

Table II shows, for the years 1922, 1923 and 1924, the estimated number of highway fatalities and the rate per 100,000 population, grouped according to type of accident.

Table II—Highway Fatalities in the United States*

Type of accident	Estimated fatalities			Rate per 100,000 population		
	1924	1923	1922	1924	1923	1922
Railway grade crossing.....	2,149	2,268	1,810	1.9	2.0	1.7
Street car.....	1,836	2,006	1,748	1.6	1.8	1.6
Automobile.....	17,566	16,452	13,676	15.7	14.9	12.5
Motorcycle.....	274	336	314	0.2	0.3	0.3
Injuries by other vehicles....	1,466	1,559	1,655	1.3	1.4	1.5
Total.....	23,291	22,621	19,203	20.7	20.4	17.6

*From Report of Committee on Statistics, National Conference on Street and Highway Safety; 1926.

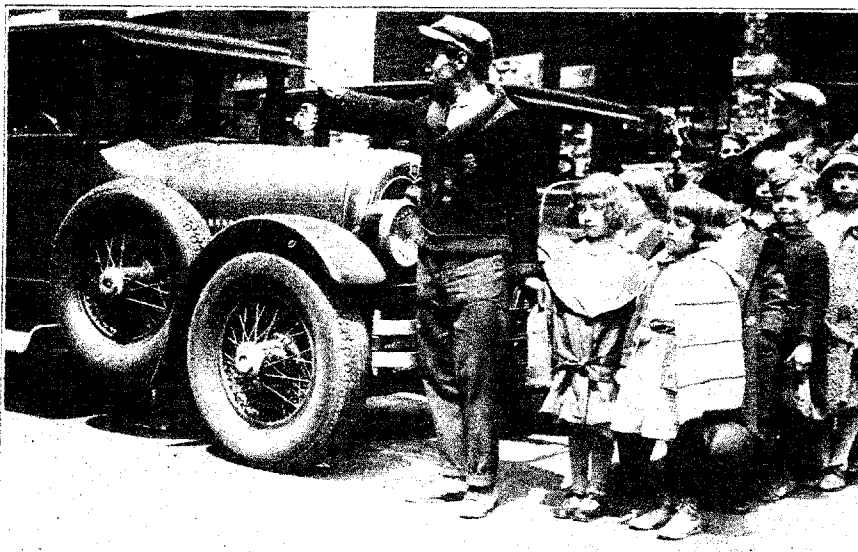
present problem is to analyze traffic trends, and to build now on a scale which will meet the needs of increased future traffic. Only in this way can we escape far more costly rebuilding in the future. In the most congested areas where street widening is impracticable, parallel routes, elevated highways or double-streets are already being built. "By-pass" highways are also being developed, to permit through traffic to avoid busy trade centers. Even more important are the systems of designated boulevards and arterial highways, especially where vehicle movement upon them is controlled by positive traffic signals. These permit of higher speed with greater safety, and so eliminate much of the congestion which would otherwise be present. Where streets cannot be improved, or until they are improved, proper police control at busy intersections is absolutely essential to keep traffic moving efficiently and safely.



IT is harder to protect the pedestrian than to protect the motorist. He is less careful. Except where he is subject to strict police regulation, he will inevitably "take chances" in crossing the streets. He acts in a less predictable manner. He is less visible at night and in stormy weather. Children forget or ignore the danger that lies beyond the curb line. Two cars may collide and



"Safety Speedometer," New Orleans



School Boy Patrol, as Advocated by Herbert Hoover, in Operation at Franklin Grammar School, Chicago

but when a pedestrian is in the street he is almost certain to sustain personal injuries more or less serious. Almost two-thirds of the traffic accidents involving personal injury in New York State from January to July, 1925, resulted from automobiles striking pedestrians. Statistics from Massachusetts show that while the number of collisions between vehicles is actually less than six years ago, despite an increase of over 160 per cent in registration, pedestrian accidents have nearly doubled during the same period. Reckless driving is sometimes the sole cause of the accident; a pedestrian may be run down while standing in a "safety zone" or even on the sidewalk. More often, however, he shares the responsibility. The dodging ability of an automobile is limited, and the operator of a vehicle has a right to expect that the adult pedestrian will exercise reasonable care in crossing its path. The same cannot be expected of children. Their movements are more than likely to be unexpected and illogical, and no driver can be too careful when they are near.

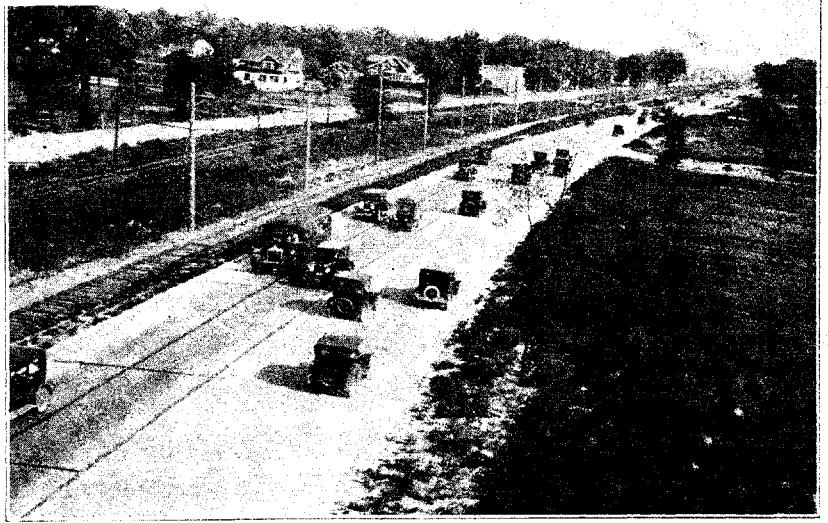
One of the principal difficulties in the way of lessening the pedestrian accident rate is that he himself resists the steps taken to safeguard him. Only the near presence of a policeman in uniform can keep him from "jaywalking," or from attempting to dodge through a moving line of vehicles instead of waiting until traffic begins to move in the other direction. The problem is complicated, too, by the necessary turning of vehicles at intersections. Any turn, right or left, requires that the vehicle must break through a stream of pedestrians, unless all turns are confined to periodic intervals during which the street is cleared of pedestrians in both directions — an extremely difficult maneuver for any traffic

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STRICT policing of congested intersections, together with a campaign of education for both pedestrian and motorist, can greatly mitigate the evil. A proper understanding of traffic signals and rules of the road should be a part of the mental equipment of every pedestrian, as of every motorist. The pedestrian, too, should be expected to use at least as great caution as the vehicle driver. Children will continue to play in the street just as long as they have no safer place to go, and we must work for the establishment of many more public playgrounds in congested population centers. The public schools have done much to teach the children of the dangers that beset them on their way to and from school. In many cases the older boys have been organized to assist in escorting the younger children over dangerous crossings.

Inadequacy of highways in rural areas is of a somewhat different type, and, in theory, should be easy to remedy. We should widen and straighten the highways, eliminate grade crossings both of railways and of heavy traffic highway routes, modify dangerous grades, establish unmistakable warning signs, install safety devices, and maintain adequate policing to enforce careful driving.

Anyone who has driven a car for the past ten years is aware of the tremendous development in



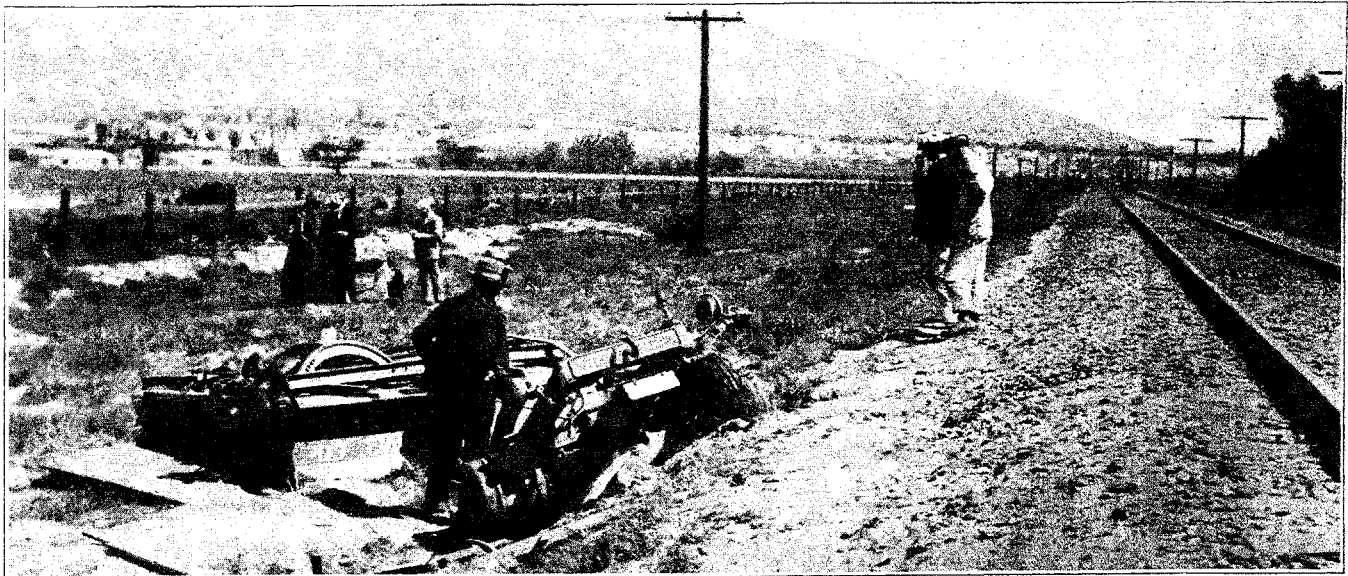
First Super-Highway, 44 Feet Wide, Between Detroit and Pontiac

the technique of roadmaking even during that brief period. The first quarter of the twentieth century has seen a greater revolution in highway building than any similar period in the history of the world. When some unknown experimenter in past ages invented the wheeled cart, it was thereafter necessary to cut wider paths through the forest. When American mechanical ingenuity and business initiative put thousands and millions of "horseless carriages" into all parts of the country, we were similarly compelled to adopt a new conception of highway construction. The principal advantage of the power vehicle lies in its superior speed, and only on good roads can this be realized. So we have had to improve

the surface, to widen it, and to relocate roads to diminish grades and eliminate danger points.



THE United States Bureau of Public Roads has been conducting a series of traffic surveys in cooperation with the highway departments of several States, one object, among others, being to determine the distribution of vehicular movement upon the various roads as a guide to intelligent planning of highway improvements. At the same time, through Federal aid to highway construction, the Federal Government has been able to exercise an important influence in standardizing highway planning to provide safe routes. It is the task of our highway officials to seek always to



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Driver and Dog Miraculously Escape When Truck Is Thrown 150 Feet at Padre, Calif.

make our roads as safe as physical improvements and legal regulation can make them.

There are at least two major lines of attack upon the problem of eliminating dangerous conditions upon the rural highways. These are, first, the application of advanced engineering technique in the planning and constructing of the roads and in the installation of mechanical safety devices; and, second, the systematic and scientific marking of these roads.

Under the first of these heads we can confidently point to what has already been accomplished as an indication of what may be expected in the future. In their purely topographical features, modern highways offer little to criticise. The sharp curves and steep grades which were adequate for slow-moving vehicles are no longer found in new surveys. High-type surfaces, too, are being bettered as fast as scientific research can accumulate experimental evidence. Pavement width is rarely all that can be desired, due to the necessary compromise between complete adequacy and expense. Eighteen to twenty feet is now generally accepted as the minimum width for a two-way highway. The proper construction of shoulders, to permit vehicles temporarily to leave the pavement without danger to themselves or others, is an essential feature of modern design. Super-elevation or "banking" is being resorted to at curves, to check dangerous skidding. The wooden guard-rail at the edge of embankments is giving way to the more efficient cable or wire mesh. Obstructions to a clear view of the road ahead, at intersections and curves, are being eliminated. Embankments, vegetation, signboards and even buildings are being cut away, razed or moved back from the right-of-way.

A MORE serious problem is presented by crossings and intersections, both of railways and of other highways. It is estimated that over two thousand fatalities annually

occur at railway grade crossings. The total deaths at railway grade crossings in 1924, Table II, shows an encouraging decline of 5.2 per cent over 1923, though still well above the total for 1922. Many of these casualties are the inevitable consequences of deliberate "taking of chances." The driver is strongly tempted at times to race for a crossing, especially when the alternative is a long wait while a freight train passes. Even when warned by crossing gates, watchmen, lights, bells or semaphores, some motorists seem to remain unconscious of the danger ahead. Only the worst kind of carelessness or ignorance can explain the majority of grade crossing accidents where such safeguards are provided. Nevertheless, it is just for the protection of these heedless or stupid drivers that we must take drastic measures.

Apparently there is only one practicable way to make a railway crossing absolutely safe—that is to eliminate the grade crossing. Viaducts and underpasses are now the rule rather than the exception on our principal highways. On the Federal aid highway projects submitted to the

eliminated. More than half of the eliminations were brought about by relocating the highway to avoid the railroad. Grade separations in any case are likely to be highly expensive, hence on minor traffic routes we shall have to do the best we can with proper signs and safeguards. On major routes grade crossings should rapidly be made obsolete.

Highway intersections and crossings are less deadly in proportion to their numbers. Removal of all obstructions to a clear view for a reasonable distance in both directions, and unmistakable marking of the crossing will go far to reduce the danger that exists. The adoption of circle intersections may be a practical means of still further reducing the hazard.

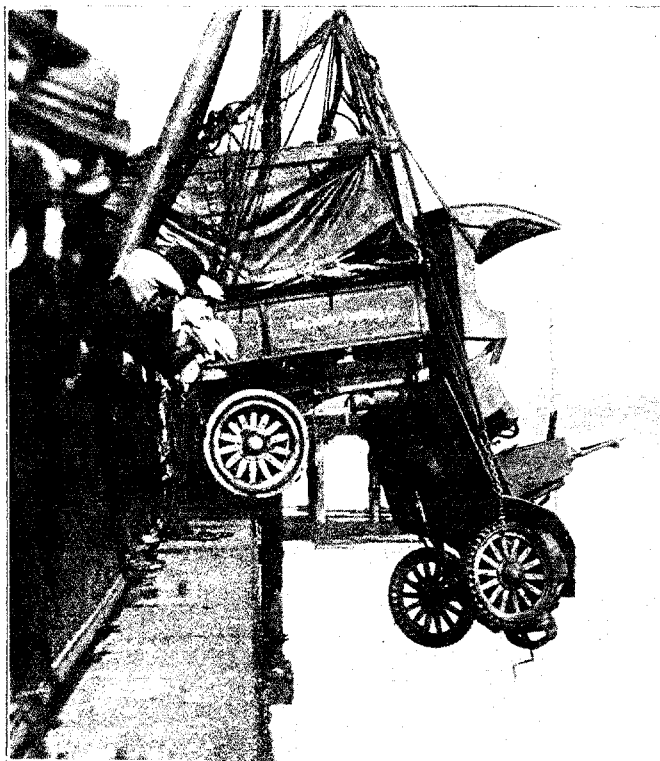


WITH all our highway improvements there will still be certain points where the hazard will be greater than at others. These are crossings, curves, grades, bridges, and special risks such as school children or construction work. Safety demands that the motorists be given due warning of these. Numerous types of signs and signals are to be seen on every road. Too often, excessive use of these warnings tends to defeat its own purpose. The motorist discovers that the signs are being placed where the danger is no greater than anywhere else, and he becomes careless. Danger warnings, to be of value, must mean what they say.

This is the theory on which numerous highway departments are acting in eliminating all but official signs, and locating these at points of real hazard. Much study, too, has been made of the design and color of these signs, with a view to making them quickly and unmistakably visible. The standard signs adopted by the Joint Board on Interstate Highways for use on United States

Highways are of such a character that even a person who can not read will understand the meaning of those indicating danger by the

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This Happened at Ft. Point Channel, Boston

Bureau of Public Roads to date, there have been over 4300 railway grade crossings. Of these, 32 per cent have already been

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about by a denial of bail.

WE believe that the law should
make it possible for our judges,
in granting of bail, to distinguish
between the professional criminal
and the casual offender, or the
person guilty of a crime of pas-
sion, and we believe it should also
be the policy of the State to keep
in custody, until tried, profes-
sional criminals charged with se-
rious crimes whose records reveal
previous convictions and other se-
rious offenses and that they should
be tried promptly and punished
as befits the crime.

"In England there is substan-
tially no trouble with professional
bondsmen. Indemnity of bail is
a penal offense in that country.
It does not seem to us, however,
that such a statute can be enacted
in this State at the present time.
The usefulness of corporate bail
has been demonstrated in connec-
tion with fiduciary positions and
the administration of decedents'
estates, to such an extent that our
citizens have become reluctant to
seek the aid of their friends and
neighbors, in such emergencies,
preferring to pay a reasonable fee
for a surety company's service."

Another measure evidencing the
same effort to protect the public
from the recidivist is a resentenc-
ing act copied from a West Vir-
ginia law. It is designed to make
effective the present sections of
the penal code providing that a
person convicted of a second of-
fense shall be imprisoned for not
less than the longest term pre-
scribed for a first conviction, and
that one convicted for a fifth of-
fense shall be imprisoned for life.
Under both these laws it has been
held that the indictment must
charge the previous offense which
is often at the time unknown.
Under the new act if at any time
after sentence or conviction it is
discovered that the prisoner has
been previously convicted of one
or more felonies, the district at-
torney must file the indictment
against him according to the
previous act, and the sentence of
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"It is said," the committee re- ported, "that a large part of the evil is due to the use of corporate and professional bail bonds. A third of the bail bonds were writ- ten by surety companies. By the mere payment of a fee, the pro- fessional criminal seems to have little difficulty in securing a bail bond, either corporate or profes- sional. Setting the amount of the bail at high figures seems to be no detriment to the payment of the premium nor the furnishing of the required indemnity to the surety.

"While it may be claimed that

"WE BELIEVE that the law should make it possible for our judges, in granting of bail, to distinguish between the professional criminal and the casual offender, or the person guilty of a crime of passion, and we believe it should also be the policy of the State to keep in custody, until tried, professional criminals charged with serious crimes whose records reveal previous convictions and other serious offenses and that they should be tried promptly and punished as befits the crime."

the state has granted charters to these corporate bodies through which the ends of justice are de- feated, and organized criminals are permitted to prey upon so- ciety, it was not within the con- templation of the legislature in granting such charters that such abuses should come into existence. We feel that it is due to some of the surety companies to say that an incomplete survey of the work disclosed that they do make seri- ous efforts to deny bail bonds to professional criminals. The ne- cessity, however, exists that the most careful scrutiny should be made of each case in which ad- mission to bail is sought. The ap- proving power can largely control the situation.

"While it has been suggested that bail should be denied outright to second offenders, your commit- tee does not feel that it is either necessary or desirable to go so far with legislation, for there would unquestionably be cases in which

"WE believe that the make it possible for in granting of bail, to between the profession and the casual offen person guilty of a cr sion, and we believe it be the policy of the S in custody, until tri sional criminals charg rious crimes whose re previous convictions a rious offenses and that be tried promptly an as befits the crime.

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Another measure evi same effort to protect from the recidivist is a ing act copied from a ginia law. It is design effective the present s the penal code provid person convicted of a fense shall be imprison less than the longest scribed for a first conv that one convicted for fense shall be imprison Under both these laws i held that the indictn charge the previous offe is often at the time Under the new act if a after sentence or convi discovered that the pri been previously convict or more felonies, the d torney must file this in against him accusing hi previous conviction. O mission of the prisoner the same person, or on termination that he is, shall sentence him as offender, vacating the sentence, and deducting actually served.

The United States Court in an opinion w Justice Hughes held tha
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shape and color. The danger and caution signs will have four different shapes, representing as many degrees of danger. They will have a yellow background with black letters and symbols, since this color combination has been found by experiment to have the greatest visibility. The standard railroad crossing sign will be round, and will bear the well-understood railroad cross with the letters R. R. At points of sufficient danger to require a complete stop the sign will be octagonal in shape, and will bear the word STOP in large letters. At curves, narrow bridges, steep hills and other points where the degree of danger is sufficient to call for the exercise of a considerable degree of caution but not a complete stop, a diamond-shaped sign will be erected with the character of the danger described in letters and symbols. At points of lesser or occasional danger a square sign will be used and the necessity for caution will be explained in a single word, such as SCHOOL.

The problem of the personal factor in automobile operation is far more serious and far more difficult of solution because it can not be reduced to a matter of scientific research in the ordinary sense. The motor vehicle has been brought within the reach of the masses, and every one expects to own a car and to drive it himself. The training of millions of Americans into operators of powerful machines, all in the course of a few years, is an impressive thing to contemplate. And every year thousands more of the oncoming generation must also learn the controls. Inevitably many will lack some or all the qualifications of expert and trustworthy drivers. We have all witnessed accidents or near-accidents that could not have happened had the operator been duly intelligent, alert and careful. Such persons are not fit to undertake the public responsibility which is implicit in motor vehicle operation. At best, they should confine their driving to limited sections where conditions are particularly favorable.

Granted that certain persons should be deprived of the right to drive, how shall we decide where to draw the line, and how enforce our decision when made? The latter question is the simpler,

and the answer in an increasing number of states lies in legislation requiring the individual to secure a state driver's license before he is permitted to operate a motor vehicle. Such a license is now required in more than one-third of the states, while another one-third require it only of employed chauffeurs. By imposing certain qualifications as prerequisite to the issuing or holding of a license, it is possible to weed out certain undesirable types of operators.



WE are still left, however, with the problem of determining pre-

CERTAIN TYPES of cripples are obviously unfit to drive. Others should be permitted to use cars in which special equipment has been installed, where it is apparent that safe operation is thereby made possible. A definite minimum standard of vision might well be added. Deafness is a more arguable defect, though there is plenty of official support for the view that it should disqualify. Granted the principle, it should not be extremely difficult to agree upon some standard test for both vision and hearing.

cisely who shall be privileged to operate a motor vehicle. Unfortunately it is practically impossible to devise, or, at any rate to impose, tests which will eliminate the dangerous driver. The "driving test," as usually given, is of little value, though it does at least demonstrate that the operator has mastered the fundamentals. What we actually want to get at is not whether, with great care, a person can drive around a few city blocks and finally park the car in a narrow space, but whether he is really able to act quickly when a dangerous situation develops. Whether he can judge distances accurately when meeting other vehicles on the open road. Whether he will negotiate turns at a safe speed. Whether he will use proper discretion when rain or snow impairs the grip of his tires on the road. Whether he can be trusted to drive at a speed consistent with safety to others, if not to himself. Whether he will be able to recognize defects in his car before they

lead to serious accidents. Finally, whether he is able and willing to recognize his own deficiencies as a driver and make particular allowances therefor. Few, if any, of these qualifications can be discovered by any ordinary examination.

The best we have been able to do up to the present is to maintain certain minimum standards. Three-quarters of the states prohibit the operation of a motor vehicle by persons under a specified minimum age, usually 15 or 16 years. As an arbitrary limit the regulation is hardly more scientific than the 21-year age test for voting. There seems to be a general belief, however, that, on the average, the extremely young driver is not a good risk. Similarly, the Commissioner of Motor Vehicles, or other issuing authority, is usually vested with the power to refuse a license to one physically, mentally or morally defective, where such defect may result in danger to other users of the highways.



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Epileptics and those subject to sudden loss of consciousness should not receive drivers' licenses. Drug and liquor addicts constitute another and far more dangerous class of operators who should be outlawed. The drunken driver—or perhaps we should say, the driver who has been drinking—is always a menace, for it is asserted by medical authorities that alcohol impairs just those physical and mental functions most essential to safe driving. Revocation of the license of anyone convicted of driving a vehicle while under the influence of intoxicating liquors or narcotic drugs should be mandatory. Unfortunately, such revocation is too apt to come after the accident.

WE have still to deal with the large class of individuals who are temperamentally or nervously unfit for the responsibility of driving. They are the most difficult class to dispose of. A certain minimum quickness of perception and reaction time, as measured by some standardized devices, would serve to eliminate the worst cases, though any practicable standard would probably have to be set so low as to lose a great deal of its value. It is the ability to think and act quickly when a real emergency presents itself which counts, not merely the ability to react in a standard fashion under standard test conditions when the emergency is absent or, at best, imaginary. Even granted that the heavy expense of a universal psychological test would be more than justified by even a small reduction in the present loss of life and property, the fact remains that, up to the present time no practical system of tests has been devised for this particular purpose, and at best we could probably hope only for the elimination of the most aggravated cases.

This is not to be taken as an attempt to depreciate the work of the psychologists. Given a free hand, they could unquestionably weed out the great majority of unsafe drivers. The difficulty is more practical than theoretical. First of all, the number of trained technicians is far below the number which would be needed should a thoroughgoing psychological examination be given every applicant. In the second place, public opinion would probably not tolerate the interference with "personal liberty" which would follow upon the refusal to issue licenses in cases unfavorably diagnosed.

LAST, but far from least among the personal causes of highway accidents, are to be considered the "moral risks." Every one of us, if he is honest, will confess to himself that he has been guilty of taking unnecessary chances. At the same time, in fairness to himself, he will also insist that there are varying degrees of guilt, and that there is a point at which recklessness becomes positively criminal. Furious speed, gambling at grade crossings, "hogging the road"—these can not be apologized for. "Drive Carefully," says a familiar slogan, "You May Meet a Fool." The fool is not al-

ways a defective in the usual psychological sense. He may be lacking only in a proper respect for the rights of others. Only too often it is the innocent party who pays for the fool's folly.

The best highways can not be safe without reasonable regulations concerning their use, and adequate enforcement of these regulations. A "code of etiquette" for the vehicle driver is the first essential, to cover all the standard practices in passing, overtaking, right-of-way, etc. There is already nation-wide agreement on these rules, and there is no excuse for any misunderstanding or deliberate violation. Any lapses by

IT IS OF INTEREST to note in passing that not only has there been a steady raising of the maximum speed limit, but there has recently appeared from various official sources a demand for a minimum speed limit on our important highways. The proposal is intended partly to control the traffic congestion caused by the slow-moving vehicles, and partly to eliminate the hazard inherent in the overtaking of vehicles on a crowded road where cars are moving in both directions.

automobile operators can rightly be regarded as reckless driving and so dealt with by the police.

It is essential that our whole motor vehicle code should be made similarly uniform over the entire country. There is already a large volume of interstate highway traffic. The Bureau of Public Roads in 1925 found over 10 per cent of "foreign" cars on the highways of Ohio. The recently established system of United States Highways will make State boundaries even less significant to the motorist. Varying regulation in the different States is a cause of confusion and danger. The tourist can hardly be expected to learn the laws of every State through which he passes.

MOTOR vehicle laws in almost every State prohibit excessive speed in general terms, but there is a wide divergence in prescribing the speed which shall be regarded as *prima facie* evidence of unsafe driving. The speed limit

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seem to have no compunctions about over-speeding or other violations so long as they can evade legal responsibility. In part this is probably due to the tendency of the police to arrest on technical charges, while the more serious, though less clear-cut cases of recklessness often go unpunished. In part it is due to unreasonable laws, which work unnecessary inconvenience or hardship. For the most part it is due to mere unwillingness to be regulated.

The primary goal to be aimed at in the enforcement of our highway vehicle laws is the safety of the public. The mere presence of a uniformed traffic officer can exert a profound influence in behalf of careful and lawful driving. A friendly warning from a police officer may be sufficient. But if our regulation is to mean anything at all, it must be supported by suitable penalties for those who are unable or unwilling to obey it. Clear-cut cases of recklessness demand severe punishment, if only as object lessons to other drivers. Repeaters or habitual offenders should be punished on an increasing scale of severity. Fines are the only appropriate penalties for minor violations, but jail sentences should be imposed more often in aggravated cases. Revocation of an offender's license to drive is probably the most drastic treatment and should be reserved for habitual or willful offenders, including those driving while under the influence of liquor. Minimum penalties for certain types of offense should be prescribed by law, to strengthen the courts against "pull" and favoritism.

For the enforcement of a vehicle code we should not have to depend entirely upon local authorities. Our principal highways, outside of incorporated cities, are administered by the States and they should be policed in the same way. Uniformity in enforcement should be sought, out of fairness to the motorist and as a means of securing his cooperation.

MOTOR car design is responsible for less than 5 per cent of the accidents on our streets and highways. Mechanically the modern automobile is about as safe as the latest engineering and metallurgical science can make it. A steer-

ing gear or axle failure is almost unheard of as a cause of accident. Control of the car is constantly being improved. There is an ever greater flexibility and response, both in acceleration and deceleration. A modern motor car, with reasonable care and periodic adjustment, can be depended upon to do just what its driver wants it to do. Such deficiencies as still remain are problems primarily for engineering research.

Probably the chief field for mechanical improvement, insofar as it is related to safety, is that of the braking system. "Defective brakes," which figure all too often as accessory to a mishap, are al-

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most invariably due to neglect of adjustment by the owner or driver. In other words, the "personal factor" is primarily responsible. But the numerous new types of brakes which have recently appeared on the market clearly indicate the demand for greater ease of adjustment and reliability of operation.

Another unsolved problem of the motor car designer is that of headlights. Nothing can more clearly illustrate the lack of agreement on this important detail than the differences in headlight legislation between neighboring States. Few will assert that the prevailing type of headlight is wholly satisfactory. A compromise must be reached between the bright illumination that is so desirable to the man behind the wheel, and the elimination of the "glare" which so often causes the driver of the passing car suddenly to find himself in the ditch. Lights of the ordinary type seem bound to get out of adjustment

from time to time, and even with proper adjustment there is no way to prevent the "glare" that frequently results from irregularity of road surface or changes in grades. Here, again, the need is being met by elaborate scientific research. Whether the final solution will be the present twin lights with improved lenses, reflectors or bulbs, and fool-proof adjustment, or whether we shall come to some type of symmetrical arrangement, remains to be seen.



IN a brief survey of this sort it is possible to touch upon only some of the multiplicity of factors which, acting together, result in a mounting total of highway accidents. Few automobile mishaps can be traced to a single cause. Every step we take toward eliminating the hazardous circumstances surrounding motor vehicle operation lessens the probability of accident. That our efforts are bringing results may be seen in Tables I and II. The increase in all highway fatalities in 1924 over the preceding year was but 3 per cent, as compared with 18 per cent in 1923, despite increases of 17 and 23 per cent in the total registration of motor vehicles for the two years, respectively. Serious endeavor on the part of highway authorities, police, automobile clubs, motor vehicle producers, insurance companies and, most important of all, the general public, will unquestionably continue to reduce the accident cost of highway transportation. The prime need now is uniformity of action, which is far more urgent than refinement of detail. Whether tail lights should be red or amber, whether the speed limit should be 30 or 35 miles per hour, whether the penalty for a given offense shall be fine or imprisonment—all these questions are subordinate to the fact that some agreement should be reached one way or the other. Standardization of highways and streets in accordance with the best modern practice, standardization of traffic laws on at least a national basis—these should come first, with uniform and rigorous law enforcement a necessary corollary. Finally, every motorist and pedestrian must assume his share of the responsibility, for neither engineers nor legislators can make the highways safe if even a small group of those who use them persist in making them dangerous.