387; John Jurkovich, Fresno, $238,075; Prentiss Paving Co, San Jose, $237,861. Contract awarded to N. M. Ball, Porterville, $221,053.

SHASTA COUNTY—Producing and stockpiling 3000 cu. yd. crushed gravel between Shotgun Creek and northerly county boundary. Dist. II, Rt. 3, Sec. D. Contract awarded to Haidlen Const. Co., Lamoine, $19,800.

SISKIYOU COUNTY—Between Shasta River and Gazelle, 7.7 miles to be graded and paved with Portland cement concrete. Dist. II, Rt. 3, Sec. B. Hanrahan Co., San Francisco, $336,456; C. W. Wood, Stockton, $337,404; Dunn & Baker, Klamath Falls, Oregon, $311,857; Fredrickson & Watson, Oakland, $310,436; Kaiser Paving Co., Oakland, $328,147; T. E. Connolly, San Francisco, $358,727. Contract awarded to T. M. Morgan Paving Co., Los Angeles, $298,650.

SONOMA COUNTY—Between Fairville and Vineburg Junction, 7.3 miles to be surfaced with bituminous macadam. Dist. IV, Rt. 8, Sec. A.B. Heafey-Moore Co., Oakland, $93,622. Contract awarded to A. Teichert & Son, Sacramento, $82,316.

TRINITY AND SHASTA COUNTIES—Between Weaverville and Tower House, 22.1 miles crushed gravel or stone surfacing. Dist. II, Rt. 20, Sec. A.B. Newport Const. Co., Portland, Oregon, $94,545; Deysher & La Fargue, San Anselmo, $89,595; Hemstreet & Bell, Marysville, $74,250; Chas. N. Chittenden, Napa, $85,057; H. G. Johnson, Roseburg, Oregon, $66,060; T. E. Connolly, San Francisco, $96,294. Contract awarded to A. Milne, Portland, $66,000.

TUOLUMNE COUNTY—Between Sonora and Sullivan Creek, 1.6 miles grading and oil treated surfacing. Dist. X, Rt. 13, Sec. C. Pacific Construction Co., San Francisco, $50,711; A. J. Grier, Oakland, $56,340; E. M. Spencer & M. J. Treaster, Sacramento, $49,846; John F. Collins, Stockton, $44,719; Tiffany, McReynolds, Tiffany, San Jose, $46,805; Wm. C. Colley, Berkeley, $46,276; The Adams Co., Angels Camp, $45,610; R. N. Murdoch, Oakland, $52,931. Contract awarded to Lilly-Willard & Biasotti, Stockton, $44,075.

STATE HIGHWAYS IN CALIFORNIA SHOWING THE PRIMARY AND SECONDARY ROAD SYSTEMS AND THE DIVISION OF THE STATE UNDER THE BREED BILL.

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