we drivers

We drivers may already know most of the pointers contained in the following pages. But perhaps we know them so well that we're apt to get careless about them. So it doesn't do any harm to sort of check up now and then and get back to the fundamentals of safe, courteous and alert motoring we followed so carefully when we first started driving.

we drivers

a series of brief discussions on driving,

dedicated to the safety, comfort and pleasure

of the motoring public.

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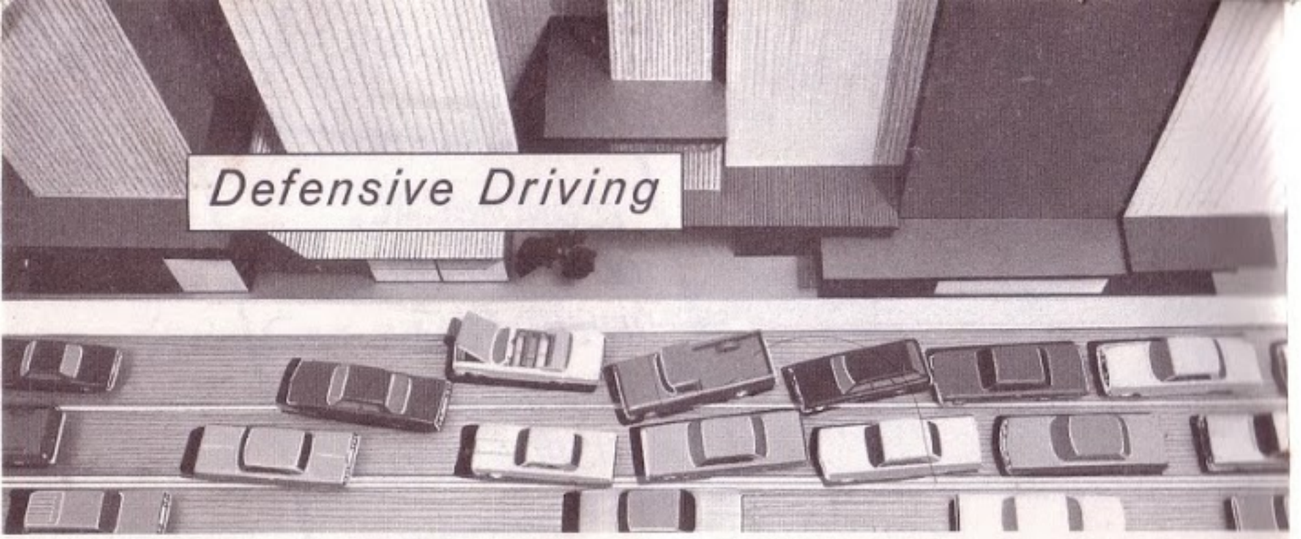
GENERAL MOTORS
DETROIT, MICHIGAN



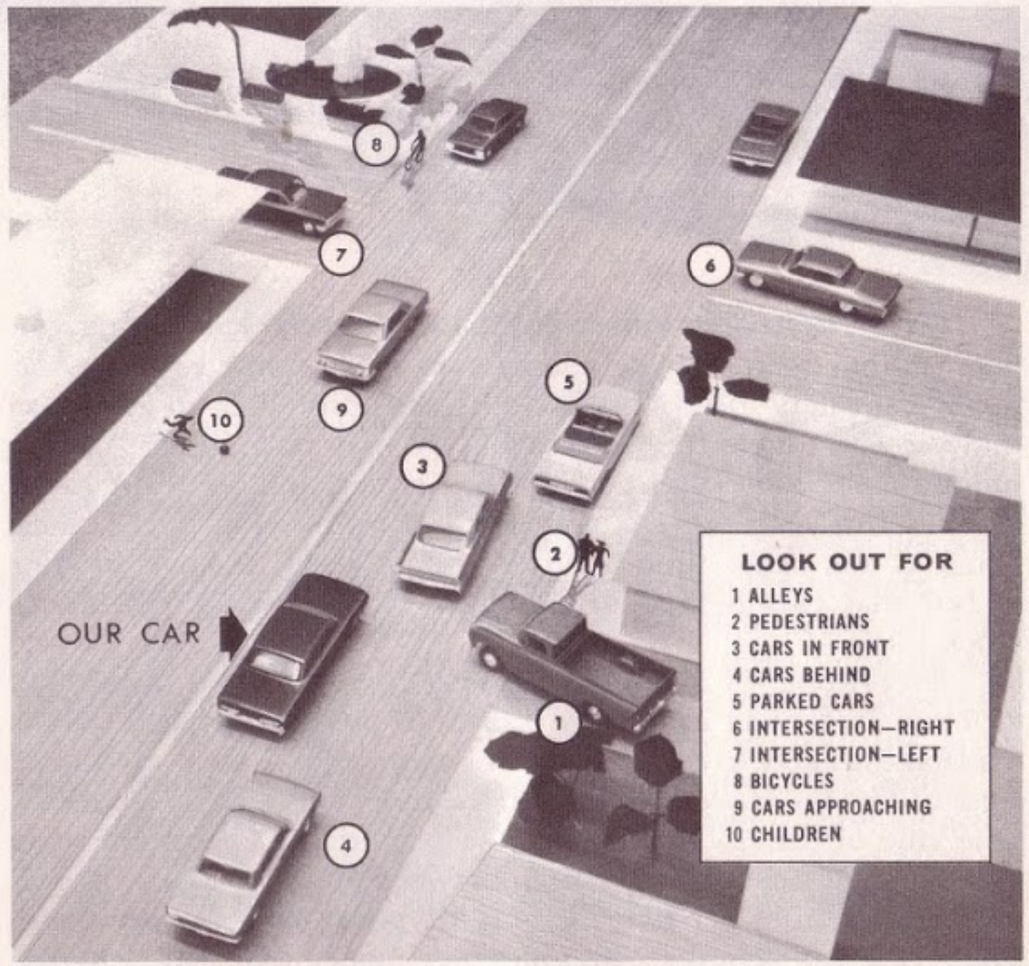
Defensive Driving

When we look down from a tall building and watch the traffic in the streets below, we wonder how in the world all those cars can keep moving along . . . crossing intersections, passing each other, turning in and out of parking positions . . . without getting hopelessly tangled.

As a matter of fact, from away up there, we do see traffic jams now and then, and many times the reasons for the trouble are just as plain as day. Someone will try to turn from a wrong position, and in a few seconds the whole line of cars is thrown out of kilter for blocks. Or a pedestrian will dart out in front of a car so the driver has to slam on his brakes, and one after another the cars behind him have to do the same thing. Then, instead of waiting courteously for the situation to clear up, there is apt to be a great blowing of horns that only adds to the confusion.

But when we become a part of that traffic our whole viewpoint changes. We can't see those things on up ahead that make us stop and start and stop again. And we can't see around corners or up alleys. And the worst of it is we can't look into other people's minds . . . the driver who makes a sudden turn, or the pedestrian who decides to do something we can't foresee. The interesting thing is that what pedestrians do may seem strange and illogical to us while we're driving; but we all lead double lives . . . sometimes drivers, sometimes pedestrians . . . and it's funny how our psychology changes when we change from one to the other.

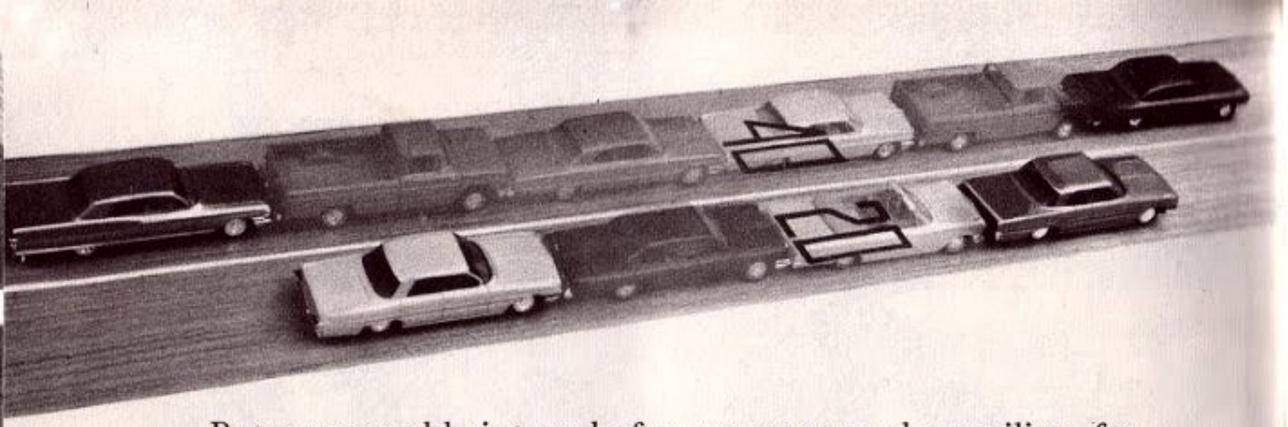
Anyhow, things can happen all of a sudden in our crowded cities and we have to be ready for them. This is sometimes called "defensive driving." As one driver has said, we have to drive



along with every intersection, every alley, every car . . . under suspicion. We all like to think it was the other fellow's fault when we get into trouble. But if we're sufficiently alert we don't let the other fellow's mistake get us into trouble.

Expert drivers tell us that the most important thing to do is to give ourselves a margin of safety . . . a reserve of space and a reserve of time.

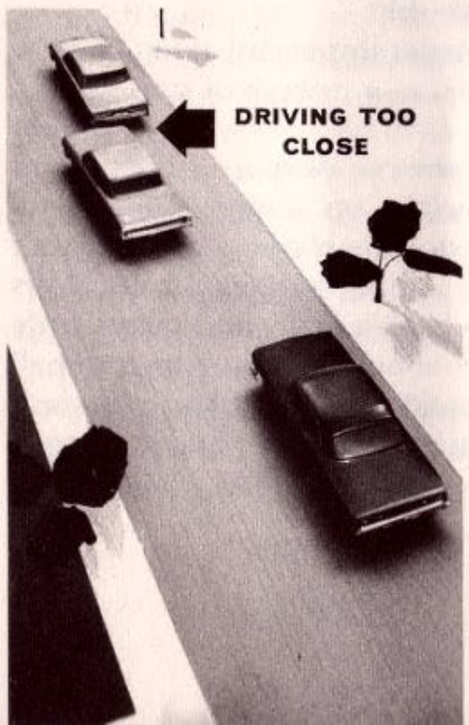
It's an easy matter to take a reserve of space. They point out that we don't have to drive right up almost bumper-to-bumper with the car ahead. If we do, the chances are we can't stop as quickly as we may need to . . . if he suddenly stops, slows up, or makes a turn. But if we drop back a little, and take a little extra room, we won't have to worry about "stopping on a dime" or turning out at sharp angles to avoid bumping. And we won't pick up such a fine collection of nicked fenders and damaged bumpers, either.



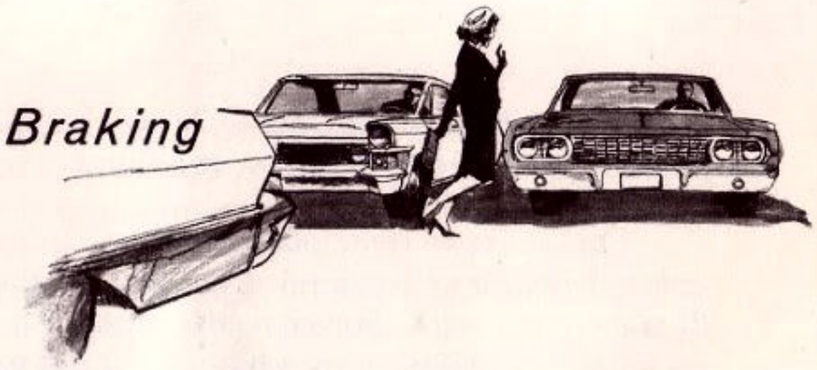
But a reasonable interval of space, or even clear sailing, for that matter, won't do us much good if we don't keep a time margin of safety too. In other words, we don't want to go so fast that we won't have time to do what we may have to do. All of a sudden a car may dash out of a side street, and we want to be sure we can keep our car and that car from being in the same place at the same time. And we don't want to have to stop so fast that cars behind us pile into each other for perhaps a block back.

Everything we have been saying here is just as important for country driving as for city traffic. In fact, at highway speeds a mistake is likely to cause something more serious than a bumped fender. The faster we are driving, the more space we must allow. One rule of thumb which many veteran drivers recommend is this: Keep at least one car length between you and the car ahead for each 10 miles per hour. If you are going 20 miles per hour, leave two car lengths; 40 miles per hour, four car lengths. Allow even more space at high speeds, on slippery pavement and after dark.

Just one note of caution, this margin of safety can be overdone. Particularly in slow, heavy traffic, leaving too much space ahead of you is simply an invitation to other drivers to pass or cut in ahead of you, disrupting the smooth flow of traffic. Play it safe, but don't overdo it.



Brakes and Braking

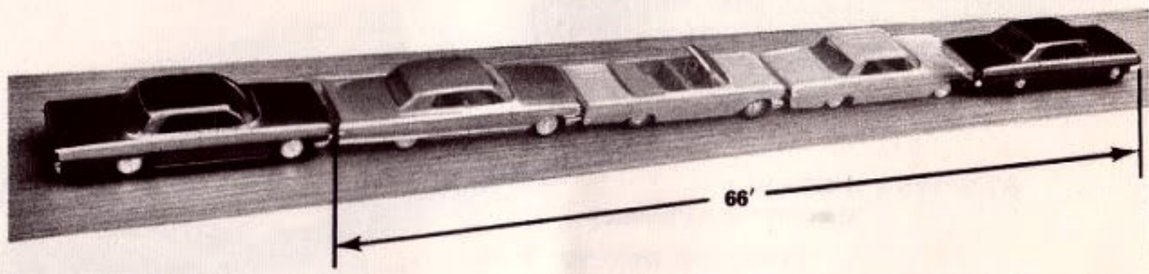


Push down on one pedal and the car goes faster. Push down on another pedal and it slows down or stops. What could be simpler?

And it *is* simple, but there is more to it than that. Anybody can push down on the brake pedal, but when to do it, how to do it, how to take road conditions into account—these are some of the questions to which the good driver has the answers.

In the first place, stopping is not the single action we often think it is. There are really three things we have to do to stop. First we have to think of stopping and decide to do something about it. Next we have to move one foot over onto the brake pedal. And then we have to push down on the brake pedal.

Those first two steps take time. Only about three-quarters of a second for the average, wide-awake driver, but at 60 miles per hour this means the car travels 66 feet before the brakes are



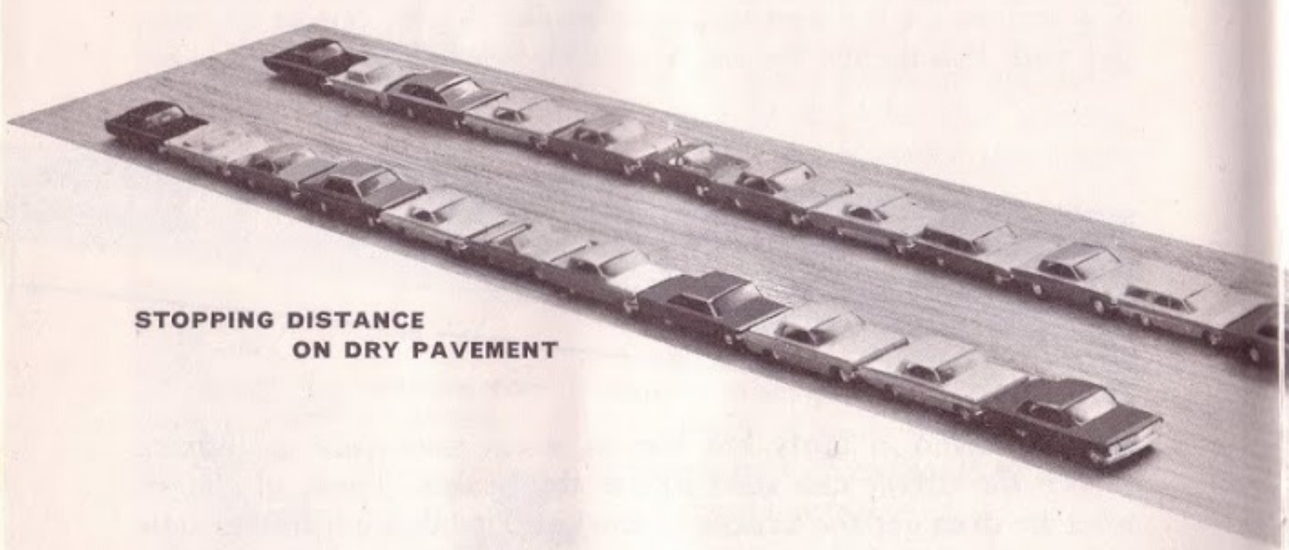
applied. Even at fairly low speeds, a car goes quite a distance before the driver can start to use the brakes. Then, of course, after he does get the brakes to working, it takes additional time to stop completely.

Power brakes can help us cut down the time required for that second step, because we can just pivot our foot on the heel and apply the brakes without having to lift our leg and move it over to the ordinary higher pedal. And we don't have to push so hard, because most of the pushing is done for us. But once we

have applied the brakes, power brakes will not stop us any faster than regular brakes in good condition. We will see why in a moment.

One thing to remember about power brakes is that in most cases their power is supplied entirely by the engine of the car. If the engine stalls, power is provided from a reserve tank, and when that is exhausted we have the ordinary brake system. But we have to push harder because of the lower mechanical advantage due to the short distance the pedal travels. So if this should ever happen to you, remember to *push hard.*

Just how long or how far it takes to stop a car is very difficult to put into figures. It depends primarily on the road surface. You might almost say that it is not the brakes that stop the car. Any brakes in proper condition can lock the wheels almost instantly when the driver jams down on the pedal, and the stopping actually depends on the grip of the tire on the road. Present-day brakes are powerful enough; our rate of stopping is determined



STOPPING DISTANCE ON DRY PAVEMENT

by what engineers call the coefficient of friction between the tire and the road surface.

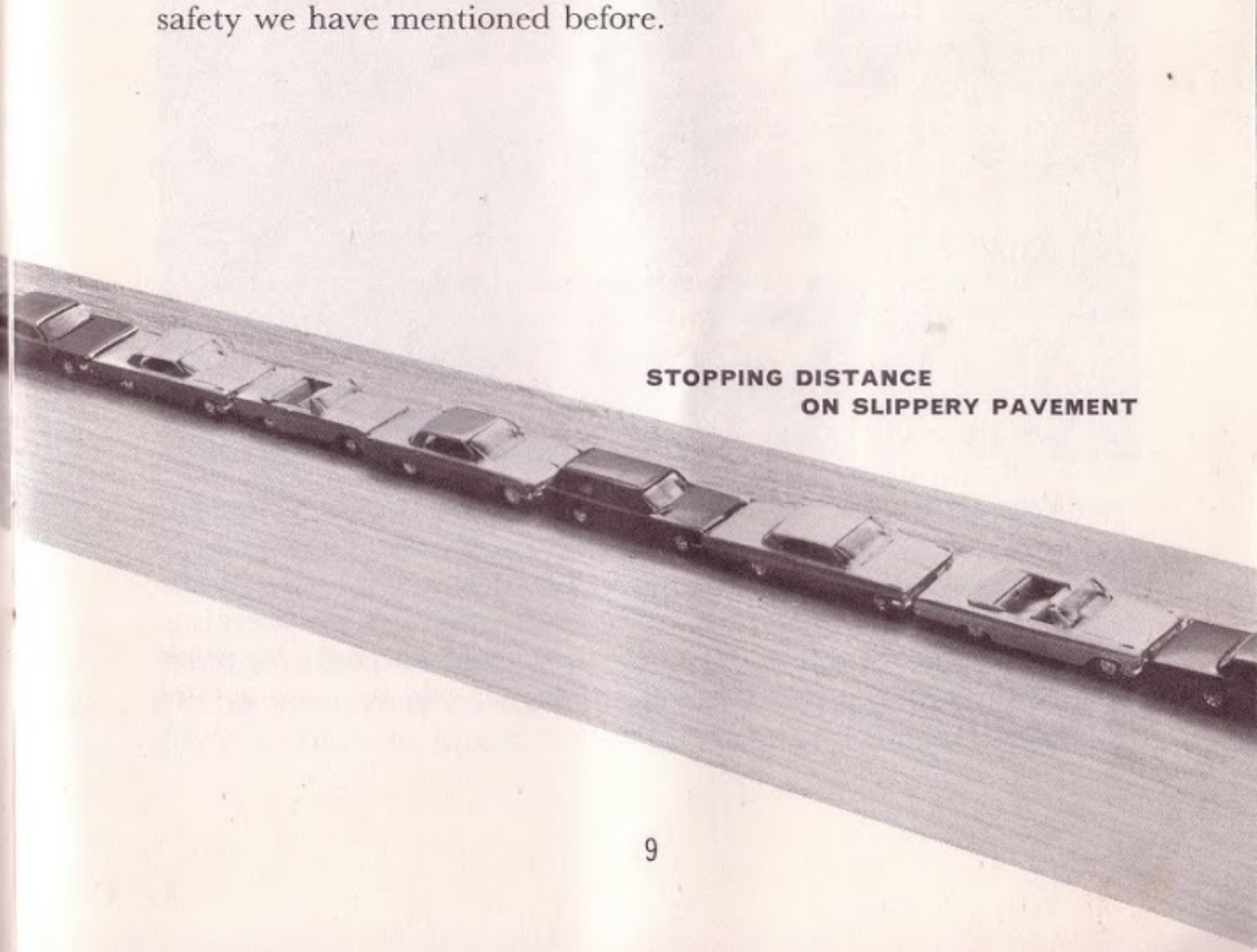
Now this coefficient of friction can vary widely. Of course we have ice and snow conditions, which we will discuss in a later chapter on driving in slippery weather. But without going to such

extremes, our stopping distance can be quite different depending on whether we are on a smooth or rough road, on pavement, gravel or dirt. And a sprinkling of wet leaves on the pavement can be as treacherous as a patch of ice.

Then there is rain. A wet street or highway is not as bad as ice, but it can be surprisingly slick. And here's a hint you may not be familiar with. The road surface after a slight wetting from a light shower or at the onset of a heavy rain is particularly slippery. A film is formed with the dust and oil on the road which acts as a lubricant; heavier rain washes this away.

So we can see that our stopping distance is affected by various factors. The important thing to remember, however, is that the distance needed to stop increases a great deal as we increase our speed. If we double our speed, we need four times as much distance to stop; if we triple our speed, we need nine times the stopping distance. At 60 miles per hour, with good brakes and dry pavement, it is difficult to stop in less than the length of a football field.

Experience can help us estimate these stopping distances, but even the veteran driver always leaves that extra margin of safety we have mentioned before.

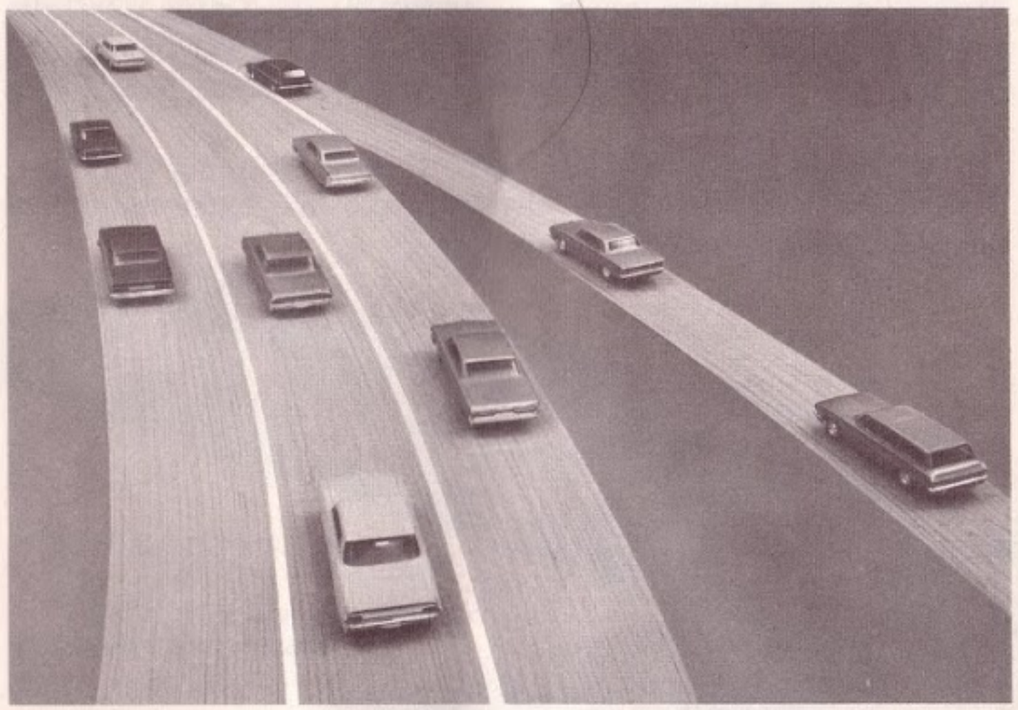


STOPPING DISTANCE ON SLIPPERY PAVEMENT

Driving on Freeways

A few years ago driving on a freeway was a rare experience. Today we find them in all parts of the country, and their increase will be even more rapid from now on. Maybe the one you are most familiar with is called a thruway, or a parkway, or an expressway, or a turnpike, but here we are lumping them all together under the term freeway, meaning a divided highway with planned access and no cross traffic.

Modern freeways are designed to make smooth, safe driving easier. But driving on them does call for some special techniques and precautions.



When we enter a freeway, we will find a strip of pavement extending for a short distance alongside the roadway proper. This is the accelerating lane, to enable us to get up to approximately the same speed as the traffic with which we are merging. But the important thing, of course, is to check carefully for other cars and make sure that there is nothing in our way and we are not interfering with through traffic.

Once we are on the freeway and cruising along, everything should be smooth sailing. The main point to remember is that we—and the rest of the traffic—are going along at a higher speed than we are probably accustomed to. Therefore we should leave an extra margin of safety all around. We should stay farther behind the car ahead of us. We should look farther ahead and plan farther ahead. If we are going to make any change of course —switching lanes or leaving the road—plan it ahead and check to make sure all conditions are right for it. Sudden decisions are dangerous on a freeway.

We might point out here that there is a great deal of difference between driving on a city freeway during the rush-hour and driving across country on a freeway in light traffic. While some things hold true in general for both cases, most of what follows has to do primarily with the open road where one can cruise for miles without interruption.

One thing we should do on most freeways is—keep to the right. When we are on a one-way, multi-lane highway, the left lane or lanes are ordinarily for passing only. We should stay in the right lane, and before turning out to pass a car, we must be sure nothing is coming up behind and that the car ahead is not about to turn out too. In any kind of driving it helps to know what is behind us; on a freeway it is even more important to make regular use of the rear-view mirror. And we should not forget to use our direction signals in changing lanes.

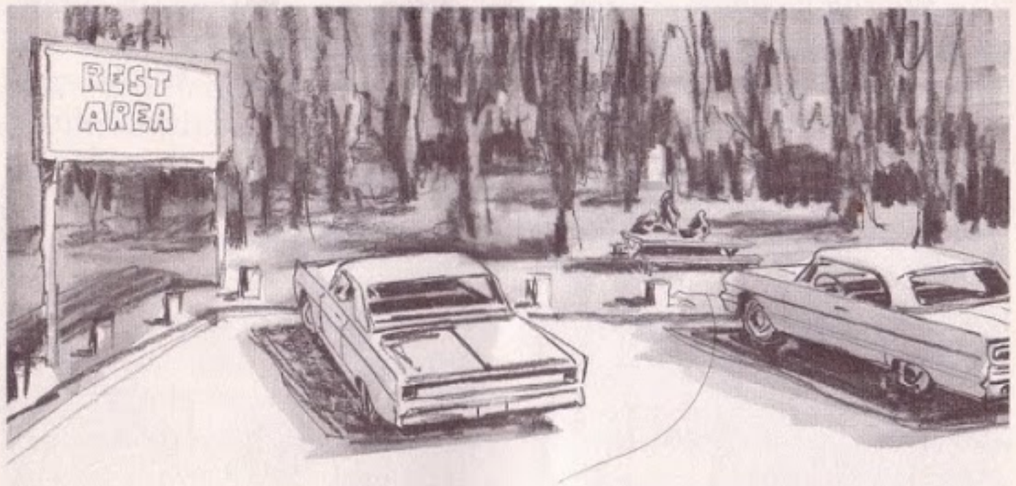
We must watch the signs more carefully than usual on freeways. The speed limit may vary occasionally, and when it does it's for some very good reason, so we should treat it quite literally. This is particularly important because we tend to lose our sense of speed during sustained fast driving and it is well to check on it frequently.

The regulations about never stopping on the highway, and even off the highway except in emergencies, are necessary for our safety. Other similar rules to cover local situations are there for the same reason—our safety—and should not be trifled with.

Some of the informational signs are just about as important —at least for our pleasure and convenience. If we don't notice how far it is to the next gas station, it can be embarrassing and cost us money. If we miss the exit we want, it isn't a case of going around the block; it probably means miles and miles out

of our way. (Incidentally, we must never back up if we pass our exit.) And here's a hint: Believe in the direction signs even if they point north and you know you want to go south. With clover-leaf intersections and intricate entrances and exits, the compass means nothing and we have to take the signs on faith.

There is one important consideration of a different type which applies to freeways particularly. We shouldn't drive too long without stopping, or sit in the same position for a long period, just looking straight ahead down the road. We actually can develop a sort of hypnosis after a time, and do not react



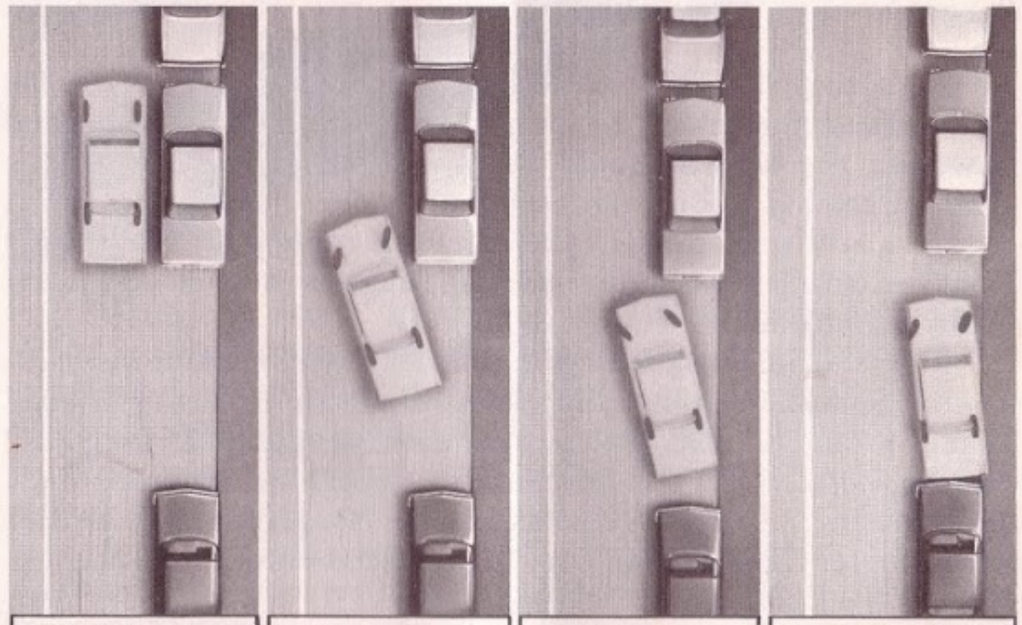
properly when it becomes necessary to do something. It is safer and more pleasant to stop every so often at one of the designated stopping places and walk around for a few minutes. While driving we can change our position now and then, open the window next to us, glance at the scenery when we have a chance or at least change the focus of our eyes to a greater or shorter distance. Almost any change or movement will help us snap out of it.

Perhaps the most dangerous thing about freeways comes when we have just left one. We have to readjust all our thinking —get back to our old ideas of speed, watch each intersection, be ready to stop for traffic lights, do all the things we haven't had to bother with for a while. Sometimes it is difficult to adjust suddenly to these changes, so it behooves us to be extra careful during this in-between stage.

Parking

With the parking problem as it is today, it's surprising how few of us are able to park our cars close to the curb in a limited space without a lot of extra turns. It is true that expert parking can come only through experience, but like everything else there are certain simple rules or principles which will help anyone to carry out this maneuver with the least amount of effort, trouble and false moves. By following the procedure outlined in the diagram we should, after a little practice, be able to park our car in a space only a few feet longer than the car itself.

If our car is equipped with power steering, we don't have to worry, of course, about the effort, and it makes the whole job easier. Power from the engine does practically all the work, and we can concentrate on turning the steering wheel in the right direction at the right time. Incidentally, power steering is very



STEP 1

Drive up in a straight line and stop even with and fairly close to the car in front.

STEP 2

Turn the wheels sharply and back the rear end of your car in toward the curb.

STEP 3

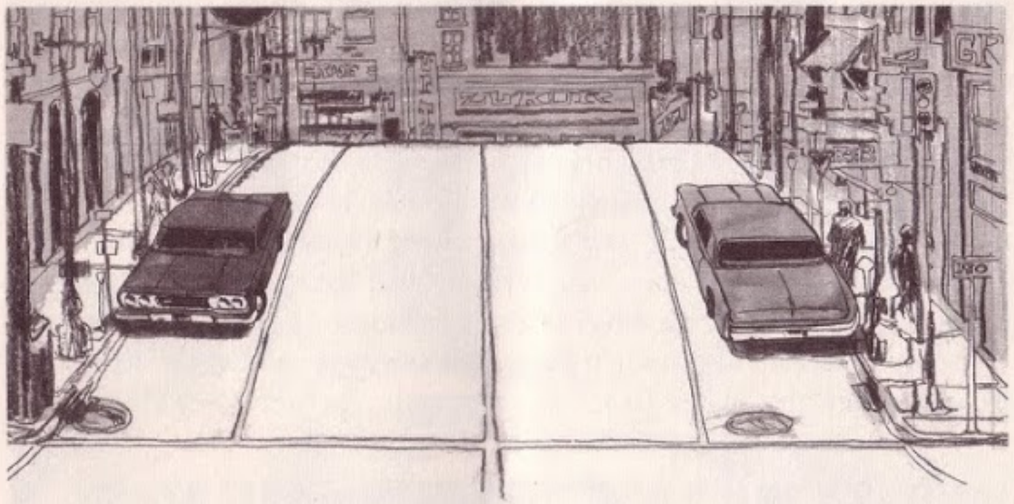
Swing the front wheels so as to bring front of car near curb.

STEP 4

Now pull yourself ahead into parking position.

helpful on the highway too. It prevents a lot of road shocks from being transmitted back to the steering wheel and gives us better control in case of a tire blowout or if one wheel hits some loose gravel or runs into a soft shoulder.

One special kind of parking is parking on a hill. When we leave the car on a slope, experts tell us that no matter what else



we do to keep the car from rolling, we should always leave the front wheels turned in the proper direction. If we are headed downhill, the wheels should be turned sharply in toward the curb; if headed uphill, the wheels should be turned out. Then the curb will help prevent the car from rolling. In many hilly localities, this is required by law, and failure to do so can result in a violation ticket.

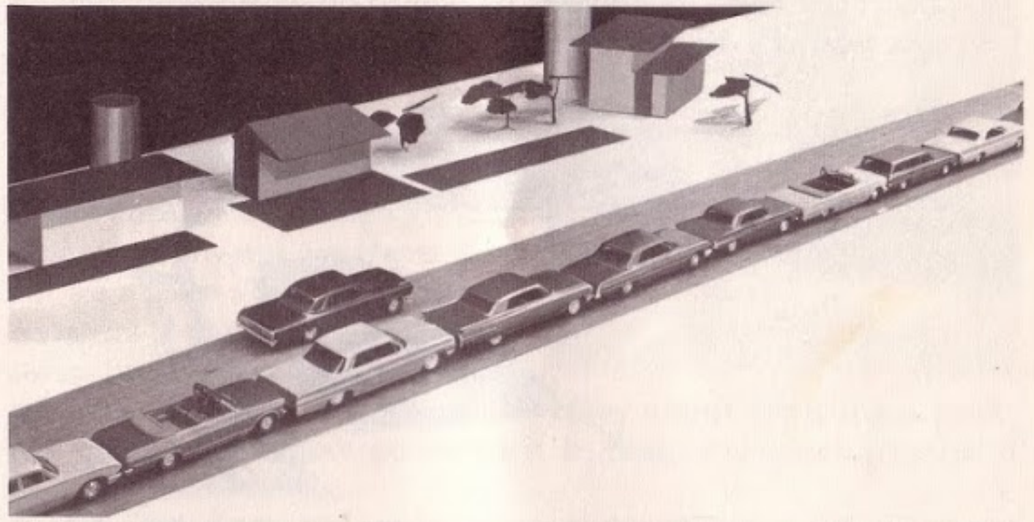
Getting back to parking in a small space, there is one caution we should keep in mind, whether we are expert or novice. When we start to back into a street parking space, the first thing that happens is that the front end of the car swings out toward the center of the street. This can be very dangerous if we are not watching for approaching cars both from the front and rear.

Passing Other Cars

No matter how expert we may be as drivers, we are all apt to fall into habits of driving that don't quite measure up to what we really know is right.

For instance, we all know that we ought to be careful about passing cars, especially when another car is approaching from the opposite direction.

And yet there probably isn't one of us who hasn't, at one time or another, moved over in the road to pass a car, and then wondered if we would get around in time.



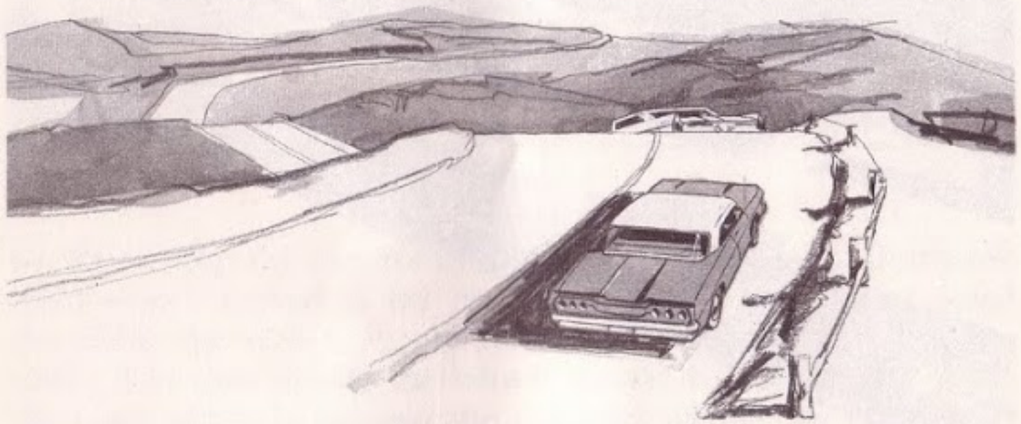
Here's one way of looking at this which might be helpful. When we try to pass a car that's going, for instance, thirty-five miles per hour, it's just the same as though we tried to pass a standing string of cars hundreds of feet long, the distance depending on our own speed in passing. The next time you start to pass a car on the highway, try to visualize it that way—a line of stationary cars parked bumper to bumper extending far down the road. If we can keep this picture in our minds, it might save some embarrassing moments or worse.

If we do make a bad estimate and find ourselves out on the left side of the road with a car approaching, it is usually best to apply the brakes and drop back behind the car we started to pass. Sometimes, however, it is better to depend on the power

of our engine to make up for our shortcomings and get us out of trouble. A quick spurt and we are ahead of the other car and safely back on the right side of the road. The more accelerating ability an engine has, the more quickly we can pass another car and swing safely back into our own lane. But play it safe; don't get over-confident.

There is another important thing to remember when passing. We always check for cars approaching us from the front, but we should be just as sure to check for cars behind us before pulling out to pass. Somebody may be just about to pass *us*. Using the direction signal before changing lanes offers some protection and warning, but it is not a substitute for a careful look in the rear-view mirror.

There are also some things having to do with passing which we must *never* do. We must never cross the center line to pass a



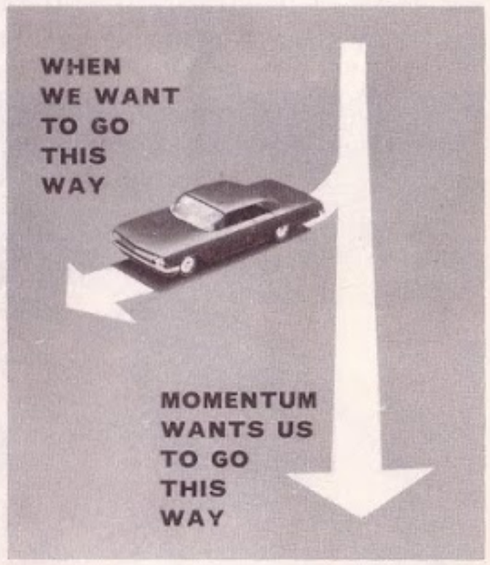
car going up a hill or on a curve where we can't see what is coming. We should not try to pass another car when approaching an intersection or where the "no passing zone" painted stripe along the center line of the highway warns us to stay in our own lane. And experienced drivers say it pays to play it safe by not overtaking slow-moving vehicles too rapidly because they might be preparing to make a left turn.

And here's one more thing to *never* do. Never speed up when someone starts to pass you. It's not only discourteous, it's highly dangerous. The best procedure is to slow down a little and let him get around you quickly.

If we just remember a few simple things—and use a lot of common sense—we will find that passing other cars can be easy and safe.

Curves and Corners

From time to time, in these discussions we will find that the same old laws of Nature will be involved. Foremost among them will be the laws of momentum and inertia, and inertia plays the major part in going around curves. Because inertia not only wants to keep us going, but going in the *same direction*. When it is trying to make us go straight instead of curving our course, we give it a different name. We call it "centrifugal force."



We have all heard of centrifugal force. We feel it when we go around curves. Railroads and modern highways are banked at curves to offset centrifugal force. Aviators bank their planes at turns by tipping them with the controls. But even though we all know about centrifugal force, few of us realize how powerful it is, and how much greater it gets the faster we go.

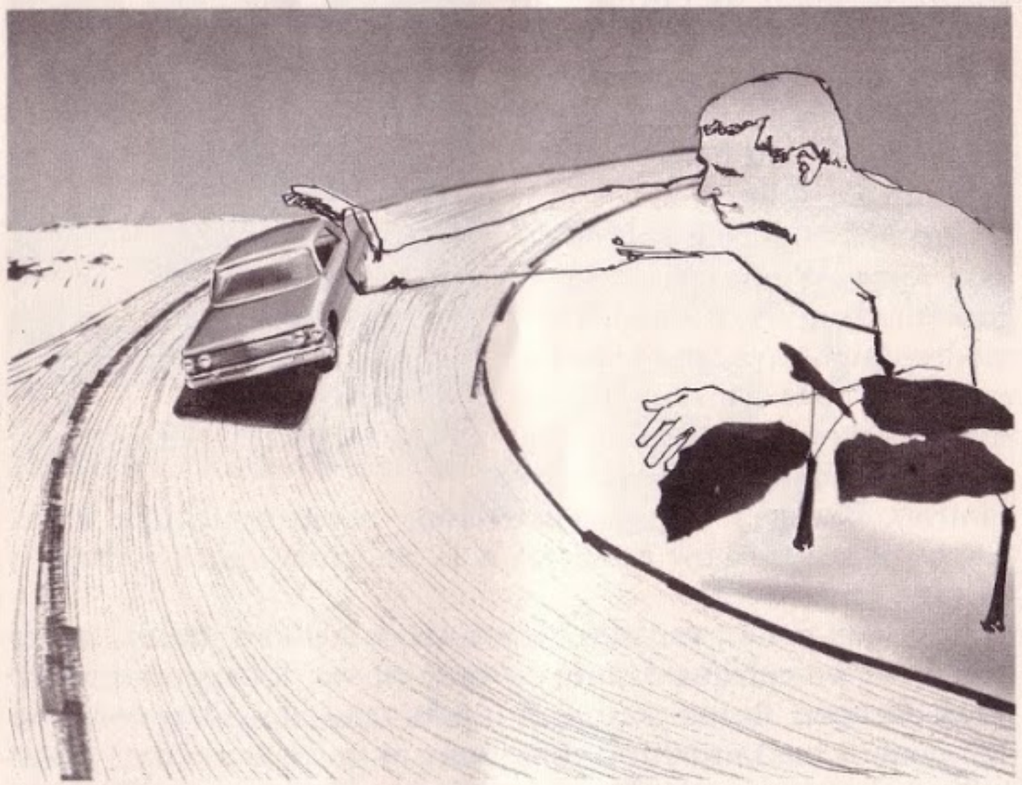
A 3000-pound car making a turn of 500-foot radius, has to overcome a centrifugal force of only about 156 pounds at 20 miles an hour. But at 30 miles an hour, that force has grown to 350 pounds, and at 60 it is nine times as great as at 20 . . . over 1400 pounds trying its best to push us off the road! The only thing that keeps us on the road in the first place is the friction between our tires and the road. The minute the centrifugal force gets stronger than the force of that friction, off the road we go.

The trouble is that often we don't realize how fast we're going. On road trips, for instance, after we have driven at a certain speed for a long time, it seems a small matter to increase our speed a few miles an hour. Then after a while we may do the same thing again. In other words, we keep putting forward our basis of comparison until eventually we have lost our usual

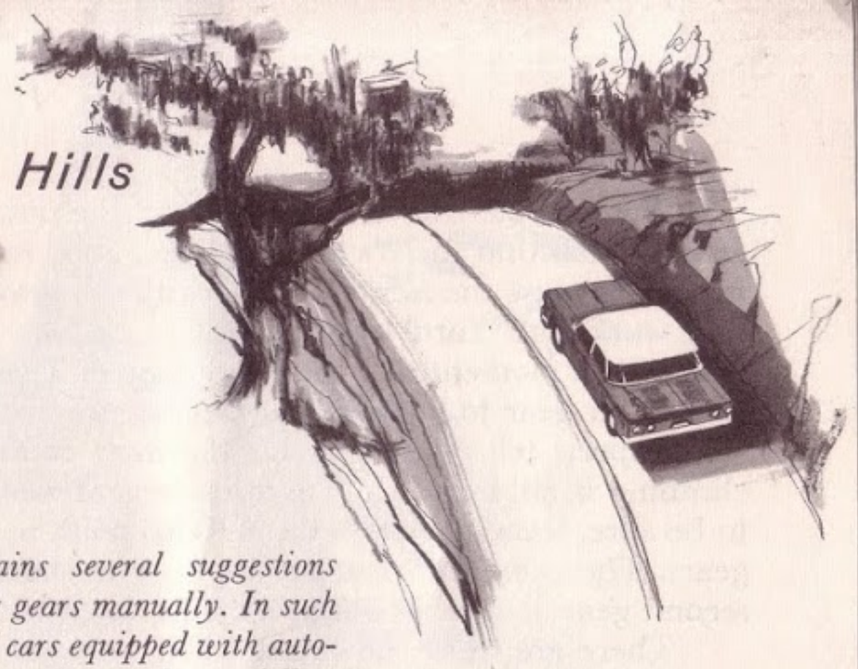
sense of how fast we are going. Then, the first thing we know, we are face-to-face with a turn or sharp curve.

So what do we do? We slam down on the brakes. It's the only thing we can do when we find we're going too fast. But even if we get around it without mishap, approaching that corner too fast has kept us from taking it as we should have liked to—in the expert manner of the driver who knows his business.

The long and short of it is that we can't take liberties with the laws of momentum and centrifugal force. Man's speed laws may not always be observed, but Nature's speed laws always are!



Driving on Hills



NOTE:
This chapter contains several suggestions that involve shifting gears manually. In such instances, drivers of cars equipped with automatic transmissions will not always follow the exact procedures suggested below. There is more information on this in the special chapter on Automatic Transmissions, beginning page 22.

In some parts of the country hills are taken for granted . . . and good steep ones, too. But for some of us who live in flatter country, hill driving is not so familiar.

As a matter of fact, there are several conditions peculiar to driving in very steep hills or mountains, especially if the altitude is high. For instance, a car that develops 100-horsepower at sea level, has only 82-horsepower at an altitude of 5,000 feet, and only 60-horsepower on top of Pikes Peak. And of course the decrease is proportional for engines of higher horsepower.

Another thing is that sometimes grades are deceptive and we don't realize how steep they are, if there is no level ground to judge by.

So if we go on a road trip and happen to get into country where hills are hills, we often have no idea of what is in store for us. We will come rolling up to a hill, taking it for granted that we'll make the grade. But before we've gone very far we find that our power seems to be giving out, and we're slowing down. Then we realize we must shift to second gear, but we're lucky if we haven't found out so late that there we are, stalled on a hill!

Now people who drive on hills all the time say one thing to remember is that there's nothing like a good start. Of course this is true, because the minute we start uphill, gravity starts to work and work fast. Yard by yard it uses up our momentum until finally that momentum is just about gone. Then we have to shift to a lower gear to increase our pulling power.

Experts tell us that by far the most common fault in hill-climbing is failure to shift to a lower gear soon enough. So just to be sure, some drivers set a definite point at which to change gears. The consensus seems to be that we should always go into second gear as soon as our speed gets down to 20 miles an hour.

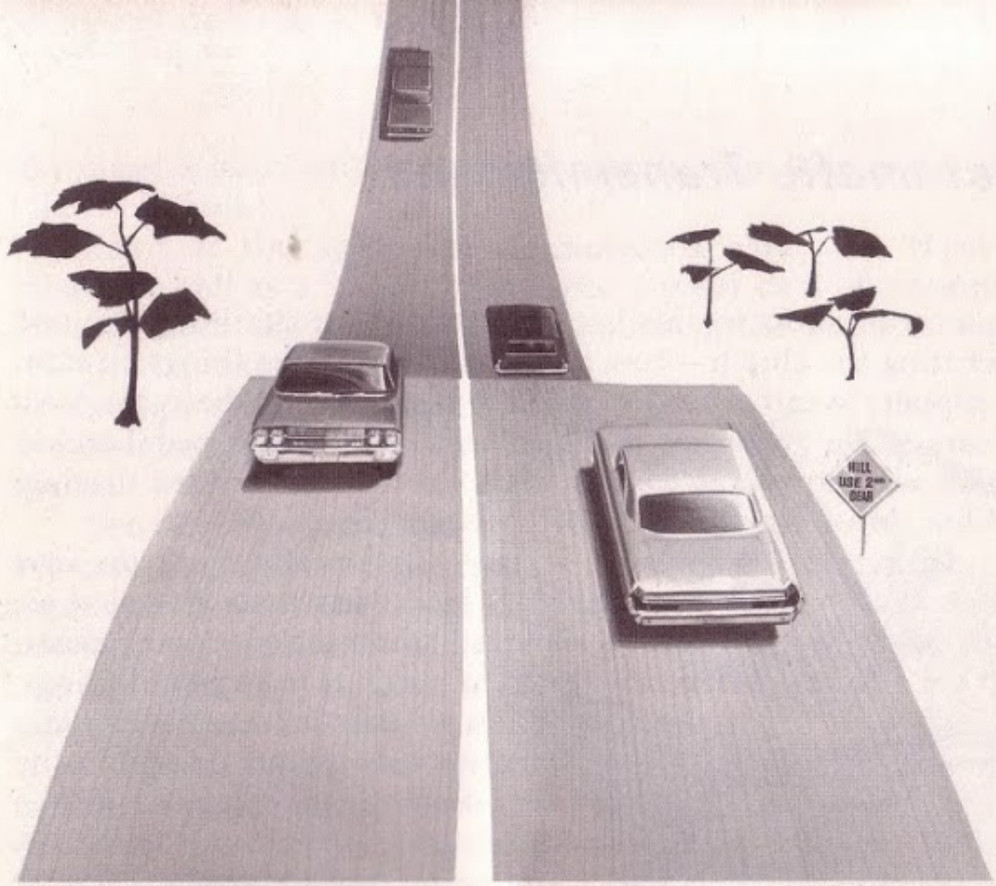
There are times, however, when we want to stop on a hill. So it's important to know how to start again, with our car on an upgrade. The simplest way is to apply the parking brake, if it is not already applied. Then speed up the engine slightly, let the clutch pedal up slowly and release the parking brake, These actions are all done at more or less the same time. You may have some difficulty in synchronizing everything perfectly when you first try it, but a little practice will make it easy to start on a hill with practically no rolling backward.

We soon find out in driving in hilly areas that what goes up must come down. And coming down may require more care than going up. That's where we have to look out for momentum. Momentum may have been a friend in need going uphill, but going down it will run away with us if we don't watch out. And if there are any sharp curves or bad bumps or loose gravel, we have to be careful or it may pitch us right off the road.

Many drivers say that we should go down a hill in the same gear we would use to get up. In other words, if it's steep enough so we would have to go up in second or even low gear, then we'd better get into that same gear before we start down. If our car is in second or low gear, our engine works as a very effective brake, and besides being safer it saves a lot of wear on our real brakes.

If we do use our brakes on a long downgrade, we should do so intermittently—on, off, on, off. Holding them partially applied for some time builds up heat in them and may cause them to lose temporarily most of their stopping ability.

Here is one final caution: *Never*, under any condition,



disengage the clutch and coast downhill. That's just what momentum is waiting for. Just give momentum a free rein, without our engine to help check it, and nobody can tell what's going to happen.

When we do get in country where people are used to driving on hills all the time, it may seem to us that they take those hills without the slightest concern. But if we were in their cars with them and could watch them closely, we would see that they take all these precautions we have mentioned, just as a matter of habit. And one thing is sure. They make it a rule never to cross the center line on hills, when they can't see far enough ahead to be sure whether anyone's coming.

Automatic Transmissions

At several points in this book we talk about shifting gears and operating the clutch—how and when to do these things on hills, in slippery weather and in other situations. But there are a lot of cars on the road now that don't have any clutch pedal and in which we don't have to shift gears for normal forward driving. "What do we do in this case?" one may ask.

In general, the answer is easy—we usually don't do anything. We don't do a lot of things in driving these cars that we have to do in a car with a standard transmission. In the main, we don't have to learn new things so much as to *forget* old things.

FREE LEFT FOOT

When we first drive some of these cars, we may grope around in the air with our left foot looking for the clutch pedal, but that doesn't do any harm. And we soon get over it.

There are several varieties of these drive systems, and there are some differences in the way they work. So it's a good idea to look in the Owner's Manual we get with our car for the special instructions on operation of the transmission. Otherwise we might not take full advantage of some of the conveniences it offers. But in general, if we just drive as we should in a standard car, we will find that most things are taken care of automatically.

For example, take driving in hilly country. When we are going up a grade, we don't have to worry about the proper time to shift to a lower gear. We simply find ourselves in a lower gear or its equivalent without thought or effort on our part, and with no loss of speed during shifting.

Going down a very steep hill—or in case of a need for additional braking effect for any reason—we can shift with a flip of the fingers into the low range. This gives us greater engine braking just as low gear does with a conventional transmission. The

low range is also useful for exceptionally hard pulling under certain conditions.

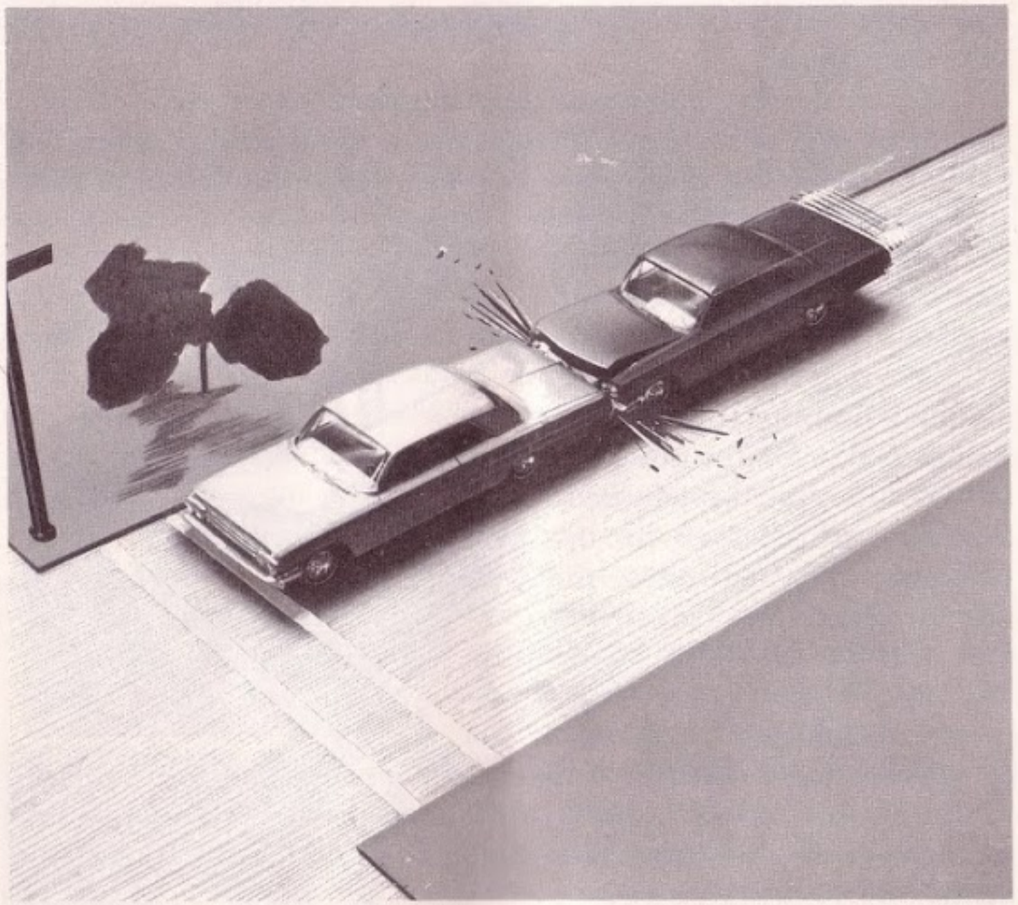
Some of the automatic transmissions have two "Drive" ranges as well as a "Low" range. For a great deal of mountain driving where the grades are not too steep, the lower of these two driving ranges will give us enough engine braking and also be useful on the upgrades.

Starting on a hill is easy. We can simplify the methods mentioned before by using our left foot on the brake pedal and our right foot on the accelerator. That is one of the advantages of having our left foot free at all times. Incidentally, some people prefer to use the left foot at all times to operate the brakes in a clutchless car. It can save valuable time in applying the brakes, but it may prove awkward at first to those of us who have been doing it the other way for many years.

There are a few special things worth remembering about these drive systems. For instance, if we get out of the car with the engine running—to open the garage door or something like that—we should be sure that the shift lever is in Parking position, or in Neutral with the parking brake applied. We should never leave it in Drive or Reverse position. Some experts contend that we should never leave the engine running unless there is a qualified driver in the front seat.

When we are stopped in traffic we don't need to move the lever—we can leave it in the Drive position. But we don't want to tramp on the accelerator momentarily as some people do to make sure the engine is running. We may find ourselves running into the back of the car ahead. Being in gear already, all it takes to start the car moving is to speed up the engine. The best system is to rest our right foot on the brake pedal instead of the accelerator pedal.

Another little tip that was passed on to us has to do with



leaving the car parked with the engine not running. Putting the lever in Drive position will not keep the car from rolling if it is on a slope. We should put it in Parking position, if such a feature is provided, or in Neutral with the parking brake well set.

So we see there are a few differences in driving a car with an automatic transmission, but if we check them over we find there is really very little new that we have to learn. All the general principles of good driving enumerated in the rest of this book still hold good. An automatic transmission just makes it easier for us to carry out those principles, and thus contributes to safer and more pleasant driving.

Slippery Weather

Ice and snow always bring problems for drivers. These problems are chiefly the result of less friction. And that is interesting, because usually we are trying to reduce friction all we can. We use ball and roller bearings to overcome friction. We smooth and polish parts to cut down friction. We put oil in our cars to reduce friction. But we can't get along without friction, just the same.

For, after all, we couldn't start a car, we couldn't stop a car, we couldn't turn a corner, if it weren't for friction. The friction between the road and our tires is what gives us traction.

Most of the time we have plenty of traction. But in certain climates every year Winter comes blowing and blustering down from the North, and the first thing we know he has spread ice and snow over our roads, and our whole traction condition is changed.

Automobiles are pretty well prepared these days to meet most conditions. The important thing is to adjust ourselves to these changed circumstances.

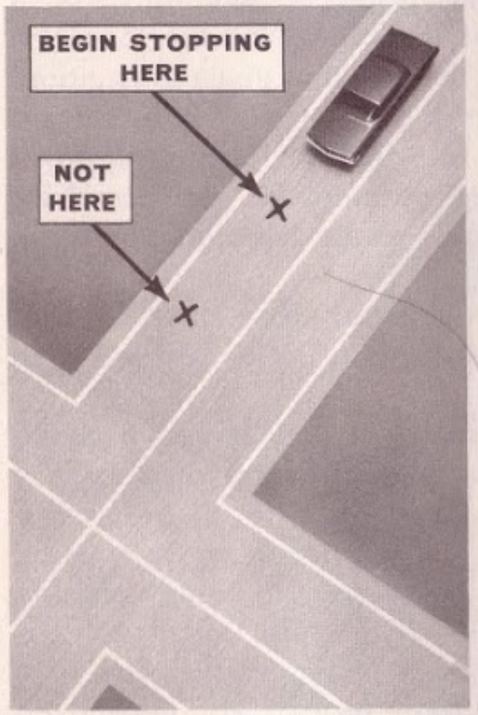
For instance, many skillful drivers, if they have a manual shift, start their cars in second or high gear on slippery, icy streets. Ordinarily this would be a bad thing to do. But when our tires have to start us going on slippery ice or snow, starting in second or high is harmless and it does help to avoid spinning wheels, side slipping, and difficulty in getting under way. If you haven't tried this after stopping at intersections, you may be surprised to find out how much more quickly you get started again. Only remember to engage the clutch *very slowly*, and push down on the accelerator pedal gently. Also with an automatic transmission, you will start better with just a light pressure on the accelerator.

This business of starting in slippery weather can be quite a problem. But stopping is even more so. However, most good drivers agree on one method that they find quite satisfactory.

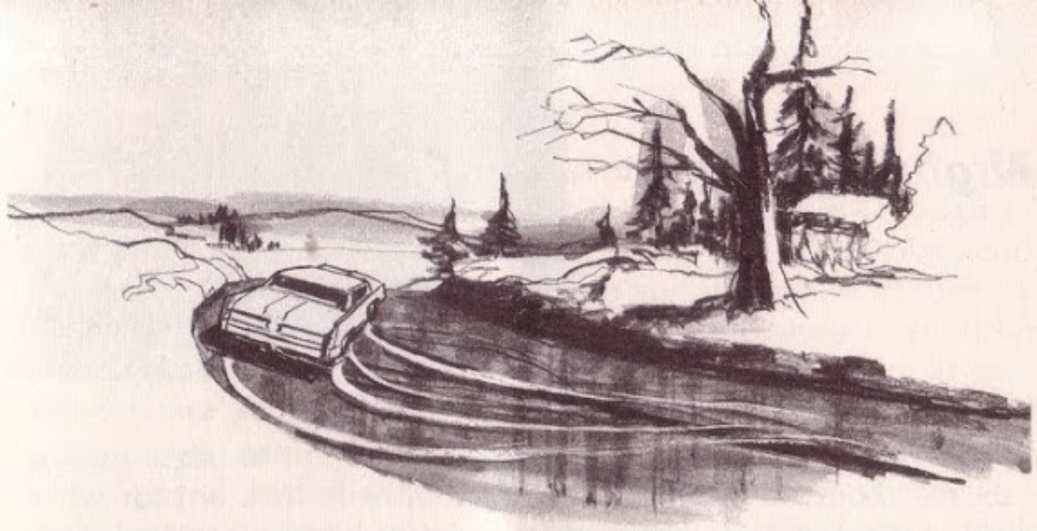
First of all they begin to slow their cars down at quite a distance from where they want to stop, releasing the accelerator pedal slowly. They press the brake lightly at first and release it almost at once. Then they press again and release quickly. In this way, they do not leave the brakes on long enough or hard enough to lock the wheels. By a series of brief, moderate brake actions, instead of one continuous pressure, they gradually reduce speed and can usually stop without skidding.

And good drivers always make it a point not to disengage the clutch as soon as they apply their brakes, but to wait until the car has almost stopped. While this is their general practice, they say it is especially important on slippery roads, as it reduces the chances of skidding.

Outside of starting and stopping, most winter skidding is at turns and curves. Many good drivers tell us that they treat every slippery curve or turn as though it were going to be a stop. They approach them using the same system of short, moderate brake actions. Thus when they reach the curve they are going so slowly that they can actually give the engine a little gas. With a little power turning the wheels, we are not so likely to skid. But it must be a *little* power, because too much would make our wheels spin and that might *start* a skid. If a skid does start, turn the front wheels briefly in the direction the car is skidding. This helps bring the car under control. And remember not to slam on the brakes, because you have no steering control with locked wheels.



Tires make a great deal of difference in slippery weather. New tires are much better than worn tires, and snow tires will often get us out of places which otherwise would give us trouble. For really severe slippery conditions the experts recommend tire chains. These will give us much more starting and stopping



ability on ice than do tires alone.

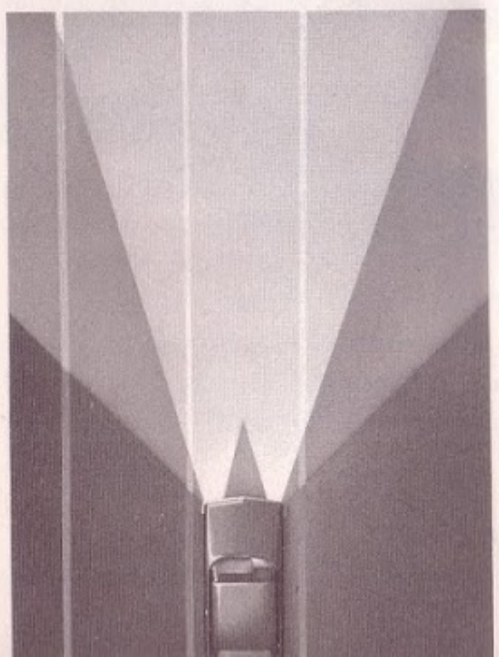
After all, the main thing to do about driving in slippery weather is just what we do about walking in slippery weather. The first thing most of us do when we go out on a slippery morning is to put out one foot cautiously and get the feel of the surface to see how careful we have to be. The best drivers we know do practically the same thing with their cars. The first thing they do after they get started, is to test the surface. They make sure that there are no cars too near, and then they gently apply the brakes. If they don't skid they resume speed and apply the brakes again—this time a little more firmly. In this way they determine the surface and know the degree of caution they must exercise to be safe.

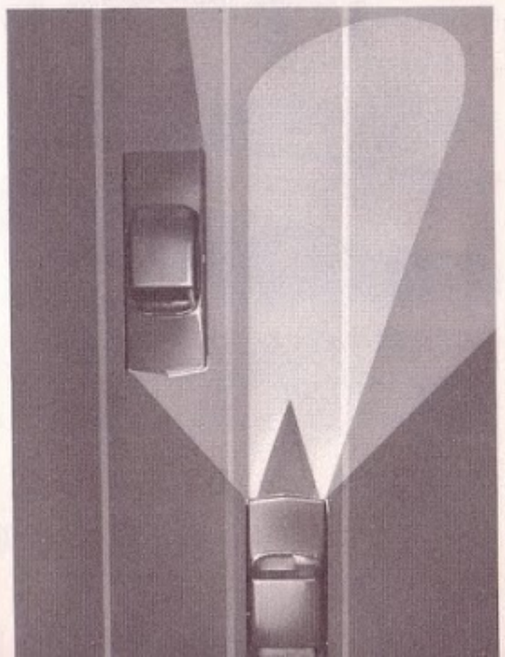
Night Driving

When people get expert at anything they're apt to begin getting careless about it, and that's what we have to look out for when driving our cars. For instance, it is easy to become careless about dimming our lights. How our own headlights affect other drivers on the road has a lot to do with both their safety and ours, so it's smart as well as courteous to switch to the lower or passing beam whenever another car approaches. This is a good idea too when pulling up behind another car, so our lights won't glare in its rear view mirror. This little jingle tells the story:

"Use lower beam always
When cars are near;
Use upper beam only
When road is clear."

With those cars which are equipped with an automatic headlight beam control, the driver does not have to worry so much about this. In most cases the beam will be raised and lowered automatically at the proper time without attention from him.





There is another thing about night driving that is very important, too. Engineers call it "overdriving our headlights." What they mean is that the distance we can see clearly by headlights is, of course, limited, and that we are apt to let our car speeds get beyond the point where we could easily stop within that limited distance. It's true that we naturally tend to go a little slower at night. But if we aren't careful we gradually get going faster than we realize, and that may get us into trouble.

After all, headlights don't give us the distance or clarity of vision that daylight does. So, on considerably shorter notice than in the daytime a vehicle, a pedestrian or an unexpected curve can come out of the darkness. Almost before we know it we may have to slow down or stop.

We may have to think quickly and act quickly to stop in time. And all the while that we are thinking and acting we keep going forward. And, of course, the faster we're going, the farther we go before we can stop.

Now, just as engineers have told us how to operate in safety with our own lights, many experienced drivers have pointed out how to avoid trouble from other people's lights. They say that when meeting other cars at night, we should avoid looking directly into their lights. If we turn our eyes more toward the right-hand side of the road, we can still see the oncoming car but will not be troubled so much by the glare. And don't return "glare for glare." It may give us some emotional satisfaction, but it simply increases the danger for everyone, including ourselves. Just flick your lights up and down once as a signal to the other driver that his lights are blinding.

All of these night driving situations are made easier if our headlights are in proper condition. With the Sealed Beam headlights which are on practically all cars, keeping them aimed correctly is a very simple matter. It is well worthwhile to have them checked periodically.

The truth of the matter is that night driving can be pleasant and safe if we're just a little more alert, a little more careful than in the daytime and a little more considerate of other drivers.

Mist and Fog

So long as we can see where we're going we may skip around at a lively rate over this old globe of ours. But every now and then Mother Nature decides to put us in our place, and of all her devices to make us slow down, none is more effective than mist and fog.

Now we may not have to contend with fog and mist very frequently, but we're bound to now and then, and when we do, they can cause us a lot of annoyance and trouble.

When a good heavy fog comes—on land, at sea or in the air—everything that moves, moves with caution. The ocean liner slows down to a few knots. Lightships signal, buoys sound and foghorns boom. Airports are closed. Even trains reduce their speed—and we drivers on the highways, too, must make our way cautiously through that baffling screen. For one thing is true, in spite of all our progress, transportation still largely depends on pairs of eyes in human heads.

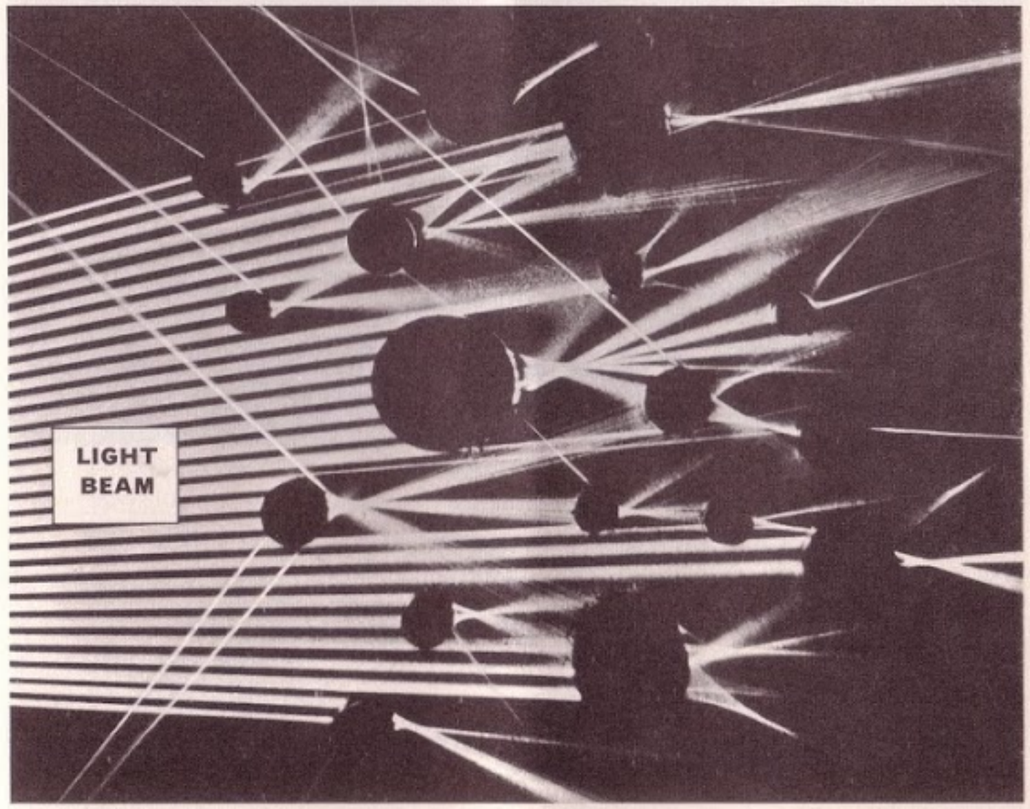
Fog is composed of tiny drops of water. These drops are so small and light that they hang in the air, and so close together that light can hardly get through them. Instead, these little drops scatter the light. When we try to pierce them with a beam of light, a great deal of it is thrown right back at us, so the effect is just like a great, gleaming white curtain hanging down in front of us.

Experienced drivers say that the first thing to do in a situation of this kind is to get our lights right. The main thing is to direct the beams of our headlights downward. If we use the upper beam, those little mist-drop mirrors reflect more of the rays right back into our eyes.

Then they say it's a good idea to guide by the road edge at

our right or by the driving lane line. But we have to keep a good weather eye ahead, too, because fog veils more than the road. It hides not only things on the road but such things as roadside warnings of curves and hills and intersections. Even the traffic light's red and green signal rays have the same hard time that our headlights do getting through that strange haze. In fact, in a good heavy fog, the best we can do for our vision is none too good. And so the main thing is to slow down. The ships have to do it, the trains have to do it, and we have to do it too. The only alternative is to pull off the road, or if we have not yet started out, we had better just wait.

But seeing in fog and mist is only half the story. We not only have to *see* but we also have to be *seen*. Our headlights, properly adjusted, are strong enough to do their duty in pointing us out to people coming from the opposite direction. Parking lights should never be used in fog; they are not bright enough to be visible very far, and we may develop a false sense of security. In addition, some drivers use their horns like foghorns by giving them a toot every now and then. But another thing



we have to think of is to be sure drivers behind us see us. And so it's a good thing to make sure that our stop and turn signals and taillights are working and that the lenses are clean. If the weather's clear and our taillights have gone out, the other fellow's lights may point us out fairly well. But if his headlights are fighting fog, they can't do much to protect us.

So when all is said and done, driving in fog is mostly a matter of having our headlights and taillights right *and being careful*. Driving in a heavy fog is never pleasant, but with some simple precautions and a lot of common sense, we can arrive at our destination—late perhaps, but safe.

Seat Belts

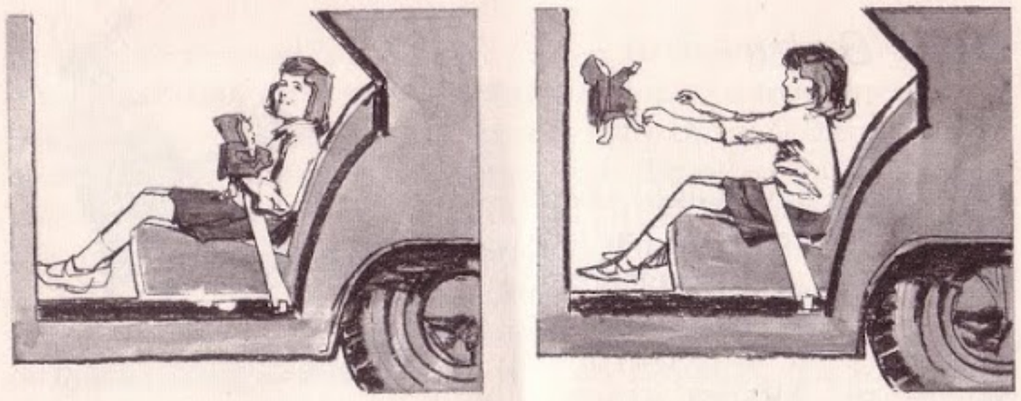
We already have talked about some of Nature's laws, particularly inertia and momentum, and have seen how they are sometimes for us, sometimes against us. Momentum may help us in going up a hill, but it is something to watch out for on a curve. In all these cases we have been considering the momentum of the car, but we should not forget that the *passengers* of a moving car also have momentum.

If a car is going along the road at 30 miles per hour, its occupants are also moving at 30 miles per hour. If the car stops suddenly, the passengers keep right on moving at 30 miles per hour until something stops them. If nothing else intervenes, that something is usually the windshield, instrument panel or steering wheel.

This is one of the most common causes of serious injury in accidents, particularly a head-on collision or running into a solid, stationary object. And it does not have to be at high speed. Suppose a car traveling at 20 miles per hour runs into a concrete culvert, and the front bumper, grille, sheet metal, etc. are crumpled and pushed back one foot. This means the stopping distance is one foot. Now if we decelerate from 20 miles per hour to zero in one foot, it can be figured mathematically that the average deceleration rate is more than 13 g's. This is over 15 times greater than the rate produced when making the shortest possible stop with the brakes—a real panic stop.

If we can recall how hard we were thrown forward by such an emergency application of the brakes—then multiply that by 15—we will get an idea of what happens in even a low-speed head-on collision. And these forces increase as the square of the speed; at 40 miles per hour they are four times what they are at 20 miles per hour.

Considering the magnitude of these forces, it is obvious that nothing will offer 100% protection to the occupants in such a crash. But approved-type seat belts can help greatly, according



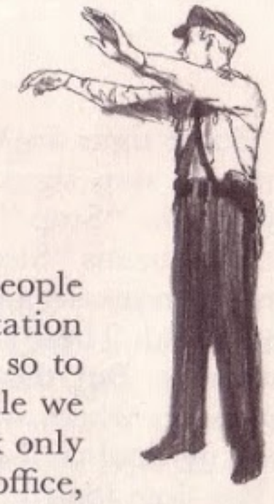
to experts who have been investigating accidents over a long period of time. If we are wearing seat belts we will still be thrown forward and shaken up, and may bump the windshield or dash panel. But we will not bump so hard, and may get out of it with a few bruises instead of serious injuries.

Another thing that seat belts do is to help keep us in the car in case of an accident—and that is the safest place to be. There are a few exceptions which we occasionally read about in the newspapers, but statistics prove that in almost any accident it is much safer to be held in the car than to be thrown out on the pavement or roadside. And it is better to be held in one place than to be bounced around inside the car. The belt can always be released instantly with one hand whenever we want to, so fear of being trapped in a burning or submerged car should not keep us from using it. In fact, with a belt we are more apt to remain conscious so we *can* get out.

There is one point to remember. A seat belt is doing no good when it lies unfastened on the seat. If we fasten it immediately (and snugly) every time we get in the car, it will soon become a habit. Some people think of a seat belt as something to use only in fast, country driving. They just don't realize that the majority of fatal accidents take place comparatively near home at speeds under 40 miles per hour.

So wear your seat belt all the time you are in the car. People who have looked into it carefully estimate that the universal use of seat belts could save more than 5,000 lives annually and prevent one-third of the serious injuries. And that seems too valuable a proposition to pass up.

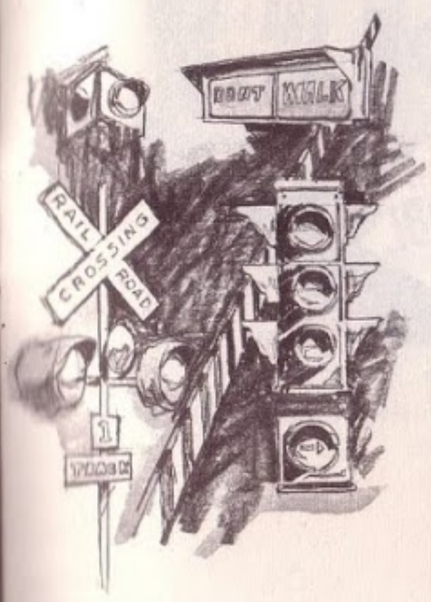
Road Signs and Signals



If we think of it in a certain light, we people who drive cars are running little transportation systems of our own—our private railroads, so to speak, with home for our terminal. As a rule we "engineers" behind the steering wheel work only on local runs—back and forth to the office, stores, school, and the other regular stops. But every now and then we get out on the main line and head for the horizon.

In either case, we might take a tip from the railroad engineer. What the railroad men mean by the best engineer, is the one who has taken his train out and brought it in, time after time, year after year, without a thing to regret. Now there's one thing about this engineer that explains his good record better than anything else. He believes in signs. All along the way there are signals that tell him what to do, and he does exactly what they say. When a semaphore says "Slow down," he slows down. Whenever he gets the sign of a curve or grade, he adjusts his speed accordingly. Every red and green and amber light that comes winking through the darkness means a definite order that he'd never dream of ignoring. And when a flare warns him of danger, he just stops until he gets the go-ahead.

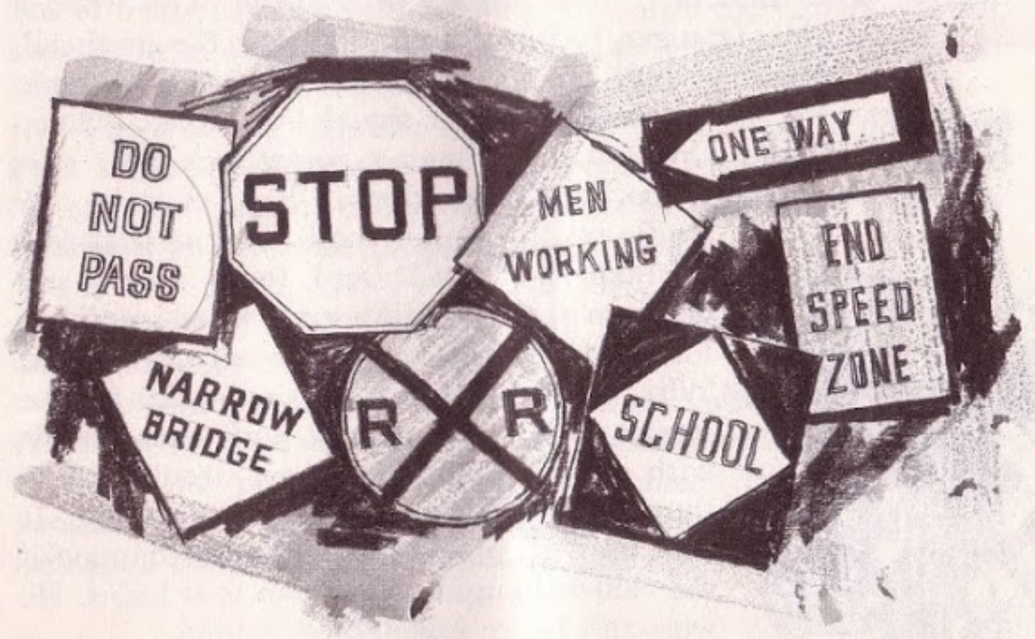
Now, when we pull out of our terminal, if we are good engineers we'll take good heed of our signals—"Curve," "Steep Hill," "Railroad Crossing." But along comes one that says "Dangerous Intersection" and there doesn't happen to be any traffic on that other road. Or one that says "School, go slow," and there aren't any children about. Or "Slippery when wet," but today the road is dry. And what's the result? Why, a good many of us get to taking those signals with a grain of salt, and, after a while with so much salt that if we aren't careful those warnings may lose their meaning. It isn't hard to imagine what would happen if the railroad engineer got into that habit. He wouldn't be an engineer very long.



Some signs are "commands." When we come up to traffic signals or stop signs, we have no choice in the matter. A red light means "Stop." When the green light changes to amber, that also means "Stop" . . . if we are not too close to the corner. A stop sign means a complete stop and then a wait until it is safe to go ahead. These signs are not suggestions or advice—they are commands. But they are commands made for our benefit, to help us get where we are going more quickly and easily. If we have any doubts about this, all we have to do is think back to the last time the traffic signals were out of order and remember the confusion that resulted. It pays to obey these robots.

One special kind of sign is that giving the speed limit for the particular stretch of highway or street on which we are traveling. These instructions should not be trifled with. They are established by experienced people who are familiar with the road and the hazards that may be lurking there, and it is just good sense to obey them.

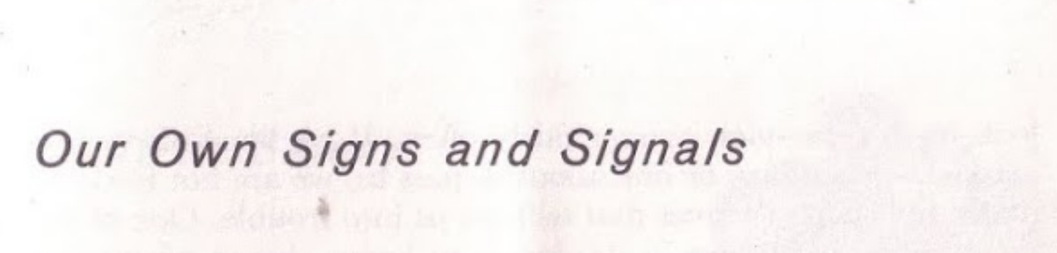
Even though occasionally warnings prove unnecessary, the railroad engineer still goes on accepting them as gospel truth. And good drivers have trained themselves to the very same habits as the engineers. We can just as easily form one habit as the other, and it pays to form the habit of acting automatically on the advice of our roadside signs.



Our Own Signs and Signals

Observing and obeying road signs and signals is not the whole story. Another thing important in both country and city is to give our own signals to let other drivers know what we're going to do. The only way we can anticipate each other's intentions is by giving the proper signals. The adoption of direction signals on cars has made this much easier, and their proper use can contribute greatly to safety not only when turning corners but also when moving from one driving lane to another. Hand signal systems are becoming more uniform throughout the country, but they still are not exactly the same in all localities. So the best thing we can do is to be sure to know the correct signals in our own state . . . and to be extra careful and observant when traveling so we do not get mixed up or mix up other drivers.

One thing we should always remember is to signal in plenty of time. It doesn't help much to signal and change our

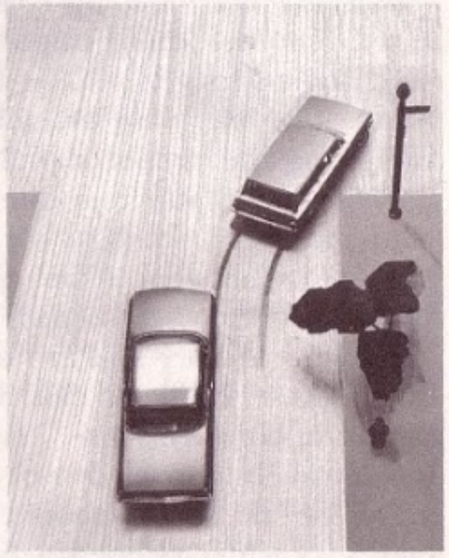

LEFT TURN SLOW RIGHT TURN

course at the same time, although perhaps it's better than no signal. And there is nothing more irritating than to pull up behind a car waiting at a traffic light and then have the driver signal a turn *after* the light turns green.

And another thing—we should always make sure it is safe before we carry out the maneuver we have signaled. Just because we have given the correct signal doesn't mean that we can suddenly make a right turn from the middle of the street. If we can plan ahead and be in the right position on the street when it comes time to turn, it is a lot safer and more convenient for everybody, particularly for us.

There is one other thing along this same line. A good driver always knows where the other cars are around him. Take a quick

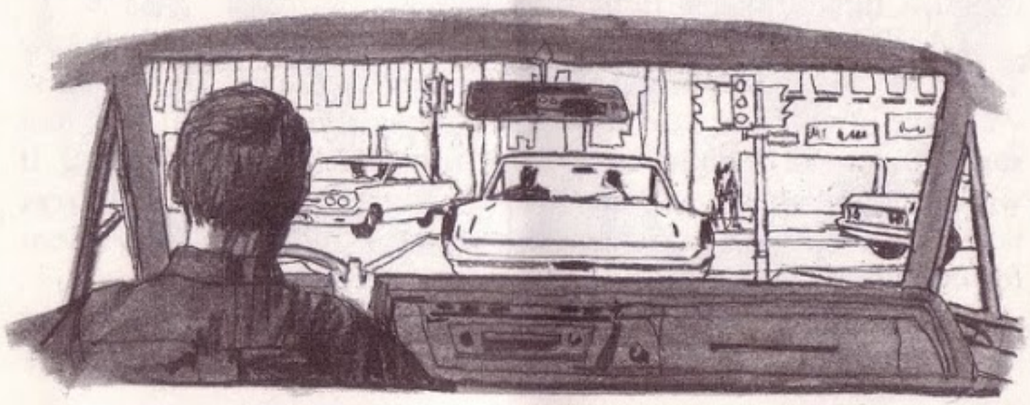
look in the rear-view mirror fairly often. If we know there is a car right behind us, or one about to pass us, we are not likely to make any sudden moves that will get us into trouble. One of the most important things in driving is to know always where our car is in relation to other moving and stationary objects.



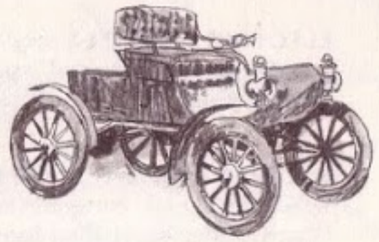
What it all gets down to is this: It isn't enough just to have our engine, brakes, lights and tires in good shape, and to watch our fuel and oil, or to follow the rule of not driving too many hours at a stretch. Those things are highly important, but it is just as important to give our signals and to watch our signs and follow them religiously. It saves our cars and it may save our lives.

We may all know these things, but we know them so well we're apt to get careless about them. Because we can carry out the mechanics of driving almost automatically, and hardly even have to think about it, we're apt to go rolling along thinking of something else. Then, all at once our eyes have an important message for our brain, and when they try to get the message through, the line is busy!

So it doesn't pay to let our thoughts go wool-gathering. As a matter of fact, it makes driving just one emergency after another, which takes all the pleasure out of it. And there's a lot of pleasure in driving a car when we know we're doing a skillful job, keeping the proper margins of time and space.



Built-in Safety



From the earliest days automobile manufacturers have been vitally concerned with safety and are unceasing in their efforts to build an ever-safer product. Designers, engineers, manufacturing people, management—all these have made safety a basic requirement in any change of car design or production.

The results of this work take two forms. One we drivers usually don't think about. It consists of improved engineering design, better materials, new manufacturing processes giving greater strength and durability, more thorough inspection and testing—all the things that lead to safe and trouble-free driving without mechanical failure. That this has proved worthwhile is borne out by the rarity of accidents today caused by the failure of any part of the car.

The other takes in the actual safety features built into or added to the cars. Some of these are to make safe driving easier, thus lessening the chances of an accident. Others are to provide protection, to prevent or reduce injuries in case an accident does occur. We may not realize how much has been done along these lines until we think back to the older models and all the things they did *not* have. Following is a roughly chronological list of some of the safety improvements which have been made in our cars beginning with the early days of the industry. Try to imagine driving a car—or perhaps we should say horseless carriage—which had none of these features.

ELECTRIC STARTER replaced hand cranking—eliminated sprained and broken wrists and arms.

ELECTRIC LIGHTS replaced Prest-O-Lite headlamps and kerosene side and tail lamps—safer road illumination.

AUTOMATIC WINDSHIELD WIPERS give better vision in rain and snow.

STOP LIGHTS to warn following driver that car is slowing or stopping.

REAR-VIEW MIRRORS for rearward vision.

FOUR-WHEEL BRAKES replaced two-wheel brakes—safer, quicker stopping.

HEADLIGHT BEAM INDICATOR—driver is aware of beam position.

SYNCHROMESH TRANSMISSIONS for easier gear shifting—safer handling.

SAFETY GLASS replaced ordinary glass —stronger and safer in accidents.

ADJUSTABLE FRONT SEAT — better vision for short drivers, greater comfort for all drivers.

BACK-UP LIGHTS—better rear vision when backing and warning to following cars.

WELDED ALL-STEEL BODIES with steel roof—increased structural strength for greater safety.

HYDRAULIC BRAKES for better equalization—safer stopping.

WINDSHIELD DEFROSTERS—de-fogging and de-icing improve winter driving safety.

INDEPENDENT FRONT SUSPENSION—better, safer control.

DIRECTION SIGNALS — improved signaling contributes to safety.

AUTOMATIC TRANSMISSIONS—easier, safer control.

SAFETY-TYPE DOOR LOCKS prevent children opening doors accidentally.

SEALED BEAM HEADLAMPS — better road illumination for safer night driving.

WINDSHIELD WASHERS — aid to safer driving.

NEW BODY DESIGNS with greatly improved vision in all directions.

HIGHER COMPRESSION ENGINES—better performance for greater safety.

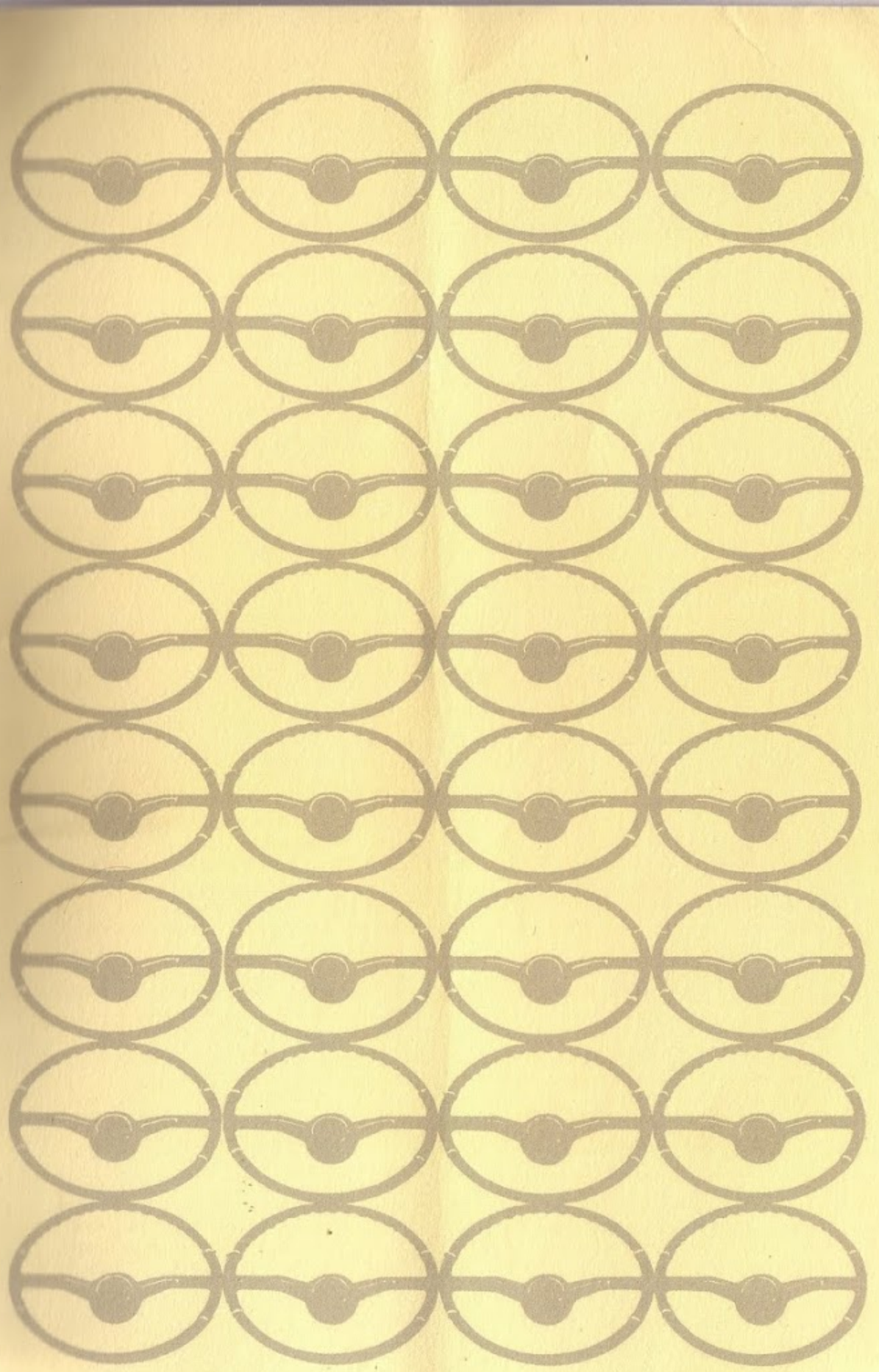
AUTOMATIC HEADLIGHT DIMMING—relieves driver of dimming and contributes to safer night driving.

POWER STEERING to lessen driver fatigue and provide easier, safer control.

POWER BRAKING for easier stopping with reduction in applying time—contributes to safer operation.

RECESSED STEERING WHEEL HUB and **INSTRUMENT PANEL PADDING** reduce injuries in case of accident or sudden stop.

SEAT BELTS keep occupants in place and reduce chances of serious or fatal injury.



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