State Treasurer—Continued

To date no such report has been filed. Chapter 1703 also removed the fund limitation on invesements referred to above, thereby increasing the ability of the State to secure additional investment returns.

We estimate that additional revenue of between $500,000 and $1,500,000 a year would result if the provisions of this act were put into effect.

During 1955 the entire warrant operation was converted to a punched card warrant system. Bond accounting is in the process of conversion to a punched card system but will not be completed until some time in 1956. Savings in machine rental and manpower will result from these changes in procedure. Also one general accountant grade 4 was eliminated and the duties absorbed by the warrant operations officer reflecting an annual savings of $8,500.

Legislation passed during the 1955 General Session permits the Treasurer to deposit securities for safekeeping with banks or the Federal Reserve Bank of San Francisco. This change in procedure will save an estimated $30,000 annually. The Treasurer recommended this change in procedure.

Other legislation passed during the 1955 General Session permits the Treasurer to invest in securities which mature later than one year. An increase in revenue from investments should result from investments in those types of securities.

No increase in staff has been required in the current fiscal year to put into effect the above mentioned changes.

We recommend that a careful review be made of the procedure whereby the Treasurer determines which of several banks should have active accounts. It is possible that costs could be reduced and revenues increased by reducing the number of banks acting for the State in this capacity. A careful study of this should be made before the 1957 General Session, using as a pattern standard bank practices with respect to compensation for services both for large corporations and for other state governments.

With these reservations we recommend approval of the budget as requested.

DEPARTMENT OF CALIFORNIA HIGHWAY PATROL

ITEM 139 of the Budget Bill

Budget page 491
Budget line No. 25

FOR SUPPORT OF CALIFORNIA HIGHWAY PATROL FROM THE MOTOR VEHICLE FUND

Amount requested	$17,841,097
Estimated to be expended in 1955-56 Fiscal Year	16,043,536
Increase (11.2 percent)	$1,797,561

Summary of Increase

	Total increase	INCREASE DUE TO: Work load or salary adjustments	INCREASE DUE TO: New services	Budget page	Line No.
Salaries and wages	$1,208,069	$419,885	$788,184	499	11
Operating expense	379,372	269,630	109,742	499	12
Equipment	206,850	—25,083	231,933	499	13
Add: decreased reimbursement	+3,270	+3,270	--	499	31
Total increase	$1,797,561	$667,702	$1,129,859	499	33

Department of California Highway Patrol—Continued

RECOMMENDATIONS

Amount budgeted	$17,841,097
Legislative Auditor's recommendation	16,711,238
Reduction	$1,129,859

ANALYSIS

The Department of the California Highway Patrol is charged with enforcing the laws regulating the operation of motor vehicles and the use of the highways as outlined in Section 139 of the California Vehicle Code. The objective of the department is to enforce these laws by patrolling the highways, giving assistance to motorists in any emergency, rendering first aid and giving information. The Field Operations Division carries out these enforcement activities. The Technical Services Division carries out the functions of planning, communication, preparation of orders, bulletins and operation manuals, research and development, and public information. The Training Academy Division trains all new officers and provides refresher training for all uniformed members of the patrol. The Administration Division is composed of the office of the commissioner and the staff sections of general administration, accounting, personnel, office services, facilities, motor transport, and stores and equipment.

Summary of Recommended Reductions

Traffic Officers and Related Expenditures

Since expenditures for construction and maintenance of the State Highway System and expenditures for the operations of the California Highway Patrol both come from highway users funds, the Legislature has the choice of directing the apportionment of this limited amount of money between the two programs.

For reasons set forth in this analysis we believe that the long-run effects of spending this money for highway improvement are of greater value in the saving of human life than the short-run effects of spending it for continuous additions to the Highway Patrol force. We further base this belief on (1) the insufficient justification presented for these new services stemming from the unreliability of existing formulas, (2) by comparing the past experience of the ratio of population to patrolmen in California, (3) a comparison of Highway Patrol coverage in other states, and (4) the desirability of employing supplementary methods, such as radar to secure the maximum effectiveness of each patrolman now on the force.

We therefore recommend the disapproval of the requested 246 traffic officers and 24 traffic sergeants plus other related personnel, expenses and equipment attributable to these positions in the total amount of $1,129,859. A summarization of this amount is shown in Table I, following:

Table I. Summary of Recommended Reductions

Salaries and Wages	
State traffic officers (246)	$695,790
State traffic sergeants (24)	86,562
Intermediate account clerk (1)	2,916
Intermediate typist-clerk (1)	2,916
	$788,184

Department of California Highway Patrol—Continued

Table 1. Summary of Recommended Reductions—Continued

Operating Expenses	
Automobile—operation	$57,660
Radio maintenance, supplies, insurance, etc.	52,082
	$109,742
Equipment	
Automobile—additional	$185,870
Radio, lockers, etc.	46,063
	$231,933
Total recommended reductions	$1,129,859

Independent Analysis of California Highway Patrol

A budget request for $10,000 has been made for a study of the organization and operation of the California Highway Patrol on a contractual basis with the Traffic Institute of Northwestern University in conjunction with the Traffic Division of the International Association of Chiefs of Police. We agree with the Department of Finance that such a study should be made; however, we believe consideration should be given to employing an outside management consulting firm to give a completely independent analysis of the problems of the department. Such a study should cover over-all organization, balance in levels of supervision, effectiveness of methods of operation, optimum uniformed strength, definition of scope of duties of uniformed officers, and general evaluation of the administrative program.

Traffic Officer Manpower Distribution

Table II following is included for reference. It shows a breakdown of the placement of the 140 authorized officers in the 1955-56 budget and the distribution of the 1,623 total at that time. It also shows the same information for the requested officers in the 1956-57 budget. The summary shows that 48 percent of the officers were placed in the southern zone in 1955-56 and 55 percent of the officers requested for 1956-57 are for this zone.

Table II. California Highway Patrol Statement of Traffic Officer Manpower Distribution Authorized and Requested

	Authorized officers 1955-56 Budget 140	*Total authorized officers 1955-56 Budget 1623*	*Requested officers 1956-57 Budget 246*	*Total requested officers 1956-57 Budget 1869*
Valley Zone				
District 2	--	--	--	--
Scale and weight	--	3	--	3
Colusa	1	9	1	10
Oroville	1	13	--	13
Red Bluff	--	7	2	9
Redding	1	15	4	19
Susanville	2	16	2	18
Yreka	1	12	1	13
Total District 2	6	75	10	85

Department of California Highway Patrol—Continued

Table II. California Highway Patrol Statement of Traffic Officer Manpower Distribution Authorized and Requested—Continued

	Authorized officers 1955-56 Budget 140	*Total authorized officers 1955-56 Budget 1623*	*Requested officers 1956-57 Budget 246*	*Total requested officers 1956-57 Budget 1869*
Valley Zone—Continued				
District 4	--	--	--	--
Scale and weight	--	7	--	7
Grass Valley	--	6	1	7
Marysville	2	12	1	13
Placerville	1	8	3	11
Roseville	1	18	3	21
Sacramento	3	41	6	47
Woodland	1	14	--	14
Total District 4	8	106	14	120
District 6	--	1	--	1
Scale and weight	--	5	--	5
Mariposa	1	3	--	3
Merced	1	20	1	21
Merced-Livingston scale	--	5	--	5
Modesto	2	24	1	25
San Andreas	--	7	2	9
Sonora	--	6	3	9
Stockton	3	37	3	40
Total District 6	7	108	10	118
District 7	--	--	--	--
Scale and weight	--	5	--	5
Fresno	4	51	--	51
Madera	1	11	1	12
Visalia	1	32	4	36
Hanford	--	9	2	11
Total District 7	6	108	7	115
District 9	--	--	--	--
Scale and weight	--	11	--	11
Bakersfield	4	61	11	72
Total District 9	4	72	11	83
District 14	--	--	--	--
Scale and weight	--	--	--	--
Bishop	--	12	2	14
Bridgeport	1	5	—1	4
Total District 14	1	17	1	18
Valley zone men	--	2	--	2
Valley zone total	32	488	53	541
Coastal Zone				
District 1	--	--	--	--
Scale and weight	1	9	--	9
Crescent City	--	6	2	8
Eureka	2	21	6	27
Santa Rosa	4	26	7	33
Ukiah	3	18	6	24
Total District 1	10	80	21	101

Department of California Highway Patrol—Continued

Table II. California Highway Patrol Statement of Traffic Officer Manpower Distribution Authorized and Requested—Continued

	Authorized officers 1955-56 Budget 140	*Total authorized officers 1955-56 Budget 1623*	*Requested officers 1956-57 Budget 246*	*Total requested officers 1956-57 Budget 1869*
Coastal Zone—Continued				
District 3	--	--	--	--
Scale and weight	--	6	--	6
Martinez	5	39	5	44
Napa	1	9	3	12
Vallejo	4	25	1	26
Total District 3	10	79	9	88
District 5	--	--	--	--
Scale and weight	--	11	--	11
Hollister	--	6	--	6
San Jose	2	42	3	45
San Leandro	3	40	2	42
Santa Cruz	1	13	2	15
Total District 5	6	112	7	119
District 8	--	--	--	--
Scale and weight	--	8	--	8
Salinas	3	32	4	36
San Luis Obispo	1	21	—3	18
Santa Barbara	1	17	2	19
Ventura	3	29	5	34
Total District 8	8	107	8	115
District 15	--	--	--	--
Scale and weight	--	10	--	10
Bay Bridge	--	36	1	37
Redwood City	4	32	8	40
San Rafael	3	28	4	32
Total District 15	7	106	13	119
Coastal Zone Men	--	1	--	1
Coastal Zone Total	41	485	58	543
Southern Zone				
District 10	--	--	--	--
Scale and weight	--	9	2	11
Barstow	4	31	3	34
Indio	3	19	6	25
Riverside	3	32	6	38
San Bernardino	4	41	13	54
Total District 10	14	132	30	162
District 11	--	--	--	--
Scale and weight	--	--	--	--
Compton	8	67	15	82
Newhall	4	31	9	40
West Los Angeles	5	46	10	56
Total District 11	17	144	34	178

Department of California Highway Patrol—Continued

Table II. California Highway Patrol Statement of Traffic Officer Manpower Distribution Authorized and Requested—Continued

	Authorized officers 1955-56 Budget 140	*Total authorized officers 1955-56 Budget 1623*	*Requested officers 1956-57 Budget 246*	*Total requested officers 1956-57 Budget 1869*
Southern Zone—Continued				
District 12	--	--	--	--
Scale and weight	--	--	--	--
East Los Angeles	6	54	8	62
El Monte	7	53	15	68
Norwalk	8	75	15	90
Pomona	4	21	6	27
Total District 12	25	203	44	247
District 13	--	1	--	1
Scale and weight	--	7	--	7
El Centro	1	17	1	18
Orange	5	48	16	64
San Diego	5	52	10	62
Total District 13	11	125	27	152
Southern Zone men	--	1	--	1
CHP Office L. A.	--	16	--	16
CHP Office L. A. scale and weight	--	16	--	16
Southern Zone Total	67	637	135	772

SUMMARY

Valley Zone	32 (23%)	488 (30%)	53 (22%)	541 (29%)
Coastal Zone	41 (29%)	485 (30%)	58 (23%)	543 (29%)
Southern Zone	67 (48%)	637 (40%)	135 (55%)	772 (42%)
Zone totals	140 (100%)	1,610 (100%)	246 (100%)	1,856 (100%)
Headquarters	--	13	--	13
State-wide total	140	1,623	246	1,869

Distribution of Patrolmen's Hours in 1954

One of the basic considerations in making the California Highway Patrol as effective as possible is in determining how the officers should spend their time. Although a certain amount of work other than actual patrolling on the road is a necessary function of highway patrol officers, it is generally agreed that this supplementary work should be cut to an absolute minimum. The California Highway Patrol is to be commended for reducing the percentage of their nonpatrol hours, and they may be able to reduce them still further. Based on the patrol's figures of 1,531 average men on duty per month in 1954 it is shown in Table III, following, that 62 percent of the officers' hours (not including the supervisory time of the inspectors, captains and lieutenants) was spent in patrol work and 38 percent of the hours was spent on other work. In other words, approximately five hours of an eight-hour workday are spent on the highway. The smallest individual category in Table

Department of California Highway Patrol—Continued

III—Court Hours—at 2 percent, represents more than one week per year per officer.

Table III. Distribution of 1954 Hours Expended

Hours Defined as Enforcement Hours	*Percent*
Patrol	62
Accident investigation	9
Administrative (field)	4
Commercial enforcement	4
Court	2
* Miscellaneous enforcement hours	3
Total enforcement	84
Hours Defined as Other Hours	
In-service training	5
Administrative (office)	4
† Miscellaneous other hours	7
Total other	16
Grand total	100

* Such as warrant service, vehicle inspection, school pupil safety, fixed post, etc.
† Such as traffic safety education, squad and school attendance, equipment maintenance, radio dispatch, etc.

Methods for Determining Manpower Requirements

There has been an attempt in past years to determine manpower needs in terms of variations of the International Association of Chiefs of Police formula which is based entirely upon the number of accidents and the number of arrests, to which arbitrary weight factors have been applied. Although an important relationship exists between these factors and the desirable number of traffic officers, it is only one consideration since the number of enforcement hours, does not directly affect the accident rate. Nation-wide tests have shown that the marginal effectiveness of increased enforcement on accident and fatality rates tends to diminish as further enforcement manpower is added, and in some cases no improvement at all can be attributed to increased enforcement personnel. From 1947 to 1954 there was an increase in California highway patrolmen of 34 percent as compared with an increase in the absolute number of accidents of 49 percent. During this same period the death rate per 100 million vehicle-miles traveled actually decreased 35 percent. We believe, however, this can be very largely attributed to the fact that many more miles were traveled on improved highways, rather than because of enforcement activity. Certainly there has been no case made in this budget for the latter.

It is the feeling of this office that an acceptable measurement of manpower requirements should include other representative growth factors such as population, automobile registrations, miles traveled, miles of highway, type of highway, relative effectiveness of auxiliary enforcement equipment and other valid criteria. We feel that the Legislature has in the past been unwilling to grant the number of men requested because of this inability to justify the increased expenditure as a lifesaving measure, whereas it can be shown plainly that the lifesaving value of freeways is very tangible. The Legislature has taken,

Department of California Highway Patrol—Continued

however, the practical approach that some increase in the number of traffic officers is consistent with increased growth of the State for highway supervision as well as an attempt to control accidents. We can find no reason to justify the increase of 246 patrol officers either on the basis that additional patrolmen provide the best expenditure for lifesaving activity on the highways or on the basis of additional patrolmen for increased highway supervision resulting from normal population increases.

For seven years (1947-1948 through 1953-1954) of the past nine years, there has been an almost constant relationship of 10.5 traffic officers per 100,000 population. This relationship was upset during the past two years (1954-1955 and 1955-1956) when the ratios were increased respectively to 11.6 and 12.5 patrolmen per 100,000 population. If this factor of 10.5 is applied to current population estimates for 1956-1957, the number of field patrolmen would be 1,413, considerably less than the 1,623 now authorized, not to mention the request for 246 additional traffic officers. Even applying the 12.5 ratio produces a requirement of only 1,682 officers.

Further, from a survey of the Minnesota State Highway Department conducted by the International Association of Chiefs of Police in November, 1954, we have applied the ratios of automobile registrations per patrolman and million vehicle miles per patrolman as calculated in the study by using the number of patrol officers recommended in the study for that state. By this method the comparable number of men would be 1,320 on the basis of registrations or 1,200 men on the basis of million vehicle miles, both considerably less than existing personnel in California.

Improved State Highways and the Accident Rate

During the period 1950 through 1954 the total mileage in the state rural highway system remained fairly constant at approximately 12,500 miles of highway. The increase in state mileage was compensated for by the expansion of city mileage thereby reducing state mileage, the straightening or shortening of roads thereby reducing total mileage and in a few cases changes in legislative definitions. There was, however, a large increase in the percentage of "full freeways and expressways"* with a corresponding decrease in two and three lane divided highways as the construction program progressed. Traffic on the system increased 33⅓ percent during this same period from approximately 12 billion to 16 billion vehicle miles traveled per year. Traffic on expressways represents approximately 20 percent of the total vehicle miles traveled and 4 percent of these miles are classed as "full freeway" miles.

The following observations are significant in Table IV:

1. Two-, three- and four-lane undivided highways have 1954 accident rates which are more than double the rates on full freeways and more than half again as high as the rates on expressways.

* Full freeways have uninterrupted traffic flow and "control access." They do not have any private or public vehicular or pedestrian cross traffic. Expressways have access roads to a limited degree.

Department of California Highway Patrol—Continued

2. A comparison of the 1954 fatality rate for the two categories in No. 1 above shows that the rate for two-, three- and four-lane undivided highways also is more than half again as high as the rates on expressways and that the rate is more than four times greater than full freeways.

3. A comparison of the reduction in accidents per million vehicle miles between 1950 and 1954 shows that even though expressways and freeways already had a much lower rate than the other types of roads, the rate still dropped more than 20 percent during the interim as compared with a reduction of from 4 percent to 7 percent in the two-, three- and four-lane undivided categories.

4. This observation does not apply to fatalities, however. The fatality rate for freeways, although more than four times lower than for the other types of highways actually increased 34 percent from 1.43 in 1950 to 1.92 in 1954.

Table IV. Accidents on Rural California State Highways

	*Accidents per MVM**		*Fatalities per 100 MVM**	
	1950	*1954*	*1950*	*1954*
2 Lanes undivided	2.37	2.21	9.85	9.49
3 Lanes undivided	2.93	2.65	12.85	9.68
4 Lanes undivided	3.67	3.54	8.90	6.47
4 Lanes divided expressways	2.13	1.71	9.28	6.45
Total (including Misc.)	2.61	2.30	9.88	8.38
Full freeways (rural and urban)	1.51	1.27	1.43	1.92

* Million vehicle miles.

Specific Example of Effect of Freeways on the Accident Rate

In order to show the specific effect on the accident rate of the conversion of a representative highway from two- and four-lane highway to freeway, we present the 1951 through 1953 figures for a 20-mile stretch of state highway in the Alameda-San Leandro area in Table V, following. The total mileages and the individual section mileages vary slightly from year to year as the sections were shortened and lengthened during the three-year interval.

Section ALA69A (some 11 miles of two-lane undivided highway) gradually reduced accidents per MVM from 3.12 to 2.49 during these three years 1951 through 1953. Although the absolute number of accidents increased during this period the total mileage traveled was proportionately higher so that there was a reduction in the accident rate. The second Section ALA69A (one-third mile of four-lane undivided highway) increased from the high accident ratio figures of 5.60 to the still higher rate of 8.31 for the same period.

In contrast, compare the results in the eight miles of Section ALA69B as it was gradually converted to freeway in 1952 and 1953. The rate of 8.44 was reduced to 6.20 in 1952 and to 7.64 in 1953 for the unconverted sections but the portion converted to freeway dropped 75 percent to 2.13 for ALA69C in 1952, and 92 percent to 0.70 for ALA69C and 89 percent to 0.98 for ALA69D in 1953.

Department of California Highway Patrol—Continued

Table V. Effect of Freeways on the Accident Rate on Representative Freeway in Alameda County

Year	Road section	Section mileage	Type of highway	Accidents per MVM *
1951	ALA69A	11.28	2 Lanes undivided	3.12
	ALA69A	.32	4 Lanes undivided	5.60
	ALA69B	8.64	2 Lanes undivided	8.44
		20.24		
1952	ALA69A	11.28	2 Lanes undivided	2.62
	ALA69A	.32	4 Lanes undivided	7.42
	ALA69B	5.73	2 Lanes undivided	6.20
	ALA69C	3.39	Full freeway 4 lanes divided	2.13
		20.72		
1953	ALA69A	11.58	2 Lanes undivided	2.49
	ALA69A	.32	4 Lanes undivided	8.31
	ALA69B	2.80	2 Lanes undivided	7.64
	ALA69C	5.29	Full freeway 4 lanes divided	.70
	ALA69D	1.39	Full freeway 4 lanes divided	.98
		21.38		

* Million vehicle-miles.

Effect of Freeways on Number of Accidents on Adjacent City Streets

The effects of freeways on accidents on adjacent city streets is illustrated by statistics relative to the City of Tulare as reported in *California Highways and Public Works* for January, 1955. The eight-mile freeway which carried State Route 4 (US 99) around the City of Tulare had the effect of reducing accidents over the entire City of Tulare. This freeway was opened on December 11, 1953. The following data refer to a 10½-month period after the freeway was opened compared to an identical period one year earlier. The comparative study embraces all streets within the city limits of Tulare plus both the old and new US 99 highways.

The freeway bypass diverted approximately 70 percent of the US 99 highway traffic, which previously flowed through the city, although traffic on the old and new routes combined had increased 7 percent in the one-year period. Since the total US 99 highway flow is essentially carried on the two routes, the accident comparisons are between the old route alone in the "before" period to the sum of the old route and the freeway bypass in the "after" period. Even on this basis, there was a reduction of 63 percent in total accidents in the period since construction of the freeway. Other streets in the City of Tulare showed a drop of 23 percent in total accidents. The freeway construction effected an average reduction in accidents of 43 percent for the entire area.

Table VI, following, shows a comparison of accidents by type in the "before" and "after" periods.

Department of California Highway Patrol—Continued

Table VI. Number of Accidents Before and After Construction of Tulare Freeway

Location	Fatal accidents		Injury accidents		Property damage only accidents		Total	
	Before	After	Before	After	Before	After	Before	After
US 99								
Freeway	No Rd.	2	No Rd.	8	No Rd.	13	No Rd.	23
Old route	4	2	48	8	114	29	166	39
Totals	4	4	48	16	114	42	166	62
Other streets								
Rt. 134	0	0	12	6	49	23	61	29
City streets	1	0	13	20	79	70	93	90
Totals	1	0	25	26	128	93	154	119
Total area	5	4	73	42	242	135	320	181

There was no significant change in fatal accidents, primarily due to the smallness of the sample. However, for the new freeway plus the old route, injury accidents decreasd from 48 accidents to 16 accidents or 67 percent after completion of the freeway.

Another interesting sidelight, following freeway construction in Tulare, was reduced enforcement necessary because of improved traffic and accident conditions. The chief of police of Tulare stated that after the freeway was opened, the traffic and accident situation within the city was so much better that he was able to reduce his total police force from 22 to 17 officers. In addition, the Highway Patrol was able to reduce enforcement personnel on US 99 in Tulare County by three men, transferring these men to other areas in the county.

Use of Radar

Although the Legislature has in the past expressed its desire to provide the California Highway Patrol with the best Class A automotive equipment to assist them in the apprehension of speeders, it has not yet expressed its desire to provide this department with the most improved and modern auxiliary equipment now available for speed detection and apprehension. Foremost in this category of equipment are the radar devices used for measuring the speed of motorists. We feel that the experiences of other state highway patrol organizations and municipal traffic departments ably demonstrates the value of this equipment.

Surveys of Use of This Equipment by Other States

The Legislative Auditor's Office has corresponded with the 10 states which are among the largest users of this equipment in an attempt to evaluate the effectiveness of this equipment. The California Highway Patrol has also surveyed the usage among seven states in conjunction with their own trial tests of the equipment and employed methods.

The conclusions drawn from these two surveys and from a general study of the subject are as follows:

A. Extent of Usage

The use of this equipment for highway patrol work started in Connecticut in 1946 and since that time it has been used in increasing

Department of California Highway Patrol—Continued

degrees by most states. As of November, 1955, there was a total of 40 state highway patrol departments and 305 municipal police departments licensed by the Federal Communications Commission to use radar.

B. Public Exposure to and Acceptance of Radar

1. A vast majority of the motorists across the country deplore the accidents caused by unsafe driving speeds and approve of any device that will reduce these accidents as long as it is operated in a fair manner.

2. The use of radar creates a consciousness of speed and speed limits in the minds of drivers at all times. It is a psychological deterrent to would-be speeders.

3. When Wisconsin put the system into use, in addition to publicizing it, they allowed motorists to pass through a radar checking lane to test the accuracy of their speedometers. This not only advertised the use of the equipment but gave the average motorist the feeling of "getting into the act" which furthered public acceptance.

4. It has been shown that radar has been responsible for more pleas of guilty as people have come to realize that they cannot argue with the positive proof supplied by radar. This equipment therefore reduces the time that patrolmen must spend in court, thus making additional time available for active duty.

5. Arizona reported that in the four years during which radar had been used, there were very few not guilty pleas and no cases were taken to the appellate courts. They also stated that there were only three written complaints on its use in 1954 and investigation proved that in these cases the radar had been placed in low speed, low accident areas. There were no complaints received in 1955 through November 22d when last contacted.

6. It is significant to note that Arizona does not always inform the motorist that he is being checked. Two of the signs they use are as follows: "Warning—*Unmarked* Patrol Cars—Radar Speed Control Used" and "Your Speed *Has Just Been* Checked By Radar."

7. The survey of the California Highway Patrol reported that out of 75 vehicles stopped for exceeding the limits, only four were unfavorable and they did not deny they were speeding.

C. Legality

1. Some states have enacted statutes legalizing the use of radar equipment to make the evidence admissible in court. Other states have not found it necessary to enact such legislation.

2. Virginia incorporated the following into its law: "The results of such checks shall be accepted as prima facie evidence of the speed of such motor vehicle in any court or legal proceedings where the speed of the motor vehicle is at issue."

3. Maryland enacted a similar measure but added that "such evidence shall not be introduced in any proceedings to enforce motor vehicle speed limits unless the highway or road on which said device was clearly marked within four miles of said device."

Department of California Highway Patrol—Continued

4. Pennsylvania has been using the equipment experimentally on the Pennsylvania Turnpike but points out that radar is prohibited under provisions of the law providing for maximum speeds allowed.

D. Mechanical Accuracy

1. The radar beam is 98 percent accurate at 100 m.p.h. which means a possible 2 m.p.h. error at 100 m.p.h. or a 1 m.p.h. error at 50 m.p.h., which is far more accurate than the automobile speedometer.

2. To eliminate all arguments on accuracy, some states have discounted all recorded speeds by 2 m.p.h. on citations.

3. Radar equipment is not affected by rain, fog, snow nor darkness, although the verification of license number and the apprehension by human means are hampered under these conditions.

4. Radar eliminates the complaint that the arresting officer did not ascertain a true check on the speed of the violator.

E. Observations on Effect on Fatality Rate

1. Since excessive speed increases the likelihood and the severity of accidents, if it can be controlled the most serious cases can be reduced materially.

2. Radar eliminates the double hazard, i.e., the need for high speed pursuit of the violators by the patrolman.

3. The use of radar on the New Jersey Turnpike is credited with a major role in cutting the fatality rate by 32 percent.

4. The death rate for one particularly bad stretch of highway in Mississippi has been reduced by 70 percent as a result of the use of radar.

5. The 1955 Arizona speed survey indicated that the over-all speed on the state highway system was down approximately 10 miles per hour and that traffic fatalities were 11 percent below the 1954 figures.

F. Effect on the Number of Officers

1. There is some disagreement as to whether any savings in manpower can be expected from radar installations. A majority of the patrols contacted expressed the idea that this is a supplementary measure which should not be compared along with existing manpower requirements.

2. Some believe that although radar improves the effectiveness of patrol work, it actually increases manpower requirements.

3. Others have expressed a different reaction, however, as the Traffic Department of the City of Akron, Ohio, which stated that radar "is just like increasing your personnel about 30 percent."

4. Virginia believes that the use of radar in conjunction with the patrol method of enforcement of speed laws will enable them to "control the speed of vehicles to a reasonable degree eventually, thereby allowing more time for all members to allot to the many other violations."

5. With radar a patrolman can check the speed of a great many more vehicles per hour than he can with a cruiser car.

Department of California Highway Patrol—Continued

6. Many different locations can be spot checked within a short period of time because of its portability. This is also effective in investigating complaints of exceptionally bad conditions.

7. Illinois stated that "radar has relieved the manpower formerly needed on Edens Highway and Calumet Expressway due to the mobility of the equipment which can be successfully operated by two officers, one noting the readings on the dial and radioing ahead to a patrol car the information needed for the apprehension."

G. Cost of the Equipment

1. Average cost of the speed meter and recorder is approximately $1,100 per unit.

2. Installation costs vary from $15 to $100 per unit.

3. Maintenance costs vary considerably with a high of $150 per unit per year.

H. Limitations of Radar Equipment

There are some limitations which should be taken into consideration in an evaluation of this equipment. They are as follows:

1. Radar is of little value in extremely heavy traffic.

2. Its effectiveness is reduced at intersections and sharp turns.

3. Its effectiveness is limited to one side of a divided highway when trees and shrubs and other obstructions are on the island.

4. It is admittedly a check on only one type of violation—*speed.*

Other Recommendations for Reducing Accidents and Improving the Flow of Traffic

There are many additional recommendations for reducing accidents and improving the flow of traffic that should be investigated. Some of these are directly the concern of the California Highway Patrol and some are not. They all must be considered, however, in any discussion of the solution to this major problem. The most important of these recommendations are as follows:

Public Education

It has been proven conclusively that the driver himself is the most important figure to be considered in an analysis of the cause of accidents. If we can somehow reach him, the scope of our problem will be vastly reduced. Proof that this can be done is evidenced by the record of La Crosse, Wisconsin, a city of 50,000 which on December 23, 1955, completed its second full year without a single traffic death and is still furthering that record. The reasons for this record are set down as continuous education via newspapers and radio, enforced laws, radar throughout the city, and complete accident investigation methods.

In order to reach the driver we must first arouse his desire and determination to do personally everything in his power to correct the situation. Education and continuous reminders through all media are important, but even more important are the compelling factors that will reach the driver who does not voluntarily give his fullest cooperation. Some of these factors are: fixed speed limits, realistic speed limits, courts which will strictly enforce these speed limits and impose appropriate fines after the limits have been set correctly, severe penalties for

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drunk driving and habitual carelessness, revocation of licenses in cases where the public is placed in continuing jeopardy. Some of these factors are outlined more completely in the following sections.

Realistic Speed Limits

One factor which materially affects the accident rate and discourages the even flow of traffic is the unrealistic speed limits which exist in many locations throughout the State. Many of these limits are so absurd that no effort can be made to enforce them. This, of course, weakens the general acceptance of an adherence to all speed limits. This condition is prevalent throughout the United States and some states are beginning to see the importance of conducting traffic-engineering studies to determine justifiable, and therefore, enforceable, maximum and minimum speed limits. Colorado now has a state law which specifies that no speed limit can be set without a traffic-engineering study.

One of the findings of California Highway Patrol's radar study was that only 7 percent of the traffic is obeying the 15 m.p.h. school zone without radar sign posts and even with signs only 25 percent observe this regulation.

The prima facie speed limit which permits motorists to drive at rates above 55 m.p.h. if considered safe and prudent is the cause of much of the dilemma involving speed violations. The judgments are further complicated by the fact that we now have three interpretations of the proper speed: those of the motorist, the enforcement officer, and the court.

The importance of enforceable traffic laws is so basic that it is safe to say that any measures taken to reduce accidents must be substantially discounted until this defect is removed.

Revision of Court Procedure

Investigation should be made of the possibility of setting up established severe fine schedules in the courts to make the public cognizant of its "buying of bad driving." If these schedules are just but costly and are administered properly, they will serve as effective deterents and will expedite the movement of cases through the overloaded court procedure.

Miscellaneous Areas for Investigation and Improvement

A. Investigation of electronic traffic controls such as the type recently installed in Los Angeles. These units interchange information, evaluate traffic situations and regulate the movement of vehicles and pedestrians after weighing all the factors involved.

B. Examination of the possible uses of the Abell Traffic Camera, a device which records on film the offender making his infraction, the date, the time and the speed. There is obviously little room for argument when such an instrument is employed.

C. Investigation of the electric eye with televised monitoring of expressway traffic which has been effectively used in the Detroit area.

D. Clarification of truck and bus obligations and privileges on highways and freeways.

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E. Investigation of the flashing sign which is activated by two photo-electric relays as developed at the University of Michigan. The speed of an auto is computed and the sign is triggered to flash some such message as "Slow down, you are driving over 60."

Janitorial Service at the Training Academy

It is evident that if the Division of Buildings and Grounds is to obtain the maximum efficiency from the janitorial staffing of all state offices, they should do the work for all agencies. On July 1, 1954, the Division of Buildings and Grounds agreed that the Department of the California Highway Patrol would assume maintenance of the Highway Patrol Academy and the building for the Office of Civil Defense.

It was contended that because of the distance involved and since the janitors were to maintain the visual aids and the control devices of the pistol range that the entire janitorial function at the training academy would be more effectively run if placed under the Patrol. The work for the Office of Civil Defense was transferred because of the proximity to the training academy.

We contend that the janitorial work for both of these agencies should be returned to Buildings and Grounds to be consistent with the purpose for which that division was created.

Significant Accomplishments During 1955-56 Fiscal Year

Following is a summary of the most important achievements of the California Highway Patrol in 1955-56 which have increased the efficiency and economy of the operation.

Field Operations

1. The California Highway Patrol has developed enforcement guides whereby the department and all local traffic enforcement agencies may follow a state-wide approach to those violations which contribute primarily to accident and vehicular congestion.

2. During periods of extremely heavy traffic flow and high accident frequencies; i.e., three-day holiday weekends, the department has re-emphasized its program whereby all uniformed personnel are on visual patrol of the highway system in an effort to curb the high accident and fatality ratings during these periods.

3. The Department of California Highway Patrol and the State Division of Highays have held interagency conferences to determine the most efficient and economical method of providing facilities for the weighing of commercial type vehicles. It has been determined that the use of portable weighing facilities will in many instances obviate a later need for higher priced scale installations.

4. Revised officer's activity report to more effectively illustrate the quality as well as the quantity of arrests.

5. Established field office overtime controls providing for a closer supervision of the accumulation of overtime and requiring prompt dispatch of accumulated hours. These requirements, however, are tempered by provisions permitting a reasonable bank which commanding officers may use as a buffer in preventing docks due to shift variances.

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6. The department restricted the assignment of uniformed personnel to assist at special events such as fairs, rodeos and like events which has effected a considerable saving of man-hours previously expended and which is allowing for more enforcement activity.

7. Following considerable experimentation, the department adopted a policy of requiring the use of safety belts during the operation of patrol vehicles at speeds in excess of normal flow of traffic. Reports from the field indicate a number of serious injuries or possible deaths have been averted by officers using this apparatus.

8. The department continues to experiment with and test crash helmets for use by all field motorcycle personnel. Their use has been adopted at the training facility with highly beneficial results accruing to the State.

9. Following experimentation and study, the department adopted the general policy of one-man patrol units. However, the policy statement contained a provision which basically left the final determination as to the number of men to be assigned per unit up to the discretion of the immediate commander, depending upon conditions existing at the time and place.

Automotive Equipment and Shops

1. The department is now equipping new cars in department shops. This has resulted in less cost for the following reasons: the dealer does not have to modify the automobiles; the $2.50-per-hour departmental labor rate v. the $5-per-hour dealer labor rate; installations are more uniform and more satisfactory; and delivery is expedited by eliminating the delays in waiting for the dealer to equip.

2. Centralized responsibility of automobile repairs up to $150 in area offices thus reducing delays in processing repair estimates through the district inspector.

3. Authorized repair of vehicles up to $75 without estimate, reducing clerical time and delay in obtaining approval for repairs.

Research and Development

1. Devised a new accident report form for state-wide use. A coding strip is included on the margin of the form, thus eliminating a coder's work sheet. The multiple page form divides the releasable and nonreleasable information thereby simplifying reproduction of the form by copy machine and expediting the release of information to area offices.

2. Prepared enforcement guides for assistance to officers, prosecutors and courts on speed, right of way, anticongestion and driving while under influence of intoxicating liquor.

Miscellaneous

1. Procedures for the sale of accident pictures, reports and tab sales were established. A total of $21,908 has been collected from these sources since the procedure was established July 1, 1953.

2. The department is continuing its program of working closely with the Society of Automotive Engineers, the Institute of Transportation and Traffic Engineering of the University of California, and the Auto-

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mobile Manufacturers Association toward the development of better safety devices on motor vehicles and the removal from roadways of devices which have proven inadequate.

3. Established a uniform procedure on a quarterly basis for the preparation and processing of requisitions for supplies and equipment. This quarterly procedure has greatly reduced the number of requisitions, has saved time in shipping charges. It has also eliminated acknowledging receipt of the supplies by returning a signed copy of the requisition. This, too, has saved mailing charges and filing time. As a short-cut the procedure provides that requisitions be mailed direct from area rather than through channels, thus speeding up the process of requisitioning by several days.

4. The department has expanded its program of conference-type meetings of various levels of command in order that maximum effectiveness and uniformity of operation might be attained.

DEPARTMENT OF INDUSTRIAL RELATIONS

ITEM 140 of the Budget Bill — Budget page 500, Budget line No. 32

FOR SUPPORT OF DEPARTMENT OF INDUSTRIAL RELATIONS FROM THE GENERAL FUND

Amount requested	$6,306,715
Estimated to be expended in 1955-56 Fiscal Year	5,933,503
Increase (6.3 percent)	$373,212

Summary of Increase

	Total increase	INCREASE DUE TO: Work load or salary adjustments	INCREASE DUE TO: New services	Budget page	Budget Line No.
Salaries and wages	$256,959	$256,959	--	509	22
Operating expense	81,983	81,983	--	509	23
Equipment	35,503	35,503	--	509	24
Less: increased reimbursements	*—1,233*	*—1,233*	--	509	34
Total increase	$373,212	$373,212	--	509	36

RECOMMENDATIONS

Amount budgeted	$6,306,715
Legislative Auditor's recommendation	6,272,905
Reduction	$33,810

Fees

During the past year the Department of Finance reviewed the fees administered by the Divisions of Housing, Industrial Safety, Industrial Welfare, Labor Law Enforcement, and the Industrial Accident Commission to determine the extent to which the sums collected covered the actual costs of the services for which fees were paid.

The results are summarized as follows: