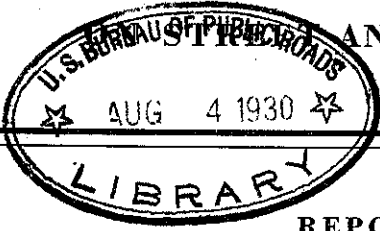


NATIONAL CONFERENCE

STREET AND HIGHWAY SAFETY



REPORT OF THE

Committee on Maintenance of the Motor Vehicle

APPOINTED BY
THE SECRETARY OF COMMERCE

FOR CHANGES SEE
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THIS REPORT is one of five issued for consideration in advance of the Third National Conference on Street and Highway Safety. The reports are: I—Protection of Railway Grade Crossings and Highway Intersections; II—Maintenance of the Motor Vehicle; III—Measures for the Relief of Traffic Congestion; IV—Uniform Traffic Regulation (accompanied by Uniform Vehicle Code, Model Municipal Traffic Ordinance and Manual of Standard Street Traffic Signs, Signals and Markings as revised); V—Traffic Accident Statistics. Copies of all of these and of earlier Conference publications (see list at back of this pamphlet) can be obtained from the National Conference on Street and Highway Safety, 1615 H Street, N.W., Washington, D. C.

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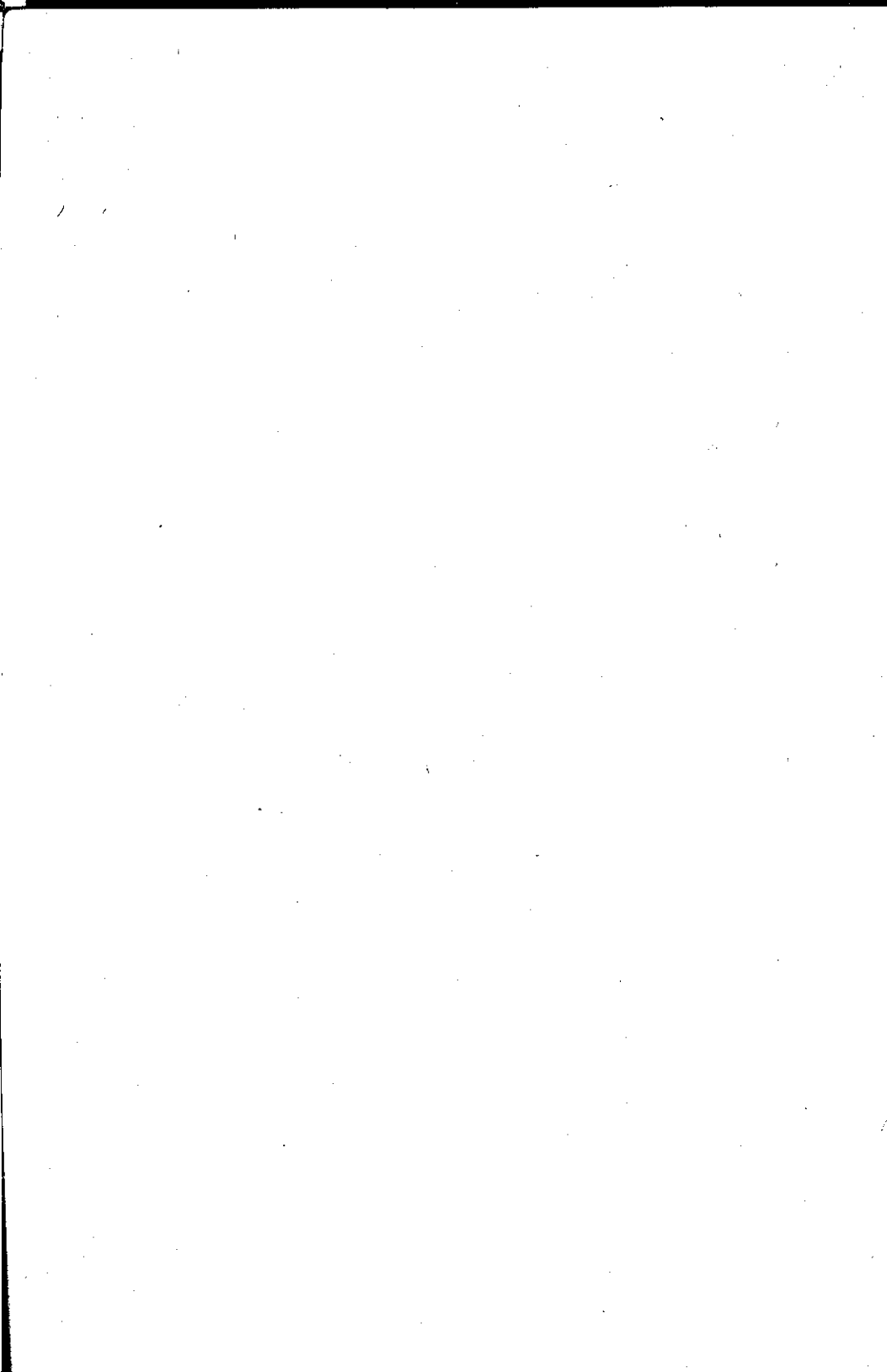
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NATIONAL CONFERENCE ON STREET AND HIGHWAY SAFETY

Committee on Maintenance of the Motor Vehicle

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Washington, D. C.*

SIR: One of the committees of the First National Conference on Street and Highway Safety held in 1924 rendered a report on The Motor Vehicle. While reference was made to the importance of proper maintenance, the report was, in the main, devoted to features of vehicle design and construction affecting street and highway safety.

In the intervening years great advances have been made by manufacturers in improving the vehicles both as to safety factors when new and as to durability and ease of maintenance. Progress in actual maintenance of vehicles on the part of individual owners, however, does not appear to have been satisfactory. In a considerable number of accidents faulty brakes, faulty headlights, faulty steering mechanism and other equipment continue to be important factors. This Committee was appointed by you to determine the facts and submit recommendations regarding vehicle maintenance as affecting safe and orderly movement of traffic.

The Committee is convinced that in addition to a considerable number of vehicles on the road in such wornout condition that proper maintenance is virtually impossible, there are also a large number of vehicles of inherently safe design and construction which are being operated in an unsafe condition because of neglect of maintenance on the part of their owners. The Com-

mittee is furthermore of the opinion that there are entirely practical measures which can be taken which will greatly improve the standard of maintenance and reduce the present hazards.

The Committee submits herewith its findings and conclusions.

By the Committee,

WILLIAM CANDLER, *Chairman.*

Washington, D. C., April 21, 1930.

Summary of Conclusions

1. From the available records it appears that vehicular defects are important or a contributing factor in at least 15 per cent of fatal motor vehicle accidents. One careful investigation of mechanical condition of vehicles involved in a series of fatal accidents and each of a number of statewide official inspection campaigns showed much larger percentages of vehicles in defective condition.

2. Defects found to require correction in the inspection campaigns, or considered as principal or contributing causes of accidents covered by the special investigations, were reported in the following percentages of vehicles examined: Defects in brakes, 24.5 to 28.0 per cent; lights, 13.3 to 25.0 per cent, and steering gear, horns and other accessories in various percentages up to 7 per cent for each item.

3. Modern driving practices are based on brake performance which a few years ago would have been considered remarkable. Modern brakes are capable of such performance if they are kept in proper adjustment and relined when necessary, but if neglected, an emergency may find the driver utterly powerless to avert a serious accident.

4. Glaring or insufficient lights contribute to between 5 and 10 per cent of all accidents, or between 12½ and 25 per cent of night accidents. The balance between insufficient light for the driver on the one hand, and glare for approaching motorists on the other hand, is a delicate one which, pending further technical improvements, can be maintained only by watchfulness and frequent check-up. The absence or poor visibility of tail lights on vehicles parked or stalled at night, especially on unlighted roads, has caused many serious rear end collisions.

5. Tires in poor condition may cause accidents through suffering a blowout at high speed or in dense traffic.

6. Other defects of the vehicle or its equipment are sufficiently important to justify regular inspection by competent

mechanics, thereby lengthening the life of the car, increasing riding comfort, lessening maintenance expenses, preventing breakdowns and reducing accident hazards.

7. As cars differ with respect to the details of their mechanical equipment and the nature and frequency of maintenance inspections required, there should be furnished with each new car complete, simple instructions regarding the care of the various parts and equipment. Dealers and service stations should thoroughly understand both the need for proper maintenance and the method of providing it, and should do everything possible to encourage regular attention by their customers.

8. To facilitate prompt and reliable inspection and service, either when required by a police officer or when voluntarily desired by the motorist, garages and service stations should be equipped with brake and headlight testing equipment, or special testing stations should be established under state control.

9. The owners of all commercial vehicles—trucks, taxicabs and buses—should arrange for regular inspection and servicing of all parts and equipment requisite to safety, as many of them are now doing.

10. Every state should adopt the provisions of the Uniform Vehicle Code (Act IV) relating to equipment, together with the necessary detailed administrative regulations consistent therewith.

11. Periodic inspection of all vehicles in the state is recommended. Such inspections should be under rigid state supervision and preferably under authorization by state law.

12. A certificate of inspection, not more than three months old, should be required before issuance of registration plates, either for all cars or for all cars more than four years old and all cars which have been repurchased.

13. Old cars eventually reach a state where they can no longer be economically kept in safe condition. The elimination of these "junk" cars from the highway is one of the most important parts of the whole problem. A car once junked should be prevented from being returned to service. This may be brought about by proper provision in the certificate of title law. The "highway safety plan" of the manufacturers, which provides an allowance

for the junking of decrepit cars, is an important step to the same end.

14. Every state should have, as part of its enforcement machinery, an adequate highway patrol force whose members should be trained to recognize the symptoms of mechanical defects and to make simple tests which will indicate whether the vehicle needs further attention. The aim of the highway patrol should be to inform motorists whose cars are defective and impress on them the need for prompt repair; but cars in a really hazardous condition should be withdrawn from the highway forthwith, and wilful violators of the maintenance requirements should be punished.

15. Both the importance of and the methods of proper inspection and maintenance should be emphasized in all educational campaigns for safety, and especially in the educational work of motor clubs among their own members and of manufacturers among their sales and service organizations, with particular reference to uneducated, untrained and immature drivers.

16. Careful investigation of all serious accidents and the causes thereof, together with a comprehensive up-to-date system of accident records and statistics, is recommended in all states and cities so that accurate information may be available regarding vehicular defects and other causes of accidents.

VEHICULAR DEFECTS AS A CAUSE OF ACCIDENTS

Most of the available figures bearing on this subject are found in the reports of state motor vehicle departments, which represent tabulations of the reports of individual accidents made by the parties involved, with sometimes additional reports by local police officers. The reports are supposed to include all factors—what the drivers or the driver and the pedestrian were doing, the condition of weather, light, roadway, time of day and other items as well as vehicular defects.

Reports compiled in this manner by California, Indiana, New York and North Carolina and similar reports compiled by the police departments of fourteen cities show that defects were reported in from 1 to 5 per cent of the motor vehicles involved in accidents. Certain other localities, mentioned below, report much higher percentages. It is the opinion of the Committee that the lower percentages first mentioned do not include all of the cases where defects existed and contributed to the accident, because the average driver or officer is not able to judge the condition of the vehicle accurately without making a test. Thus, even with the best of intentions, such persons do not report mechanical defects unless the latter are glaring and unmistakable.

An effort was therefore made by the Committee to obtain more accurate records from other jurisdictions in which particular attention is given to ascertaining the causes of accidents. A special report was obtained from the Massachusetts Registry of Motor Vehicles. This is believed to present a more accurate picture than is available in most other states, although even here the reports in many cases are far from complete. Defective equipment was reported in 15 per cent of the fatal accidents and 8.3 per cent of the nonfatal accidents on which sufficient information was available occurring in 1928, as shown in the following table:

Nature of defect	694 Fatal Accidents		2,741 Nonfatal Accidents	
	Number	Percentage of total	Number	Percentage of total
Defective brakes.....	49	7.1	53	1.9
Glaring lights.....	9	1.3	34	1.2
Insufficient headlighting.....	19	2.7	106	3.9
Defective steering gear.....	2	0.3	12	0.4
Windshield obstructed.....	19	2.7	21	0.8
Other defects.....	6	0.9	0	0.0
Total equipment accidents..	104	15.0	236	8.3

In this table it will be noted that the percentage of defective brakes is much higher for the fatal cases than for the nonfatal cases. This difference is probably due to the more thorough investigation of the fatal cases.

Further light is thrown on this situation by a special analysis of 45 fatal accidents which occurred in the Boston district in about three months, where the vehicle was examined and tested in each case. The results are summarized as follows by the Engineer of the Registry of Motor Vehicles:

Factor	Number of Accidents				
	Brakes	Lights	Windshield Wiper	Steering Mechanism	Horn
None	29	36	43	45	45
Questionable	5	3	0	0	0
Contributing cause	8	6	2	0	0
Principal cause	3	0	0	0	0
Total	45	45	45	45	45

Factor	Percentages				
	Brakes	Lights	Windshield Wiper	Steering Mechanism	Horn
None	64.4	80.0	95.6	100.0	100.0
Questionable	11.1	6.7	00.0	00.0	00.0
Contributing cause	17.8	13.3	4.4	00.0	00.0
Principal cause	6.7	00.0	00.0	00.0	00.0
Total	100.0	100.0	100.0	100.0	100.0

In this limited number of cases it will be observed that the sum of the various defects reported as principal or contributing cause, without any allowance for the "questionable" cases, amounted to more than 42 per cent of all the accidents. Most of these were "contributing" rather than "principal" causes. Seldom is a mechanical defect the obvious sole cause of an accident, but careful inquiry will often disclose, as in Massachusetts, a much greater number of cases where defects were combined with personal carelessness or other factors to cause death or injury.

Connecticut statistics charge 8 1-3 per cent of fatal accidents in 1929 and 3 per cent of personal injury accidents *primarily* to defective equipment. The reports do not show the number of additional cases in which such equipment was a contributing factor.

The state of Oregon likewise reported defects in more than 15 per cent of 2,000 vehicles involved in accidents and the chief

of the Highway Patrol of that state explained that the patrolmen make a practice of giving special attention to the condition of the vehicles thus involved.

In Cook County, Illinois, the condition of 567 vehicles involved in 500 fatal accidents during the first part of 1929 is thus reported by the Coroner: In apparently good condition, 309; brakes defective, 65; steering mechanism defective, 28; other defects, 5; headlights out, glaring or obscured, 4; no chains (on wet and slippery road), 29; not known, 127. The total of these figures for brakes, steering mechanism and "other defects" is 98, or 17.3 per cent of all the vehicles, or 23.3 per cent of all the vehicles whose condition was reported.

These higher percentages are consistent with other statistics relating to the circumstances of accidents. In a tabulation of the violations or unsafe practices of 73,000 drivers involved in accidents, as reported by various states and cities to the National Safety Council, 24,300, or one-third of the total, "did not have right of way," this being by far the largest single item. While inattention or poor judgment, if not actual recklessness, was doubtless the chief factor in most of these cases, it is probable that in a great many of them a contributing cause was the driver's inability to stop as quickly as he thought he could. Again, studies of the number of accidents at different hours of the day, in comparison with the volume of traffic, show a higher frequency (though a smaller total number) of accidents in the hours of darkness than in the hours of daylight. Many of these are undoubtedly due in part to either glaring or defective lights—often combined, of course, with careless driving.

In "Save-A-Life" or vehicle-inspection campaigns in six states—Delaware, Maryland, Massachusetts, New Jersey, New York and Pennsylvania—covering nearly 4,000,000 cars, defects were reported in the following percentages of the total cars inspected:

	Per cent		Per cent
Brakes adjusted	21.5	Steering replaced.....	1.0
Brakes reined.....	6.5	Mirrors adjusted.....	1.0
Lights adjusted.....	21.0	Mirrors replaced.....	2.0
Lights replaced.....	4.0	Windshield wipers adjusted.....	1.5
Horns adjusted.....	3.0	Windshield wipers installed and replaced	2.0
Horns replaced.....	1.0	Registration plate corrected.....	2.0
Steering adjusted.....	6.0		

The relative frequency of the various kinds of defects is fairly consistent with the appearance of the same defects in the accident reports already given.

It is often said that average driving speeds have increased as much as 10 miles per hour in the past two or three years, due to improved engines, springs, brakes and other details of construction. An increase from 20 to 30 miles per hour, now not uncommon on many city streets, represents an increase of 50 per cent in speed but an increase of 125 per cent in the energy and the destructive power of the moving vehicle, because the energy is proportional to the square of the speed. This would mean also an increase of 125 per cent in the stopping distance required if the braking equipment were the same in both cases. Modern four-wheel brakes partly restore the balance and make it possible to control the car safely—if they are in good condition. But a car out of control, at present-day speeds, may easily do twice the damage that it would have done at the lower speeds formerly prevailing.

It is thus evident from every standpoint that defective vehicles are a serious menace on the highway, and proper maintenance is more vitally necessary today than ever before.

ESSENTIALS OF SAFE EQUIPMENT

This report cannot set forth an inspection manual for every part of every make of automobile. To do this is the function of the manufacturer, and to put such schedules into daily use is the function of the dealer and service organizations. The principal essentials, common to all vehicles, may be briefly stated.

Brakes

Present standards for brakes are found in the "Safety Code for Brakes and Brake Testing" formulated under sponsorship of the U. S. Bureau of Standards and the American Automobile Association and approved by the American Standards Association. This code requires that all vehicles shall have foot brakes capable of stopping the vehicle from a speed of 20 miles an hour within a distance of 50 feet on a dry, hard, level road free from loose ma-

terial; and that the hand brakes shall be capable of stopping the vehicle within a distance of 75 feet under the same conditions. This supplements the general provision of the Uniform Vehicle Code that every vehicle shall have two adequate braking systems.

This stopping distance of 50 feet from 20 miles per hour was based on tests made when four-wheel brakes were practically unknown. A stopping distance of 35 feet from 20 miles per hour can reasonably be required of passenger cars with four-wheel brakes. Many cars with four-wheel brakes can stop in much less than 35 feet, just as many cars with two-wheel brakes can stop in less than 50 feet.

The best-known method of making a brake test is by the use of two lines on the pavement, 50 feet apart. The driver is instructed to approach at a speed of 20 miles per hour and on crossing the first line to throw off the power and apply the brakes, whereupon he is expected to bring the car to a stop before crossing the second line. This method is open to serious objection because of personal differences or errors in approaching at exactly the proper speed and applying the brakes at exactly the proper instance. These errors can be reduced but not entirely eliminated by the use of an official car running alongside the car being tested, as pace-maker. A much more reliable means of making this kind of test is through the use of the decelerometer or brake meter. When this is placed in the car or on the running board and the brakes are applied, it gives a reading in terms of the stopping distance from a speed of 20 miles per hour. Additional tests for proper equalization of the brakes are also desirable.

The bulletin of the American Automobile Association, entitled "Brake Testing Campaigns for A. A. A. Clubs," gives the following further detailed methods of conducting such campaigns:

"These stopping distances are the distances traveled after the brakes are applied. There is an interval, called the 'reaction time,' which elapses between the instant when the need for braking becomes apparent to the driver and the instant when the brakes actually take effect. This reaction time, according to tests, averages about $\frac{1}{2}$ second, but for many individuals is as great as 1 second or even more. In 1 second a car traveling 20

miles per hour goes about 29 feet; at 30 miles per hour about 44 feet. Such distances must be added to the theoretical stopping distances, in determining the total distance which a car will travel after the need for stopping becomes apparent to the driver."

Headlights

The Illuminating Engineering Society and the Society of Automotive Engineers have developed technical specifications for headlights, conformance with which is required by the states composing the Eastern Conference of Motor Vehicle Administrators and is furnished by practically all headlights now sold in any part of the United States. The initial provision of proper lights is, however, only the first step. Other essentials are:

1. Reflectors should be in good condition and equipped with the proper bulbs.
2. The lamps must first be focused according to the instructions supplied with the car.
3. The lamps must be aimed so that the top of the beam is horizontal. The top of the upper beam of depressible beam equipment should be horizontal when the car is empty. When the car is equipped with single-beam headlamps the top of the beam should be horizontal when the car is loaded.
4. The operator should always carry a spare headlamp bulb.
5. For cars using fuses to protect the lighting circuits a spare fuse should be carried.

Headlight testing requires equipment. A properly ruled screen or light target must be placed 25 feet ahead of the vehicle, which must stand on a level surface. Instructions for making these tests have been published by the American Automobile Association, the Bureau of Standards, the National Safety Council and others.

Other Lights

The requirements of the Uniform Vehicle Code with regard to other required or permissible lighting equipment should be strictly observed. Aside from the frequent misuse of spot lights, when

these are turned so as to shine into the eyes of others, the most important remaining items are the tail lights, and, on large bodies or loads, additional clearance lights at the front and rear.

On both freight and passenger vehicles, manufacturers and owners should give special consideration to the vital importance of providing tail lights and (where required) clearance lights, of such kind and so located as to be visible at all times and not obscured by an overhanging body or load or by the tail board of a truck when open. Owners and operators should give special attention to keeping such lamps always in good order. In some cases, where the nature of the vehicle and its use make it difficult to place and maintain a tail lamp where it will always be visible and in good condition, the provision of a reflector in addition to the tail lamp, or two tail lamps, is a valuable safeguard. A spare tail light bulb should always be carried.

Tires

Air pressure in tires should be checked regularly in conformance with the recommendations of the tire manufacturers. Insufficient inflation results in wear and deterioration of the side walls of the tire. The sides may likewise be seriously worn by rubbing against the curb when parking, or against other obstructions.

A blowout at high speed on either a front or a rear wheel makes control of the car extremely difficult and sometimes impossible. Many serious accidents have been due to this cause, including many of those listed in accident statistics as "ran off roadway." To minimize the hazard of a blowout, no tire should be used after the rubber tread has been so worn down as to expose the fabric. The alignment of the front wheels should be checked whenever the front tires show any evidence of excessive wear.

Other Equipment

A check of the steering mechanism should be made by a qualified service station at least every six months. Backlash should be kept down to a reasonable amount.

Horns should be capable of being heard under normal con-

ditions at a distance of 200 feet and should be kept in good operating condition at all times.

Windshield wipers, now generally required by law, should be inspected at least every six months and wiper blades replaced if necessary.

Mirrors should be kept clean and in such position as to give clear vision of the road behind. They should, of course, be replaced if broken.

License plates must not be obscured. They should be properly placed and kept clear and visible at all times.

PROVISION FOR MAINTENANCE BY OWNERS

The modern automobile will run longer with less attention than almost any other machine of equal power and complexity. Motorists buy cars for stamina and dependability and the manufacturers naturally feature these points in their advertising. Thus many owners, being not mechanically minded and totally unfamiliar with what is going on underneath the hood, go to the extreme of driving from one end of the year to the other with no servicing of the car other than gasoline, oil, water and air unless something goes wrong.

Even the most miraculous mechanism cannot be expected to thrive under such neglect. Nowhere is it more true that "a stitch in time saves nine." Inexpensive treatment of troubles which are small when they first appear saves heavy repair bills later, annoying breakdowns in service, and accident hazards.

Manufacturers have come to realize that the best interest of the customer requires emphasis on the need for regular inspection and maintenance, as well as on the fine performance of the car when thus maintained. But an enormous amount of educational effort is still needed to overcome the inertia and bad habits of many owners in this respect.

One step in the right direction is the setting up and advertising by dealers of standard servicing plans whereby either a general inspection and minor adjustments are made monthly at a flat rate, or inspections of more elaborate scope, at a fixed price, are recommended to the customer at certain intervals. The

practice is growing among garages and service stations of affixing a tag to each car that is brought in for any kind of work, on which certain simple maintenance items are checked as having been attended to or as needing attention. Any such plans which promote proper servicing are recommended, and manufacturers are urged to do everything in their power to promote such practices.

Testing Stations

Mention has already been made of the need for special equipment to make proper tests of brakes and headlights. Such tests may be provided either in regular garages or service stations, or in special testing stations, the latter being economically possible only where a sufficient number of motorists will pay a reasonable fee for the tests, either voluntarily or under the requirement of a state law. The provision of one or more properly equipped testing stations in every community is a great aid to safety and convenience in driving and should be encouraged by the automobile industry, motorists' associations and public authorities.

Fleet Inspections

Commercial vehicles in fleets—trucks, taxicabs and buses—cover high daily mileages in all kinds of weather and on all kinds of routes, and their proper operating condition is of prime importance for the public safety as well as for economical operation. Many fleet operators are giving, and all should give, meticulous attention to the condition of their vehicles through regular inspections by their own mechanics. In some large companies, for example, each driver must fill out a chauffeur's card every day that he drives. Any complaint regarding the condition of the vehicle is written on the back of the card (verbal reports not being accepted), and careful inspection is made in the garage, in addition to regular daily inspection of steering mechanism, brakes, spring shackles, wheels and similar items, while a weekly check inspection is made by another man to catch any items that may have been overlooked. One large company using this system reports no accident in more than two years attributable to a detectable mechanical defect.

Some intercity motor bus companies use printed inspection reports covering a large number of items that must be checked in the garage at the end of each run, while another shorter report form is provided for inspection of certain items at stations en route.

In a large city motor bus system, an inspection is made by the driver with the help of the assistant garage foreman each time the gasoline, oil and water are being replenished. The result of the inspection, as well as a report with regard to any trouble that has been experienced during the day, is recorded on a report card. In addition a regular weekly inspection is made. After going 2,500 miles, the motor bus is held in the shop for five hours or longer to undergo a general overhauling. Careful records of the performance of tires and the gasoline consumption throw light on the condition of the vehicle as well as on the competence of the driver.

Typical report forms used by bus and truck operating companies may be obtained through the office of the National Conference on Street and Highway Safety, Washington.

Uniform Vehicle Code Equipment Requirements

All states have motor vehicle laws containing some form of requirement with respect to motor vehicle equipment. Nineteen states have adopted in whole or in part the provisions of the Uniform Vehicle Code relating to motor vehicle equipment requirements, or have made changes in their laws toward conformity with the Uniform Vehicle Code in this respect. It is obvious that all states should have adequate requirements with respect to motor vehicle equipment. It should be equally obvious that, in the interest of public safety, requirements with respect to such important items of equipment as brakes, lights, horns and warning devices, mirrors and windshield wipers should be uniform. The requirements of the Uniform Vehicle Code with respect to these important items of equipment have been carefully prepared by eminently qualified technical experts and offer a uniform standard which is recommended to all states. It is equally important that the detailed administrative regula-

tions consistent with these provisions should be vested in a central authority responsible for the administration of the state motor vehicle law.

Periodic State-wide Inspection Campaigns

Six of the Eastern states have recently conducted a total of ten "Save-A-Life" campaigns in which, during a period of four to six weeks, all motorists were either urged or required to submit their cars to inspection at an authorized testing station, a large number of garages and service stations being so designated under state supervision. In the first part of this report figures were given showing the percentage of cars thus inspected which were found to have various defects. The state officials under whose direction these campaigns were conducted have spoken favorably of their effect in discovering and remedying many defects, arousing the public to a realization of the importance of proper maintenance and of accident prevention in general, and, in some cases at least, bringing about an actual reduction in the number of accidents.

Such campaigns are a combination of education and enforcement. They are most easily handled where there is a state motor vehicle bureau to supervise the campaign carefully and a highway patrol force to carry out such supervision and to check up on the equipment and practices of the inspection stations. The following points are considered essential:

1. The campaign must be under official sponsorship and supervision.
2. It should run about one month and at a time of year when the garages and service stations can handle the additional load.
3. There should be at least one inspection station for every 500 registered cars. These may be garages, service stations, special stations set up by motor clubs or similar bodies, or the garages and shops of fleet owners for inspection of their own vehicles; but all stations should be officially authorized, on application and showing of proper facilities, and authorization should be immediately revoked upon the abuse of the privileges granted.

4. Careful publicity should precede and accompany the campaign to acquaint the public with its purposes and method.

5. Each inspection station should be furnished with appropriate stickers to be placed only on cars which have passed the tests.

6. Where placed on a voluntary basis the tests should be given without charge.

Information and suggestions for these campaigns can be obtained from the National Bureau of Casualty and Surety Underwriters.

The most recent development of these inspection campaigns has been the passage, in four states, of laws authorizing the governor or the motor vehicle administrator to require, by proclamation, the submission of all motor vehicles to test during a specified time. The authorized stations are then permitted to make a fair charge—50 or 75 cents—for testing, permitting a stricter control.

Certificate of Inspection

In order to insure the inspection of all motor vehicles at least once a year it is recommended that a certificate of inspection be required as a prerequisite to the issuance of registration plates. To avoid congestion which would ensue if inspections were concentrated at the time applications for new registration plates are made, it is suggested that such inspections be extended over a period of three months, preferably from October to January, with suitable provision for inspection in other states in case of vehicles out of the home state at the time of registration renewal. This would enable dealers and garages to make inspections at a time when other demands upon their facilities are at a minimum.

It has been recommended that the dealer be required to furnish the purchaser of a used car a certificate of inspection certifying that the car has been inspected and found to comply with the state motor vehicle law requirements as to equipment. In case the owner of a repurchased car is competent to make such repairs as may be necessary, he would, after having made those repairs,

receive from the dealer a certificate as evidence that the car meets the legal requirements of the state motor vehicle law.

ELIMINATION OF UNSAFE VEHICLES

The universal habit of trading in old cars has made every automobile dealer a used-car dealer. The trading process often continues until a car has passed through the hands of numerous owners. Many used cars are carefully reconditioned and sold under a guarantee. On the other hand, a dealer is often forced by competition to take in trade an old car of no real value which he is thereupon glad to sell "as is" at almost any price that may be offered.

Such decrepit vehicles, particularly in the hands of irresponsible persons, are unquestionably a serious hazard to other drivers and to pedestrians. The following steps have been taken to reduce this hazard:

1. The present Pennsylvania motor vehicle law provides for the issuance of a "junking certificate" when a car is sold to a junk dealer or otherwise junked. This definitely ends the chain of title of such car and prevents it from being again lawfully used as a motor vehicle. Proper legislation is recommended to all states to stop the common practice of taking an old car out of a junk pile and again placing it on the highway.

2. It is reported that a number of the automobile manufacturers are putting into effect what is called the "highway safety plan," by which they grant their dealers a specified allowance on a limited number of "junk" cars when the latter are retired from service. This plan is strongly recommended.

ENFORCEMENT AND EDUCATION

Increased safety on our streets and highways necessitates the constant enforcement, by local and state police, of the legal provisions covering the presence and condition of brakes, lights, horns and other such equipment.

In several states the highway patrolmen have found it possible to check up fairly well on brakes by observing the actions of cars stopping or slowing up at intersections and on hills.

Those appearing to need attention are given a simple road test and if necessary their operators are given "tickets" and required to appear within a specified time and show that the defective brakes have been corrected. Similarly, cars with apparently glaring headlights are picked up at night and tested on the spot by the use of a portable screen, with a similar procedure for those found seriously defective.

Such enforcement procedure with special attention to the main items of brakes and headlights might well be adopted by every state and city police force.

Highway Patrol

Enforcement outside of cities is obviously impossible without a well organized state highway patrol, except in the rare instances of a similar county police force. This furnishes an additional argument for the establishment of such highway patrol in every state, as was recommended by the Committee on Enforcement of the National Conference on Street and Highway Safety. The main function of such patrol is to bring about improvement in driving practices and equipment through the education and warning of motorists, but in flagrant cases arrests are necessary.

Education of Private Owners

In addition to reaching the private owner through the dealers and service stations and through special statewide inspection campaigns as have been described, proper maintenance should be emphasized in all general safety educational programs conducted either for a limited time or continuously by safety organizations, motoring organizations, civic bodies and others. The methods used in these campaigns—newspapers, radio, posters, motion pictures, meetings and the like—need not be detailed here, as they have been covered in other publications of the National Conference on Street and Highway Safety and its participating organizations. There is a particular opportunity for motor clubs, through their magazines and other contacts with their members, to emphasize the economy and safety resulting from proper attention to vehicles. Many of them are now doing this.

Public authorities also can do much toward the education of the motoring public in connection with their registration and licensing functions and through the issuance of news releases and bulletins dealing with vehicle maintenance as well as with other phases of safety.

INVESTIGATION OF ACCIDENTS

Police department records of serious traffic accidents, based upon the testimony of witnesses, are in many instances the only sources of information available with respect to such accidents. Owing to conflicting accounts of the same accident given by different witnesses, such information alone cannot be relied upon to establish the cause of the accident. In several cities a squad of trained police investigators makes careful investigation of all serious traffic accidents. Photographs are taken, skid marks noted, measurements made and all other pertinent evidence is recorded. Investigations of this kind enable the police department to determine, among other things, the extent to which vehicular defects are responsible for traffic accidents and what relation they bear to other causes of such accidents. On the basis of the information disclosed by comprehensive records of these careful investigations intelligent preventive measures can be devised. The accident investigating squad is an important unit that can be set up within city and state police organizations for the purpose of securing accurate and comparable statistical information regarding serious traffic accidents.

PUBLICATIONS ON STREET AND HIGHWAY SAFETY

**Available on Request to National Conference on Street
and Highway Safety, 1615 H Street, N. W.
Washington, D. C.**

Committee reports submitted to Third National Conference, May 27-29,
1930:

- Traffic Accident Statistics
- Protection of Railway Grade Crossings and Highway Intersections
- Maintenance of the Motor Vehicle
- Measures for the Relief of Traffic Congestion
- Uniform Traffic Regulation, accompanied by
- Uniform Vehicle Code, consisting of
 - Uniform Motor Vehicle Registration Act
 - Uniform Motor Vehicle Anti-Theft Act
 - Uniform Motor Vehicle Operators' and Chauffeurs' License Act
 - Uniform Act Regulating Traffic on Highways
- Model Municipal Traffic Ordinance
- Report on Street Traffic Signs, Signals, and Markings.

Reports of former committees and conferences:

1924	1926
Statistics	Statistics*
Traffic Control	Uniformity of Laws and Regula-
Construction and Engineering	tions*
City Planning and Zoning	Enforcement
Insurance	Causes of Accidents*
Education	Metropolitan Traffic Facilities
The Motor Vehicle	Public Relations
Public Relations	Second National Conference
First National Conference	

In addition to the foregoing the National Conference has available for distribution publications relative to these subjects issued by participating organizations.

*Out of print