

SAFETY ENGINEERING

# Peril on the Road

## Driver, Car, and Road All Contribute Their Parts To Annual Toll of 36,000 Dead and Million Injured

By ROBERT D. POTTER

PEOPLE will pay good money at circuses to see skilled performers outline their partners with bullets, hatchets, spears and knives. The paying spectators shudder at the danger and are glad they are in the stands. Yet after the performance those same spectators will blithely step into their motor cars and take chances comparable with those of the beautiful circus performer in the hatchet-throwing act, who day after day stands on the "brink of death," as the circus ballyhoo puts it.

Over 36,000 persons killed in 1935 in motor vehicle accidents and nearly another million injured from the same cause—that is the price America is paying to travel over its highways. Who is at fault: the driver, the car or the road? What are the remedies?

States with low speed limits are rather proud of them. With somewhat doubtful legal right, the acting motor vehicle commissioner of New Jersey recently reissued one driver's license only when the chastised driver agreed to install a governor on his motor which limited its speed to not more than forty miles an hour.

And the movement is growing, with something like the blind credulity that marked the Townsend plan in politics, to have "branded" license plates to bring permanent ridicule to convicted reckless drivers.

In the rush of the present "do something" demand for action to decrease traffic deaths, accidents and property damage, the more level-headed among the public officials, highway experts and traffic commissioners are seeking above all else to divert the aroused public opinion into constructive channels. Extreme measures leading up the blind byways of the traffic problem will never accomplish a real solution of the motor vehicle menace.

### Like a "Cure-All"

Above all, thinking persons who can see the merits of the automobile and the way it has changed the whole structural picture of the United States dread to have a single factor, like speed, singled

out as the cure for the complex problem. The method smacks too much of the "cure-all" type of medicine.

And because speed without contact never killed anybody, it is highly questionable just how much good the proposed rigid curbs on speed would do. The severity of the accidents might be reduced, but the total number would not be decreased greatly.

The word "contact" gives the clue to why speed is a contributing factor in highway accidents and deaths. But note also that "contributing" is the qualifying adjective.

This is no plea for limitless speed on the public highways or even for any speeds higher than those now generally allowed by the majority of the states—say 40 miles an hour in open country—but the facts about speed need straightening.

### Misguided Effort

For those who want speed limits lowered to 30 or 20 miles an hour consider what men like Dr. Miller McClintock, Director of Harvard University's bureau of traffic research, think of the matter. In a report to the Society of Automotive Engineers, Dr. McClintock called the demand for lower speeds an irrelevant and misguided effort.

Consider, said the Harvard traffic expert, two cars moving at the moderate speed of 30 miles and approaching on a country road. Through some accident—to the drivers, cars, the road, or some pedestrian—they meet head on.

"It is rather academic, isn't it," asks Dr. McClintock, "whether the cars are approaching at 30 or 40 or 50 miles an hour?"

Since the force of impact is the same as though either car ran into a stone wall at twice its given speed, even a ten-mile-an-hour speed limit would do plenty of damage and cause fatalities in this kind of accident. Such head-on collisions are not so rare as they may seem.

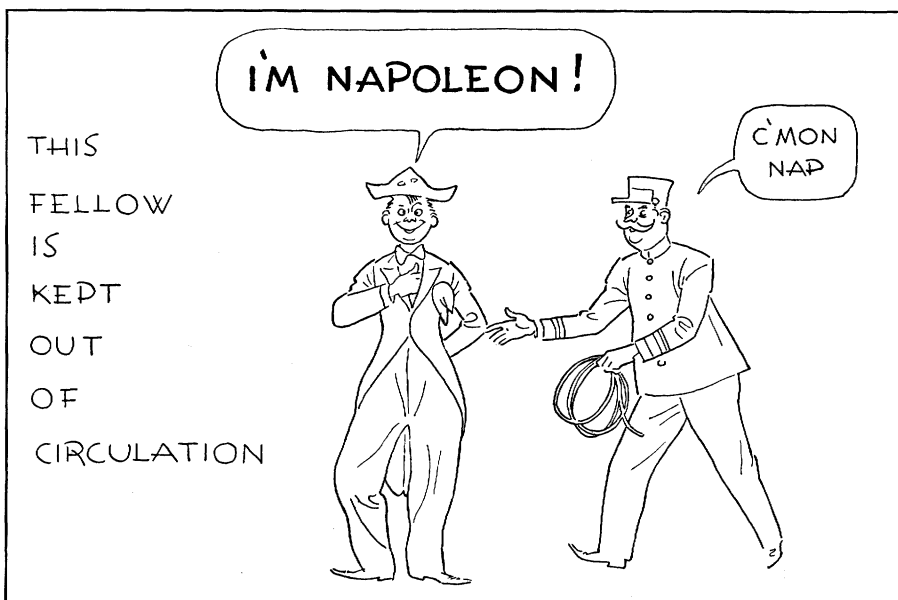
### Trend Toward Speed

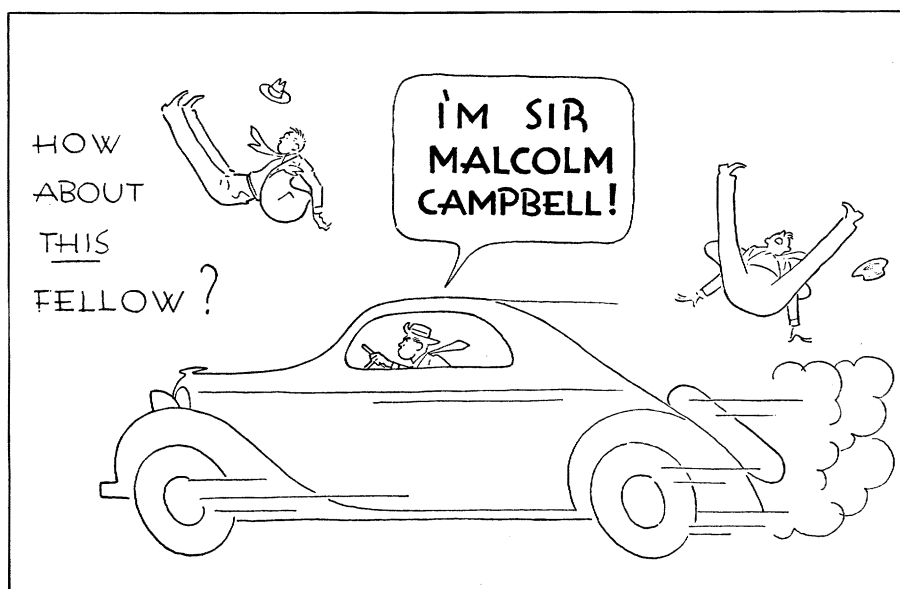
With the way motor cars are being built nowadays—based on public demand—the trend is toward more power and hence more speed. R. E. Toms, chief of the division of design, U. S. Bureau of Public Roads, recognized this trend clearly when, to the American Road Builders Association, he said:

"Whether we like it or not the trend in highway traffic as well as in all other transportation is toward higher average speeds."

Because he was speaking to the men who build America's highways, Mr. Toms added:

"We cannot reverse this trend toward higher speeds by building highways that are unsafe for these speeds."





Cartoons Courtesy The Travelers

Better highway construction, indeed, is one very tangible and constructive way traffic deaths and accidents can be decreased.

"Smart roads for dumb drivers" might well be the slogan of such commendable organizations as the American Road Builders Association, the Highway Research Board of the National Research Council, the U. S. Bureau of Public Roads, and other agencies helping to solve the nation's traffic death problem by building better and safer highways. Building better roads, in fact, is among the soundest of all methods for decreasing the annual toll of dead and injured.

### Road Easiest Controlled

Of the three factors which bring traffic deaths—the road, the car and the driver—the road is most easily controlled by the law. No road, for example, ever broke a law. Build the road right in the first place, give it reasonable maintenance and you have improved one third of the factors which bring traffic death.

It is possible to build roads that help eliminate the intersectional type of accident, the danger of collision with approaching cars and markedly decrease accidents due to passing. Moreover, it is possible to modernize existing roads so that the menace of motoring can be cut quickly to tolerable figures.

The U. S. Bureau of Public Roads estimates that between 25 and 50 per cent of all the vast network of highways built in the last twenty years needs modernization!

The early battle cry of motoring, "Get

us out of the mud!" accomplished its purpose. But motorists then did not foresee the enormous increase in the use of the automobile which has raised registration figures from but little more than 6,000,000 in 1918 to over 26,000,000 in 1935.

### Menace

Those early roads, some less than two lanes wide and many only wide enough to permit two cars to pass with a foot to spare, are the menacing hangover of the true horse and buggy days.

Highway engineers know about the "smart roads for dumb drivers." Where new roads are being built and the necessary funds available, they are building them. Mainline, cross-country highways are now being built four lanes wide with a section in the middle permanently separating the two streams of traffic. Overhead crossings at intersections are provided. Feeder roads come in properly and with adequate warnings. There is no parking on such highways and the shoulders are broad and firm.

But such roads cost money, from \$100,000 to \$400,000 per mile. They must be planned for many years hence and their construction is necessarily slow.

More rapid and of more immediate usefulness are steps to modernize existing highways in the light of present day, and near future, traffic demands.

One step requiring nothing more than the fabrication of metal signs are curve warnings telling the maximum *safe* speed at which a curve may be taken. Too often are accidents caused by driving curves at fifty miles an hour which

are designed for 25-mile-an-hour traffic. The curve speed signs would adopt the same technique used to tell the maximum load permitted on bridges.

How fast a car can safely take a given curve is a not too difficult engineering calculation. The sharpness of the curve, the bank of the roadways and a few other factors can be put in an equation and the answer readily obtained. The railroads do it with their curves all the time. The weight of the car, incidentally, has nothing to do with the answer.

Other possibilities in highway modernization include: roughened "sand-paper" surfaces to cut skidding, the lowering of grades to prevent the collection of lines of cars behind a laboring bus or truck on a hill, the removal of deep drainage ditches from the roadside, the straightening of roads where possible and the widening of existing roads.

### Fender Fracture

Did you know that doctors are recognizing a new type of injury, called fender fracture, due directly to the automobile? Technically it is known as "comminuted compression fracture of the outer tuberosity of the tibia produced by a force exerted from the outer side, producing valgus strain" and occurs in accidents where pedestrians are side-swiped by a car, particularly on turns.

What part does the modern fast and powerful motor car play in the present accident death toll? "Today's chief difficulty in motor car deaths is high speed operation on low speed roads," is the indictment returned by the City Officials Division of the American Road Builders, in reporting on their national traffic survey.

Admittedly the manufacturers are building fine cars, but how they advertise them is something else. Comments the same City Officials' report:

"The advertised high speed ability and the quick-get-away for the automobile has not been conducive to traffic safety."

Two-thirds of the officials queried also agree that "the driving public has been misled into believing that the modern automobile is a safer device than it has actually shown itself to be."

And that, "The motor car as designed and constructed at present, is lacking in necessary qualifications to be a safe instrument in the hands of the average motorist when driven at speeds which have been advertised."

Just as the constant repetition of fear sells puncture and blowout proof tires,

when such accidents cause only one per cent of all accident fatalities, so too can the constant repetition of "safety" in all-steel, one-piece bodies give a false sense of security to the naive driver.

A check of motor car accidents and fatalities in 1935 indicates that structural failure in the car itself accounts for but 5 per cent of the accidents and 7.5 per cent of the deaths.

### Seldom at Fault

Said another way, 13 people lose their lives in cars in good mechanical condition for every one killed in an accident traceable, in some way, to the car's failure or inferior mechanical condition. This indicates, clearly, that automobile manufacturers are turning out a pretty fair product on the whole.

What happens after the car leaves the factory is something, however, over which the builder has no control. Given gasoline regularly and oil irregularly, motor cars go on and on until the menace of what are popularly called "old crates" becomes serious.

At the recent meeting of the Society of Automotive Engineers in Detroit, speakers complimented the men who design and build the cars of America on their fine job. They added, however, that traffic hazards might be appreciably reduced if the cars were built so that the present burden of owner maintenance were, in some way, decreased. While this is a commendable goal, it is questionable just how far the factory can do the owner's thinking for him in this respect.

Among the biggest problems of the automobile builder is the fact that motor power is beginning to outstrip braking ability. At 70 or 80 miles an hour your car may not be able to stop within a safe distance. Or, at night at top speed, you may be able to outdrive your own headlights.

Coupled with the need for better brakes is the problem of what to do about headlights and night driving in general. Daytime driving is gradually getting safer, despite faster speeds, but nightly games of "blindman's buff" with one and two ton vehicles are increasing the dangers after sundown.

### Compulsory Inspection

Compulsory inspection of motor cars by state authorities is a growing technique to help decrease highway accidents, but it is a debatable topic whether or not such inspections bring the slightest improvement in over-all safety, or in the number of mechanical failures, or in the number of cars found thus defective.

Remember, 92 per cent of all cars involved in fatal accidents are reported in good condition. For non-fatal accidents the figure mounts to 95 per cent in good mechanical shape.

The unpredictable menace of the man at the wheel was involved in two out of every three automobile accidents last year.

Machines can be tested and hence their characteristics predicted. But motor car drivers, as a cross-section of humanity, suffer all the ills and faults of their very human nature. Despite all the tests and rules and regulations, no one can predict, very accurately, what a given individual driver will do in an emergency; and the emergency arises every time a traffic accident is imminent.

### Education Basic

The basic and most permanent way to obtain fewer traffic deaths is generally recognized to be the education of the driving public to the hazards, the risks and the proper precautions in driving. But it is a long range program whose beneficial effects will come in future years, when the present crop of school children turn into the coming generation of drivers.

Fear as a factor in influencing the driver is a popular way to combat the problem. It affects one type of driver and not another and there is always the old psychological fact that constant crying of wolf dulls the mind to the importance of a given "fear."

Campaigns of rigid enforcement of speed laws are a favored method of combatting the traffic death problem. But it has the handicap always inherent in restraints and prohibitions which great masses of people think unreasonable. Enforcement of the 18th amendment was, of course, the classic example in this field.

### Accidents at Low Speed

Whether rigid enforcement cuts traffic accidents is questionable because most accidents occur at speeds below the speed limit.

For those who cry, "Lower the Speed Limit," there is always the fact that a reduction of even five miles an hour in some localities would so increase congestion that the number of accidents might be expected to go up instead of down.

Most strongly urged by many traffic and highway authorities is the need for uniform requirements for drivers' licenses. Many states still do not require any license whatever. Those states requiring both a physical examination and

a real driving test are still in the minority.

Ideal, perhaps, would be a Federal license, but the embryo movement, already under way, is up against the Constitution. Only possible justification for a Federal permit appears to be in Section 8, Article I, regulating commerce with foreign nations, among the States and the Indian Tribes!

The coming of the automobile has divided pedestrians into two groups: the "quick" and the "dead." And it does a dead man little good to know that he had the right of way. Last year nearly half of all motor vehicle fatalities were pedestrians—the man on the street.

For centuries a man that walked had the right of way over all other forms of transportation. But recently only four out of thirty large cities queried admitted the pedestrian had this right over motor cars at all times and places. Crossing at an intersection on a green light is the only time and place when the pedestrian is uniformly within his rights.

### Pedestrian Blamed

Most cities blame the pedestrian for an accident in which he is involved, even while admitting that the sidewalks are too narrow to accommodate a rush-hour pedestrian population. Few cities fine the pedestrian for traffic violations.

Efforts to safeguard pedestrians by over-and-under-passes have met with little success. In some cities only ten per cent of the walking traffic will use them. And school children shun them. Nowhere is there a law forcing one to use them.

Discussing this point, the recent Traffic Survey of the City Officials Division of the American Road Builders Association states:

"It is apparent that the safety of pedestrians is largely dependent on the motor car driver and again emphasizes the necessity for strict requirements covering the driver's ability and the physical condition of the car. Encouragement in pedestrian safety is found in many communities with respect to schoolchild safety, both the child and the motor car driver have been made conscious of the hazard existing. Evidently the pedestrian-accident rates will be reduced after many more years of educational effort."

### Long-Range Program

The statement emphasizes anew that education is the basic method of approach to the traffic accident and death problem but, unfortunately for immediate benefits, is a long range program.

America's shameful record on the streets and highways in 1935 is both worse and better than in 1934. Traffic deaths reached an all time peak at 36,100; an increase of one per cent over the previous year. That is the bad side.

But on the good side of the traffic death ledger is the fact that gains in motor car registrations and gasoline consumption should have increased the deaths from 5 to 6 per cent.

### Hope for Future

Something altered the increasing trend and slowed it up for the first time in some years. The curve denoting deaths by years has risen each time but appears to be flattening off. Sometime soon it may reach its peak and start downward.

Out of the whole complicated picture certain efforts stand out as giving help in remedying existing traffic conditions. Without attempting to put them in order of importance they might well be the following:

1. Curb the driver who travels above the speed limit but set the limits reasonably; 10 miles an hour where needed but with high speeds where possible with safety.

2. Build "smart roads for the dumb drivers" who at present do high speed driving on low speed roads.

3. Through education train the younger generation to the realization of traffic hazards.

4. Strive for more uniformity of requirements for driver licenses, making physical examination and a real test of driving ability essential parts.

### Improve Design

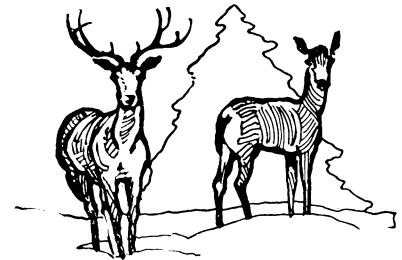
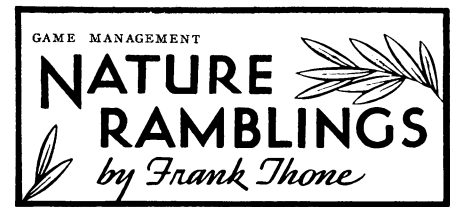
5. Let motor car manufacturers so design their cars that they will stay in factory-delivered condition longer than they do; and make periodic inspection of motor cars mandatory to solve the problem of the careless delinquent driver who is taking a moving menace over the roads at high speed.

6. Strive for uniformity in traffic signals and regulations. Have them reasonable but enforce them consistently.

7. Attempt the solution of the parking problem with its resulting aid to decreasing congestion.

8. Use the propaganda of fear where necessary but remember that it will only work over fairly short periods of time and is not a permanent solution.

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Deer Versus Forests

DEER and the woods are so commonly thought of as inseparable that it will come as a shock to many to learn that they can be enemies. And it will be a second shock, to hear that the profession of forestry in Germany, usually held up to the world as an almost inerrant model, can make mistakes, and has made some very serious ones in the past.

Yet such is the case. Right now, as a result of mistakes in past German policies of forestry and game management, there are too many deer in the forests of Germany, and the problem of getting them back into balance with their food supply is giving German foresters and game management people many brow-wrinkling hours.

The ups and downs of deer and forest, the flow and ebb of forestry fads in Mitteleuropa (for there have been fads even in German forestry) are given a thoughtful exposition by Aldo Leopold of the University of Wisconsin (*Journal of Forestry*, April). Mr. Leopold spent several months in the forest regions of Germany and Czechoslovakia, investigating conditions and methods there.

The present deer-forest unbalance in Germany, Mr. Leopold indicates, is due in part to the "spruce fad" of the late nineteenth century. It was found that larger cuttings of wood could be made from pure stands of spruce trees, grown close together, than from any other type of forest. So this highly artificial type of forest swept the country, and held sway until about the time of the World War.

But in such a forest there is nothing for deer to eat. Spruce needles themselves are inedible, and the crowded

### MEDICINE

## Find New Dangers in Chronic Carbon Monoxide Poisoning

A NEW danger from insidious carbon monoxide poisoning, previously unrecognized by physicians generally, was reported by Dr. Harvey Beck of Baltimore at the meeting of the American Therapeutic Society in Kansas City, Mo.

The hitherto overlooked disease is slow carbon monoxide asphyxiation. Acute carbon monoxide poisoning has been much discussed, but the chronic form has been neglected, Dr. Beck said. He thinks physicians have confused the chronic form with other diseases which it resembles in some of its symptoms. He reported ninety-seven cases of this condition. The patients had been repeatedly exposed to carbon monoxide, in doses too small to kill them outright, at varying intervals over prolonged periods.

The patients complained chiefly of headache, but also of dizziness, nervousness, nerve and muscle pains, shortness of breath, digestive disturbances and palpitation. Weakness, restlessness, a

depressed feeling were other symptoms. Some of the patients were confused and had difficulty in talking. Two had symptoms of stomach ulcer and two suffered from typical angina pectoris. These symptoms of serious heart and stomach disorders cleared up promptly when the patients were removed from exposure to carbon monoxide which in these cases came from defective gas heaters.

In all cases of this disease the cause of it, exposure to small amounts of carbon monoxide, must be removed before the patients can be restored.

Solution of the problem lies in proper preventive measures, Dr. Beck said. Carbon monoxide is a colorless, tasteless, odorless gas which gives no warning of its presence. It kills by combining with the hemoglobin of the blood, thus depriving the body tissues of their normal supply of oxygen. Air containing as much as one-tenth per cent of this gas is dangerous to life.

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