DRIVE and LIVE

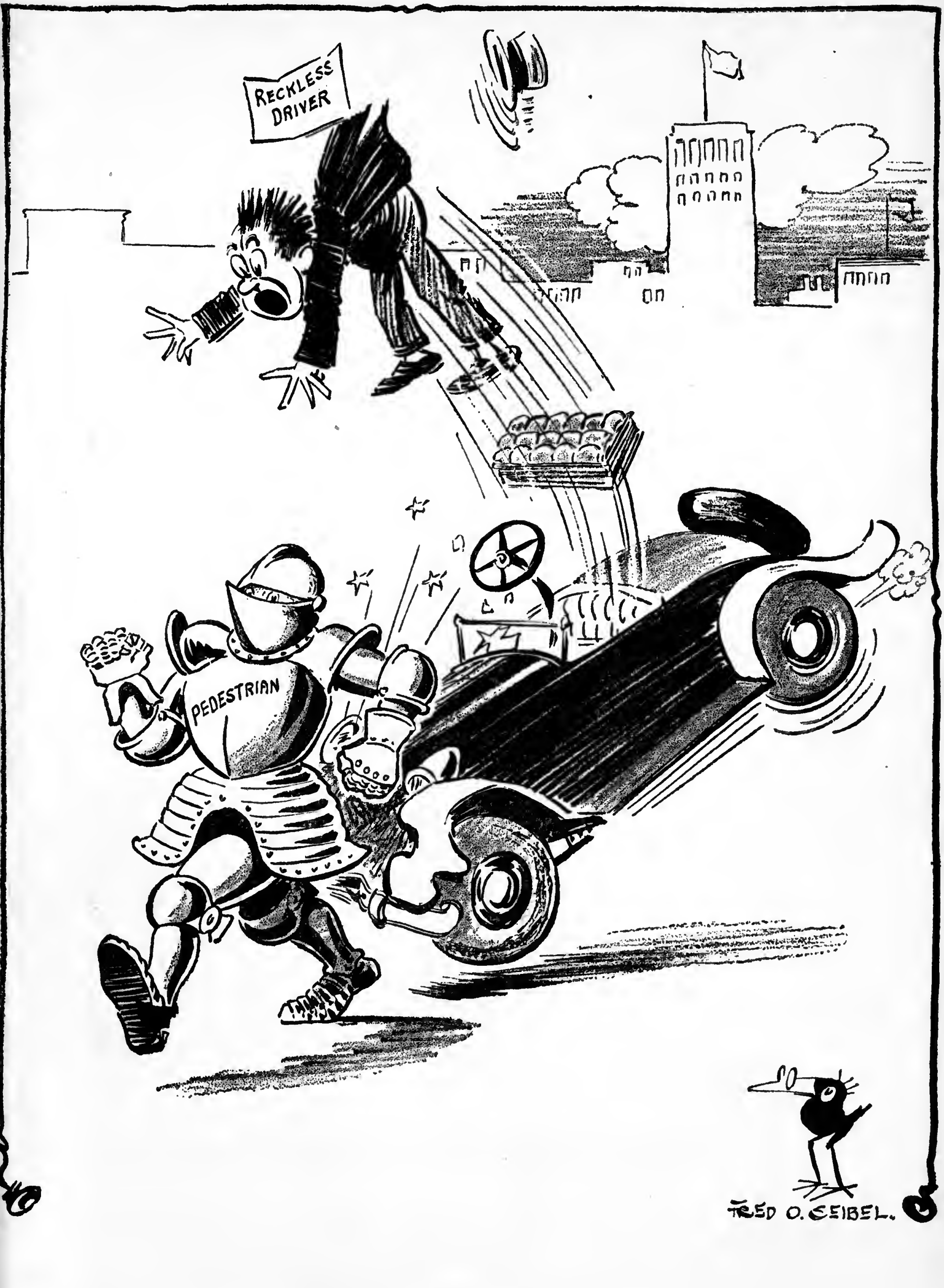
FITZGERALD
HOFFMAN
BAYSTON

JOHNSON PUBLISHING COMPANY

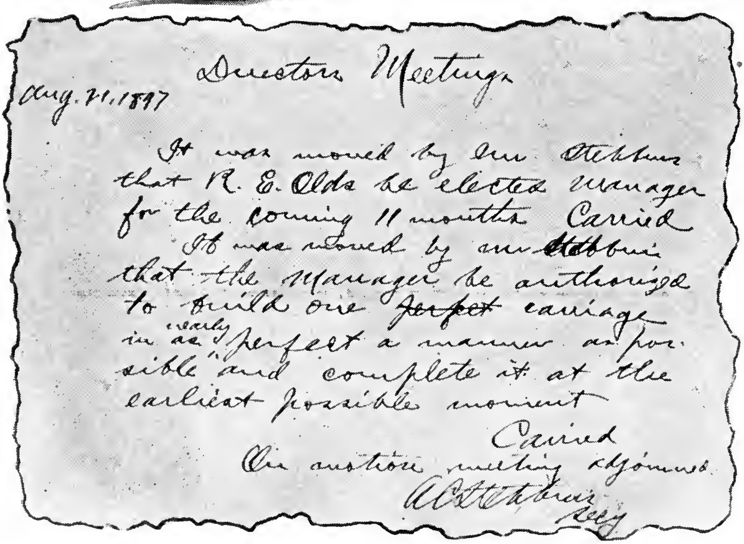
Can Nothing Stop Him?

7217 $35-

A Suggestion—All Steel Bodies for Pedestrians



DRIVE AND LIVE



Directors Meeting

Aug. 21, 1897

It was moved by Mr. Stebbins that R. E. Olds be elected Manager for the coming 11 months Carried

It was moved by Mr. Stebbins that the Manager be authorized to build one ~~perfect~~ carriage in as nearly perfect a manner as possible and complete it at the earliest possible moment

Carried

On motion meeting adjourned.

A C Stebbins
Secy


429 524

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DRIVE AND LIVE

BY

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The authors and publishers are deeply indebted to Dr. B. H. Van Oot, Supervisor of Trade and Industrial Education in Virginia, for having read *Drive and Live* and for the valuable suggestions and other aids he has freely given.

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△

Dedication

To the Young Driver:

May he realize his responsibility and attain sanity in driving his automobile on the highways of our country

PREFACE

Within the brief period of forty years the automobile has changed American life and manners. Much as the broncho and the steam train gave new impetus to travel, so too the car has brought speed, efficiency, and ease to traveling America.

Transportation, communication, and travel have been developed beyond the most superlative dreams of the manufacturers of forty years ago. A terrifying and baffling problem which staggers the nation has arisen during the last twenty years. It involves control of the driver and the automobile. CAN AMERICA CONTROL DRIVING?

In 1936, in spite of all the regulations of traffic officials, in spite of the jail sentences and penalties imposed by the courts, and in spite of the safety drives fostered by organizations throughout the country, 37,800 people were slaughtered outright, more than 100,000 were cruelly maimed and crippled for life, and more than a million were injured.

The cost of automobile accidents last year was greater than the cost of public education. That the mania for speed, power, and greed, so manifest in drivers, must be eradicated or curbed is evident.

Many who are physically unfit, mentally untrained, and socially unbalanced operate cars recklessly, negligently, or criminally on the highways. These drivers, a positive menace to life and property, must be controlled.

The police, the courts, the manufacturers, the automobile associations, and the safety councils seem powerless to stem the mounting tide of death and waste. Every force in America must join the crusade for safety. Education must accept the challenge! With the road and car engineers and the traffic police courts, the educational forces of the Nation must join. School, church, community organizations, business men's organizations, women's clubs, the radio, and the press must face the crisis courageously if the car is to be managed and the driver trained. Education must do the job. Safety must be secured.

This book is presented to assist in the fight against unsafe practices and in the crusade for sane driving.

CONTENTS

PART IV—ACCIDENTS, THEIR CAUSES AND RESULTS

THE MOTORIST'S PRAYER*

Grant me a steady hand and watchful eye,
That no man shall be hurt when I pass by.

Thou gavest life, and I pray no act of mine
May take away or mar that gift of thine.

Shelter those, dear Lord, who bear me company,
From the evils of fire and all calamity.

Teach me to use my car for others' need
Nor miss through love of speed
The beauties of Thy world; that thus I may,
With joy and courtesy go my way.

*From the *London Church Times.*

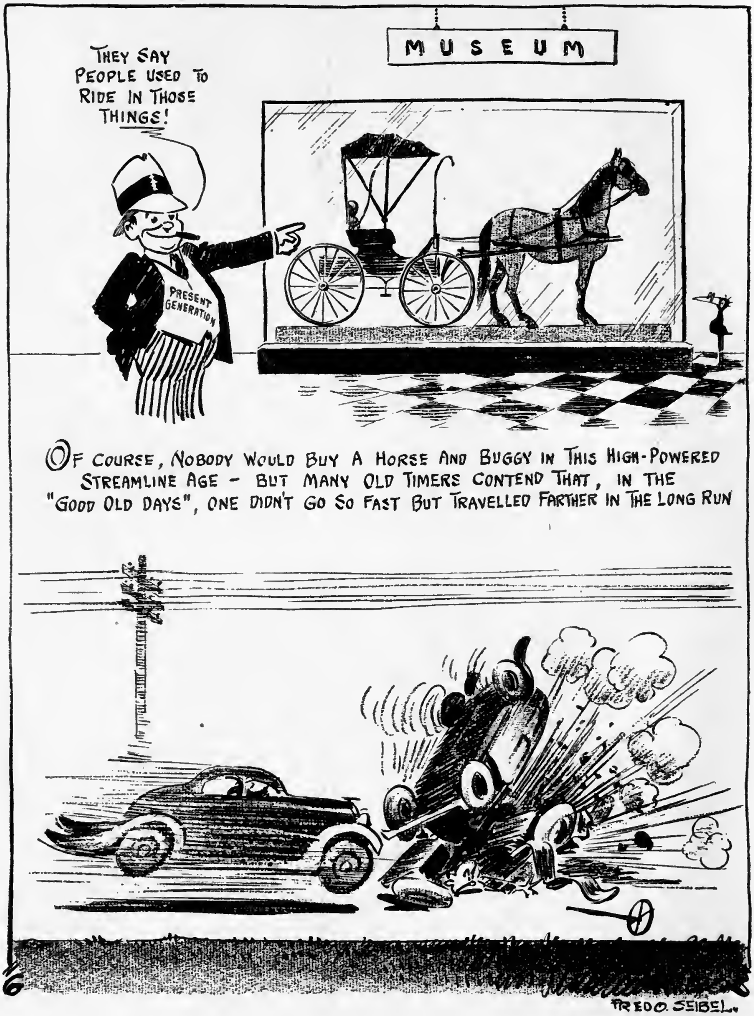
PART 1

A Nation Rides

The development of the automobile has changed the life of the people of America.

The danger of the automobile offers the challenge: can driving be made safe for the people?

It Wouldn't Happen
If All Drivers Had Horse Sense




THE EVOLUTION OF THE MOTOR CAR

CHAPTER 1

THE ROMANCE OF THE AUTOMOBILE

THE PEACEFUL CITIZENS of Springfield, Massachusetts, were startled one day in 1892 by the most amazing spectacle since Fulton, in 1807, launched the *Clermont* on the Hudson. The first motor car in America, guided by the Duryea brothers who had labored long in its making, came down the street at the rate of seven miles an hour.

An old buggy was the car's body. A one-cylinder gasoline engine, the exhaust of which could be heard for blocks around, was the motor. The "horseless carriage," as the early automobile was called, was difficult to start, more difficult to guide, and most difficult to control because it was new to the hand and mind of man, and because it was very imperfect mechanically. Control of cars is still a problem, not because of their mechanical features, but because of the inability of the driver to cope with speed and power.

Improvements and changes came with the years. The perversity of the "horseless carriage," with its high wheels, loud exhaust, acetylene lights, curved steering tiller, starting crank, and high seats, has gone with the name. The name, "horseless carriage," has been superseded by the name "automobile." "Stable," the word which designated the home of the "horseless carriage," has given way to the word "garage." The word "chauffeur," which came into partial use, has been for the most part replaced by the word "driver."

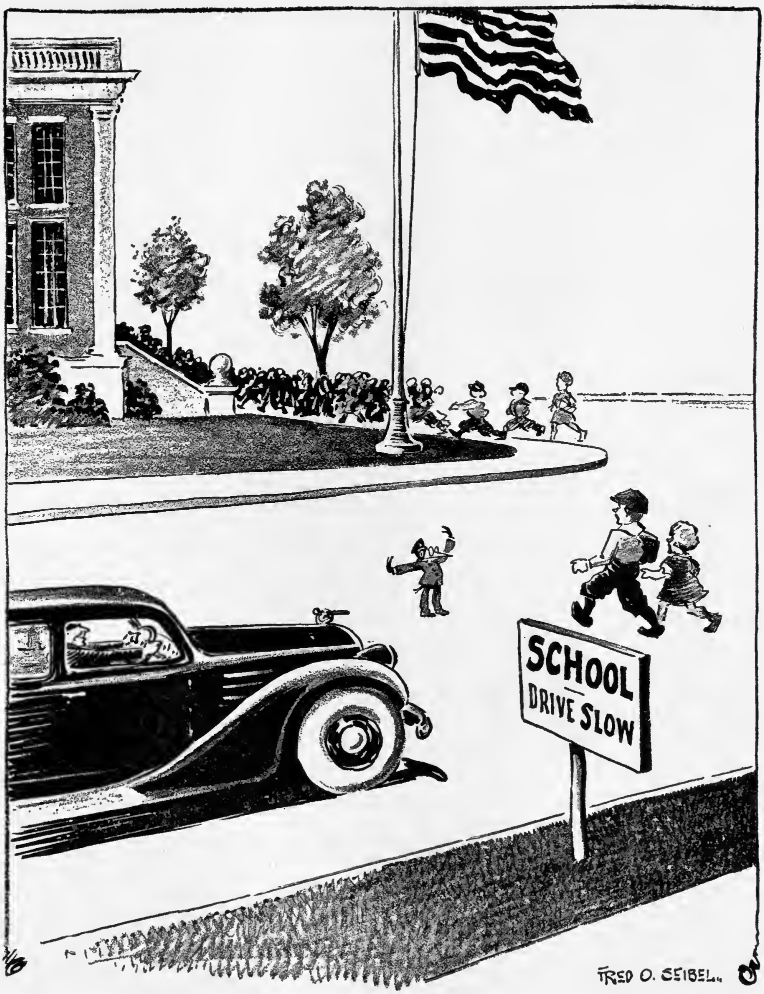
Hampering old laws have been repealed both in this country and in foreign lands. Ridicule of the skeptics has long been forgotten. The rutty old roads with their sharp turns and their treacherous bumps have been changed into highways with wide shoulders on the sides, safety signs, and carefully planned curves at the corners. Every precaution for safety to car and road is now being taken.

The Car in Modern Life

On week ends, in beautifully upholstered cars with almost noiseless motors, millions of Americans drive with their families over fine roads to picnic grounds, to the country, to the city, or to visit neighbors. Over improved roads, farmers, business men, salesmen, agents, and officials perform their daily work more effectively, more easily, and with less fatigue than ever.

Millions of boys and girls go to and from school morning and evening in motor vehicles. According to the *Research Bulletin* of the National Education Association, "Three million boys and girls are transported to and from school daily in conveyances provided by school authorities. Morning and evening a fleet of approximately 80,000 school busses moves out upon the highways of the nation to cover routes totaling at least a million miles." The car is thus an instrument of great usefulness. In less than fifty years, America has become a nation of car users.

Now, If Ever, Is The Time To Drive Carefully



The Discovery of Petroleum

Before this great development of the automobile could take place, it was necessary that an economical fuel be available. Automobile engineers learned that the petroleum industry could supply this demand for fuel.

Petroleum was known to the ancients. Some say that it was used for making cement for the Tower of Babel in Babylon. Although they did not like its odor, the Romans burned oil in their homes for light.

In 1635 the people of Pennsylvania discovered petroleum there. At first it was used principally for medicine. These people knew that petroleum gave a good light, but because of its rancid odor they used homemade candles instead. In 1853, when it was discovered that petroleum was of great value for oiling machinery, oil refining increased. The Drake well, dug in 1859 at Oil Creek, Pennsylvania, initiated the first commercial production in America.

Chemists discovered that oil heated to a certain temperature gave off a vapor, and that when the vapor was condensed into liquid it would burn rapidly. By further refining, chemists separated gasoline from kerosene. The kerosene made an excellent fuel for lighting, but the gasoline was so dangerous that it was poured into the sea.

In time, experimenters found that this fluid, which had been thrown away as waste, was ideal for running the gasoline engine. How well the oil industry has provided a fuel for the automobile can be estimated from the hundreds of thousands of service stations in this country. These offer ready and willing service for the motoring public.

Invention of the Gasoline Engine

About the time that chemists were producing kerosene and gasoline from crude oil, Nicolaus Otto was perfecting an "internal combustion engine," that is, an engine in which energy is directly transformed into power by explosions in the cylinder behind the piston. He found that gasoline was an excellent fuel for his engine. A simple heat engine, run by the expansion of heated air, had been used before Otto in 1876 produced his famous "Otto Silent Gas Engine" with its "four-stroke" cycle.

But the Otto engine was better adapted to the automobile than the simple heat engine. In 1878 Dugald Clerk produced the two-stroke cycle engine. In 1891 other improvements were made. The gas engine improved with the automobile. The future of the one seemed to be for the most part bound up with the future of the other. The old one-cylinder engines are now replaced by high-powered eights and twelves or economical sixes.

Development of the Automobile

George B. Selden secured a patent on the automobile, a self-propelled vehicle, in 1895. Numerous manufacturers were licensed to build cars under this patent in 1897. The first car had a one-cylinder engine placed under its seat. A chain ran to the center of the rear axle to apply the power to the rear wheels. The wheels were high like buggy wheels. When you wanted to crank the engine, you stood at the side of the car between the wheels. As the cars were short and the wheels large, it was difficult to get between the wheels and into the seat. The result was that a number of manufacturers placed the door to the rear seat in the back of the car. The passengers sat at each side of the door and the driver sat in the front seat.

These cars were slow and cumbersome, rarely making more than fifteen miles per hour. Their average cost was approximately $1500. They would go about ten miles on a gallon of gasoline at a speed of about ten miles per hour and develop about ten horsepower.

As time went on, the engineers improved the automobile, step by step. Today a man may buy a car for $750 that will run about eighteen miles on a gallon of gasoline, travel at a maximum speed of about eighty miles per hour, and develop approximately eighty horsepower.

From these facts one may compare the present-day automobile with the car of forty years ago. Its great development has come because of the effort and work of engineers, chemists, metal tradespeople, and workmen in various allied industries.

The Automobile Industry

In 1935 the United States produced over 4,000,000 motor vehicles. This was nearly four times as many as those manufactured in the rest of the world. In 1936 approximately 70 per cent of all the world's motor cars were registered in the United States. In 1935 the whole-

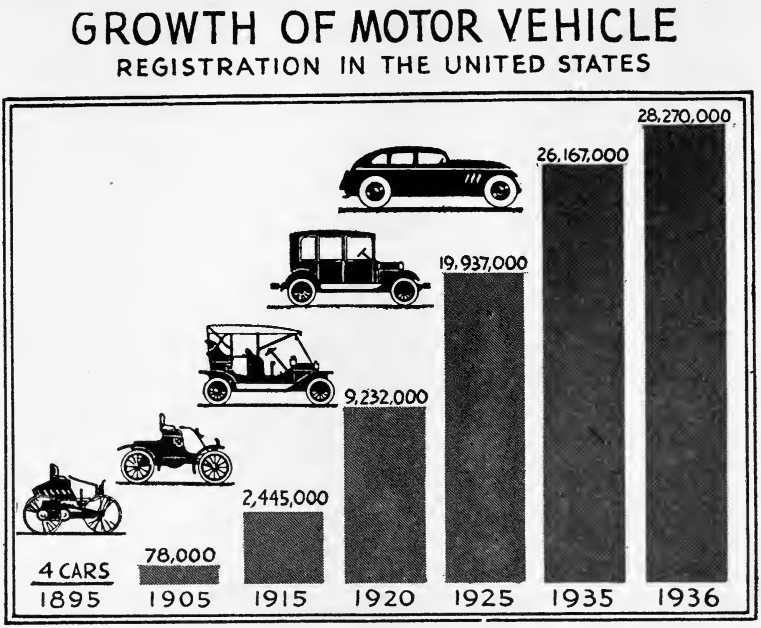


Fig. 1

sale value of all automotive products in the United States—new cars, new trucks, parts, tires, and other accessories—was more than $3,000,000,000. In 1935 the Federal Government spent more than $1,750,000,000 on the highways. This does not include amounts spent by state and local governments. The automotive industry and the road-building industry are of gigantic proportions.

Many people work in these industries. In 1935 there were 6,000,000 people employed in the motor transport and service industry; 439,000 were employed in building cars; and 957,846 had jobs in connection with federal and state highways. More than 7,000,000 people were gainfully employed in these industries. The automobile, directly and indirectly, serves many people. Pleasure and efficiency come from its proper use in business and recreation, and it offers employment and means of livelihood. Its manufacture is one of the greatest of American industries.

In the total number of miles covered, motor travel has exceeded all other kinds of travel. In the United States in 1934 the entire distance traveled by motor vehicles exceeded 384,000,000,000 miles, a distance more than fifteen times as great as the mileage of steam railroads.

The motor car is a great means of aiding business and promoting pleasure. When used properly, it is one of the finest forces in America today. Unfortunately, it has not always been used with discretion. The power of the motor car has forged ahead of the development of the roads, traffic regulations, laws, and personal capacity to handle the car. Unfortunately, the speed of the automobile has developed more rapidly than the nation's and the individual's means of control.

A great national problem is before us.

Study Aids

A. *Experiences*

1. In about what year was the car in which you had your first ride built? In what year was the car built in which you last took a ride? Describe the difference in the comfort and enjoyment of the two rides.
2. Have you ever been in a car that was stuck in the

mud on a main highway? On a side road? When? Do you believe that these conditions would be possible at the same place today?

3. Did you ever see a car with acetylene lights? Compare them with the present-day lights.

B. *Problems for Class Discussion*

1. Discuss the value of the automobile to the farmer; to the business man.
2. Did the development of the oil industry benefit any other industry besides the automobile industry?
3. Why is the power of the present-day automobile smoother than that of twenty years ago?
4. Describe the first cars.
5. Why has the speed of the automobile developed faster than the power of man to control it?
6. Suppose the supply of gasoline should suddenly be exhausted:

    a. What fuel would take its place?

    b. List the changes you would have to make in your daily habits if you could not depend on the automobile.

    c. How many persons do you know who would have to seek other kinds of employment?

C. *Study Activities*

1. Determine the number of cars sold in your city last year.
2. Find out how many people in your town are employed in the automobile industry.
3. How many parents of students in your class are employed in the automobile industry directly or indirectly?

4. Several groups may be appointed to do the following things:
   a. Place on your bulletin board a series of pictures which show the development of transportation. Choose a part on which to put pictures that show the development of the automobile.
   b. Show on a map or graph the great petroleum centers. Describe the process of obtaining it. Where will you go for information?

D. *Questions*

1. When was the first car operated in America? Where? Who invented it?
2. How many children ride to school daily in motor vehicles?
3. How did the development of the oil industry affect the automobile industry?
4. How many gasoline stations are there within a radius of six blocks of your school?
5. About what per cent of the new cars of the world are manufactured in the United States?
6. When and where was petroleum discovered?
7. How many people earn their living in the making of cars and in related industries?

E. *Suggested Readings*

1. *Automobile Facts and Figures.* Automobile Manufacturers Association. Washington, D. C. 1936. 96p.

2. Eiselen, Malcolm R. "The Horseless Carriage." *Reader's Digest.* pp. 69-71. November, 1936.

3. "Old Cars and New Hopes." *Reader's Digest.* pp. 47-49. February, 1932.

THE EVOLUTION OF THE MOTOR CAR

CHAPTER 2

THE CHALLENGE FOR SAFETY

More than 37,000 people killed outright! More than 100,000 people maimed and crippled for life! More than 1,000,000 people injured! Approximately $2,000,000,000 wasted! That is the amazing record of the misuse of the automobile in one year!

The Problem

Training the driver in the control of the automobile is one of the greatest problems which faces America today. The following are some of the questions to be answered in solving the problem:

1. How can we stop the yearly killing of 37,000 people by the automobile?
2. How can we check the yearly maiming for life of 100,000 people?
3. How can we stop the yearly pain and shock to a million more people slightly injured in automobile wrecks?
4. How can we stop 6,000,000 yearly accidents that occur in one form or another?
5. How can we make the automobile do the bidding of man without its killing him?
6. How can we make the highways safe for driver and pedestrian?

7. How can we make driving sane?
8. How can we teach man that he must master his machines now and in the future?

The problem involves not so much the control of the car as it involves the training and the discipline of its driver. The automobile is a machine which obeys simple mechanical laws; but the driver is a living human being with instincts good and bad, strong and weak; with emotions of love and kindliness and hate and fear; with great or small intelligence, and with varying attitudes.

Man must learn to control himself before he will ever learn to control his car. Instincts must be controlled. Emotions must be disciplined. Correct attitudes must be taught. Man must understand his natural limitations before he can drive a car sanely. Man must know his defects in order that he may avoid accidents.

Safety on the highways involves the control and management of thirty million motor vehicles and the training of forty million drivers in skills, abilities, and attitudes. Old roads must be made safe. Signs and signals must be improved. Safety codes must be developed.

The deficient driver must be made an efficient driver by training. The unfit and the defective must be denied a license. The fit must be kept informed and trained. Safety attitudes must be taught. If accidents are to be reduced, and death and suffering decreased, if future driving is to be that of hope and not of fear, the driver must become the master instead of the pawn.

The Present Situation

America may be said to be a nation on wheels. Every person in the United States could be carried at one time in all the motor vehicles of the nation.

Our highways and streets are a veritable shuffleboard with millions of cars moving to and fro and weaving in and out at varying speeds. About every third person in our population drives either his own car or some other car. Drivers represent every type of our people: the careful, the careless, the cautious, the reckless, the gracious, the greedy, the courteous, the sober, and the drunk. With this vast fleet of cars and with every kind of driver at the wheel, the problem of control and safety is serious and critical.

Legislatures have passed statutes. Cities have made traffic regulations. Officers have effected arrests. Courts have passed sentence.

But the human slaughter continues to increase.

In the last three years the automobile caused more than one of every three of all accidental deaths in this country. Think of the automobile, beautiful but dangerous, powerful but deadly, luxurious but death-dealing. Contrast the 4,000 accidental automobile deaths in 1913 with the 37,000 accidental automobile deaths in 1935 and the 37,800 in 1936. While the deaths on railroads were decreasing, the deaths by the automobile were actually increasing eightfold. What will be the result? What will be the end? Will man or machine be the master?

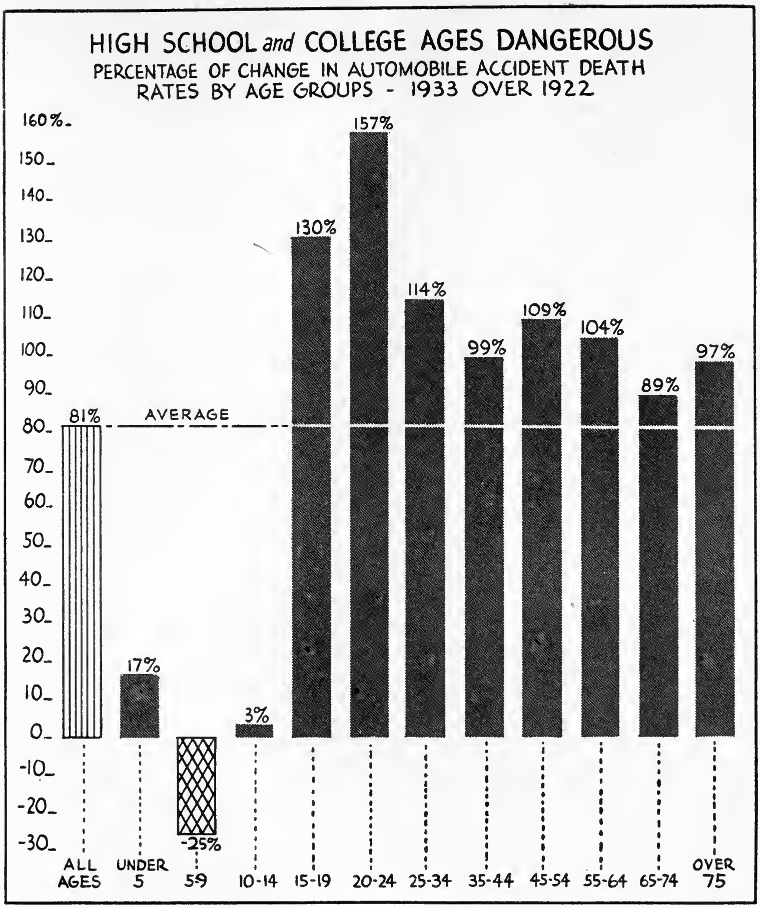
The seriousness of the automobile massacre is evident when one considers the following figures. In one year approximately as many people were killed by the automobile as all of those who live in a city the size of Arlington, Massachusetts; of Auburn, New York; of Butte, Montana; of Cumberland, Maryland; of Muskogee, Oklahoma; of Santa Monica, California; or of Sioux Falls, South Dakota.

The awfulness of the massacre may be better understood if you consider that in one year approximately as many people were permanently disabled, some with "injuries worse than death," as all of those who live in El Paso, Texas; in Evansville, Indiana; in Lynn, Massachusetts; in Sacramento, California; in Schenectady, New York; in South Bend, Indiana; or in Wichita, Kansas.

The problem is better appreciated if you consider that in one year approximately as many people were temporarily injured as all of those who live in Baltimore, Maryland; in Boston, Massachusetts; or in St. Louis, Missouri.

Danger of Accident in a Lifetime

Every driver should realize the danger in which he travels. A young person learning to drive should understand that the car is an instrument of danger and death. Figure 2 shows that high school and college ages are dangerous ages. It shows that the safety learned by the small child at home and in the elementary school seems to have little effect upon the high school population among whom the toll of death and injuries mounts amazingly. Figure 2 shows the increase of the auto-



Courtesy of Travelers Insurance Co.

Fig. 2. Copied from *School Life*, p. 5, Sept. 1936.

mobile accident death rates of 1933 over 1922. Note that the increase in accidental death for boys and girls from fifteen to twenty was 130 per cent, and that the accidental death increase for people from twenty to twenty-five years was 157 per cent. These increases are the greatest of any age groups, but the average increase for all ages was 81 per cent, an astounding increase in death toll.

Figure 3, adapted from the figures of an engineer, presents appalling facts. If the present rate of accident and death continues on American roads, of every one hundred boys and girls sixteen years of age, twelve will be killed or seriously injured, and sixty-five more will receive minor injuries because of automobile accidents.[1]

Summary of Accidents

Think of the devastation for 1935. On more than 3,000,000 miles of road there were:

6,000,000 accidents
1,000,000 injuries
105,000 permanent injuries
37,000 deaths by accident in automobiles

Another way to view the facts for the United States is to consider the following figures from the *Daily News Almanac:*

One death	for every 88 miles of road
One permanent disability	for every 31 miles of road
One temporary disability	for every 3 miles of road
One property damage accident	for every ½ mile of road

[1] *School Life.* September, 1936, p. 5.

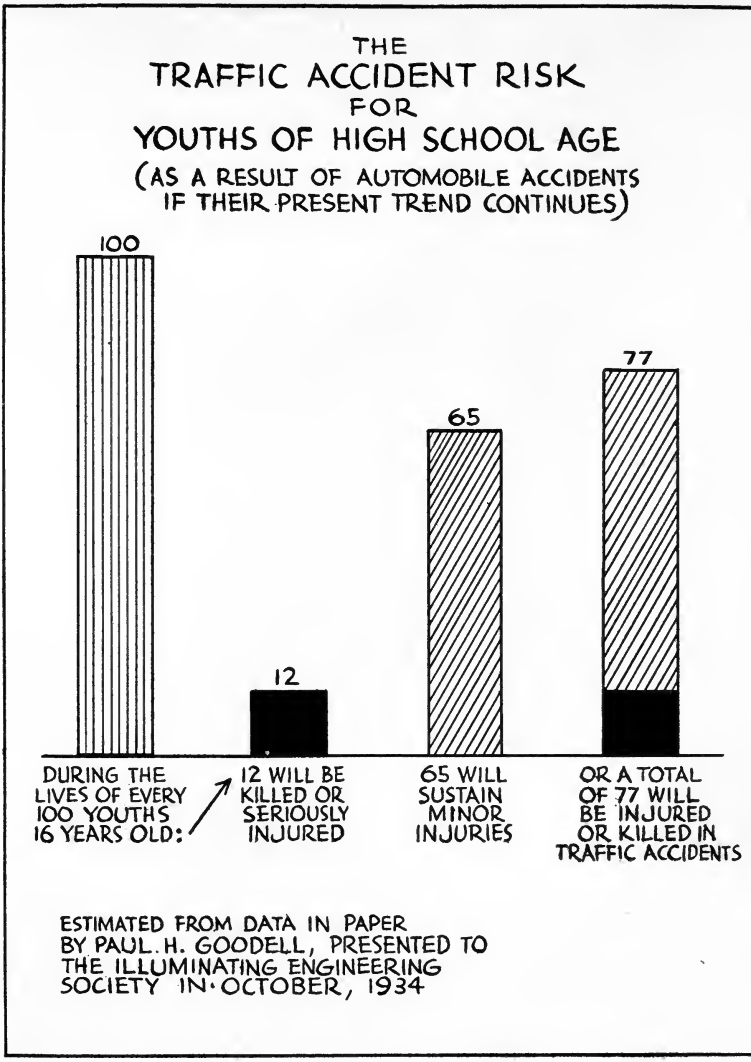

THE
TRAFFIC ACCIDENT RISK
FOR
YOUTHS OF HIGH SCHOOL AGE
(AS A RESULT OF AUTOMOBILE ACCIDENTS
IF THEIR PRESENT TREND CONTINUES)
100
12
65
77
DURING THE LIVES OF EVERY 100 YOUTHS 16 YEARS OLD:
12 WILL BE KILLED OR SERIOUSLY INJURED
65 WILL SUSTAIN MINOR INJURIES
OR A TOTAL OF 77 WILL BE INJURED OR KILLED IN TRAFFIC ACCIDENTS
ESTIMATED FROM DATA IN PAPER BY PAUL H. GOODELL, PRESENTED TO THE ILLUMINATING ENGINEERING SOCIETY IN OCTOBER, 1934

Fig. 3

Shall this slaughter be considered inevitable? How can it be checked? What power will stop it?

Your Problem

If the automobile is to be a blessing, not a curse, it must be used properly. It must be driven sanely

What are you going to do to help reduce the number of accidents?

What are you going to do for safety?

How are you going to drive?

Are you going to learn to drive:

a. with sanity?
b. with skill?
c. with right attitudes?
d. with courtesy?
e. with character?

Safe driving is your problem. The success or failure of the automobile is in your hands. Will you drive with character and good attitudes or madly and criminally?

Study Aids

A. *Experiences*

1. Have you ever been in an automobile accident? If so, what were the causes of that accident? Who was to blame? Coula it have been avoided? How?
2. Have you ever seen an automobile collision? Describe the results. Give the causes as you understood them. What could have been done to prevent that collision?
3. Do you know of any dangerous piece of road?

How could it be repaired so that driving upon it would be safe?

4. Do you know any type of driver who should not be permitted to operate an automobile? Should society deny such a driver a license?
5. Over a period of a week observe the following things about automobiles and their drivers:

   a. How many cars have defective tires?
   b. How many cars have defective lights?
   c. How many drivers exceed what you think ought to be the speed limit?
   d. How many persons were driving on the wrong side of the road?
   e. How many made turns from the wrong side of the road?

B. *Problems for Class Discussion*

1. Make a brief statement which describes the present conditions in which one drives in the United States.
2. Describe the seriousness and the magnitude of the automobile accident problem.
3. Summarize the facts of accidents for one year in this country.
4. State briefly your problem in learning to drive.

C. *Study Activities*

1. Make an investigation of the causes of automobile accidents.
2. From your reading and study, list the organizations which are interested in making driving safer than it is.
3. Turn back and read again "The Motorist's Prayer."

Now try to write "A Motorist's Creed." The editor of your local newspaper or of your school paper might wish to publish the best of these safety papers by members of your class.

D. *Questions*

1. How many people are killed yearly in automobile accidents?
2. How many people are crippled for life in one year in automobile accidents?
3. How many people are injured yearly in automobile accidents?
4. What is the most important problem in connection with the automobile?
5. Figure out how many people were killed or injured each day? How many were killed or injured each hour of the day?
6. How many people live in your city, or county, or state? How does that number compare with:

   a. the number killed by automobiles in one year in the United States?
   b. the number permanently injured?
   c. the number temporarily injured?

7. In the United States there are approximately two million children of any given age. What are the chances of a boy of twelve years being killed? of being permanently injured? of being temporarily injured?
8. How can we make driving safer?
9. Which is more difficult to control, man or the automobile?

10. What has been done to check the number of accidents?
11. Have automobile accidents increased greatly in the last twenty years?
12. What are the most dangerous ages for automobile accidents? Why?
13. If the present rate of accident and death continues on American roads, what are your chances of being killed or injured?

E. *Suggested Readings*

1. *Chicago Daily News Almanac and Year Book for 1937.* Edited by Claude O. Pike. *Chicago Daily News,* Inc. Chicago, Illinois. 960p.

2. Kenyon, Robert E. *Motor Massacre.* Chicago Lloyds. August 1936. 8p.

3. *Live and Let Live.* Travelers Insurance Company. Hartford, Connecticut. 38p.

4. "Safety." *Building America.* Vol. II. No. 2. November, 1936.

5. "Safety in Pupil Transportation." *Research Bulletin* of the National Education Association. Vol. XIV. No. 5. November, 1936.

6. *Saving Seconds or Saving Lives.* Aetna Casualty and Surety Company. Hartford, Connecticut. 18p.

7. Stack, Herbert James (Editor). *A Teacher's Manual,* National Bureau of Casualty and Surety Underwriters, New York, 1937.

8. Stupka, Peter J. "Sportsmanlike Driving." *School Life.* September, 1936. pp. 5-6.

9. *World Almanac and Book of Facts for 1936.* Edited by Robert Hunt Lyman, *New York World-Telegram,* New York. 925p.

10. *You Bet Your Life.* Travelers Insurance Company. Hartford, Connecticut. 36p.

PART 2

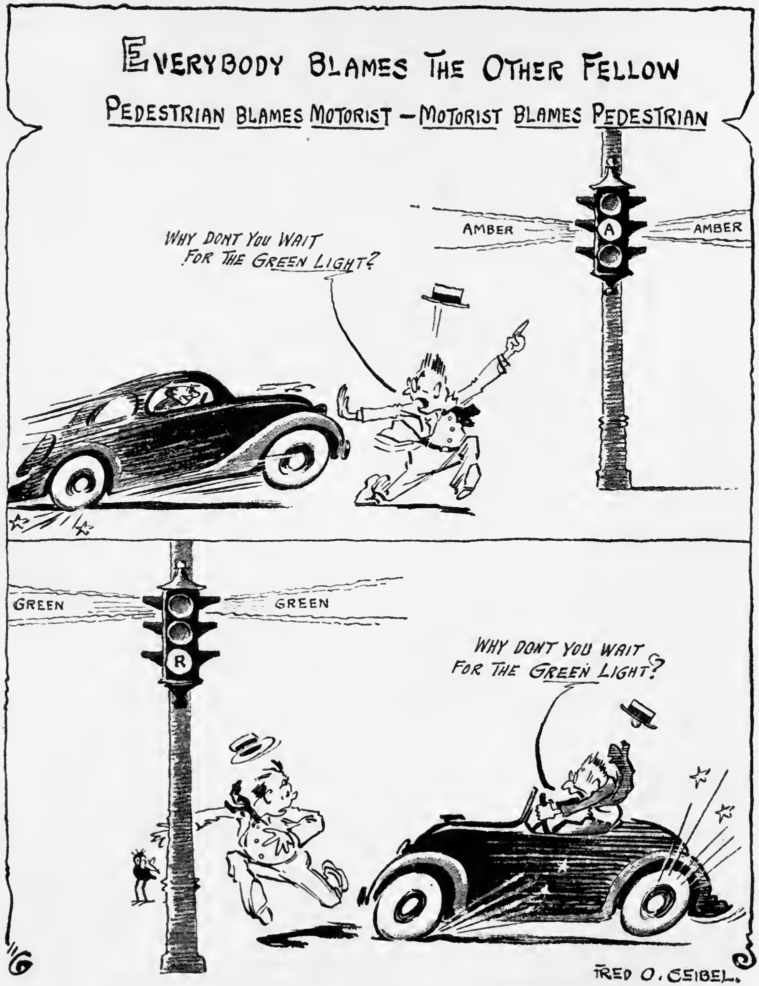
The Driver

The driver must be master, the car the tool. The young driver must acquire right attitudes: self-control, attention, courage, kindness, courtesy, and sportsmanship.

The prospective driver must understand the extreme differences among drivers and pedestrians. Principles of learning applied to driving will make driving safe and sane.

An expert driver knows his own rights and privileges, and his duties and responsibilities to society.

Both Are to Blame




THE EVOLUTION OF THE MOTOR CAR

CHAPTER 3

THE EDUCATION OF THE DRIVER

The automobile driver is the keeper of his own life and welfare; he is the guardian of the lives and welfare of those who ride with him and those whom he meets.

The driver is the brain; the car is the brawn. The driver is a human being; the car is a machine. If he is to be the master, the driver must be alert, intelligent, strong, and human. The car must come under the control of the driver; the driver must be in command, for he is responsible. The car is not responsible; it must be made to do the driver's bidding.

Mistakes of Drivers

Mistakes of drivers are largely responsible for America's shameful record of death and wreckage on street and highway. According to some writers,[1] mistakes of drivers are responsible for 90 per cent of the deaths in automobile accidents. America has tolerated the automobile massacre of 420,000 killed outright since 1921. This number does not include 1,000,000 permanently maimed and crippled since that time. In nine cases out of ten the driver was directly or indirectly to blame.

Mistakes of drivers are due in great part to defective

[1] Kenyon, Robert E., *Motor Massacre,* p. 4. Chicago Lloyds. 1936.

vision of one kind or another, poor hearing, lack of precise bodily control, and a lack of understanding of reaction time.

Vision and Light

Everyone who drives a car must be capable of seeing clearly. Young people generally have good eyesight, but often their eyes have not been trained to see what they should when driving. If one has vision below normal, his eyes should be tested so that he will know the extent of his defect. An oculist may be able to remedy the defect with glasses. If a driver's vision is pronouncedly poor he should not drive an automobile.

In order to see an object clearly, the eye must act in many ways. Each part has its particular function. Important among them are the following: the iris must regulate admission of the proper amount of light to the retina; the lens should focus the image upon the retina. The visual mechanism must function properly; the eye should distinguish between colors.

Admission of Light

Some eyes do not respond readily to the changes in the intensity of light. The normal eye takes a considerable length of time to adjust itself to sharp changes in light intensity. The iris operates slowly. The result is momentary blindness when a bright light is suddenly flashed upon the eye in the dark. When the approaching headlights of a car contact the eye, the iris normally contracts to a small opening in order that an excess of light will not enter the eye and cause temporary blindness. This change in the iris may take place in from one to three seconds. When the bright light disappears, about seven seconds elapse before the iris has opened wide enough to permit the eye to get sufficient light for normal vision again. Partial temporary blindness is then the result.

Suppose a driver is going sixty miles an hour and meets a car with bright headlights which flash upon him. His own car is moving eighty-eight feet a second. If the iris takes seven seconds to open after the bright light has disappeared, the car will cover a distance of six hundred feet in which the driver at the wheel has poor vision. Danger is evident in this condition. Laws in most states now demand a careful adjustment of the lights so that the bright rays of an approaching car will not blind a driver. Protection of the eyes is necessary if danger and accident are to be averted.

Restricted Side Vision

In order to see an object clearly, the lens of the eye must change its thickness so that the image of the object is thrown directly on the retina of the eye. If the image is not properly focused on the retina, glasses can generally be used to correct this defect. Some people can see objects better at a great distance than close at hand. They are farsighted. Others see near-by objects clearly but those at a distance dimly. These people are nearsighted and need glasses to correct their difficulty.

The side vision of the average person covers an angle usually greater than 180 degrees. Some people have a restricted vision as small perhaps as 150 degrees. Others have side vision as great as 210 degrees. In order to test yourself for side vision stretch out your arms sideways and look straight head. Can you see both of your hands at the same time? Now move both of your hands back slowly until you cannot see them. Bring them back so that you can just see both of them. The angle, hand-eyes-hand, so made is roughly the angle of your side vision. The angle is limited greatly when you are driving a car rapidly.

At sixty miles an hour, the side vision narrows to a comparatively small angle. When you are driving fast, you are watching the road a great distance ahead of the car. It is only natural that the eyes adjust themselves to a focal point at a distance when one is driving. The faster the driving, the farther the focal point. Therefore, the eye does not see objects at the side, nor has the driver time to remove his eye from the road to see what is at the side. Vehicles approaching at the side in the distance must be recognized while they are ahead and at the side, and the speed of the car adjusted so as to pass them without collision.

When approaching a corner some drivers turn their heads, first to the right, then to the left. The good driver keeps his eyes on the road straight ahead and looks out of the corner of his eyes in both directions at the same time. If there is a vehicle approaching he will readily detect it, and then give his attention to it. If he is going too fast when approaching an intersection, the angle of side vision is so small that he will not be able to see much out of the corner of his eyes. Such a practice is dangerous. Corners and intersections should be passed carefully so as to give the side vision of the eyes a fair chance to function.

Defects of Vision

Some people cannot distinguish between colors. Those who cannot discriminate between all hues correctly are color-blind. Partially blind persons fail to distinguish certain colors. The most common type of partial color blindness is the "red-green" blindness. A person with such partial color blindness may not see a red light and so may make the wrong reaction. It is therefore most difficult for one who is color-blind to follow color signals. He can follow them after a fashion by following what the traffic is doing and watching for the change in lights.

Some people who are color-blind depend upon the knowledge that the position of the red light, for instance, is highest on the signal post. In another city they find to their dismay that the green light is at the top and so they are greatly handicapped. Uniform location of the various colored lights throughout the country would help the partially color-blind as well as those with good vision.

A person without the quality of depth perception cannot be trusted to judge distance correctly. A person of this kind may drive into the path of an automobile coming from the opposite direction and be hit. The driver who lacks depth perception often does not realize that an oncoming car is close until after the crash.

Note. The Snellen and the Telebinocular tests may be used to test vision, the Ishihara to test color blindness.

Double vision is another defect which should be detected. If a person's eyes do not balance, it is dangerous for him to drive. For example, if one is pronouncedly cross-eyed or if the eyes turn to the side, he may think that he sees two cars instead of one. In such condition, no driver should attempt to drive an automobile.

Fatigue and eyestrain caused by glare or by long hours of driving may cause fatalities. Rest overcomes fatigue.

Good Hearing

Good hearing is of assistance too. One must be able to hear the horn of the following motorist, the signal of the policeman, and any irregularity in the sound of his own motor.

Reaction Time

"Reaction time," especially as applied to the automobile and driving, is the amount of thinking time consumed by the driver. When a red signal is flashed, the driver begins to take his foot from the accelerator pedal and place it on the brake pedal. The time consumed by the operation is reaction time.

Some of our reactions in driving are simple, others are complex. The reaction time which elapses before the mind and body react to a notice of danger is very important. How long does it take a person to act for safety when he begins to stop a car?

Measurements have been made which show that the average reaction time for starting to stop the car is three fourths of a second. Let us see what three fourths of a second means at various rates of travel. The

Table 1. Reaction-Time Distance

DISTANCE TRAVELED AT VARIOUS SPEEDS DURING REACTION TIME

(The approximate number of feet traveled before pressure is put upon the brakes.)

Speed in Miles an Hour:	If Reaction Time in Seconds is:							
	0.4	0.5	0.6	0.7	0.75	0.8	0.9	1.0
10	6	7	9	10	11	12	13	14.7
20	12	15	18	21	22	23	26	29.3
30	18	22	26	31	33	35	40	44
40	23	29	35	41	44	47	53	58.7
50	29	37	44	51	55	59	66	73.4
60	35	44	53	62	66	70	79	88
70	41	51	62	72	77	82	92	102.9

Note: The table is read as follows: If the speed of the car is 40 miles per hour for a reaction time of 0.4 of a second, the distance traveled is 23 feet; for a reaction time of 0.5 of a second, the distance traveled is 29 feet, etc.

accompanying graph shows that if your car is traveling ten miles per hour, it will travel eleven feet before your hand and foot begin to exert pressure on the brakes. If you are going twenty miles per hour, it will travel twenty-two feet. The motorist traveling fifty miles an hour goes fifty-five feet before he even exerts pressure on the brakes. (See Figure 4.)

If the brakes are excellent, he needs a braking distance of 172 feet more to stop the car without collision. If

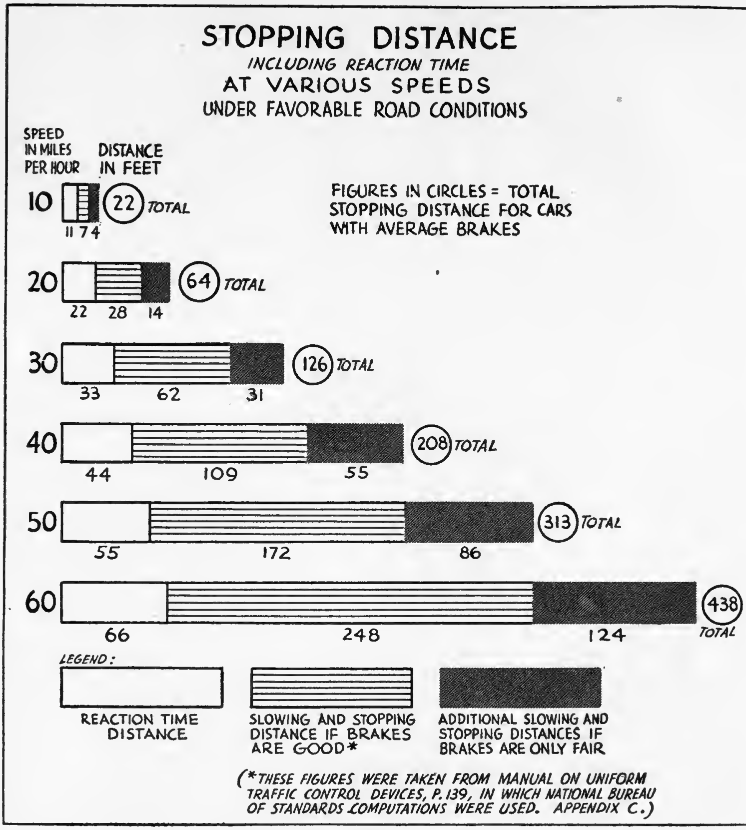


Fig. 4

a barrier is met within one hundred feet (of the braking distance) an accident is inevitable. If the brakes are only in fair condition he will need a total of approximately 313 feet in which to stop the car. This distance, which includes reaction time and braking distance, is a danger zone. In daylight a speed of fifty miles may be safe, but in most night driving this speed is very dangerous.

Everyone who drives a car should know his reaction time so that he will be able to compute the distance his car will travel before stopping. He should know the braking distance of his car at all speeds. For example, for one who has a reaction time of one-half second, the reaction time distance when traveling at forty miles an hour is twenty-nine feet, while for one whose reaction time is one second the traveling distance is approximately fifty-eight feet. If your reaction time is twice as great as the average, after a warning, you will travel twice as far before applying your brakes. Thus the slower your reaction time, the greater the chance of accident. (See Table 1.)

Bodily Control

Effective body control is necessary for safe driving. Very young children do not have good bodily control because their muscles and nerves have not matured. The jerky, spasmodic movements of a baby show but little co-ordination.

As children grow, they exercise. Their bodies mature; that is, they develop. They not only increase in height, weight, and size but their nervous systems develop.

When the boy has reached the age of seventeen or eighteen, his physical growth has almost been attained. Even though he is still maturing, he is more precise in doing. He thinks more quickly. He has mastered many habits of control. He has learned to use his hands and feet more expertly. He plays better; he walks more gracefully; he co-ordinates mind and muscle which have been made to grow through exercise.

Neither the very young and immature nor the very old and decrepit can be depended upon to control the use of their legs and arms so well as do those in the prime of life. Therefore very young and very old people do not handle a car so well.

The young person can learn to control his body by practice. Safe habits must be mastered. He must train purposefully. He must train himself to act quickly and correctly in driving so that he will be ready for any emergency. This careful training may save a life in later driving.

The Unsafe Driver

The unsafe driver is the inattentive driver, the reckless driver, the driver who drives on the wrong side of the road, the drinking driver, the fatigued driver, the untrained driver, the ignorant driver, the nervous driver, the driver with poor judgment, the angry driver, the conceited driver, the driver with poor vision, the driver with poor hearing, the driver who disregards signals and regulations, the driver who goes too fast for safety, the driver with bad attitudes, the driver with criminal tendencies.

Many states restrict driving by the feeble-minded, the badly crippled, the intoxicated, and those who cannot see. But there are thousands of people not in the above groups who, although unfit, because of carelessness and bad attitudes are permitted to drive automobiles and to endanger the lives of others.

Sometimes irresponsible drivers' licenses are revoked for a period of time. Jail sentences are served. Sooner or later the drivers are permitted back on the roads again to harass, to maim, and to kill. The massacre continues. These inefficient, reckless, and criminal drivers are tolerated too long. The unfit driver must be eliminated from the roads of America.

The unfit driver must be either educated or denied license to drive if the automobile massacre is to be curbed. It is the unfit driver who menaces American life and property. If the 15 per cent accident prone drivers could be taken from the highways or re-educated, the roads would not be so dangerous.

The Safe Driver

Fortunately the drivers who make up the types enumerated above are in the minority. There are many who understand the rules of the road and obey them, mindful of the rights of others. There are many who understand the mechanism of the car, who know what to expect from it, and who keep a vigilant watch over the safety of others. The safe driver has developed skill and sound techniques. He has presence of mind in an emergency. He does not take chances with life when death is the alternative.

The safe driver knows [1]
- himself.
- his car.
- how people think and act.
- the odds against the pedestrian.
- that drivers are responsible.

[1] Credit is given to the Illinois Safety Bulletins for many of these slogans.

that reckless driving causes accidents.
that he can be killed in an automobile accident.
that courtesy helps to prevent accidents.
his duties and obligations as a driver.
the hazard of railroad crossing.

The safe driver

uses common sense when driving.
drives only when physically and mentally capable.
thinks, attends, and acts with care.
stops at stop signs.
doesn't drink when driving and doesn't drive when drinking.
keeps on his own side of the road.
observes all traffic signs and signals.
studies and learns.
watches children to protect them.

Value of Training Drivers

Statistics show that the elementary school children have learned to walk more safely than they did a few years ago. They have become safety conscious. Statistics show also that the drivers of the American Telephone and Telegraph Companies drive approximately six times as safely as drivers of the general public. They have been trained for safety.

The president of a large automobile company recently expressed the need for scientific study of driving. He said that tests made in various parts of the country showed that many people displayed amazing inability to handle a car properly. He proposed:

1. Publicized courses on driving in newspapers and over the air.
2. Motor club and police instructions on traffic regulations.
3. Elimination of dangerous old dilapidated cars from the highways.
4. Strict drivers' license tests in which physical and mental qualifications and past records of drivers are checked.
5. Free driving lessons by the automobile dealers.

The insurance companies have waged a poster war upon poor driving and poor drivers. The Aetna Life Insurance Company of Hartford, Connecticut, sets forth in its posters several challenging slogans for the education of the driver in specific points. Among them the following are valuable:

The careful driver keeps his mind on driving and watches the road ahead at all times.
Inattention of the driver often results in accident.
Drivers: Get your copy of traffic rules today.
Do you know your local traffic regulations?
Nodding over the wheel is dangerous.
Courtesy and correct signaling are necessary to avoid intersection accidents.
Your car may be a powerful destructive force unless you are a thoughtful driver.
Young drivers: you are intelligent; you must be responsible.
You can drive only when you are fit.

Study Aids

A. *Experiences*

1. Have you ever observed a cross-eyed driver? Was he able to drive without danger? Explain.
2. Have you ever heard of someone's sleeping at the wheel? What was the result?
3. Have you ever known a person with poor bodily control? Do you think he would make a good driver? Explain.
4. Have you ever known a person who was really unfit to drive an automobile? If so, list his qualities.
5. Do you know a driver who is fit in every way to drive a car on the highways? If so, list his qualities.

B. *Problems for Class Discussion*

1. Describe what you think is the greatest defect in a driver.
2. Discuss the defects of vision.
3. Describe how lack of the quality of depth perception may cause trouble.
4. If you were driving on a hot day and you began to feel drowsy, what would you do? What should you do?
5. Suppose you have the average reaction time. How many feet would you travel after a warning of danger before you begin to stop the car if you were going thirty miles per hour? Sixty miles per hour?
6. Discuss various methods for training expert drivers.

C. *Study Activities*

1. Draw a diagram of the eye showing the iris, the pupil, the retina, the lens, the cornea.
2. Note the size of the pupil in an eye. Bring a lighted candle or an electric light near the eye and notice the effect upon the size of the pupil. Explain.
3. Draw a figure of the eye to show its conditions in case of nearsightedness; farsightedness.
4. Measure the side vision of one of your friends and have him measure yours. Write a brief paragraph to show the importance of this kind of vision in driving.
5. Test your ability to distinguish colors.
6. Have your eyes tested to see if you have good visual acuity and to find whether you have satisfactory vision for driving.
7. The chart on page 34 has been constructed with three fourths of a second as the reaction time. Suppose you find your reaction time is three fifths of a second. Make a chart showing your reaction time distances at various speeds. If your reaction time is some other value, make a chart for yourself.
8. Make a poster which will be valuable in stopping the automobile massacre.

D. *Questions*

1. Why is the driver responsible for accidents?
2. For what per cent of deaths in automobile accidents are drivers responsible?

3. How many people have been killed in automobile accidents during the last sixteen years?
4. How many people have been maimed or crippled for life in automobile accidents in the last sixteen years?
5. What is the effect on the pupil of the eye when a bright light contacts the eye?
6. Define reaction time. Illustrate.
7. If your speed is twenty miles an hour, what is your total stopping distance if your brakes are very good?
8. What is the total stopping distance for fifty miles per hour if your brakes are only fair?
9. Define conditioned reflex. Illustrate.
10. What standards of physical fitness should be prescribed for an applicant for a driver's license?
11. Make out a list of all of the things a driver might do that would label him a careless driver, such as:
    - *a.* Making a left-hand turn from a right-hand lane
    - *b.* Pulling out from the curb without looking back and signaling
    - *c.* Getting out of the left-hand door of the car when the car is parked on a thoroughfare

E. *Suggested Readings*

1. Billings, Curtis. "Are You Safe To Drive?" *Reader's Digest*, pp. 9-12. April, 1934.
2. Hoffman, Harold G. "When You Drive After Dark." *Reader's Digest.* pp. 69-70. February, 1936.

3. Jenkins, Ab. "Drive Right." *Reader's Digest.* pp. 67-70. August, 1934.

4. *Sportsmanlike Driving.* Chicago Motor Club. Chicago, Illinois. 1935. 51p.

5. "The Driver." *Sportsmanlike Driving Series.* American Automobile Association. Washington, D. C. 1936.

6. *Too Long at the Wheel.* National Safety Council. Chicago, Illinois. 1935. 48p.

7. *We Drivers.* General Motors Corporation. Detroit, Michigan. 36p.

8. *Your Capacity as a Safe Driver.* Chicago Motor Club. Chicago, Illinois. 12p.

CHAPTER 4

THE ATTITUDE OF THE DRIVER

An attitude is the state of mind or feeling that a person has toward another person or any situation. We speak of good attitudes and bad attitudes in driving as well as in other things. A driver's attitude is good when he has the interests of others as well as of himself at heart and is resolved to protect them. His attitude is said to be bad when he allows his emotions, such as vanity, selfishness, or fear, to dominate his driving.

A young person who is learning to drive should be especially careful to see that he forms correct habits and good attitudes, for habits and attitudes formed in youth usually remain with one for the remainder of life.

Natural Equipment

The attitudes of drivers are based upon mental, emotional, and physical characteristics. All men have certain reflexes, instincts, and capacities which should be used properly in driving and in learning to drive. Among them are: reaction time, muscular control, seeing, hearing, attentiveness, mastery, rivalry, greed, fear, susceptibility to suggestions from authority, curiosity, kindliness, and co-operation. These must be controlled and trained. If the driver develops a strong desire to pay good attention, to learn, and to be honest and kind, sane driving should be attained. If a driver has no desire to curb rivalry, greed, and fear, driving may lead to great danger.

Self-control

Socrates, a great thinker of ancient Greece, said, "Know thyself." Each driver must learn to know and understand his powers, his strength, his defects, and his limitations in order that he may learn how to drive most safely. It is rightly said that no man can teach others or control others until he is able to control himself. Accordingly, a driver must understand the speed of his reaction time, the strength of his sustained attention, the strength of his natural vision, and his susceptibility to fatigue before he can manage his car properly.

Self-control brings good attitudes as well as highly perfected skill in driving. The wrong attitude to society, to other drivers, and to the car itself may develop detrimental lack of control. Self-control means that a driver must appreciate his position among millions of drivers. Self-control means that a driver cannot hold himself above the law or be superior to others. Self-control tends to develop character. Character is life dominated by justice, honesty, kindliness, and courtesy. Self-control thus defined leads to sanity in car control. When one can control himself, he learns to control the things about him.

Attention

Attention is one of the vital attitudes which must be developed in driving. The driver must be attentive to

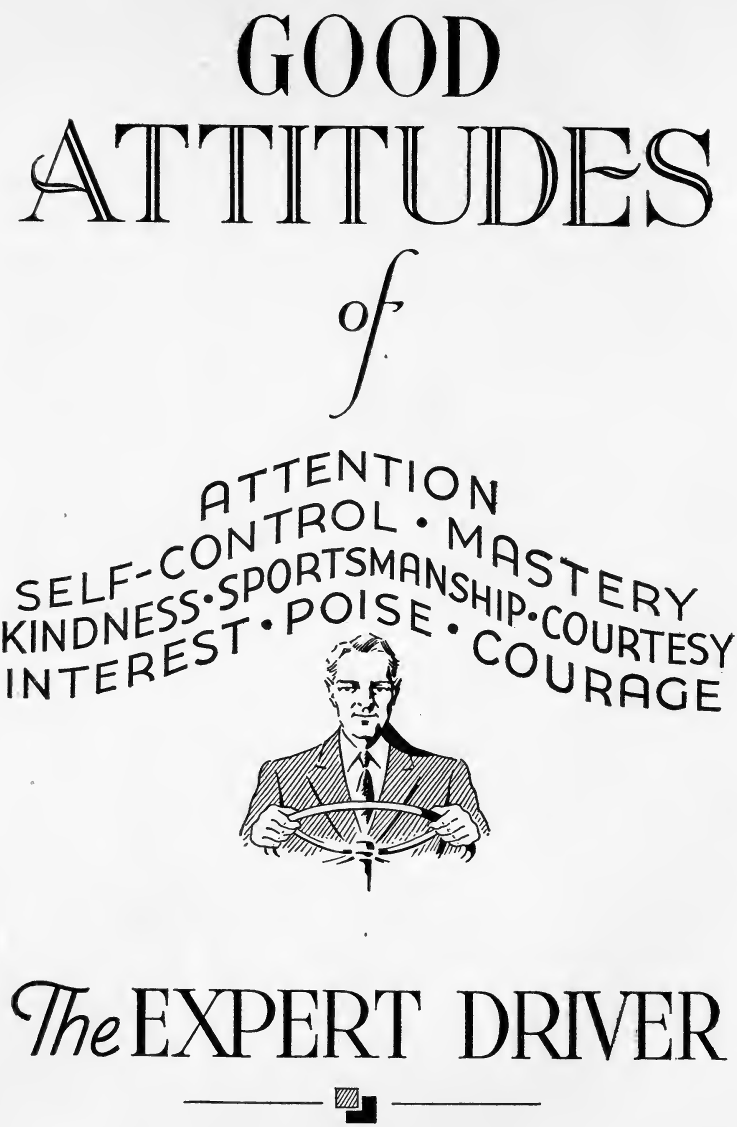

GOOD
ATTITUDES
of
ATTENTION
SELF-CONTROL • MASTERY
KINDNESS • SPORTSMANSHIP • COURTESY
INTEREST • POISE • COURAGE
The EXPERT DRIVER

Fig. 5

every condition and device which would be helpful in developing safety and sanity. He must train himself to attend to the car, the road, the traffic, obstacles, and pedestrians.

If a driver has the attitude of giving attention to these important things and not attending to distracting things like a parade, a high building, a new house, or a flock of geese, he is training himself correctly for driving. No man can attend with safety to driving and to other things at the same time. The driver must give his sustained attention to his job. This means that he must concentrate upon it and not lapse into daydreams and idle speculation while he is driving.

A driver who wishes to be sane must control his desire to get attention. Some drivers are vain. They like people to see them in a car, particularly a new car. They wish people to think that they drive nonchalantly. They like to show off. They have the attitude of trying to get attention by doing something spectacular. They race the engine and they drive like fury. They throw on the brakes with all their strength. They do all this to satisfy their desire to show off. Often they form a habit of trying to gain attention. This attitude should never be permitted to develop in the young driver. It is not safe. It is not sane. It often leads to accident and sometimes to death.

Mastery

A young driver should develop his instinct of mastery. He should learn to control himself; he should master the car; he should master traffic regulations; his attitude should be that of the disciplined, self-controlled, courteous man without the superiority mania. A driver more than anyone else needs to be a master of his job. The wrong attitude toward mastery leads to danger and to death.

Rivalry and Greed

The driver who has the racing attitude is a menace on the road. A young man should learn to control his desire to beat, or get ahead of, the other fellow. He should never race on the highway. Races like these result in death and disaster. It is ridiculous to think that two people who would walk the streets in an orderly manner should race each other when they get behind the wheels of two automobiles.

The road hog, an example of a greedy driver, is one of the greatest nuisances and dangers on the highway. You have known the road hog, the bully, blowing his horn and shouting epithets at pedestrians who cannot defend themselves against heavy automobiles. The common good demands that greed be curbed in every driver on every road. A hog should be in a pen, not on the road.

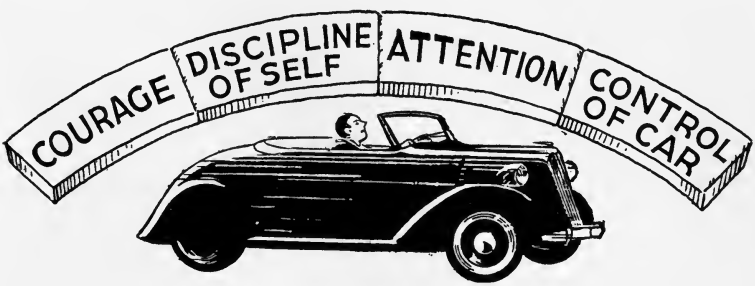
Fear and Anger

The conscientious driver who has inordinate fears is often a menace to the driving public. He drives in trembling tenseness which exhausts him and makes him nervous. He lacks balance and poise; he fears every sound; he jumps at ordinary sights; he may be said to be supercautious, but his very timidity and slowness are dangers to others, to himself, and to his companions. If he is to become a successful driver he must conquer his fear and replace it with courage. The good driver is courageous, confident, reliant, and alert.

Anger and gasoline do not mix. A good driver never permits himself to become angry. Anger frustrates good judgment, particularly when one is driving a car. The correct attitude for the driver to assume is that of the citizen who would be at peace with his fellow men, and that of a traveler who wishes to go to his destination without undue haste and in safety.

Kindness and Courtesy

One of the most important attitudes for a driver to attain is that of kindness. Kindness to fellow creatures



is an instinct which must be developed in driving. To drive without kindness is to ask for and to court trouble. The kindly driver is the one who is willing to give a little more than half the road; he is the one who waits longer at a *Stop* and *Go* sign than is absolutely necessary. He does this because it is the humane thing to do.

Courtesy comes with kindness; it grows and develops. The careful young driver learns to be kind to others, for they have rights to life and the pursuit of happiness. An old and decrepit man or woman may be slow in crossing the street. To honk the horn and frighten one of them is unkind and inconsiderate. Wait a little. "Haste makes waste" is a good maxim to keep in mind when on the road.

Courtesy to all, one of the four basic principles of parliamentary law, should be one of the basic principles of the highways. We tip our hats to ladies; we salute the American flag; we stop to permit others to walk before us. Why should we not exercise the same courtesy on the highways? There it would pay great dividends in safety.

Curiosity

The correct attitude toward curiosity must be developed. The right kind of curiosity must be exercised every time one drives, the wrong kind never. The driver should be curious about his car. Each time he drives he should know the effectiveness of the brakes, the strength of the lights, and the condition of the tires. He should know their exact state, their strength and limitations. The man who has no curiosity about an unusual noise in a car, such as a knock in the engine, is inviting disaster.

Curiosity about objects, animals, other cars, and scenery on or near the highway must be curbed. That kind of curiosity distracts one from his job of driving and leads to accident.

Sportsmanship

Young people are being trained to be good sportsmen in athletics. People show much better sportsmanship today than they did in general a generation ago. Then a baseball game, a basketball game, or a dance often ended in a fight. Today people have learned to "play the game." They swim, dance, and play together in harmony. Good sportsmanship has taught that it is better to lose fairly than to win by a foul. A thoroughbred will break no rule to win.

An expert driver is a thoroughbred, a champion of fair play and of good sportsmanship; he knows the rules and plays the game fairly and squarely. Nothing can or will swerve him from obeying regulations at all times. He will obey the traffic laws not only because it is a disgrace to do otherwise, but also because it is unreasonable to take the chance of accident and death which one always takes when regulations and principles of safety are broken.

Summary

A gardener cultivates the flowers in his garden. He pulls the weeds so that they will not crowd the more delicate plants. A careful driver disciplines the powers of his mind and body. He weeds out his bad tendencies and fosters his good ones.

A careful young driver learns to cultivate himself. He kills off the tendencies to greed, discourtesy, intolerance, anger, and hate. He must attain through conscious effort the attitudes of courage, kindness, courtesy, charity, and sportsmanship, if he is to become an expert driver.

Study Aids

A. *Experiences*

1. Do you know a driver who has excellent self-control? If so, think of the attitudes which he possesses.
2. Have you ever seen a driver who tried to get the attention of people by doing dangerous or foolish things? Discuss drivers of this kind.
3. If you have ever seen a race upon the highway, tell what the results were; point out what might have been the result.
4. Do you know a greedy driver? Indicate what should be done to control him.

B. *Problems for Class Discussion*

1. What attitudes are possessed by a driver when he:

   a. passes another car on the brow of a hill?
   b. refuses to pull to the right side of the road when another car wants to pass him?
   c. gives another driver the right of way at an intersection?
   d. honks his horn loudly when the driver ahead does not start his car immediately when the light changes from red to green?
   e. draws attention to himself while driving a car?
   f. talks aloud to himself about the driver ahead who has done something displeasing to him?
   g. drives his car when he knows his brakes are faulty?

h. is annoyed at the least unusual sound coming from his car?
i. races with another car?
j. tries to beat the light?
k. gets out of the left side of the car while it is parked on a busy thoroughfare?
l. weaves in and out of the line of traffic when he is in a hurry to get nowhere in particular?
m. gestures with his hands when he is talking to someone who is riding with him?
n. takes the inside of the road when going around curves?

2. Show how self-control is advantageous in handling the car.
3. Show the values and disadvantages of fear in driving.
4. Show the advantages and disadvantages of curiosity in handling a car.

C. *Study Activities*

1. Make a list of the attitudes which will help a young driver to master his job of driving safely. Discuss the importance of each in connection with the problem of controlling the car.
2. Make a list of the attitudes which endanger lives upon the highway. Suggest ways for changing these attitudes.

D. *Questions*

1. What natural tendencies are useful in car control?
2. What natural tendencies must be curbed or trained in order that driving may be safe?

3. To what things must a driver attend?
4. Against what distractions should a driver guard?
5. What is meant by mastery?
6. If a pedestrian is crossing the street slowly just in front of your automobile and the sign indicates that you may go, what should you do?
7. What is sportsmanship? Develop with concrete illustrations.
8. What is the value of courtesy in driving?

E. *Suggested Readings*

1. *Calling All Drivers.* Metropolitan Insurance Company. New York. 16p.

2. Douglas, R. A. *Commonsense in Driving Your Car.* Longmans, Green and Company. New York. 1936.

3. Furnas, J. C., "—and Sudden Death." *Reader's Digest.* pp. 21-26. August, 1935.

4. Kenyon, Robert E., *Motor Massacre.* Chicago Lloyds. August, 1936. 8p.

5. *Saving Seconds or Saving Lives.* Aetna Casualty and Surety Company. Hartford, Connecticut. 18 p.

6. *Thou Shalt Not Kill.* Travelers Insurance Company, Hartford, Connecticut.

7. Waring, James. "Higher Education for Drivers." *Reader's Digest.* pp. 51-53. May, 1936.

8. *You Bet Your Life.* Travelers Insurance Company, Hartford, Connecticut. 36p.

9. *Your Capacity as a Safe Driver.* Chicago Motor Club, Chicago, Illinois. 12p.

THE EVOLUTION OF THE MOTOR CAR

CHAPTER 5

INDIVIDUAL DIFFERENCES IN DRIVERS

Every driver, especially the young prospective driver, should know man's limitations as a driver and how people differ in their reactions, capacities, and attitudes. Every young driver should also understand the individual differences of drivers and pedestrians. A safe driver understands how he compares with other drivers; it is necessary for him to understand those whom he will meet upon the road. What will the persons whom you meet do in emergencies? How do they think? How will they react? How do they differ?

Physical and Mental Differences

A good driver recognizes that individuals are very different, one from another. It was the human element in drivers that caused two thirds of the accidents last year. It was also often the human recklessness, negligence, and indecision of pedestrians which caused many accidents. A good driver studies people and the differences among them; he tries to find out what they are liable to do when anything happens to them.

The physical differences are many and intricate. People vary in health from the robust to the invalid; in vision, from the man with normal eyesight, good visual acuity, excellent depth perception, and good color discrimination, to the totally blind. Consider the difference in your problem in meeting a man of normal vision and a nearsighted man who cannot see you until you are upon him.

Differences in native strength are important. Some people are scarcely strong enough to guide a car, stop it by use of the brakes, or operate the clutch; others do these things without effort. You, as a driver, will meet extremes sooner or later. You should be prepared by study to face emergencies before you drive.

As a driver you will have to contend with the varying maturity of drivers; some old, some young, and others of middle age. Wise drivers understand that these individual differences exist and they are prepared to meet them.

Important as physical differences are, the mental differences are even more important. It does not take the intelligence of a genius to drive a car; normal intelligence properly controlled will suffice.

Alertness and Experience

Mental alertness and activity must be contrasted in all its degrees with mental laziness and passivity. Sooner or later you will meet the mentally lazy driver who may not try to drive correctly. You must be alert in order to avoid collision with sleepy or fatigued drivers. Sheer laziness has caused many accidents. You will meet the effectively trained driver and the driver with little or no training. You will meet the intelligent driver and the ignorant. You will meet drivers and pedestrians who know the laws and regulations and others who lack

INDIVIDUAL DIFFERENCES
IN
Native Traits, Learning, Experience, Attitudes
OF
DRIVERS

INTELLIGENCE	DULLNESS
ALERTNESS	SLUGGISHNESS
QUICK REACTION	SLOW REACTION
SELF-CONTROL	LACK OF CONTROL
COURAGE	FEAR
ATTENTIVENESS	LACK OF ATTENTION
COURTESY	DISCOURTESY
CHARITY	GREED
KINDNESS	CRUELTY
EXPERIENCE	INEXPERIENCE
INTEREST	LACK OF INTEREST
MATURITY	IMMATURITY
SUCCESS	FAILURE
CAREFULNESS	CARELESSNESS
GOOD SPORT	POOR SPORT
GOOD MEMORY	POOR MEMORY
KNOWLEDGE	IGNORANCE
GOOD CONDITION	FATIGUED
STRONG	WEAK
RELAXED	TENSE
POISED	NERVOUS
GOOD JUDGMENT	POOR JUDGMENT
SOBER	INTOXICATED

Which traits fit You ?

In what are you strong? weak ?

How will you drive ?

Fig. 6

common and simple knowledge. You must anticipate how the people you meet, either driving or walking, will react. Be ready to meet any emergency.

Experience, growth, and maturity contrast with inexperience, lack of mental growth, and immaturity. When the driver with experience and maturity is met, there is little to fear and no difficulty in passing him; but when an inexperienced and immature driver is met, it is necessary for one to be ready for an emergency. One never knows what breach of etiquette may be made.

Thinking

In ability to learn there are of course very great differences. Some learn easily and others with difficulty. Some people have good memories and others poor memories. Some remember all regulations they have studied and others none. Some people have excellent ability to think, but others have little or no such ability. Some think rapidly, others slowly; some fairly intelligent people cannot think in a "pinch," but others think quickly in an emergency.

You will meet people who cannot think along with those who can and do think. In an emergency, you must be able to take care of yourself, and often, too, of the other fellow. A good way to be prepared is to go over all possible situations which may arise and think just what you should do. In this way you can make yourself more perfect in the art of driving.

Mental Fatigue

Mental fatigue is a variant among individuals. Some people tire quickly because of the tenseness with which they drive. Because they are not unnecessarily tense, others can drive all day without tiring. They understand the difference between tenseness and alertness.

Some people cannot withstand glare and so eye fatigue causes them to be mentally slow and to drive poorly. A few years ago, one of the authors, driving a new car nine or ten hours a day for several days, sustained terrific headaches. It was some time before he realized that the glare which came from the nickel-plated back of the left lamp was the cause. From then on, he covered the back of the left lamp and drove the car more efficiently and with a greater enjoyment.

Co-ordination

Co-ordination is the ability to combine thinking with acting. Co-ordination in individuals varies greatly; some people have little or no ability to see, act, and think with precision; others see a great deal, think quickly, and drive expertly. Some people cannot handle a car well because they cannot co-ordinate muscle and mind. While co-ordination comes easier to some than to others, almost everyone can attain it, who, having an average amount of physical and mental ability, trains himself by concentrated exercise to think and act. Such co-ordination can be obtained by practicing at first in simple situations and then in more complex ones.

Emotional Qualities

Certain kinds of emotion disrupt judgment, distract attention, and injure performance. Emotional differences must be understood as much as possible. Control of emotions is perhaps never 100 per cent perfect, but there is a great variation in the degree to which people have succeeded in attaining this control.

A few people are too emotionally immature to drive. Worry distracts the mind from driving. Some people drive poorly because they take personal criticism as an insult. These people are unstable. They cannot be depended upon to rise to an occasion or an emergency, for they are nervous. They lose their tempers and they drive recklessly. They get upset over little things; they crowd the middle of the road; they always blame the other fellow. They are "never wrong" and they never see themselves as others see them.

Illusion of Greatness

Another kind of emotion which is detrimental in a driver is the illusion of greatness. This causes a superior attitude toward the rest of the world. Such a driver may be an egotist who loves to show off, who drives too rapidly for traffic conditions, who boasts that he can do things the ordinary man cannot do. He boasts of his ability to make terrific speed between two places, and relies upon his luck and ego to pull him through danger. He uses the brakes more than common sense and good judgment permit. He believes that he will drive without accident.

This egotist is always glad to take a dare and believes that others think him a great man, but they usually deem him a fool. He likes to have people see him pass lights or drive on the sidewalk; he likes "to give his dust" to slower cars, take more than his share of the road, step on the gas when another car comes alongside, and race dangerously. He makes a fool of himself and acts as a general nuisance.

The Driver Prone to Accident

The statistics of accidents show that most of the mistakes in driving are made by a comparatively small number of drivers. Research figures show that nearly 100 per cent of the accidents are caused by 15 per cent of the drivers.[1] The driver prone to accident is the type who combines several of many defects, as: poor vision, slow reaction time, bad attitudes, emotional instability, and lack of correct knowledge. If this driver could be barred from the highway, driving would be much safer for all.

The Expert

In contrast to such drivers as those pictured above is the well-trained expert who shows tolerance for the juvenile and inexperienced driver. He enjoys his own driving, but he emanates kindliness and courtesy. This man has the attitude of charity; he understands the obligations of the driver; he believes in safety first, and is considerate of others. If someone makes a slight mistake, he goes more than halfway in rendering aid.

His attitudes are those of poise, courage, confidence, and courtesy. He understands the weakness of human nature and from experience he gains many facts which in time make him more expert. His good attitudes are more important perhaps than a good intellect or a fine physique. Such a man is well-balanced; he has a fine personality, and more important, he has character. It is a man like this who should teach others to drive.

[1] "Foolproof Roads." (Condensed from *Fortune*) *Reader's Digest,* p. 56. October, 1936.

We have considered briefly individual differences in physical, mental, and emotional traits. Let each student summarize these differences among drivers.

Study Aids

A. *Experiences*

1. Did you ever know a driver who became angry when someone passed him on the road? If so, discuss the dangers which may come of such lack of control.
2. Have you ever met an egotistic driver who thought he was a better driver than anyone else? What might happen to him?

B. *Problems for Class Discussion*

1. Discuss the importance of interest in learning to drive.
2. Show how thinking is of value in driving an automobile.
3. Show the value of co-ordination. Discuss how seeing, thinking, and doing should be co-ordinated.

C. *Study Activities*

1. Make a list of the differences in drivers; list the good points on one side and the bad points on the other. Check the good points which every driver should have.
2. List the physical differences between drivers; the mental differences; the emotional differences.
3. Write a brief paragraph, the best you can, on "The Expert Driver."

D. *Questions*

1. What was the cause of the majority of automobile accidents last year?
2. What are the differences among drivers in ability to see?
3. Why is good vision helpful in driving?
4. Is it safe for a man with poor vision to drive?
5. What are the differences in ability to hear among drivers?
6. What is mental alertness?
7. What is meant by a breach of etiquette?
8. What is mental fatigue?
9. What is meant by emotional immaturity?

E. *Suggested Readings*

1. *Live and Let Live.* Travelers Insurance Company. Hartford, Connecticut. 1936. 38p.

2. *We Drivers.* General Motors Company. Detroit, Michigan. 36p.

3. Wiggan, Albert Edward. "Women Drivers." *Reader's Digest.* pp. 35-37. March, 1932.

CHAPTER 6

PRINCIPLES OF LEARNING TO DRIVE

EVERY PROSPECTIVE DRIVER, who is serious, studies the principles of learning to drive. Innate capacities must be carefully cultivated and controlled. Edward L. Thorndike holds that man is the greatest learner because he is capable of so many connections.[1] Truly man is a great learner, and he needs to be a great learner in this complex and rapidly changing age. To learn how to drive an automobile involves many activities and much thinking.

STUDY AND THINK

Before one goes out on the road as a driver, he must carefully study the automobile and the relation of the parts to the whole. He must appreciate the problem the driver has in traffic. He must know about obstacles and pedestrians. He must further consider the relation of the individual to society and know the rights, privileges, and responsibilities of each. Unless he has considered the whole problem, it is dangerous for him to drive. Unless he has studied carefully the subjects of speed, light, vision, strength, reaction time, fatigue, the possibility of mechanical defects, human weaknesses,

[1] Thorndike, Edward L. *Educational Psychology.* Teachers College, Columbia University. New York. 1926.

and dangers of the road, he is not prepared to venture out at the wheel of an automobile. A careful young driver is thoughtful.

Just as learning involves many things, the education of the driver may be brought about in many ways. The objective is the trained, courteous, expert driver. Some of the means by which this objective is accomplished are: doing correctly, thinking properly, studying from books and in classes, practicing, correcting mistakes, and observing good driving.

Principles of Learning

The principles of learning which everyone who wishes to become a driver should understand are:

1. Readiness
2. Simple situations for beginning practice
3. Practice, drill, and training
4. Habit formation
5. The effect of success in driving

Readiness

Is the young person ready to learn to drive an automobile? Is he capable of accepting the responsibilities of handling the car with all its potential dangers? To be ready one must know what the various problems of driving are. One must have the physical ability to control his muscles. One must have the alertness of mind and quickness of reaction time to stop the car promptly in emergencies.

One must also have the correct attitudes toward society and the car. One must have a knowledge of

PSYCHOLOGICAL PRINCIPLES of LEARNING TO DRIVE

READINESS
SIMPLE SITUATIONS
PRACTICE • DRILL • TRAINING
HABIT FORMATION • SUCCESS

QUICK THINKING • RIGHT DOING

THE LEARNER

Fig. 7

the dangers connected with driving. One must have an interest in learning to drive. Readiness means that a young person will be satisfied by successful learning and expert driving, and that he will be annoyed by unsuccessful learning and by mistakes in driving.

If one is not ready to learn, teaching him should be deferred to a later time when he will be ready. Mental, physical, or emotional unreadiness may bring disaster. If one is ready to learn, learning will become satisfying to him and the rate of his improvement will be rapid.

Simple Situations for Beginning Practice

When one is first learning to drive, he is faced with difficult situations. He should not attempt to drive a car in heavy traffic. At first, driving must be practiced in a field, a vacant parking lot, or on a quiet country road; later one may drive on a highway and in town. Until one has learned the more intricate principles of car control he should not be confronted with the heavy traffic of the national highways or of the main streets of our great cities. In learning to drive an automobile, one must learn in easy simple situations first and in more difficult ones later. This is simply good common sense.

Practice, Drill, and Training

The saying, "Practice makes perfect," is false. In practicing, one must always remember that practice of itself does not make perfect. It is better to realize that correct practice educates. Let your driving then be correct at first in light traffic and simple situations, and then in heavier traffic and more complex situations.

Good methods of training and drill will teach you to think accurately and act precisely. Fighters and runners train. Baseball players, football players, and basketball players drill. Actors drill. All of these work long hours to become proficient. Great automobile racers train and drill; but the young autoist gets into a car and drives off without preparation of any kind.

Training is one of the best methods by which one can be taught to drive correctly. Train. Drill. Practice thoughtfully. Drill conscientiously. Train understandingly. Correct practice and persistent drill beget courage, discipline, and control in mastering driving problems.

Training oneself to precise attention and exact performance is very important. Drilling oneself against shock or cold or surprise is equally important. Correct practice is highly advantageous in manual driving, in stopping, in backing a car, in rounding a curve, in feeding gas into the engine, or in giving attention to the pedestrian. With correct practice and careful drill, the driver puts himself into the right mental and muscular states. Later he will react properly under unexpected and trying circumstances. But incorrect practice and drilling will equally become a habit. Early caution saves later error.

Habit Formation

The principles of habit formation are helpful in learning. William James suggests four principles of habit formation. These are valuable in learning to drive.

Through a critical evaluation of your driving, you may decide that you do not always signal before passing another motorist, and that you sometimes take dangerous chances by cutting corners. These two violations of good road etiquette should be attacked immediately.

When you have made the critical diagnosis which tells you that among other things, you do not signal, what must you do?

1. Make a firm resolve to correct the fault.
2. Practice the correct procedure and etiquette.
3. Permit no exception to occur in the correct practice. (This is important because one slip or violation may be fatal.)
4. Practice each correct habit until it is automatic.

In the same way you can rid yourself of the other wrong habits. Day by day you will learn other important habits and practice them until they become "second nature."

By thoughtful consideration of your driving problems followed by training, correct practice, and sound habit formation, you can become an expert driver.

Effect of Success in Driving

If the first lessons in learning have been successful, the learner will desire to do more driving and will have more satisfaction in driving well. The effect of success in driving an automobile is satisfying; on the other hand, if the first lessons or any of them have been unsuccessful, the young driver should be annoyed to the extent that he will strive with all his ability and strength to correct his mistakes.

Suppose that a young driver has run through a red light or a stop sign. He should be made aware of the possible serious results of the act so that he will not commit the same violation of the traffic regulations again. Recognition of successful driving and its results, and understanding of unsuccessful driving and its effects, are very important in the proper education of drivers. The motto, "Nothing succeeds like success," should be clearly understood.

In brief, it is essential that one become a good driver. First attempts may be discouraging. But persistent effort with readiness to learn the right attitude, and an understanding of the degree of success and failure, should bring about encouraging improvement. Attitude is of great importance in learning. If the young driver desires to drive safely, if he is anxious to avoid recklessness, and if he can properly estimate his own accomplishments, there can be no doubt of eventual success.

Think and Act

Let every driver consider carefully each of the mechanical operations such as starting the engine, shifting gears, steering, and braking, and see that each operation is performed properly.

Let every driver observe courtesy in driving, be mannerly in waiting for pedestrians to pass, and exercise poise and expertness in the ordinary driving which he does. He must have the habit of attending to his driving.

Let every driver be prepared for emergencies. To be thus prepared he must know himself, have mastered the correct habits, and trained himself to courage and poise in all car operations. If emergencies come he will then be ready to meet them.

Summary

Principles of learning to drive an automobile involve the following: readiness, simple situations for beginning practice, practice drill and training, habit formation, and the effect of success in driving.

No one should be taught to drive before he is ready to learn to drive. Correct practice educates; just any kind of practice may be faulty and even harmful. Real success succeeds. The results of success and failure should be understood by the learner. Training in control, courage, poise, the correct attitudes, and the right responses is necessary to make driving safe. The habits of safety must be practiced until the driver is sure of himself. By means of such principles, driving can be made safe for the driver and for the public.

Study Aids

A. *Experiences*

1. Have you ever seen a beginning driver attempt to park? Was his attempt successful? If not, why not?
2. Have you ever seen a well-trained man or woman? In what was he or she well-trained? How could you tell?
3. If you have ever known anyone who was in an

automobile accident, consider the effects, mentally and emotionally, upon him.

B. *Problems for Class Discussion*

1. Explain why one should study the problem of driving before he drives a car on the highway.
2. Describe safe situations for beginning practice.
3. Discuss the effect of success in driving. Do you believe there is anything in the motto, "Nothing succeeds like success"?

C. *Study Activities*

1. List all of the native traits related to the ability to drive.
2. Enumerate dangers connected with driving and show how definite principles of learning will offset these dangers.
3. List the main laws or principles of habit formation and show how each one applies to the learning of a particular skill.
4. List the habits which should be formed in safe driving.
5. Name the mechanical operations about which a driver should think, and indicate how the principles of learning will assist him.
6. Give several examples of how a person may learn wrong habits through practice.

D. *Questions*

1. What is the objective in teaching safe driving?

2. What is meant by the principle of readiness?
3. Where is the best place to learn to drive?
4. Does practice make perfect?
5. What is drill?
6. What is practice?
7. What is training?
8. How does psychology help in learning to drive?
9. How does psychology help in driving?

E. *Suggested Readings*

1. Billings, Curtis. "Are You Safe to Drive?" *Reader's Digest.* pp. 9-12. April, 1934.

2. *Calling All Drivers.* Metropolitan Life Insurance Company. New York. 16p.

3. MacDonald, Malcolm. "The Dangerous Age." *The Education Digest.* p. 7. January, 1937.

4. *Parents and the Automobile.* pp. 21-52. Teachers College, Columbia University. New York, 1936.

5. Waring, James. "Higher Education for Drivers." *Reader's Digest.* pp. 51-53. May, 1936.

6. Williams, Sidney J., "Education for Safety in America's Secondary Schools." *The Education Digest*, pp. 32-33, April, 1936.

CHAPTER 7

THE SOCIAL ASPECTS OF DRIVING

In our country travelers have great personal freedom. They go from one state to another without passports. Since the automobile is used extensively for travel, every driver should know driving rights and privileges, and driving duties and responsibilities. The driver should know his true relations to society, and to city and state governments.

Rights and Privileges

Although a pedestrian pays no fee to walk or a teamster to drive a team on the highways, a motorist must pay a fee for the privilege of driving an automobile. A license gives to the driver rights and privileges and imposes upon him duties and responsibilities. The license implies also a superior right of the state or city to control driving and to revoke, if necessary, the privilege in case of serious infractions of the driving regulations.

The privilege to drive on well-paved streets and highways is rich in benefits. What could be a greater pleasure than to drive an automobile safely on a week-end trip into the country to picnic among the beautiful trees and flowers? Is it not a great privilege to drive a car without interruption from state to state or from city to city? This is the privilege which is granted and assured by the automobile license.

The Declaration of Independence sets forth certain rights, such as the right to life, liberty, and the pursuit of happiness. It states, "To secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed." It is admitted therein that when the best interests of all demand it, the people have the right to make changes for the safety and happiness of all.

The great increase in the number of cars and also in the amount of travel makes it necessary to regulate traffic more and more carefully. Necessity for change in safety regulations is becoming increasingly evident. The rights of all the people as well as the rights of the individual must be considered in these changes. If the terrific death and injury toll keeps mounting, even stricter regulations will be necessary.

Millions killed and permanently maimed demand that we seek the best possible solution. One of the best means to the solution is education, for as Judge Dougherty, in one of the broadcasts of the Safety Court of Chicago, suggests, we do not need so much a change in the laws as we need a law-abiding and an educated driving public. Information about the rights of all the people and the limitations of the rights of the individual is an absolute necessity.

The state or the city has rights, and the individual members of the group have certain other rights. No one in a democracy will deny that the greatest good for the greatest number should be the ideal of authority and government; this principle demands that all the people have the right to go about upon the streets and highways in safety. It means that the individual has the right to drive a car, but that right must be exercised with care and safety to himself and to others. It must be within the limits of the law.

Group Versus Individual Rights

The public has the right to place necessary restrictions upon driving. Certain regulations are set up and enforced in order that safety may be enjoyed by all. We have stop signs, safety zones, and traffic officers for the protection of the moving public, both pedestrians and motorists. Speed regulations and traffic laws are made to meet the needs and conditions of time and place. The relatively superior rights of the group demand an effective regulation of traffic.

Accordingly, the driving rights of the individual are limited. They are less important than the rights of the whole group. Driving is a privilege to be enjoyed but not to be abused. If violations occur there must be a withdrawal of some of or all the privileges of those who commit the violations. The license to drive may be withdrawn; a fine may be imposed; a jail sentence may be given. Evidence at the present time points to the conclusion that such measures do not get to the heart of the problem. Evidence and analysis indicate the necessity for better education of the driver. The driver of an automobile should not only learn of his rights and privileges; he should also discover his duties and responsibilities.

Eight Rule for Safety

A driver has obligations to his own passengers, occupants of other vehicles, pedestrians, children playing on the highway, and to the owners of property adjacent to the highway. The good driver observes duties and rules for safety:

1. He keeps himself fit at all times, particularly while driving.
2. He keeps his car in good condition, particularly the safety appliances, such as brakes, lights, mirrors, and horns.
3. He knows the traffic laws and obeys them religiously.
4. He co-operates wholeheartedly with traffic officials.
5. He knows what parts of the road he may rightfully use at different times.
6. He protects the lives of pedestrians by knowing his car and understanding the psychology of the pedestrian.
7. He safeguards the lives of children by exercising extreme care in driving near and among them.
8. He always gives aid in case of accident.

Keep Fit to Drive

Sidney J. Williams, Director of the National Safety Council, suggests that practically all accident causes may be traced to the individual and that these fall into three categories: (1) Defects of the mind or body; (2) Lack of skill or experience; (3) Wrong attitudes.[1]

Mr. Williams points out also that safety is made up of three basic qualities: fitness, skill, and attitude or character. If these three qualities are impressed upon the public, our society will become safe and sane.

It has been made clear that bodily defects such as lack of strength, poor vision, or lack of depth perception must be carefully understood and remedied. If they cannot be remedied, the driver, knowing his weakness, should not imperil the lives of others; for him to drive is recklessness itself. Poor vision may be remedied by glasses; fatigue by sleep; ignorance by reading and study. Every driver must get himself into shape for the job of driving.

Keep the Car in Condition

It is your duty and responsibility to keep your car in condition at all times. Examine it frequently, particularly the lights, the steering apparatus, the brakes, the horn, the mirror, the windshield, and the tires. In the first one hundred yards, one should try his brakes and assure himself that the transmission shifts properly. His windshield should be cleaned, his engine running smoothly. One must do these things in order that he will know his car and have it under control all the time. Then when an emergency comes, one is ready to solve the problems which it brings.

[1] Bulletin of the Secondary-School Principals of the National Education Association. March, 1936.

Co-operate with Traffic Officials

Traffic officials have a particularly difficult position to fill. They dislike to arrest people or even to reprimand them. If everyone tried to assist in making the roads safe by carefully co-operating with the officials, there would be fewer accidents. Obey the officers. Do not try to beat signal lights; do not cut corners; do not honk your horn irritably; do not race with a train to the crossing, for if the race is a tie, you lose. The best thing to do is to drive on your own side of the road, obey the laws, and be courteous. Be a good citizen.

Share the Road

The best way to co-operate with the traffic officials is to know all traffic regulations and carry them out exactly. Suppose a new regulation is made with which you do not agree. What is the right way for you to act? You must obey; the wrong way is to break the law.

Share the road with the other drivers. At times you have the right of way; at other times the other person has the right to use the road before you. You have the first right to the right-hand side of the road and may use the left side when you are making a left turn or when you are passing others. You have the right to use the left, that is to borrow it if no one else is using it or is about to use it. Never use the left when going up a hill. If there is a clear path ahead you have the first right to intersections when the signal is green. Remember that the pedestrian has right of way over turning cars. Remember that the police cars, ambulances, and fire equipment have the first right to use the street in an emergency.

Keep on your own side of the road. Obey the traffic code. Drive carefully. Be tolerant of the rights of others.

Protect Pedestrians and Children

It is the duty of the driver to protect the pedestrian at all times. The social privilege to drive implies the social obligation to drive safely. True, the driver has the right of way when the lights are green, but he has no moral right to run down a pedestrian, who, for some reason or other, is in the wrong place. Courtesy, kindness, tolerance, and poise mean proper regard for pedestrians. When one realizes that approximately fifteen thousand pedestrians were killed by automobiles last year, one sees the necessity for the control of speed, good judgment in driving, and the right attitude toward the relatively weak.

Children are thoughtless; like pedestrians they are likely to step before a car at any time. Even though there may be a twenty-five mile an hour speed limit in a city, one should hold his speed down as low as seven or eight miles per hour when he passes a school. Wherever children play, the greatest care must be taken to protect them. One moment of inattention, a foolish burst of speed, a careless turn, and a child's life has been taken. Such a calamity would follow you all your days. Because you were negligent or incompetent a child's pale face, a little body broken would be constantly before you.

Behave Correctly in Accidents

Sometimes when a driver has been involved in an accident he runs away; such a man is acting the part of the coward. If there have been injuries, the hit-and-run driver is inhuman and criminal.

Socially a driver who has struck a man owes every courtesy and kindness which he can give to the injured. He should stop, give first aid, get medical help, and arrange for transfer of the injured to the hospital, give his name and address, notify the police of the accident, and do everything possible to help the injured person.

Morally, a driver who is to blame for an accident owes not only every courtesy and kindness which has been mentioned above, but he also must make restitution to the injured. It is his duty to make that restitution in money and in other ways to lighten the suffering of one injured because of his mistakes.

If the moral and social obligations of driving are known and willed, safety to all will be better assured thereby.

Commandments

The following commandments for safe driving were published by educators in a great national magazine. They are good rules for every driver to follow.

Ten Commandments for Safe Driving

I

Keep to the right of the center line of the highway.

II

Pass overtaken vehicles on left, but only after sounding horn and only when road ahead is clear enough to permit getting back to the right with a safe clearance and with a wide margin for safety.

III

Under no circumstances attempt to pass an overtaken vehicle at an intersection, on a curve, or approaching the crown of a hill.

IV

At intersections, be prepared to stop if vehicle on intersecting road is moving onto intersection and do not try to take the right of way.

V

Keep far enough back of the vehicle ahead to allow a safe braking distance in the event that other vehicle makes a sudden stop. Except in emergency, do not stop so suddenly as to cause collision by following vehicle.

VI

Signal before making a turn, and further insure safety by looking to see whether a vehicle is approaching from the rear. Wait before pulling out from the curb until making such observation.

VII

Always keep both hands on steering wheel and eyes on road ahead. Look behind before backing.

VIII

Stop before crossing all railroads. After carefully looking in both directions and listening, proceed only if it is safe beyond any possible doubt and then proceed in low gear, gears not being shifted until all tracks have been cleared.

IX

When stopping on highway, pull as far off hard surface as road conditions permit and, where the stop is prolonged, see that the rear of vehicle is adequately protected.

X

Do not operate at excessive speed at any time. At curves, blind crossings, crests of hills, in fog, or wherever the view is curtailed, reduce speed so as to be able to stop within the distance of clear vision.[1]

Summary

Every driver must understand the superior rights of society. He must consider the social factors in connection with traffic and driving problems. In the first place he must know his rights and privileges and their limitations. In the second he must understand and appreciate his obligations, duties, and responsibilities in driving. Every expert driver must keep fit, be alert, think, and act with precision.

[1] *Research Bulletin* of the National Education Association. Vol. XIV. No. 5, p. 221. Adapted from a poster prepared and distributed by the National Association of Motor Bus Operators.

Study Aids

A. *Experiences*

1. Do you know anyone whose car is always being hauled in? What are the causes for this?
2. Did you ever see a wheel come off a car? How could this have been prevented?
3. If you have ever seen an accident, tell how the drivers behaved.

B. *Problems for Class Discussion*

1. Compare the rights of the individual with the rights of the city or state.
2. Discuss the skills which are important for safe driving.
3. Discuss the best way to co-operate with traffic officials.
4. If you do not like a law, what should you do about it? Should you obey it? Should you break it? Should you have it repealed? How?
5. Discuss the right to use the road.

C. *Study Activities*

1. Compare the eight rules for safety with the Ten Commandments for Safe Driving. Which do you like the better? Add to both any other rule which you think valuable.
2. List the chief ways to protect the pedestrian.
3. List the responsibilities of the driver.
4. Write a paragraph on "How a Driver Should Act in Case of Accident."

5. Collect from available newspapers all the reports of automobile accidents for a week. Make an analysis of them which shows:

    a. the time of their occurrence.
    b. the number of people injured.
    c. the number of people brought to court.
    d. the number of deaths caused.

    Conclude your report by showing which of the Ten Commandments for Safe Driving were violated.

6. Observe traffic officers at their posts.

    a. Do they conduct elderly people and children across the street?
    b. Do they protect individual or group rights, or both?
    c. Write a paragraph on "The Necessity of Having Traffic Officers."

7. Observe the actions of traffic officers and list helpful things which they do.

D. *Questions*

1. Why is a license necessary for the driving of an automobile?
2. What does the Declaration of Independence say about rights?
3. What is the best way to solve the problem of accidents because of the automobile?
4. Can the right to drive be withdrawn? By whom?
5. Who can stop reckless driving?
6. How can one keep fit for driving?

7. How many pedestrians were killed by automobiles last year?
8. Why are more pedestrians killed than drivers?
9. Where can you obtain a set of traffic regulations in your city?
10. How fast is it safe to drive when going by a school?

E. *Suggested Readings*

1. "Driver and Pedestrian Responsibilities." *Sportsmanlike Driving Series.* pp. 22-45. American Automobile Association. Washington, D. C., 1936.
2. *Industry's Part in Saving 38,000 Lives.* National Safety Council. Chicago, Illinois. 5p.
3. *Organized Safety.* National Congress of Parents and Teachers. 1936. 16p.
4. *Parents and the Automobile.* pp. 5-18. Teachers College, Columbia University. New York, 1936.
5. *Safety Bulletin.* Vol. II. No. 9. Division of Highways. Springfield, Illinois. December, 1936.

PART 3

The Car

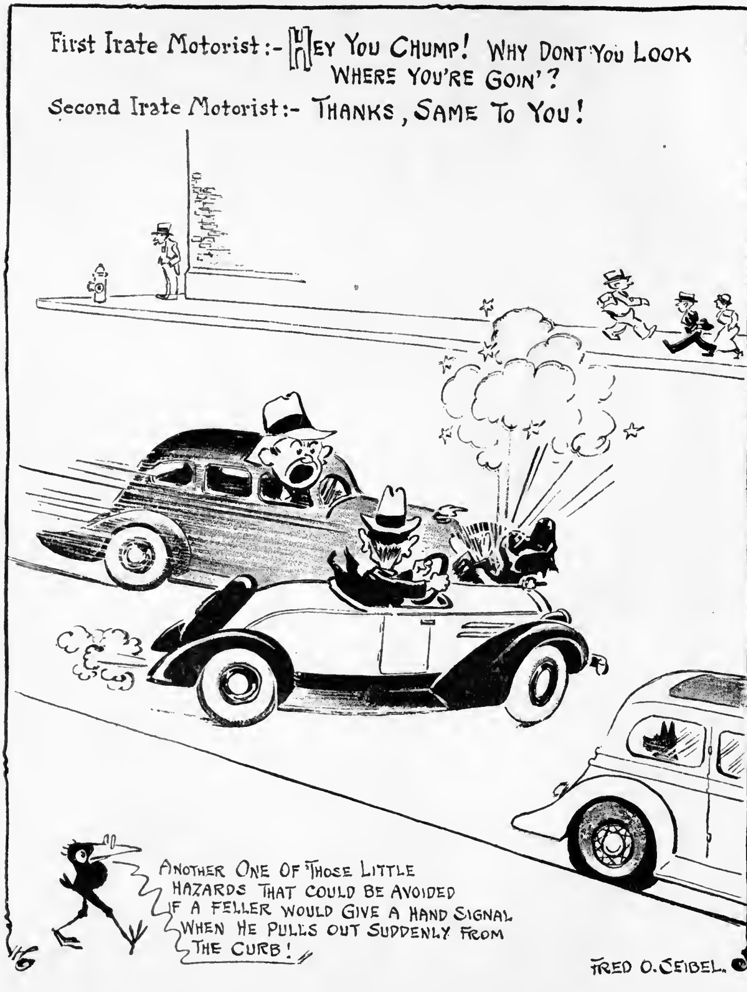
A knowledge of the car is the basis for safe driving.

Safety devices should be kept in perfect condition.

The greatest thrill of every driver should be to handle his car safely.

Care for your car.

As The Safety Director Sees It



CHAPTER 8

THE AUTOMOBILE A MACHINE

THE AUTOMOBILE has been one of the greatest factors in the rapid development of this country. In the days of the horse and buggy, distances were measured in miles; today, because of the automobile, they are literally measured in minutes.

We all know the value, benefits, and efficiency of the automobile. Few of us consider its dangers. Since the automobile may be as deadly as a machine gun when placed in the hands of a person who is unfamiliar with it, a simple, brief explanation of its operation follows.

For the sake of explanation, the automobile will be divided into two parts, the engine and the transmission system. The engine is that part of the car which transforms the energy of gasoline into mechanical power. (See Figure 8.) The transmission system is that part which transmits the power from the engine to the road so that the car moves.

THE ENGINE

There are a number of auxiliary units necessary to make the engine run properly. The carburetor is a device used to mix gasoline and air in their correct proportions so that the burning or exploding will be complete and of great heat intensity.

The ignition system produces a spark in each cylinder at the right moment. This causes the gas to explode and drive the piston downward to turn the crankshaft.

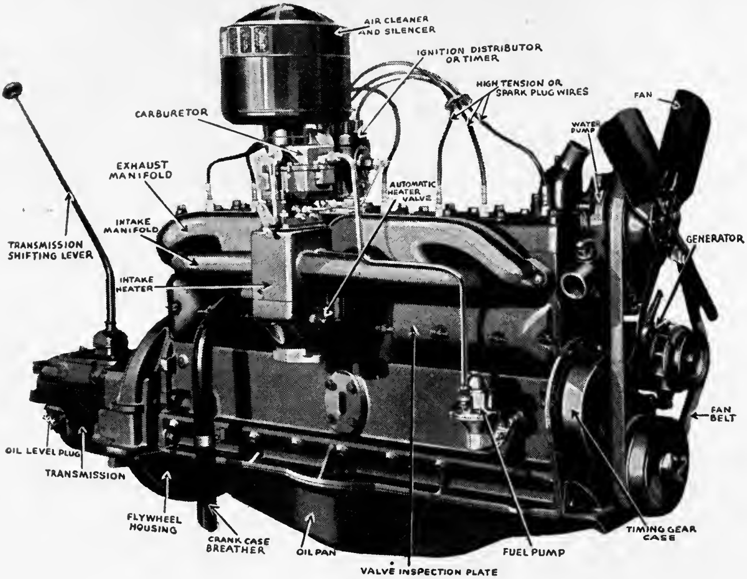


Fig. 8

The lubrication system keeps all of the moving parts oiled and prevents friction and eliminates wear.

The cooling system keeps the engine and the metal parts from heating excessively in order that the lubricating oil will not burn. The present-day car engine runs best at from 160° to 180° Fahrenheit.

The present-day automobile engine has more than one cylinder. Manufacturers have found that with a number of cylinders the power of the engine is not so jerky as it was with only one cylinder. Because of successive rhythmic explosions in the different cylinders, a six-or-eight-cylinder engine develops a smooth continuous power. In order to make these explosions turn a shaft or wheel, the cylinders must exert a pressure on a crankshaft through a connecting rod and a piston. A boy riding a bicycle might be considered a two-cylinder engine, that is, his two legs would represent the connecting rods, and the pedals, the crankshaft.

The Clutch

Some means must be provided to let the engine run without propelling the car. A clutch accomplishes this service. (See Figure 9.) One type of clutch is made up of a disc fastened to the transmission and held against the flywheel by means of a spring. When the clutch pedal is pushed in, the disc is drawn away from the flywheel. When pressure is removed from the clutch

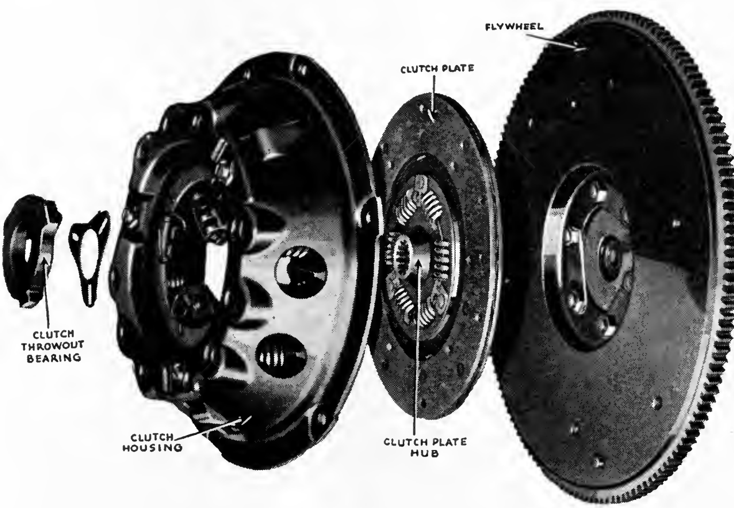


Fig. 9

pedal, the spring forces the disc against the flywheel, thus connecting the engine to the transmission.

The Transmission Gear Box

More power is needed to walk up a steep hill than a gently sloping one. In like manner, more power is needed to run a car uphill than on the level. In order to develop this necessary greater power, the engine must run faster in comparison to the speed of the car. This proportionate increase of power is made possible by the transmission gear box. The transmission consists of sets of reduction gears so arranged that the ratio of the speed of the engine to that of the car can be changed by the driver when he moves the shifting lever. (See Figure 10.)

Since much power is necessary to put the car in mo-

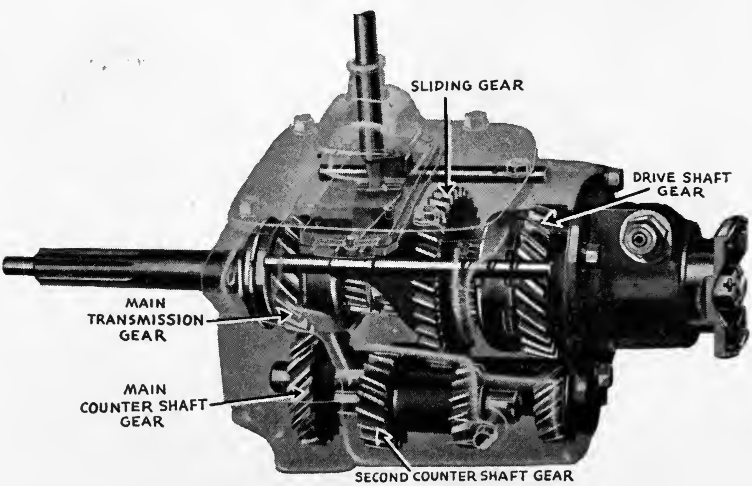


Fig. 10

tion, it is started in first, or low, gear. After the car is in motion, the intermediate or second speed gear is used. After the car has reached a speed of from ten to fifteen miles an hour, high gear, or direct drive is used. This is the speed which is used at all times except when starting, or going up steep hills, or through sand or mud, or on rough roads.

If a hill is not steep enough for low gear, then second gear should be used. When it is necessary to back the car, the driver merely uses the reverse gears by moving the shifting lever into the reverse position.

The Steering System

The steering system is one of the most important safety units of the car. It is made up of a steering wheel, a steering post, a steering gear box, a steering arm, and two or three rods connecting the two wheels and the steering arm. (See Figure 11.) This arm is fastened to the shaft in the steering gear box. Several joints and connections are necessary in the steering system to control the car and to permit movement of the front wheels.

Brakes

Manufacturers have felt for years that the ability to stop the car quickly is as important as being able to start the car or drive it. It would be a very poor situation, at least from the angle of safety, to be able to start and not be able to stop. In this sense good brakes are as important as a good engine.

The principle of all brakes is very simple. A shoe expands inside of a drum. The drum is fastened to the wheel and the shoe to the axle. The friction between the shoe and the drum causes the wheel to slow up. Pressure is applied by pushing on the brake pedal or by pulling the hand brake lever. The operating medium between the pedal and the brake shoe is either a metal

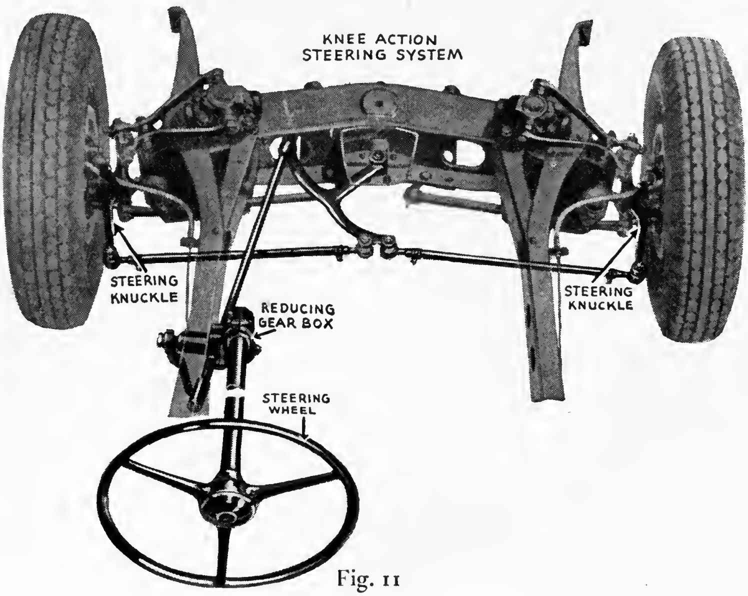


Fig. 11

rod or cable, or a fluid. When metal is used the brakes are said to be mechanical brakes. When a fluid is used the brakes are said to be hydraulic. (Figure 12 shows a hydraulic brake system.)

It is a fact of physics that when pressure is exerted on a fluid, it is equally transmitted in all directions to the container of the fluid. Therefore, when the brake pedal is pushed down, forcing a piston into a cylinder filled with a fluid, the fluid is forced into smaller cylinders in each brake with calculated pressure. This pressure causes the brakes to be applied evenly on all wheels and prevents skidding when the car is being stopped.

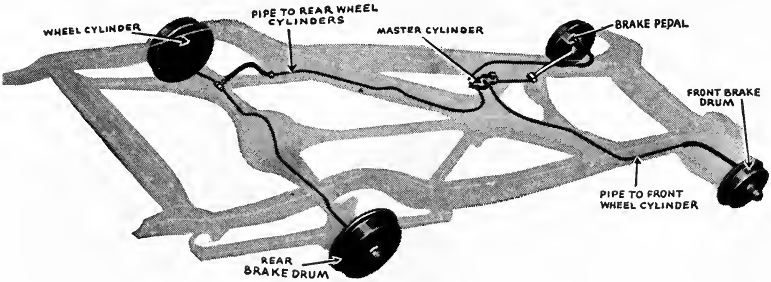


Fig. 12

When mechanical brakes are used, equalizers must be adjusted so that pressure will be applied evenly to all of the wheels. Practically all cars built in the last few years have hydraulic brakes. As a matter of fact the front wheel brakes generally do about 60 per cent of the braking and the rear wheels about 40 per cent. The front wheel cylinders of the hydraulic brakes are a little larger in order to accomplish this larger share of braking. In like manner, mechanical brakes produce greater leverage on the front wheels.

Study Aids

A. *Experiences*

1. Have you ever driven a car? If so, do you appreciate the damage you can do with that car?
2. Have you ever taken an engine apart? Would it run after you put it together again?

3. Have you ever driven a car when the engine was overheated? How did the engine behave?
4. Have you ever applied the brakes and noticed that the rear of the car skidded to one side? Is this dangerous? How can this be corrected?

B. *Problems for Class Discussion*

1. Discuss the advantage of quick pick-up from the point of view of safety.
2. Explain the purpose of the cooling, the lubrication, and the ignition systems.
3. Discuss some of the things that will cause a car to steer hard.

C. *Study Activities*

1. Call on your local brake service station and make a report to the class on different types of brakes.
2. Prepare a paper on "How Heat Produces Work in a Gasoline Engine."
3. Explain how the car can be backed up when the direction of rotation of the engine has not been changed.

D. *Questions*

1. Why do automobile engines have more than one cylinder?
2. What is the purpose of the carburetor?
3. Why is a clutch necessary?
4. What is toe-in?
5. What is the purpose of the piston?

6. Why are some brakes called "hydraulic" brakes?
7. Is as much braking applied to the rear wheels as to the front wheels? Why?
8. What is the purpose of the transmission gear box?
9. Why is it necessary to have some knowledge of the mechanics of a car in order to be a safe driver?

E. *Suggested Readings*

1. *Automobile Engineering.* American Technical Society. Chicago, 6 Volumes. 1936.

2. *Dyke's Automobile and Gasoline Engine Encyclopedia.* The Goodheart-Willcox Publishing Company. Chicago, Illinois. 1935. 1230p.

3. Kuhns, Ray F., *Automotive Service.* Bruce Publishing Company. Milwaukee, Wisconsin. 1931.

4. *With Jack and Jill in Motor-Car-Land.* Packard Motor Car Company. Detroit, Michigan. 32p.

CHAPTER 9

SAFETY DEVICES

Many accidents occur because the driver has failed to keep his car in good condition. It is the easiest thing in the world to put off until tomorrow some repairing which should be done today. It may be that the brakes need relining, that the windshield needs a new wiper blade, or that the horn needs attention. Safety demands that these devices be carefully inspected and conditioned.

Brakes

In order to meet various emergencies which may arise, the driver should realize the importance of keeping the brakes perfectly adjusted at all times. In order that their condition may be known every time the car is used, brakes should be tested in the first one hundred yards of driving. Sometimes a little water or dirt gets into the brake drum and prevents it from functioning properly. This is a dangerous condition which should be corrected immediately.

All of the cars manufactured at the present time have four-wheel brakes. The law of many states require four-wheel brakes, and it is a good law. If there are brakes on all four wheels, the car can be stopped quicker than if there are brakes on only two wheels.

If the brake pedal almost strikes the toe board when the brakes are applied, or if the car swerves when the brakes are applied, the brakes should be adjusted or relined.

Lights

The lights of the car are very important safety devices. Safety requires that all of the lights operate perfectly for night driving. The law demands this too. The lenses should be kept clean. Dirty lenses prevent as much as one half of the light from reaching the highway. All possible light is needed.

Headlights

The headlights of the modern car are sufficiently strong to illuminate the roadway for reasonably high speed. If the visibility is poor, or if the driver cannot see a sufficient distance ahead so that he is able to stop in that distance, he should drive slower.

Most of the headlights throw either of two beams. (See Figure 13.) One of the beams is focused so that the light will be thrown parallel with the road. The focus of the other falls on the road nearer the car. The first is used for general driving; the second for passing other cars. Thus the probability of the lights blinding other drivers is eliminated.

Several states require that all cars have their headlights adjusted at an official headlight testing station. This tends to keep the lights in proper adjustment and to prevent accidents.

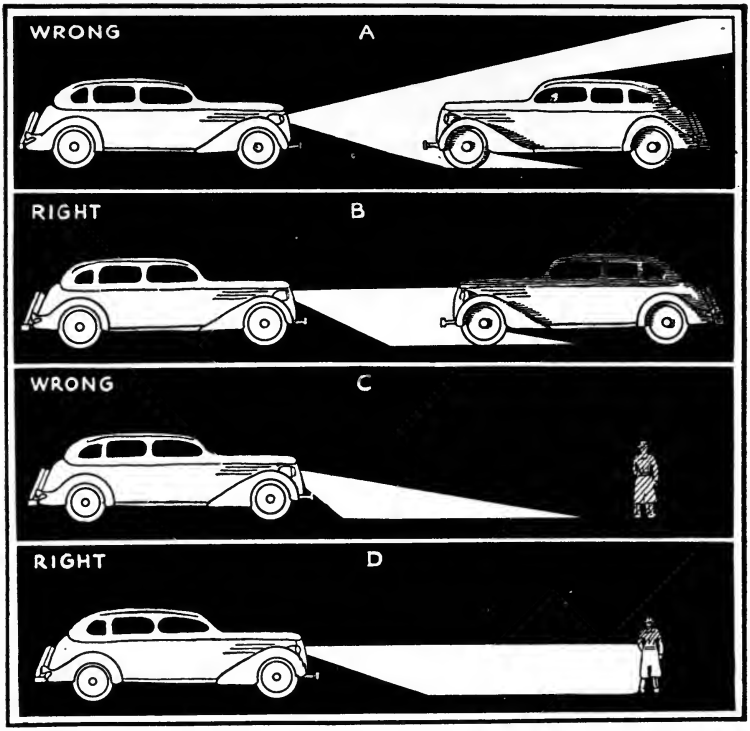


Fig. 13. A. Driving lights are high and blind the oncoming motorist.
B. Passing lights are low and do not blind the oncoming motorist.
C. Lights set too low do not show up the road ahead.
D. Passing lights show the object ahead.

Taillights

The fact that the taillight is burning is not enough. The lens must be clean. If a taillight is not as bright as it should be, it is not seen sometimes until the vehicle behind has come upon you. Thus an emergency is created. Sometimes the taillight on your car is seen too late for a driver who is following to stop. He may swerve out to the left side of the road to avoid hitting you. But if another car should be coming from the opposite direction a bad accident is probable. A number of late-model cars have the taillight in the center of the rear of the car. It is more visible there and does not catch so much road dirt.

Stop Light

The stop light should work properly at all times. It warns the drivers approaching from the rear that your brakes are being applied. This warning may save a life.

Tires

Good tires are very important safety equipment. The tread of the tires not only protects the fabric from wear, but strengthens it as well. When this tread becomes worn and smooth, the tires are an element of danger and may cause the car to skid on wet or icy roads. Such tires are weak and more liable to blow out.

It is always good practice to keep the best tires on the front wheels because a blowout on a front wheel makes the car harder to control then a blowout on a rear wheel. The steering mechanism is also connected with the front wheels.

Chains

Although they are somewhat of a nuisance because they are noisy, chains are valuable for slippery roads. However loose ice sometimes catches under a link and the wheel then slides. The links wear out quickly and should always be kept in good repair.

Some people consider chains a good safety device. With chains on, a wheel seems to lock easier than without. Then the wheel is of little use as a brake.

The Steering Mechanism

If there is too much play in the steering gear, the driver cannot drive the car accurately. When the steering wheel has too much play, the driver must continually move the wheel, first one way, then the other in order to keep the car on the road. There should be, it is true, a little play in the steering wheel, but if there is too much, driving is tiresome and dangerous. The connections of the steering system should be checked every few thousand miles to see that all of them are tight and properly lubricated.

Aids to Clear Vision

The windshield should be clean in order that the driver may see clearly. If the driver does not have clear vision, then he should slow down and drive carefully, especially when turning the corners. Two windshield wipers are desirable. The added clear vision insures more safety. If the wiper blade is worn so that it does not clean the windshield, it should be replaced. A new blade costs but a few cents and it is excellent insurance against accidents.

Rear-View Mirror

The rear-view mirror is a safety device which is easy to keep in its proper place and in good condition. If the rear-view mirror is used correctly, a large number of accidents may be avoided. Glance into the mirror often, especially before you start to make a change in direction or speed of your car. Also look into the mirror some time before making a left turn on the country highway. If a car is seen in the mirror, you can slow up and let it pass before you make the turn, or if there is plenty of time, you may make the turn before the other car reaches you.

The rear-view mirror often helps you when backing your car. By looking in this mirror you can find out what is directly behind you without turning around.

Safety Glass

A number of states require that all new cars sold be equipped with safety glass in all openings. This is purely for the safety of the motoring public. The nature of safety glass is such that when it is struck by a heavy object, it is not smashed into a thousand pieces but holds together, thereby eliminating the danger of bad cuts from flying glass.

The Horn

When used correctly the horn of the average car is a safety device. The horn has a voice, a pleasing voice when it is properly adjusted. It is no longer necessary to have a horn that is rasping and hard on the nerves.

Few people seem to understand the correct use of the horn. The use of the horn on the car is to inform pedestrians and drivers of the presence of your car. In case of an emergency, and when passing another car, the horn should be blown.

The Horn Tooters' Chorus

Fresh Air

Many persons become careless when starting their cars with the result that they are overcome by carbon monoxide gas. This gas is emitted from the exhaust pipe. The incomplete combustion of carbon causes carbon monoxide to form. Monoxide gas forms very rapidly when a motor is being warmed up. It has no odor and no color. The victim is oblivious of its presence until it is too late.

If one is overcome by it, death often results. The way to prevent this accident is to be sure that the doors of the garage are fastened open before the engine is started. Do not take a chance. Never run the engine in a closed garage.

Study Aids

A. *Experiences*

1. Have you ever been in a car that could not be stopped when the driver wanted to stop it? How did you feel?
2. When you are riding in a car at night, what effect do the bright lights have on your vision?
3. Have you ever had the brakes lock on a car which you were driving?

B. *Problems for Class Discussion*

1. What do you believe is the most neglected safety device on the average car?
2. What do you believe to be the most important safety device?

3. Discuss the value of using passing lights when meeting another car.
4. Secure some safety glass from your garageman. Of what is it made?
5. Are there any advantages in having highways illuminated with arc lights? Will the time come when highways will be lighted like streets? Discuss this question.

C. *Study Activities*

1. Visit a garage in your vicinity and inspect a model of the braking mechanism of one of the cars. Report the findings to the class.
2. If there is a safety lane in your neighborhood visit and inspect it. Present a report on the devices tested.
3. Secure a cross section of a tire from a tire dealer. Examine it and discuss the value of the various parts of the tire.
4. Visit the laboratory of the school and ask the teacher of chemistry to prepare some carbon monoxide. Study its qualities.

D. *Questions*

1. What kind of braking mechanism is used on most cars?
2. Is there any particular disadvantage in the four-wheel brake?
3. Why are taillights on a number of the newer cars placed in the center of the rear?

4. What action on the part of the driver causes the stop light to work?
5. On what wheels should the best tires be placed? Why?
6. Are tire chains absolutely skid proof?
7. Should there be any play in the steering wheel?
8. Why is it important to know what is going on behind you when you are driving?
9. Why should safety glass be used on all cars?
10. What are the two proper uses of the horn?

E. *Suggested Readings*

1. *I Drive Safely.* International Harvester Company. Chicago. 61p.

2. Hamilton, J. R. and Thurston, L. L., *Safe Driving.* Doubleday, Doran & Company. New York City. 1937. 74p.

3. *Traffic Safety. A Manual for Indiana High School Teachers.* Indiana State Department of Public Instruction. 1936. 88p.

4. *You in Your Car.* Automotive Manufacturers Association. 1936. 63p.

CHAPTER 10

HOW TO HANDLE A CAR

One learns the fundamental facts concerning the functioning of the car before he drives safely. Ignorance of simple mechanical car operations costs many lives. Starting, stopping, steering, parking, driving in fog, in mountains, at night, and on slippery roads are important safety topics.

Starting the Engine

When starting the engine, first be sure that the shifting lever is in neutral. Pull the hand throttle out about an eighth to a quarter of an inch, especially if the engine is cold. (See Figure 14.) If there is a hand spark control on the car, it should be retarded so that the spark will occur late and the engine will not "kick" or tend to run backwards. On cars which have no hand spark control, the spark is automatically retarded.

Turn on the ignition switch and press the starter button or lever firmly. After the engine has turned over for a few seconds and does not start, pull the choke out all the way. Just as soon as the engine starts, push in the choke about three fourths of the way. If the choke is left out, the engine will get too much gas and stop. Let the engine run slowly for a few minutes to "warm up." After the engine is warm, push the dash throttle in and the car is ready to be put in motion.

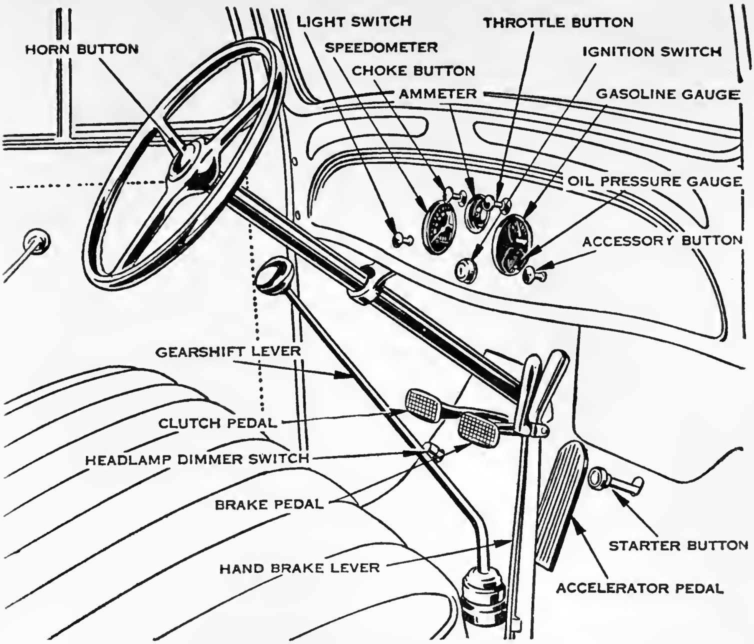


Fig. 14. This shows the controls and driving compartment of a typical car.

Starting the Car

The left pedal is the clutch pedal, the right the brake pedal. Press each of them with the corresponding foot to get the feel of them. To the right of the brake pedal will be found the foot throttle (or accelerator pedal). In order to understand its action push this down a little several times with the right foot. Notice that the engine speeds up when this foot throttle is pushed down.

In order to connect the power of the engine to the transmission system, the gears in the transmission must be meshed. Before this is done the clutch pedal must be pushed in. While the clutch pedal is held down with the left foot, move the gear shift lever to the left and rear. In this way the low speed gears are meshed. Now let the clutch pedal out slowly with your left foot. With your right foot feed the necessary fuel.

When the car has attained a speed of from five to ten miles an hour you may shift to second. To put the car into second speed, push down on the clutch pedal and at the same time release the pressure on the foot throttle. This is very important. If the throttle is not released, the engine will race because there will be no load attached to it. After the clutch is pushed down, move the gear shift lever forward with your right hand exerting pressure to the right so that when it reaches neutral position it will pass to the right side. Push the lever to the right and forward as far as it will go. Then let out the clutch; the foot throttle must be depressed in order to increase the speed of the engine and the car.

After a speed of ten to fifteen miles an hour has been attained, remove the foot from the foot throttle, push in the clutch, and pull the gear shift lever all the way back, pressing the lever to the right when so doing. Then release the clutch. The car is now in high gear. Vary the speed of the car by pressing or releasing the foot throttle.

Steering

If the car is to be steered to the right, turn the steering wheel in a clockwise direction. Drive slowly along the road and get the feel of the steering wheel. Learn to know where your front wheels are. Practice steering so that you can run over a piece of paper or miss it at will, also so that you can stop at the curb with the wheels about six inches from the curb, but never touching it.

Stopping the Car

To stop the car, remove the right foot from the foot throttle and press it down upon the foot brake. When the car slows down to about five miles per hour, push the clutch pedal down with the left foot. After you have stopped, and before removing your feet from the pedals, be sure to move the gear shift lever into neutral position. Turn off the ignition switch. Pull on your hand brake.

Backing the Car

When the car is to be backed, it is necessary to put the transmission lever *in reverse*. Proceed as you did when starting the car forward, except that the gear shift lever is moved to the left and front instead of the left and rear. Release the clutch slowly. The car will move backward. Steer carefully.

Passing a Car on the Highway

Many accidents on the highway are due to poor judgment of time and distance by drivers who attempt to overtake and pass cars. To pass a car successfully the driver must be able to judge speed accurately just as a good ball player must be able to judge the speed of the ball if he is to be able to catch it.

The car which you are overtaking is also moving and you must increase your speed so that you will be able to pass that car and be back in the right lane before a car coming from the opposite direction meets you. If your judgment is bad and you do not have sufficient time to pass the car, the oncoming driver must either turn out on the shoulder of the road or collide head on with your car. Of course the driver you are meeting may slow up, but he too may have miscalculated and thought that you would be able to get your car into the right lane in time. Do not take unnecessary chances.

Rounding Curves

A driver should never attempt to pass a car when he cannot see the road ahead. The view is often bad on curves and hills and an unseen car may be coming. It is not worth the risk to stake a few seconds of time against a life. Wait until you are able to see clearly a good distance before you overtake and attempt to pass another car. There is a law in a number of states making it a misdemeanor to pass a car on a hill or curve.

After you have been out on the highway for a short time you will find the thrill of driving may cause you to go much faster than you intended. When you come to a curve, you turn the steering wheel but find that your car's momentum—the property of a moving object—tends to push your car forward in a straight line. You attempt to turn but your tires seem scarcely to stick on the road. The traction seems to have been lost. The momentum seems to push the car off the road. Momentum (Mass x Velocity, or Weight x Speed) tends to keep a body moving in a straight line. Friction between the tires and the road tends to keep the car on the road. If the force of the traction or friction is greater than that of momentum the car will stay on the road. However, if the momentum is greater, the car will leave the road. One cannot change the sharpness of the curve but he can and should change his speed so that the friction will be great enough to insure safety.

Speed on Curves

Safe speed on a curve depends upon a number of things. One of them is *banking*, which means that the road slants down on the inside of the curve. Some of the turns are banked so that the effect of the momentum will be counteracted. By banking the road on a curve the friction between the road and the tire is increased; and the momentum is shifted toward the center of the curve.

It is a fact that when this momentum or centrifugal force is applied to a circular path, it increases very rapidly as the speed of the car increases. If the curve is sharper, the centrifugal force will be greater or if the speed is more rapid, the momentum will be greater. Therefore a sharp curve must be taken at a slower speed than one whose radius is greater. In order to drive safely around a curve slow down before reaching it; as you go around bring your car to a safe speed.

If the road is slippery, the speed of the car must be retarded greatly because the friction (or traction) between the tires and the road will be reduced, and the car will have a tendency to skid off the road

Where to Park

The safe driver parks a car so that the view of motorists and pedestrians will not be shut off from traffic signs and signals. His parked car does not interfere with access to fire plugs and mail boxes. He uses his best judgment when parking in narrow streets. Double parking is a bad practice. Parking on curves is dangerous; parking on a bridge or its approaches is not advisable. Parking against traffic is illegal in most cities and towns. Parking without lights at night is hazardous. A good driver does not park too near an intersection, since this would interfere with the flow of traffic around the corner.

Parking on a hill or grade is a practice which may result in damage. If you park on a grade, set the hand brake and adjust your front wheels so that they jam the curb and keep the car from rolling forward or backward. If the hill has no curb or bank, put the transmission in second gear in addition to setting the emergency brake. The use of good judgment in parking your car will contribute to safe driving practices.

How to Park

One of the driving operations that confuse many drivers is parking in a small space parallel to the curb. After selecting the desired parking space the following things should be done. (See Figure 15.)

1. Stop your car in a position parallel with the car ahead of the parking space, the rear end of your car even with the rear end of the parked car

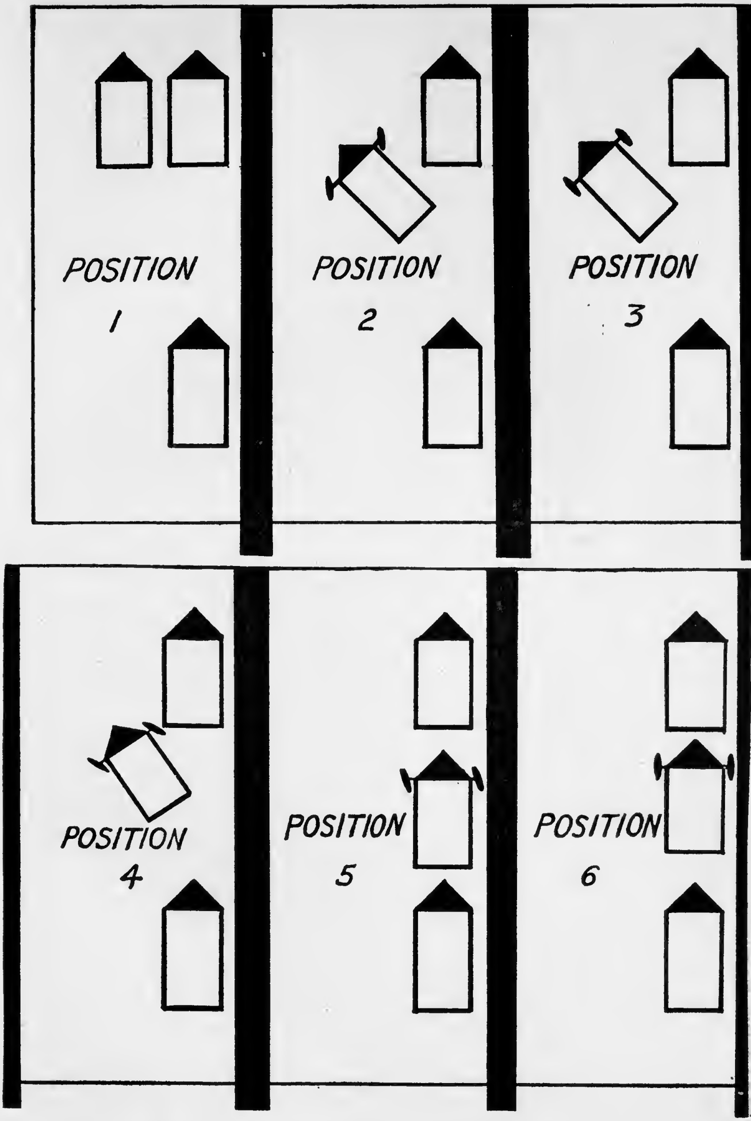


Fig. 15. Showing the correct way to park a car.

and six inches to one foot away from it. (Figure 15. Position 1.)

2. Turn the steering wheel in a clockwise direction in order to point the rear end toward the curb (Position 2).
3. Put the car in reverse and start backing.
4. When the center of your car has reached a point even with the rear of the parked car, straighten up the front wheels by turning the steering wheel in a counter-clockwise direction (Position 3).
5. Let the car roll back slowly, making sure that the front end of your car just misses the rear end of the parked car (Position 4).
6. When the car is parallel to the curb, turn the steering wheel to the right (or clockwise) and go straight ahead (Position 5).
7. Turn the wheel to the left and back up slowly (Position 6).
8. Stop. Turn off the ignition switch; pull on the emergency brake.

If these operations are practiced a few times, the driver becomes adept in the correct method of parking.

Night Driving

Driving at night is more hazardous than day driving. In the first place, artificial light is never so satisfactory as natural light. The bright lights on the oncoming cars prevent the driver from having a clear vision of the road ahead. A person ordinarily drives a little slower at night than he does in the daytime. If, however, the driver is not careful, he will gradually pick up more speed than he intended and may, because of poorer vision, run into something. When passing a car coming from the opposite direction, it is best to look at the right edge of the pavement. If you are near that edge of the pavement and the other driver stays on his side, passing will be made in safety.

It is an excellent plan to turn on the driving lights when you are about ten feet from the approaching car. This does not blind the other driver, but it will tend to eliminate partial blinding just after the car has been passed.

Driving in Fog or Mist

Fog or mist is still one of the great enemies to safe travel. When the "driving headlights" are used in a heavy fog, vision is poorer than if "passing lights" were turned on. This is because the fog or mist is made up of millions of particles of water so fine and small that they merely float in the air. These small balls of water reflect the driving rays of light back into the eyes of the driver. When the rays are tilted down, the light strikes the small balls of water at an angle and is reflected downward onto the road. When the headlights are in the tilted position, naturally a good driver goes slowly, for he can only see the road a short distance.

Mountain Driving

Problems arise in the mountains and hills which are not present when one drives on level roads. The engine does not have as much power and pep in hign altitudes as in low. At high altitudes the atmospheric pressure decreases and there is less oxygen drawn into the engine cylinders. This causes the explosions to be weaker and less power is developed. Superchargers similar to those used on aeroplane engines are sometimes used on automobile engines to force oxygen into the cylinders. An engine that develops 100-horsepower at sea level will develop only 82-horsepower at an altitude of 5000 feet, and only 60-horsepower at the top of Pikes Peak, about three miles above sea level (Figure 16).

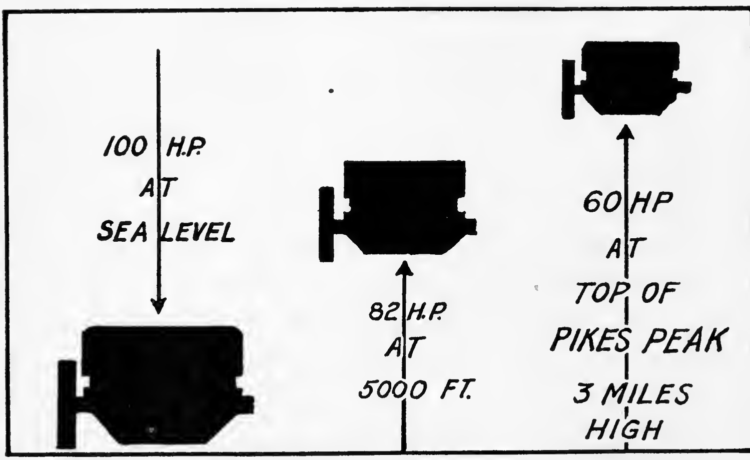


Fig. 16. An engine has only 60% of its rated horsepower when at the top of Pikes Peak.

Of two equally steep grades, a car can climb the one at sea level and fail to go up the one high in the mountains. Before starting up a steep grade in the mountains, shift from high into second or low gear. If this is not done, the engine may be stalled and it will be necessary to start the car on the grade.

There are two methods of starting a car on a grade. After the engine has been started, the car can be held by the emergency brake. Then, as the foot throttle is slowly pressed in and the clutch pedal slowly let out, the emergency brake must be slowly released. Another method is to hold the car with the foot brake; then as the brake and clutch pedals are slowly released, the hand throttle is slowly opened. After the car is under way and the right foot is on the foot throttle, the hand throttle is pushed in and driving may continue in the regular manner.

Going Down Long Grades

When a driver is going down a long grade, the brakes should be used sparingly. The engine should be used as a brake. If the grade is steep, put the transmission in second gear before starting down the hill. Keep your foot off the foot throttle. Thus, the engine acts as a brake. If more braking is necessary, shift into low gear. In shifting into low gear, speed up the engine so that the gears will meet easily.

Some drivers turn off the ignition switch when using the engine as a brake. This procedure will cool the engine. If, however, the engine becomes too cool, there is a possibility that the fuel will condense in the cylinders, pass the rings, enter the crankcase, and dilute the oil. Do not, in any case, coast down a long hill with the gears in neutral and the engine running idle. To do so is dangerous; your car may get out of control.

Skidding

When the road is dry and free from ice, the traction is good. If the brakes are adjusted properly, the car can be kept on a straight course when a stop is being made. When a stop is to be made on a slippery road, one of the wheels may have good traction and the other poor traction. The wheel having poor traction will lock and slide along while the other wheel is braking. This causes the car to skid.

How to Get Out of a Skid

When the car starts to skid, turn the steering wheel in the direction the car is skidding. A quick turn will straighten the car in its course. Generally the brakes should be released when the skidding starts.

Starting on a Slippery Road

If it is difficult to get the car in motion on a slippery road, try starting in second gear instead of in low. The rear wheels will take a better hold of the road. Do not speed up the engine too quickly; increase the speed slowly. This method will prevent the wheels from spinning and will provide better traction.

Study Aids

A. *Experiences*

1. Have you ever driven a car? With what operation of driving did you have the most difficulty?
2. Have you ever lost control of a car in a skid? What did you do to stop the skid? Was it the right thing to do?

3. Have you ever parked a car parallel to the curb? Did you have any difficulty? What was it?
4. Have you ever driven in a heavy fog? Which lights were the best? Why?

B. *Problems for Class Discussion*

1. Discuss the problems which arise when driving in the mountains.
2. Explain how to start a car on a slippery road.
3. Describe the proper method of getting the car in motion after the engine has been started.

C. *Study Activities*

1. Make a report on the errors of a driver with whom you took a trip.
2. List the types of accidents on curves.
3. Go to one or more car dealers in your community to find recent improvements which enable the driver to shift the gears more easily.

D. *Questions*

1. Why must the choke be used as little as possible?
2. Should the spark generally be retarded when starting the engine? Why?
3. Why must the clutch pedal be depressed before shifting into low gear?
4. When the car is in high gear how is its speed varied?
5. What would you do to stop the car quickly?
6. How should a car be overtaken and passed safely on the highway?

7. What is it that tends to pull the car off the road when rounding a curve?
8. What is the best way to round a curve?
9. Are dim or bright lights better for driving in a fog?
10. Why does an automobile engine lose power in high altitudes?

E. *Suggested Readings*

1. *Calling All Drivers.* Metropolitan Life Insurance Company. New York, N. Y. 16p.
2. Douglas, R. A. *Commonsense in Driving Your Car.* Longmans, Green and Company, New York, N. Y. 63p.
3. Hoffman, Harold G. "When You Drive After Dark." *Reader's Digest.* pp. 69-70. February, 1936.
4. *I Drive Safely.* International Harvester Company. Chicago, Illinois. 61p.
5. Jenkins, Ab. "Drive Right." *Reader's Digest.* pp. 67-70. August, 1934.
6. *Let's Be Skillful.* Aetna Casualty and Surety Company. Hartford, Conn. 13p.
7. *We Drivers.* General Motors Research Corporation. Detroit, Michigan. 36p.

CHAPTER 11

CARE OF THE CAR

THE AUTOMOBILE is a very intricate mechanism. There are parts in the average car fitted as closely and as accurately as the parts in a very fine watch. All of these parts moving against one another must be properly lubricated if the car is to give a maximum amount of service.

LUBRICATION

Most cars should be thoroughly lubricated every thousand miles of travel. If the car is operated in the country over dirt and gravel it should be lubricated more often. Service stations throughout the country in towns and villages are properly equipped to grease and oil the car. The cost is small compared with expensive replacement of parts.

The engine oil should be changed about once every thousand miles. Oil becomes worn out and filled with particles of dirt and metal from the engine. If it is used too long, oil tends to act as an abrasive and increases, rather than decreases, wear. A good grade of oil of proper thickness should be used. Good oil is cheap in the long run. In the winter lighter oil should be used than in the summer so that lubrication of all parts will be assured, for it takes less heat to cause the lighter oils to flow readily.

The Cooling System

Rust and sediment collect in the radiator and tend to clog the small passages there. By flushing the radiator with clean water once or twice a year, clogging will be eliminated. The water in some localities is very hard. When the hard water is heated, the mineral matter is deposited in the form of a crust on the interior of the cooling system, like that which forms on the bottom of a tea kettle. Flushing removes a great deal of this mineral matter. The best kind of water to use in the radiator is rain or distilled water, for these contain no mineral matter.

If the water in the cooling system freezes, it may crack the engine block or burst the radiator. The use of a good anti-freeze solution in the water will eliminate this danger. Denatured alcohol has long been a standard anti-freeze solution. It is inexpensive and available at nearly every service station. It will not harm the interior of the cooling system. It evaporates very quickly, however, and a careful check must be made frequently to see that there is enough alcohol in the radiator. A number of patented anti-freeze solutions on the market have been used with excellent results. Most of these are more expensive than alcohol, but as they do not evaporate, manufacturers claim their final cost to be as low as that of alcohol.

The Battery

The storage battery is the reservoir for the electricity which is developed by the generator and not needed at the time. It supplies the electricity for the lights, the ignition, the horn, and the electrical accessories of the car. As current is put into and taken out of the battery, heating takes place. This vaporizes the water in the battery. If the water gets too low and the acid becomes too strong, the metal plates in the battery are injured. Therefore the amount of the water in the battery should be checked at least once every two weeks. The battery should be filled with distilled water to about one-half inch above the top of the plates.

Tires

Proper inflation of the tires is very important. Get information on the recommended pressure for your tires, then check them once or twice a week. When a tire is run with too little air, it overheats, weakens, and is likely to blow out. Too much air is also bad, especially on a long trip.

Heat on a summer day may cause the air pressure of tires to increase to a dangerous degree. On a long trip the pressure is often far beyond normal by the middle of the day. A blowout may be the result of this excessive pressure. So it is good policy to check the tire pressure after an hour or two of driving.

Washing and Cleaning the Car

When the car is washed it will not only look nicer, but certain parts of the car function better when clean. The loose dirt should be rinsed off with plenty of clean water, preferably from a hose without a nozzle. A sponge is helpful. The car should be dried with chamois. Wax will preserve the finish and prevent dirt from accumulating.

Inspection of the Car

It is an excellent practice to inspect the car periodically, the lights, brakes, steering system, and other parts. Lift up the hood and check nuts, bolts, and connections. See that the fan belt is tight enough. If frayed, it should be replaced soon. If there are oil and gasoline leaks they should be checked. Such leaks are fire hazards, especially in case of an accident.

See that there are no loose wires under the dash. See that the brake rods are securely fastened. Check the rods on the steering mechanism.

Bumpers

In the last few years the height and style of the bumpers have been changed. As a result all bumpers are not of equal distance from the ground. In cities where the bumper is a necessary adjunct for parking, it is generally advisable to install bumper guards so that one bumper cannot push over another to damage the radiator shell or fenders. Keeping bolts on the bumpers tight at all times prevents rattling and strengthens them.

Care of the Car in Winter

In the winter, frost on the inside and the outside of the windshield makes it difficult for the driver to see clearly. Most of the new cars have a defroster of some kind. This should be kept in good condition. A careful person keeps his windshield free from frost when driving. An open window will help prevent the frost from forming on the inside.

The battery must be kept charged, especially in winter. It takes more current to start the engine when it is cold. The battery is also likely to freeze if it is not at least half charged. A fully charged battery freezes at about 90 degrees below zero, a half-charged battery at about 10 degrees below zero, and a discharged battery at 20 degrees above zero. To prevent freezing after water is added during cold weather, the car should be operated for at least fifteen minutes so that the water will mix with the sulphuric acid.

Study Aids

A. *Experiences*

1. Have you ever been in a car when the engine heated excessively? What caused the heating?
2. Have you ever examined old oil from an engine? Have you compared it with new oil? How did the two compare?
3. Have you ever driven a car whose brakes operated poorly? What was the reason?

B. *Problems for Class Discussion*

1. Describe the care which should be given a car in the winter.
2. Name various anti-freeze solutions sold in your neighborhood.
3. Give the reasons for the increase in tire pressure after the tire has been on the road for an hour or so on a hot day.

C. *Study Activities*

1. Go to a service station to determine how many kinds of grease are used to lubricate a car. Make a report to the class and state why different greases are used.
2. Make a list of all the things you would do in order to put a car in good condition for driving.

D. *Questions*

1. Why is it necessary to change the engine oil?
2. Why should light oil be used in winter?
3. What care should be given the cooling system?
4. What is a popular anti-freeze solution? Why?
5. What happens when a tire is run with too little air?
6. Should the engine be kept clean and free from oil and gasoline leaks? Why?
7. Explain two ways of defrosting the windshield.
8. How often should the battery be watered?

E. *Suggested Readings*

1. *Automobile Engineering.* American Technical Society. Chicago, Illinois. 6 Volumes. 1936.

2. *Check Your Car for Safety and Performance.* Metropolitan Life Insurance Company. New York, New York.

3. *Dyke's Automobile and Gasoline Engine Encyclopedia.* Goodheart-Willcox Publishing Company. Chicago, Illinois. 1935. 1230p.

4. Kuhns, Ray F., *Automotive Service.* Bruce Publishing Company. Milwaukee, Wisconsin. 1931.

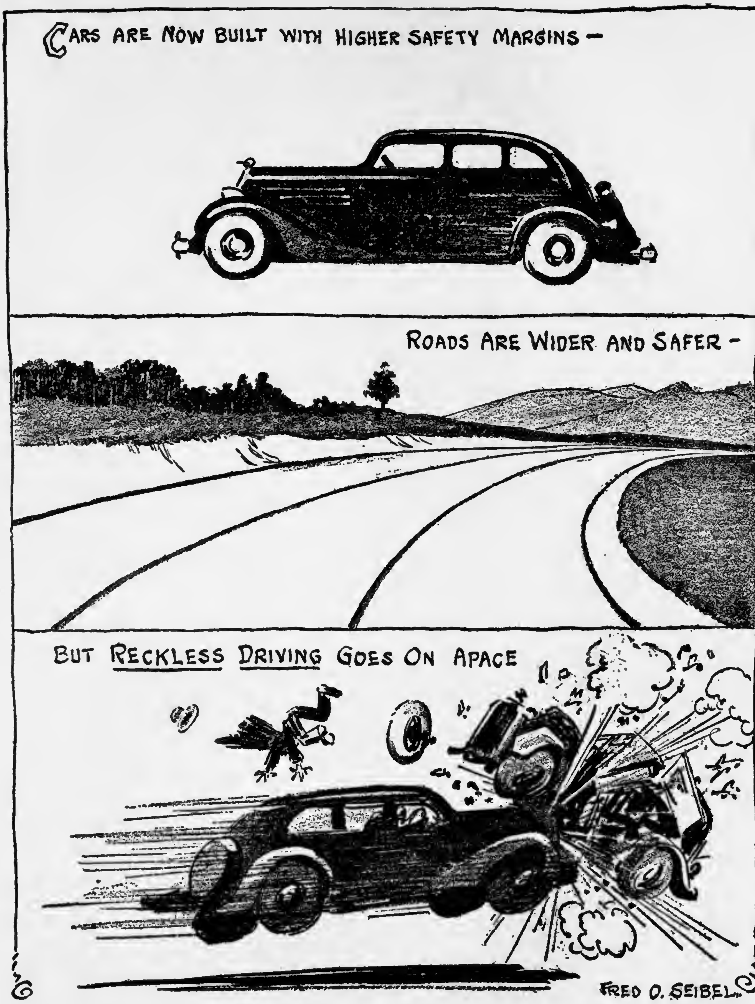
PART 4

Accidents, Their Causes And Results

The greatest cause of automobile injuries and deaths is driver defects.

Reckless driving in a decade has cost America more than three hundred thousand lives, nearly a million maimed and crippled for life, tens of billions of dollars in property damage and waste, suffering, and heartaches innumerable.

Why?


CARS ARE NOW BUILT WITH HIGHER SAFETY MARGINS —
ROADS ARE WIDER AND SAFER -
BUT RECKLESS DRIVING GOES ON APACE
FRED O. SEIBEL

CHAPTER 12

THE CAUSES OF AUTOMOBILE ACCIDENTS

America is staggered by the awful fatalities and terrible injuries which have come with the automobile. Nearly 38,000 killed outright! Approximately 100,000 maimed and crippled for life! A million hurt more or less painfully! Waste, suffering, heartaches innumerable! These are some of the results of one year of driving so-called seventy-mile an hour cars on thirty-mile an hour roads by drivers with ability to drive twenty miles an hour.

When there is a problem, those who try to solve it define that problem. If there are defects in a skill or procedure, an investigator not only tries to find out what those defects are, but he tries to understand the causes of those defects. America's automobile problem is: *How can driving be made safe and sane?* Everyone knows that the car driven improperly is a dangerous weapon. We can infer from statistics, however, and also from common observation, the four main factors which contribute to automobile accidents.

They are: highway deficiencies, car defects, shortcomings of drivers, and pedestrians' mistakes. A brief statement concerning each of these factors should assist the reader in understanding the causes of accidents.

Highway Deficiencies

Important among the highway deficiencies which make American highways "dark and bloody roads" are: narrow roads, sharp turns, unstandardized signs, blind corners, unexpected railroad crossings, bad bridges, and multiple-lane roads.

Narrow roads upon which collisions sometimes occur and from which drivers frequently ride to their deaths are a cause of car accidents. Many sharp turns, either unmarked or improperly marked, are the causes of overturned motor vehicles which leave telltale dark-colored spots on the roadway. Improperly placed signs and the lack of traffic signals are main factors in collision and fatality. Blind corners are always highly dangerous. Surface railroad crossings are an outstanding hazard. Poor bridges and defective culverts are chief causes of smash-ups, and multiple lanes are sometimes the scenes of terrible jams, where car is piled upon car and people are intermingled with machinery.

Vehicle Defects

Car defects, according to the National Safety Council, are responsible for approximately 15 per cent of the accidents. A good driver will offset many of these vehicle defects. But defective brakes make driving more dangerous. Poor headlights increase the hazard of collision with fixed objects, pedestrians, and other cars. Glaring headlights blind the oncoming driver with serious consequences. Blowouts resulting from defective tires are particularly dangerous at high speeds.

Among other car defects are: the broken rear light, the mirror cloudy or broken, the windshield dirty or wavy, no chains on a wet or slippery road. Finally, monoxide gas brings paralysis and death either in the garage or in the car itself.

Daily the newspapers give accounts of accidents which can be directly attributed to defects in the mechanism of the automobile. Carelessness and ignorance are two of the worst causes of injuries. Periodic inspection should be given all automobiles. Irresponsible drivers who consider sixty miles per hour justifiable, do not understand the complex relation between driver and car that constitutes control. Each fast driver should understand the deadly results of mixing power, gasoline, speed, and bad judgment.

Speed is a deadly attribute.

Shortcomings of Drivers

Principally because of his mistakes and defects death stalks the automobile driver on every hand. Driver shortcomings are the most important cause of automobile accidents. According to most conservative estimates, the driver is responsible for two thirds of the car accidents and deaths. According to others, the driver is responsible for as many as 90 per cent of the casualties. It is true that most of the crashes are brought about by drivers who are prone to have accidents. On the other hand, there are drivers who never have an accident.

Mistakes of Drivers

Mistakes of bad drivers were responsible for fifteen hundred more deaths in 1935 than in 1934. The most

One Sure Way to Stop Him

glaring mistake of the driver is speed. Table 2 shows that speed was responsible for nearly 23 per cent of driver accidents and about 31 per cent of the driver-caused accidental deaths in 1935.

TABLE 2. RESULTS OF SERIOUS TYPES OF RECKLESS DRIVING IN 1935[1]

	No. of Accidents	Per Cent	Persons Killed	Per Cent	Persons Injured	Per Cent
Exceeding Speed Limit	121,460	22.8	7,240	30.7	161,550	22.9
On Wrong Side of Road	85,770	16.1	3,940	16.7	111,460	15.8
Did not Have Right-of-Way	135,840	25.5	3,580	15.2	191,880	27.2
Drove off Roadway	55,940	10.5	3,390	14.4	64,190	9.1
Reckless Driving	51,670	9.7	3,020	12.8	67,020	9.5
Failed to Signal Improper Signaling	27,700	5.2	260	1.1	35,980	5.1
Cutting in	17,580	3.3	420	1.8	23,980	3.4
Passing on Curve or Hill	8,520	1.6	400	1.7	11,290	1.6
Car Ran Away No Driver	3,200	.6	280	1.2	4,230	.6
Passing Standing Street Car	2,130	.4	70	.3	2,820	.4
Passing on Wrong Side	2,130	.4	50	.2	2,820	.4
Miscellaneous	20,780	3.9	920	3.9	28,220	4.0
TOTAI	532,720	100.0	23,570	100.0	705,440	100.0

[1] Adapted from *Live and Let Live*, p. 8. The Travelers Insurance Company.

A report of the National Safety Council shows that the greater the speed the worse the accident. According to this report when the speed is from

0 to 20 miles per hour 1 accident in 61 is fatal,
20 to 29 miles per hour 1 accident in 42 is fatal,
30 to 39 miles per hour 1 accident in 35 is fatal,
40 to 49 miles per hour 1 accident in 25 is fatal,
50 and over miles per hour 1 accident in 11 is fatal.[1]

Table 2 shows the types of careless, hasty, foolish actions of drivers which caused more than 23,000 deaths and more than 700,000 injuries in over 500,000 accidents. Driving on the wrong side of the road, not having the right of way, driving off the roadway, and reckless driving are among the worst faults of drivers.

Defects of Drivers

Poor eyesight, lack of bodily control, and fatigue are dangerous defects in drivers. Senses dulled by alcohol or monoxide gas cause trouble. The drunken driver is becoming an increasing cause of fatalities.

Lack of training in the mechanical operations of driving, such as stopping, starting, backing, shifting gears, and signaling is often fatal. And ignorance of the law and of traffic regulations causes many terrible accidents.

Many drivers who have accidents do not maliciously intend to injure people or to cause suffering. Most drivers who cause accidents do so because they do not try hard enough to avoid them. They take chances.

[1] *Accident Facts.* National Safety Council, p. 44. 1937.

They expect others to take care of them. Some autoists are mentally and physically lazy. Some of them are ignorant. They do not realize the danger of the car in their incompetent and untrained hands. A last very great shortcoming is the lack of will power, a strong desire to drive correctly. A driver must will to drive right and to avoid difficulty.

Mistakes of Pedestrians

Although the chief factor in automobile accidents is the driver imperfections, also very important are the weaknesses of the pedestrian. The pedestrian crosses the street against signal lights. He walks diagonally in the intersections. He jaywalks between intersections. He gets off vehicles in front of oncoming traffic. Often he has the "I dare you to hit me" attitude instead of a co-operative spirit. Children playing on the street add to the accident problem. Men working on the roadway further endanger the safety of driving. The man who jumps from behind a parked car, and the intoxicated pedestrian are also responsible for many accidents. Two out of five traffic deaths are pedestrians' deaths, and many of these are brought about through the fault of the pedestrians themselves.

Study Aids

A. *Experiences*

1. Have you ever seen a blind corner where there was to your knowledge an accident? How could that blind corner be improved?
2. Have you ever observed a drunken motorist? Give

reasons why he should not be permitted to drive a car on the highways?
3. Have you ever known anyone who was injured through monoxide poisoning? How can such an accident be avoided?

B. *Problems for Class Discussion*

1. How can driving be made safe? Discuss one of the several phases of this problem.
2. Explain why speed is so dangerous. Take into account in your discussion (a) speed itself, (b) the momentum of the automobile, (c) possibility of a blowout, and (d) road imperfections.
3. Discuss the danger of monoxide gas.
4. Discuss Table 2. How can such driver mistakes be eliminated?

C. *Study Activities*

1. List specific highway defects which make driving dangerous.
2. Write a brief paragraph listing the principal car defects. Choose one of these defects and find all the information which you can about it.
3. List several pedestrian weaknesses.
4. Below are presented five cases of accidents. Study the cases carefully. List the principal factors of the accident in each case. Show what the main cause was and indicate how the accident could have been avoided.

Case 1

One day a few years ago, two Reserve Army Officers were driving north on Federal Highway No. 77, when a hobo drove a dilapidated car through a stop sign from a crossroad. The Major who was driving threw on his brakes and stopped in a very short distance. But the old car's brakes were worn out and it struck the other car on the right side, nearly turning it over, smashing both fenders and a door. The two officers were bruised slightly; one of them, the owner, carried black and blue marks for a few weeks. The old hobo was left in the middle of the road, not much worse off than he was before the collision. Two witnesses admitted the driver of the old car to be at fault. However, he had no brakes, no insurance, no job, and very little money. There was a license plate on his car, it is true, but no man could have driven such a car competently.

Case II

A few years ago on a graveled highway, a car was traveling about thirty or thirty-five miles an hour. The driver, a young man of twenty-one, in the prime of life, saw the sign which said, "new gravel," but he did not slow up. He had driven in it many times. This time, however, the gravel which was lately spread was more treacherous than usual. His car went into a bad skid. After several efforts to right the car, he lost control. Into the ditch he went. When passing motorists and a farmer pried the car off his broken neck a few minutes later, he was dead. Imagine the sorrow of two old people who had lost their only son and consider the record of this otherwise quite careful driver, who thought it would not happen to him.

Case III

A fine man in the prime of life was driving home to spend the New Year with his mother. He had worked hard all day and it was late at night; he was tired and the road had been monotonous; he was alone and although the weather was severe, he was warm, for he had closed all the windows of his coupé. No one knows exactly the cause but he drove into the side of a culvert. He died two hours later. He may have gone to sleep at the wheel. Carbon monoxide gas may have caused him to drive off the road.

Case IV

One of the teachers in one of Chicago's largest high schools was riding with his little boy of four years, when four irresponsible young fellows who had been drinking, driving an old car recklessly, side-swiped his car. The result was a bad collision in which no one was killed. The teacher was badly hurt and it was necessary for him to have eighteen stitches in his forehead. A badly damaged car was another result. No restitution was made in this case because the young owner of the old wreck had no money. Drink and reckless driving jeopardized the lives of this man and boy.

Case V

Two or three years ago one of the authors was driving along a country highway at a speed perhaps of forty miles an hour, when he saw an old car approaching at a slight diagonal from the other side of the road. Although this man did everything in his power to gain the attention of the other driver, there was no response. On, on, came the car diagonally still. By this time he could see that its driver, a young boy, was turned around arranging some things in the back seat as he held the wheel. To stop would have been fatal, for the young farmer boy would have driven straight into the stopped car. To drive into the ditch would have been fatal, for the grade at this point was high and the ditch deep. The only chance to avoid a collision was to drive ahead rapidly. With good luck, the author was able to steer his car between the ditch and the other car with only inches to spare. The boy went on, zig-zagging from one side of the road to the other, unconscious of his miraculous escape and apparently oblivious to his danger.

D. *Questions*

1. What are the chief factors in accidents?
2. Who is chiefly to blame for traffic accidents?
3. What is the greatest mistake of the driver?
4. What are the principal defects of the driver?
5. How can one drive safely at an intersection?
6. Who has the right of way at an intersection, the pedestrian or a turning car?
7. Do you believe that drivers have many accidents because they do not try hard enough to avoid accidents?
8. What are the most serious types of reckless driving?
9. How can reckless driving be curbed?

E. *Suggested Readings*

1. *Accident Facts.* National Safety Council. Chicago, Illinois. 1937. p. 30.
2. *Carbon Monoxide Gas.* John Hancock Mutual Life Insurance Company. Boston, Massachusetts. 1936.

3. Clousing, Lawrence A., "Are You Driving a Lethal Chamber?" *Reader's Digest.* pp. 98-100. March, 1936.

4. Furnas, J. C., "—and Sudden Death." *Reader's Digest.* pp. 21-26. August, 1935.

5. Peters, Russell Holt, "Death on the Highway." *Reader's Digest.* pp. 19-22. April, 1935.

6. *Saving Seconds or Saving Lives.* Aetna Casualty and Surety Company. Hartford, Connecticut. 18p.

7. *You Bet Your Life.* Travelers Insurance Company. Hartford, Connecticut. 36p.

CHAPTER 13

THE INCREASING TOLL OF ACCIDENTS

In 1913, approximately 5 per cent of the accidental deaths in the United States were in connection with automobiles; in 1933, twenty years later, more than 33 per cent of them were caused by automobile accidents. In 1935, motor vehicles were responsible for 36,369 of the approximately 100,000 accidental deaths in the country; in 1936, there were 37,800 automobile deaths among 111,000 total accidental deaths in the country.

It is clearly seen that approximately one of every three people who meet death accidentally die in automobile accidents. More awful than the 111,000 who were killed outright in accidents, is the staggering total of 400,000 who were permanently disabled, and the 10,700,000 injured temporarily in 1936.

All Accidents a National Problem

Table 3 shows the increasing rate of motor vehicle accidental deaths in comparison with the deaths by falls, burns, drowning, railroads, firearms, gas, and poisonings. In the twenty-two years (from 1913 to 1935) covered by this table, although the total of accidental deaths increased 21 per cent, motor vehicle deaths increased 760 per cent.

In the same period deaths from falls increased nearly

65 per cent; deaths from burning decreased 12 per cent; deaths from drowning decreased 39 per cent; deaths in railroad travel decreased approximately 57 per cent.

Figure 17 indicates the principal types of fatal accidents for 1935. It shows that 36 per cent of them were from motor vehicles, 25 per cent from falls, 8 per cent from burns, 7 per cent from drowning, and so on.

TABLE 3. ACCIDENTAL DEATHS IN THE UNITED STATES BY PRINCIPAL CLASSES, BY YEARS [1]

Year	Total	Motor Vehicle *	Falls	All Burns #	Drowning	Railroads *	Fire Arms	Gas †	Poisonings ††
1913	82,460	4,227	14,881	8,983	9,875	12,537	2,400	3,467	3,221
1918	85,149	10,723	13,156	10,255	7,148	10,541	2,693	4,247	2,661
1923	84,528	18,394	14,114	9,063	6,814	8,096	2,940	2,712	2,946
1928	95,186	27,996	16,911	8,482	8,483	7,131	2,979	2,718	2,856
1929	98,258	31,215	17,680	8,232	7,578	7,073	3,150	2,735	2,672
1930	99,300	32,929	20,821	8,852	7,744	6,000	3,243	2,529	2,785
1931	97,415	33,675	21,138	7,675	7,835	5,444	3,158	2,175	2,807
1932	89,167	29,451	21,225	7,762	7,712	5,159	3,040	2,130	2,462
1933	91,087	31,363	21,746	7,341	7,465	5,410	3,026	1,668	2,334
1934	101,139	36,101	23,828	8,261	7,326	5,246	3,023	1,695	2,302
1935	99,967	36,369	24,520	7,874	7,108	5,406	2,854	1,665	2,120
1936	111,000	37,800	estim	ated					

* Deaths from collisions of railroad trains and motor vehicles are included under both headings in order that each one may appear in proper perspective.

Including conflagrations † Absorption of poisonous gas †† Not gas

[1] *Accident Facts.* p. 61. National Safety Council, 1937. *Chicago Daily News Almanac and Year Book.* 1937.

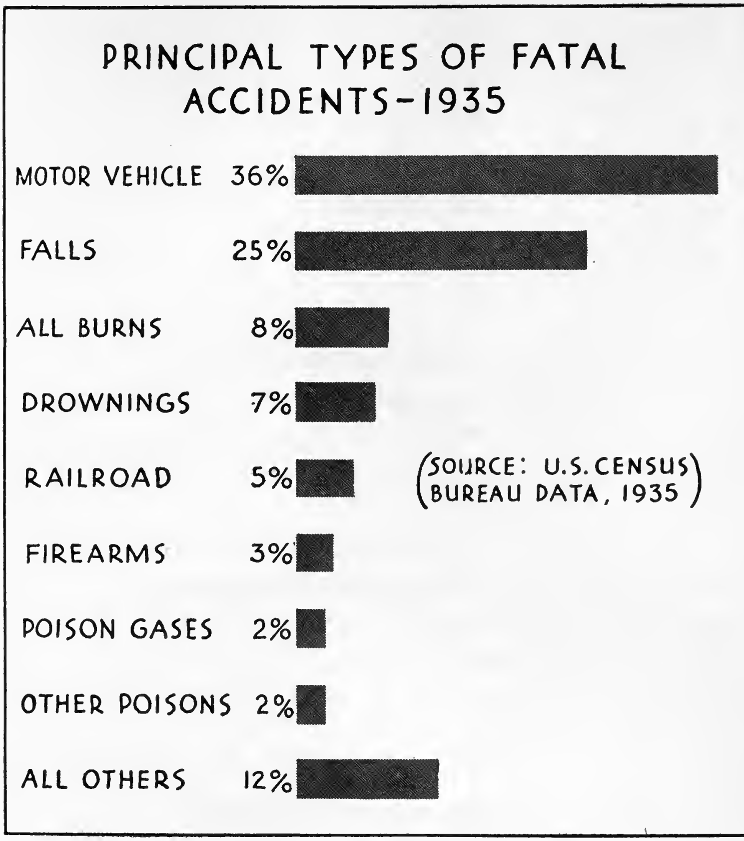


Fig. 17

U. S. Census Bureau Data, 1935. Adapted from *Accident Facts*. 1937 edition National Safety Council, p. 7.

Figure 18 indicates the principal types of fatal accidents for 1935 for five age ranges. In three of them, school children from five to fourteen, young adults from fifteen to twenty-four, and adults from twenty-five to sixty-four, the motor vehicle accidents were by

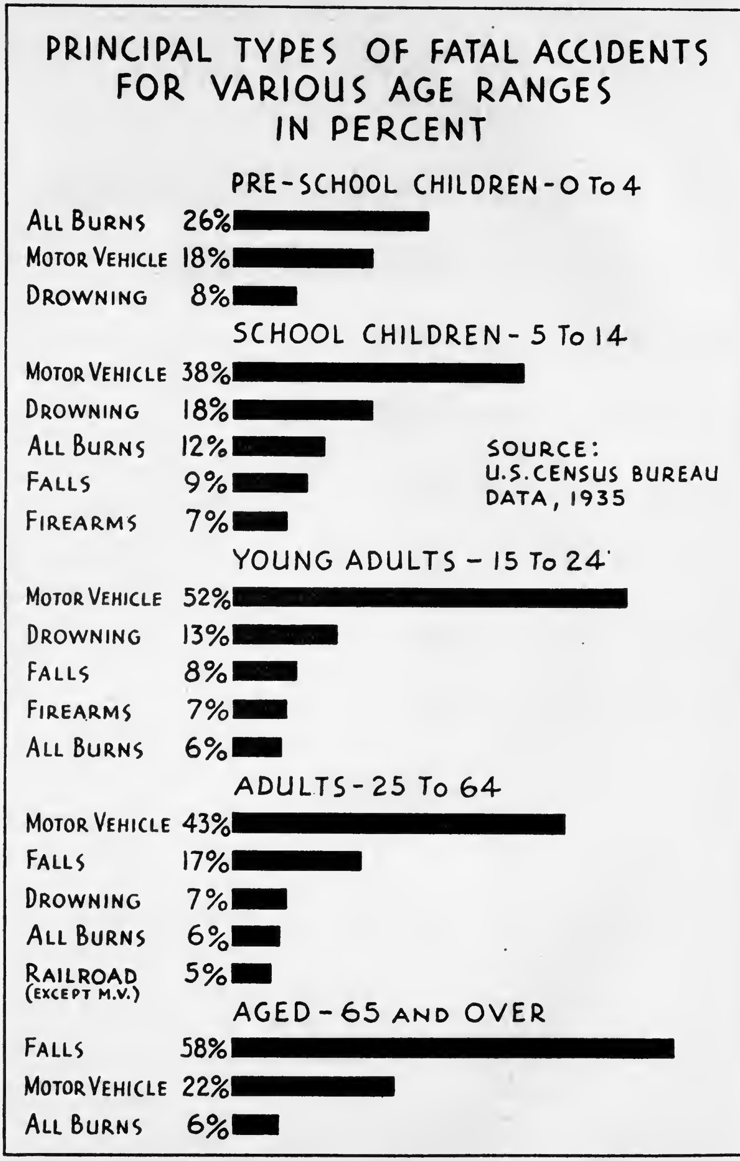


Fig. 18

Adapted from *Accident Facts*, 1937 edition National Safety Council, p. 11, 12, 14-16.

far the most numerous type. For young adults, motor vehicle accidental deaths made up more than half the total. Among the very young and the very old, motor vehicle accidental deaths held second rank.

Automobile Accidents in 1935 and 1936

It is hard to believe that about 2 of every 10,000 people in this country met death because of the automobile in 1936. In 1935 according to the National Safety Council, 36,369 people were killed, 105,000 were permanently disabled, and 1,180,000 were temporarily disabled in 6,500,000 vehicle accidents in which there was property damage.[1] In 1936 there was a slight increase in the number killed.

Figures of the National Safety Council indicate that accidents in 1936 cost Americans $120 per second, the sum of $3,700,000,000 a year, a considerably larger sum than in 1935. These figures show that for the motor vehicle alone, the cost of injuries, deaths, and property damage amounted to $1,640,000,000.

Newspaper Headlines and Magazine Titles

Every newspaper in the land cries out against the massacre. Headlines should help us understand the terror of the crushing fatalities. A few of the headlines are presented here:

Auto Massacre in U. S. Speeds on to New High

Kills 38,500 Last Year

Hit-run Driver Is Sentenced to 30 Days in Jail

[1] *Accident Facts.* National Safety Council, 1937, pp. 4 and 57.

Injures 18 When He Drives Auto Through Crowd
Girl Driver Killed in Car Plunge
9000 Autos Get City Test; Only Half Found O.K.
Holiday Death List Smashes Five Year Record—Autos Take Biggest Toll

Magazines and journals are accepting the challenge of the danger of unsafe driving. Awed by the statistics of death and destruction, waste and loss, writers use such titles as the following:

"Death on the Highway"—*Forum.* February and March, 1935
"When You Drive After Dark"—*Colliers.* March, 1936
"Dark and Bloody Roads"—*Colliers.* March, 1936
"Foolproof Roads"—*Fortune.* August, 1936
"Smash"—*American Legion Monthly.* March, 1932
"Are You Safe to Drive?"—*Atlantic Monthly.* March, 1934
"Stop, Look, and Listen!"—*Forum.* October, 1934
"Drive Right"—*Rotarian.* August, 1934
"—and Sudden Death"—*Reader's Digest.* August, 1935
"The Aftermath of Sudden Death"—*Reader's Digest.* December, 1935

Holiday Death Tolls

The toll of death in the Christmas holidays in 1936 was astounding. One headline on December 26, 1936 read: "Yuletide Fatalities Sadden Many Homes." Another on December 27 flashed: "Yule Accidents Fatal to 514; 408 Car Deaths." On December 28, another said: "516 Dead; U.S. Traffic Toll."

The National Safety Council predicted that there would be five hundred fatalities in the Independence Day week end, July 3-5, 1937. The exact figures will not be known or published for some time, but the chances are that the Safety Council figures are not far wrong. A terrible situation confronts our country. We know that death stalks us, that it will take many of us without warning by automobile accidents. We are powerless against the insane and criminal tendencies which cause the danger.

The Average Day Toll

We know that the automobile at the present time takes its daily average toll of

100	killed
287	maimed and crippled for life
3,233	temporarily disabled
3,620	total casualties

Each day the motor vehicle casualty list (killed and injured) is approximately as great as the number of people who live in such cities as:

Piedmont, Alabama
Mesa, Arizona
Wynne, Arkansas
Gilroy, California
North Haven, Connecticut
Winter Park, Florida
Vidalia, Georgia
Wallace, Idaho

Rochester, Indiana
Irvin, Kentucky
Pineville, Louisiana
Brunswick, Maryland
Marysville, Ohio
Lancaster, South Carolina
Arlington, Texas
Vinton, Virginia
Mount Vernon, Washington
Hudson, Wisconsin

Automobile and War Fatalities

Many people deplore the awfulness of war. They do so rightly; war is terrible. But the fatalities of all America's major wars were not so great as the fatalities caused by reckless automobile driving in this country. Table 4 gives the number who were killed in action and died of wounds in America's major wars as 244,357. In the last nine years, the number killed outright in motor vehicle accidents in America was 296,899, exclusive of

Table 4. Fatalities in Six Wars[1]

	Total Troops Engaged	Killed in Action and Died of Wounds
Revolutionary War	395,858	4,044
War of 1812	528,274	1,956
War with Mexico	116,597	1,549
Civil War (Union forces)	2,128,948	110,070
Civil War (Confederate forces)	900,000	74,524
War with Spain (including Philippines)	280,564	1,704
World War	4,057,101	50,510
TOTAL	8,407,342	244,357

[1] Data from Adjutant General's office of the War Department. Adapted from *Accident Facts*. National Safety Council. 1937, p. 63.

the millions maimed, crippled for life, and less permanently injured.

Non-fatal Accidents

In one sense, the killed are a very small part of the loss in accidents; in 1935 more than 100,000 people were maimed terribly or disabled for life. Table 5 gives the facts: 12,530 sustained fractured skulls, 1,790 fractured spines, 74,310 suffered other fractures. Nearly 90,000 fractures alone were sustained. Nearly 15,000 people suffered concussion of the brain; such injuries are serious, sometimes more serious than death.

These accidents must be checked.

Table 5. Results of Automobile Accidents. Nature of Non-fatal Injuries Suffered by the Victims in 1935 [1]

	Persons Injured	Per Cent
Fractured Skull	12,530	1.4
Fractured Spine	1,790	.2
Other Fractures	74,310	8.3
Concussion of the Brain	14,320	1.6
Severe General Shock with Contusions and Lacerations	138,770	15.5
Shock (less severe) and Shakeup	531,800	59.4
Internal Injuries	13,430	1.5
Other Injuries (sprains, dislocations, wrenches, etc.)	108,330	12.1
TOTAL	895,280	100.0

[1] Adapted from *Live and Let Live*. Travelers Insurance Company, p. 23.

Types of Automobile Accidents

A thoughtful student desires to know the most fatal types of accidents. Table 6 shows the fatality of various types. Collisions with pedestrians and other automobiles caused nearly 25,000 deaths and more than 700,000 injuries in 1935. Collision with fixed objects, with railroad trains, and non-collision accidents were proportionately the most fatal. One of four collisions with railroad trains resulted in death. About one of every thirteen collisions with fixed objects resulted in death, and one of twelve non-collision accidents resulted in

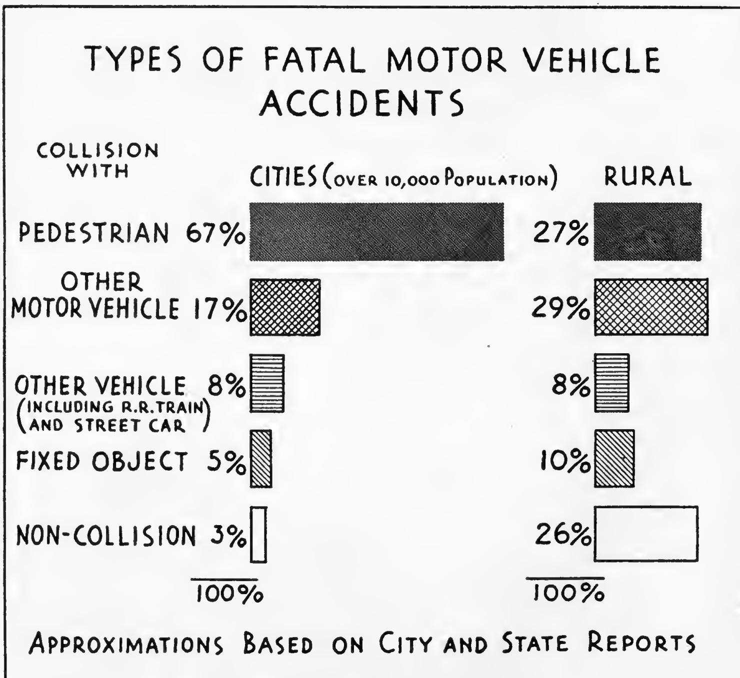


Fig. 19

Adapted from *Accident Facts.* 1937 edition National Safety Council, p. 39.

death. Reading between the lines, one may understand that when a car hits a pedestrian, the poor unprotected pedestrian comes out second best. This is shown by the 16,000 pedestrian deaths last year. Safety for yourself as a driver and safety for the pedestrian demand of you extreme care and decency in driving.

Road Location of Accidents

According to Table 7, although there were less than 5,000 automobile accidents at railroad crossings, more than 1,440 persons were killed and nearly 5,000 in-

Table 6. Serious Types of Automobile Accidents in 1935 [1]

	No. of Accidents	Per Cent	Persons Killed	Per Cent	Persons Injured	Per Cent
Collision with:						
Pedestrian	297,610	36.0	16,030	44.4	276,640	30.9
Automobile	374,490	45.3	8,900	24.6	450,320	50.3
Horse-drawn Vehicle	4,960	.6	140	.4	5,370	.6
Railroad Train	4,960	.6	1,440	4.0	4,480	.5
Street Car	13,230	1.6	310	.9	11,640	1.3
Other Vehicle	8,270	1.0	250	.7	8,060	.9
Fixed Object	53,730	6.5	4,080	11.3	64,460	7.2
Bicycle	19,840	2.4	580	1.6	17,910	2.0
Non-collision	47,120	5.7	4,290	11.9	53,720	6.0
Miscellaneous	2,480	.3	80	.2	2,680	.3
TOTAL	826,690	100.0	36,100	100.0	895,280	100.0

[1] Adapted from *Live and Let Live.* The Travelers Insurance Company, p. 4.

jured. In this type of accident the automobile is relatively the unprotected participant and the car and its passengers suffer out of all proportion to the comparative fatalities in other types of collisions. Table 7 gives the interesting implication that speed is most dangerous. Note that about one third of the accidents were between intersections and resulted in 23.5 per cent of the fatalities. Note that about one fifth of the total accidents were on the highway and resulted in nearly two fifths of the deaths. Note also that a little less than two-fifths were at street intersections and resulted in one sixth of the deaths. Most of the fatal accidents occur on the highway on which the autoists speed; accidents involving speed are relatively more deadly than others.

TABLE 7. WHERE PEOPLE WERE KILLED AND INJURED ON THE ROADS IN 1935 [1]

	No. of Accidents	Per Cent	Persons Killed	Per Cent	Persons Injured	Per Cent
Between Intersections	275,000	33.3	8,470	23.5	307,980	34.4
Rural intersections	33,890	4.1	1,520	4.2	35,720	4.0
Highway	157,360	19.0	13,710	38.0	151,000	16.9
Driveway	4,130	.5	250	.7	4,480	.5
Curve	40,510	4.9	3,970	11.0	42,000	4.7
Street intersections	299,260	36.2	6,050	16.7	337,980	37.7
Railroad crossing	4,960	.6	1,440	4.0	4,480	.5
Bridge	11,580	1.4	690	1.9	11,640	1.3
TOTAL	826,690	100.0	36,100	100.0	895,280	100.0

[1] Adapted from *Live and Let Live.* Travelers Insurance Company, p. 29.

Rural and City Accidents

In order to understand traffic dangers, a comparison of accidents in rural and urban centers is helpful. Figure 19 based upon accident facts collected by the National Safety Council shows that two thirds of the fatal accidents in the city and less than one third of those in the country are in collisions with pedestrians. In sharp contrast is the fact that only about 17 per cent of the car accident fatalities in the city are in collisions with other vehicles, but in the country 30 per cent of the fatal accidents are in collisions with other vehicles. This figure shows that comparatively twice as many

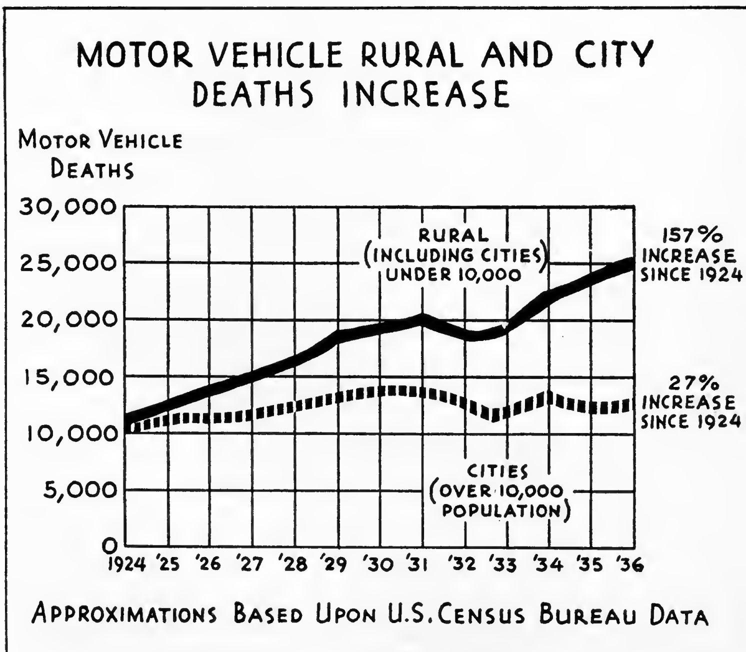


Fig. 20

Adapted from *Accident Facts.* 1937 edition National Safety Council, p. 38.

deaths in the country as in the city are in collisions with fixed objects. The mania for speed on the rural roads is largely responsible for the difference.

Figure 20 shows that there were approximately twice as many automobile accidents in the country as in the city in 1936, and that the increase of accidents in rural districts since 1924 was 157 per cent, while in the city it was 27 per cent.

Fatal Times of Day

Table 8 indicates the hours when people were killed and injured in automobile accidents in 1935. Each student should study it carefully. It shows the terrific fatalities of the later hours of the day and the early hours of the night, when people are coming home from work fatigued and lacking in alertness. It shows also the greater fatalities of night driving than those of day driving. A smaller number of cars are on the road at night, yet the number of accidents are almost as great as the number in the much heavier traffic of the day.

The number of deaths "occurring in the normal hours of darkness, from 6:00 P.M. to 6:00 A.M. totaled 21,480 last year as against 14,620 in the normal hours of daylight from 6:00 A.M. to 6:00 P.M." [1] Although less than 10 per cent of the total number of accidents occurred in the five hours between 1:00 A.M. and 6:00 A.M., yet 14 per cent of the deaths occurred in this period. Thus again we may draw the implication that in the darkness, driving is too rapid for safety. Night driving is dangerous.

[1] *Live and Let Live.* Travelers Insurance Company. p. 31.

TABLE 8. HOURS WHEN PEOPLE WERE KILLED AND INJURED IN AUTOMOBILE ACCIDENTS IN 1935[1]

	No. of Accidents	Per Cent	Persons Killed	Per Cent	Persons Injured	Per Cent
12 to 1 A.M.	28,110	3.4	1,590	4.4	29,550	3.3
1 to 6 A.M.	80,190	9.7	5,050	14.0	85,050	9.5
6 to 7 A.M.	10,750	1.3	790	2.2	11,640	1.3
7 to 8 A.M.	17,360	2.1	690	1.9	18,800	2.1
8 to 9 A.M.	23,150	2.8	760	2.1	25,960	2.9
9 to 10 A.M.	23,970	2.9	760	2.1	25,960	2.9
10 to 11 A.M.	30,590	3.7	830	2.3	34,030	3.8
11 to 12 A.M.	35,550	4.3	1,120	3.1	39,390	4.4
12 to 1 P.M.	36,370	4.4	1,050	2.9	39,390	4.4
1 to 2 P.M.	34,720	4.2	1,080	3.0	38,500	4.3
2 to 3 P.M.	41,340	5.0	1,410	3.9	44,760	5.0
3 to 4 P.M.	50,430	6.1	1,730	4.8	55,510	6.2
4 to 5 P.M.	62,000	7.5	2,090	5.8	67,150	7.5
5 to 6 P.M.	63,650	7.7	2,310	6.4	69,830	7.8
6 to 7 P.M.	57,040	6.9	2,670	7.4	61,770	6.9
7 to 8 P.M.	60,350	7.3	3,320	9.2	64,460	7.2
8 to 9 P.M.	55,390	6.7	2,560	7.1	59,980	6.7
9 to 10 P.M.	44,640	5.4	2,350	6.5	47,450	5.3
10 to 11 P.M.	36,370	4.4	2,060	5.7	39,390	4.4
11 to 12 P.M.	34,720	4.2	1,880	5.2	36,710	4.1
TOTAL	826,690	100.0	36,100	100.0	895,280	100.0

[1] *Live and Let Live.* Travelers Insurance Company. p. 31.

TABLE 9. DAYS OF OCCURRENCE OF AUTOMOBILE ACCIDENTS RESULTING IN INJURIES AND DEATHS IN 1935 [1]

	No. of Accidents	Per Cent	Persons Killed	Per Cent	Persons Injured	Per Cent
Sunday	143,020	17.3	7,440	20.6	153,090	17.1
Monday	106,640	12.9	4,660	12.9	115,490	12.9
Tuesday	104,990	12.7	4,180	11.6	114,600	12.8
Wednesday .	102,510	12.4	3,830	10.6	111,910	12.5
Thursday	104,990	12.7	4,400	12.2	114,600	12.8
Friday	114,910	13.9	4,730	13.1	124,440	13.9
Saturday	149,630	18.1	6,860	19.0	161,150	18.0
TOTAL	826,690	100.0	36,100	100.0	895,280	100.0

[1] *Live and Let Live.* Travelers Insurance Company. p. 32.

TABLE 10. LIGHT CONDITIONS PREVAILING IN ACCIDENTS RESULTING IN INJURIES AND DEATHS IN 1935 [1]

	No. of Accidents	Per Cent	Fatal Accidents	Per Cent	Non-fatal Accidents	Per Cent
Daylight	479,650	58.0	14,000	41.9	465,650	58.7
Dusk	30,100	3.6	1,540	4.6	28,560	3.6
Dark	316,940	38.4	17,870	53.5	299,070	37.7
TOTAL	826,690	100.0	33,410	100.0	793,280	100.0

[1] *Live and Let Live.* Travelers Insurance Company. p. 32.

Accidents and Days of the Week

One fifth of the people die from automobile accidents on Sunday. (See Table 9.) Almost forty out of every one hundred who are killed in automobile crashes die from accidents on the week end (Saturday and Sunday). Week-end accidents are more serious than accidents in the middle of the week.

Table 10 indicates the relative danger of the light, the darkness, and the dusk. Although 58 of 100 accidents occur in the daylight, 58 of 100 deaths occur in the darkness and dusk.

Study of these statistics shows that certain kinds of accidents, such as those which involve speed or the pedestrian, are more fatal than others; that Sunday accidents are more fatal than Wednesday's; that darkness is more dangerous than daylight. Ask yourself the causes and the reasons for the greater fatalities.

Summary

The young person, untrained and somewhat irresponsible, is an unsafe driver. The fatalities caused by the youthful driver are very high in proportion to the number of accidents in which he is involved.

Drivers, particularly young drivers, should be challenged by the statistics of death. Because of the terrific increase in automobile accidents in the last few years, and also because of the pronounced inefficiency of young drivers, it is necessary for the nation and particularly for the youth of the nation to think and act sanely in this crisis, in order that the massacre, which bids fair to decimate our people, shall be stopped. The number of deaths and permanent injuries is the shame of American drivers.

You must be intelligent about driving.

Study Aids

A. *Experiences*

1. Have you ever seen persons driving automobiles who should not have been permitted to operate a car? If so, give the facts.
2. Have you ever been to a hospital and seen victims of a non-fatal accident brought in? Describe that experience.

B. *Problems for Class Discussion*

1. Why are accidents such a serious problem in this country?
2. Discuss why accidents and deaths from automobiles continue to mount.
3. Give reasons why more people are killed in the country than in the city in automobile accidents.
4. Why do young drivers have so many and such fatal accidents?

C. *Study Activities*

1. Make a graph (a drawing) to show the comparison of automobile and war fatalities.
2. List the most serious types of "non-fatal" accidents.
3. Enumerate five of the most important types of accidents in order of importance.

4. Make a graph or chart to show where people were killed on the road.

D. *Questions*

1. In what types of accidents have deaths increased the most in the last twenty years?
2. How many people were killed in accidents in 1936?
3. How many people were permanently disabled in 1936?
4. How many people were less seriously injured in 1936?
5. What was the cost of all accidents in 1936?
6. What was the cost of automobile accidents in 1936?
7. How many people were killed in 1936 by automobiles?
8. When an automobile and a pedestrian collide who is most likely to be injured?
9. When the automobile and a train collide which is most likely to be damaged?
10. What days of the week are most dangerous for motorists? Why?
11. When is driving comparatively more dangerous, in daytime or at night? Why?
12. What part are you going to play to lessen accidents by automobiles?

E. *Suggested Readings*

1. *Accident Facts.* National Safety Council. Chicago, Illinois. 1937. 96p.

2. *Automobile Facts and Figures.* Automotive Manufacturers Association. New York City. 1936. 96p.

3. *A Teachers Manual for Safety Education.* Elementary Schools of Virginia. State Department of Education. 1936. 152p.

4. *Chicago Daily News Almanac and Year Book for 1937.* Edited by Claude O. Pike. Chicago Daily News, Inc. Chicago, Illinois.

5. "Safety." *Building America.* Vol. II. No. 2. November, 1936, 27p.

6. *The New War on Accidents.* National Safety Council. Chicago, Illinois. 16p.

PART 5

The Public

Sixteen thousand pedestrian deaths in a year indicate the necessity for safe walking.

More and more we need foolproof roads to curtail the mounting toll of automobile deaths.

Speed must be controlled if accidents are to be reduced.

Effective traffic control is one of the best means of assuring safety in driving.

Correct driver attitudes will enable all to live and let live.

Double Parking Is Another Knot in the Traffic Tangle

CHAPTER 14

THE PEDESTRIAN

THE PEDESTRIAN is "a walker; one who journeys on foot; a foot traveler."[1] This definition pictures the ordinary pedestrian. It does not, however, show the differences among pedestrians. Safety demands that these differences be clearly understood.

TYPES OF PEDESTRIANS

Among the types of pedestrians which the driver contacts are workers along the roadway, the hitchhiker, the shopper, and children playing on the street or highway.

Pedestrians differ greatly. Some are very young, thoughtless, and irresponsible. Some are very old, absent-minded, and decrepit. Others are blind or have some serious eye defect. Still others are deaf or hard of hearing. Furthermore, there are drunken pedestrians and those who have been drinking, arrogant pedestrians, careless pedestrians, jaywalkers, and foot travelers with bad attitudes.

Each type of walker is markedly different from every other type. Each member of a type differs greatly from other members of that type. For example, two children playing on the street may be expected to act dif-

[1] Webster's *New International Dictionary of the English Language.* G. and C. Merriam Company. Springfield, Massachusetts. 1930.

ferently. In short, pedestrians differ even as drivers differ. They differ physically, mentally, emotionally, and morally.

The forty million drivers in this country are also pedestrians part of the time. These people should be the most careful walkers. Because they walk, they should adequately understand individual differences among walkers. As drivers they should know better how to meet and pass pedestrians safely on street or highway.

Defects and Mistakes of Pedestrians

An analysis of automobile accidents indicates the following as mental and emotional causes of pedestrian deaths: absent-mindedness, confusion, fear, carelessness, ignorance, stubbornness, selfishness, unsportsmanlike attitudes, trust in the driver's ability to stop, and the expectation that someone else will be more careful than he will be. Pedestrian actions contributing to fatalities are: drinking, badgering, disobeying traffic regulations, taking short cuts, walking or running into moving traffic, playing games on the street, stepping from between parked cars, and walking improperly upon the highways.

According to National Safety Council figures for five states,[1] the pedestrian was at fault in 55 per cent of the automobile accidents causing pedestrian deaths, or in about one fourth of the total of car accidents in those states.

[1] *Accident Facts,* p. 37. National Safety Council. Chicago, Illinois. 1937.

Table 11 presents the numbers of pedestrians killed and injured in 1935. According to that table, 4,550,

TABLE 11. PEDESTRIAN MISTAKES AND RESULTS IN 1935[1]

Crossing at Intersection:	Pedestrians in Accidents	Per Cent	Pedestrians Killed	Per Cent	Pedestrians Injured	Per Cent
With signal	10,990	3.8	210	1.3	10,780	3.9
Against signal	36,200	12.4	1,070	6.7	35,130	12.7
No signal	37,280	12.7	1,870	11.7	35,410	12.8
Diagonally	5,350	1.8	370	2.3	4,980	1.8
Crossing between intersections	78,100	26.7	4,550	28.4	73,550	26.6
Waiting for or getting on or off street car	3,210	1.1	80	.5	3,130	1.1
Standing on safety isle	1,210	.4	100	.6	1,110	.4
Getting on or off other vehicle	3,210	1.1	260	1.6	2,950	1.1
Children playing in street	45,850	15.7	1,600	10.0	44,250	16.0
At work in roadway	6,220	2.1	450	2.8	5,770	2.1
Riding or hitching on vehicle	3,920	1.4	320	2.0	3,600	1.3
Coming from behind parked car	34,340	11.7	1,140	7.1	33,200	12.0
Walking on rural highway	14,650	5.0	3,030	18.9	11,620	4.2
Not on roadway	5,920	2.0	340	2.1	5,580	2.0
Miscellaneous	6,220	2.1	640	4.0	5,580	2.0
TOTAL	292,670	100.0	16,030	100.0	276,640	100.0

[1]Adapted from *Live and Let Live,* p. 10. Travelers Insurance Company.

more than one fourth of the pedestrians sacrificed, were killed in crossing streets between intersections. Nearly 2,000 were killed by crossing at intersections with no signals. More than 1,000 were killed crossing against the signal at intersections; 1,600 children playing on the street were killed; more than 1,000 coming from behind parked cars were killed; over 3,000 walking on rural highways were killed. In 1935, 16,030 pedestrians met death in automobile accidents, and 276,640 more were injured. In 1936, according to the figures of the National Safety Council, more than 15,100 pedestrians were killed in automobile accidents.[1] The victim of 40 per cent of automobile fatalities was the unprotected pedestrian. In the majority of cases the pedestrian was at fault. More than half of these pedestrians were killed from 6:00 P.M. to midnight.

One great trouble which is becoming increasingly important is drinking. In 1935, 9 per cent of the pedestrians who were involved in accidents had been drinking; in 1936, 11 per cent. People must learn that drinking is not conducive to safe walking.

Rights and Privileges of the Pedestrian

From time immemorial the pedestrian has had the right to walk from place to place. In America he has still the right to walk upon the streets and highways. Because of the changing conditions, congestion, heavy traffic in the cities, and speed upon the rural highways, the rights and privileges of the pedestrian have been in a

[1] *Accident Facts,* p. 33. National Safety Council. Chicago, Illinois. 1937.

certain sense curtailed, but they are clearly defined. There are times when the pedestrian is forbidden to cross the street at an intersection in order that motor vehicles may pass. Again, it is unsafe, and in many states unlawful, for the pedestrian to cross the streets between intersections or diagonally in the intersections. Walking upon the streets even with these limitations is a very great privilege. The street is free to all, and should be used properly and with discretion.

Duties and Obligations of Pedestrians

Rights and privileges imply duties and obligations. Every citizen should know and obey the law. Every careful pedestrian reads and studies the traffic regulations of his city and learns his rights and the rights of others. He understands that other pedestrians have rights, and he appreciates the rights of the motorists. He thinks how he can walk safely. He endeavors to co-operate with traffic officers to assure safety.

Some pedestrians do not seem to understand their obligations to protect themselves or to co-operate with drivers. They break every rule of safe walking. They forget that it is their duty to protect and safeguard their own lives.

Attitudes of the Pedestrian

As we know, driver attitudes are important. Pedestrian attitudes are also of extreme importance. Wrong attitudes must be eradicated; right attitudes must be developed. Attitudes of attention, alertness, tolerance, courtesy, charity, and sportsmanship are as valuable to the pedestrian as to the driver. A pedestrian should be alert and attentive to varying road conditions, and courteous to drivers. Sportsmanship and good breeding are shown in the actions of the pedestrian as well as in those of the driver. Co-operation and good will go a long way in helping to eliminate fatalities.

Obedience to Traffic Regulations

Every pedestrian must obey the law if he would walk safely. He should obey the traffic officers; he should read the signs and signals. When a signal flashes the word *Stop* in a red background, the pedestrian should stop; he has no right to cross the street against the signal. Table 11 shows that more than 1,000 pedestrians were killed and 35,000 injured by that one type of disobedience in 1935. The pedestrian has no legal right to cross between intersections in many states, but this rashness in 1935 cost more than 4,500 lives and 73,500 pedestrian injuries. The pedestrian must learn that his own reckless acts cause a majority of the pedestrian deaths and injuries upon street and highway.

Rules for Safe Walking

The pedestrian who is a good citizen conforms to traffic rules and regulations. He strives to make walking and driving safe. He helps stop the motor massacre. Good habits help him to walk safely. The following rules should be learned and practiced. They should be made habits of all pedestrians, habits that must never be broken.

Fourteen Points of Pedestrian Practice

1. The pedestrian keeps sober and in good condition when walking on the roadway, and especially when crossing a street.
2. He makes crossing safely his business; he watches the traffic; he walks carefully; he does not tarry in the middle of the street.
3. He obeys traffic and patrol officers.
4. He crosses a street only at intersections and only at right angles.
5. He looks both ways when crossing a street, to the left first.
6. He waits for the *Go* or *Walk* sign before attempting to cross.
7. He does not jaywalk, or cross the street where he should not.
8. He does not step into the street from between parked cars.
9. He faces approaching cars when walking on the highway.
10. He furnishes a good example and assists others to safety, especially children and aged people.
11. He is a good citizen and practices tolerance and good sportsmanship.
12. He boards and alights from the right side of a vehicle and is careful not to step into oncoming traffic.
13. He is doubly careful at night.
14. He does not skate, coast, or play on city streets.

Mutual Responsibility of Driver and Pedestrian

When the driver of an automobile meets a pedestrian, he is in a superior position. Mechanically fortified by two tons of steel he can do amazing damage. In an illusion of greatness, some drivers run amuck and take advantage of the pedestrian. This is criminal and unlawful. These drivers are punished by the courts. On the other hand, the pedestrian is comparatively seldom arraigned for unsafe practices in walking. He should realize his responsibility to society and to the driver. He should not run into danger needlessly. He should be alert. Without confusion he should walk when and where he has a right to walk. He should feel that the driver has rights. He should co-operate with the driver to make the use of the automobile safer both to himself and the motorist.

Study Aids

A. *Experiences*

1. If you have seen a pedestrian hit by an automobile, analyze the causes and state what you think to be the most important single cause of the accident.
2. Have you ever observed a drunken pedestrian? Was it safe for him to cross the street?
3. Have you ever heard an argument between a pedestrian and a driver? What was the cause of the argument?

B. *Problems for Class Discussion*

1. Explain why the pedestrian should look first to the left and then to the right before crossing the street.

2. Compare the rights of the present-day pedestrian with those of the walker of a century ago.
3. Discuss the evils of hitchhiking. Why do some states make hitchhiking unlawful?
4. Discuss the fourteen points of pedestrian practice. Pick out the ten most important and add if possible five others which have not been included.
5. How can the school safety patrol assist boys and girls in safer travel to and from school?
6. Show how policemen co-operate with pedestrians and drivers.

C. *Study Activities*

1. Make a list of the various types of pedestrians. Which one is the most hazardous?
2. List the practices of pedestrians which you think are most dangerous to their safety.
3. Write a brief paragraph on "Safe Walking."
4. List the rights of the pedestrian.
5. Enumerate the duties of the pedestrian. Be prepared to discuss each.
6. Make a list of five good attitudes and three bad attitudes which you have observed in pedestrians. Write a paragraph on one of them.

D. *Questions*

1. How many pedestrians were killed by automobiles in 1935? in 1936?
2. Why is the pedestrian rather than the driver usually hurt in a collision between car and man?
3. What is jaywalking?
4. At what time of day is walking most dangerous?
5. Define: *traffic regulation, traffic officer, patrol boy.*

6. When a car is turning a corner and a pedestrian is crossing the street, who has the right of way, the pedestrian or the driver?
7. What pedestrian mistake caused most motor vehicle accident deaths in 1935? in 1936?

E. *Suggested Readings*

1. *Accident Facts.* pp. 32-43. National Safety Council. Chicago, Illinois. 1937.
2. Allen, Thomas. *Safe and Sane Use of Highways.* E. M. Hale and Company. Milwaukee, Wisconsin. 1936.
3. *Live and Let Live.* Travelers Insurance Company. Hartford, Connecticut. 1935. 38p.
4. *Model Traffic Ordinances.* United States Department of Agriculture. Bureau of Public Roads. Washington, D. C. 1936. 29p.
5. "Safety." *Building America.* Vol. II. No. 2. November, 1936. 27p.
6. *The Safe Walker's Memo Book.* Metropolitan Life Insurance Company. New York. 16p
7. *You in Your Car on City Streets.* Automobile Manufacturers Association. Detroit, Michigan. 63p.

CHAPTER 15

ROADS AND THE MOTOR CAR

Early Roads

Good roads are an interesting evidence of human progress. It would be difficult to say just where or when roads were first built. The Egyptians had wonderful roads built of huge stone blocks; in places they were ten feet thick. The Persians, Assyrians, Carthaginians, Chinese, and the Peruvians built excellent roads.

The Romans were noted for their roads, the first of which was the great "Appian Way." The "Flaminian Way" was the second of these renowned roads. Twenty-nine excellent roads ran from the gates of Rome in all directions. This system of highways extended over fifty thousand miles, unifying the Empire and making extended military operations possible. Truly, it may be said that much of the legislation relative to roads in this country had its origin in Roman law and custom. Building of the roads was principally at public expense of the province or district through which the road passed.[1]

The first settlers in America brought with them from the mother countries the customs of those coun-

[1] *The Encyclopedia Americana.* Americana Corporation. New York, 1929. Volume XXIII.

tries. England furnished the model for road legislation in a great part of our country. In 1632 the House of Burgesses in Virginia provided for an extreme method of local control in both construction and maintenance of public roads.

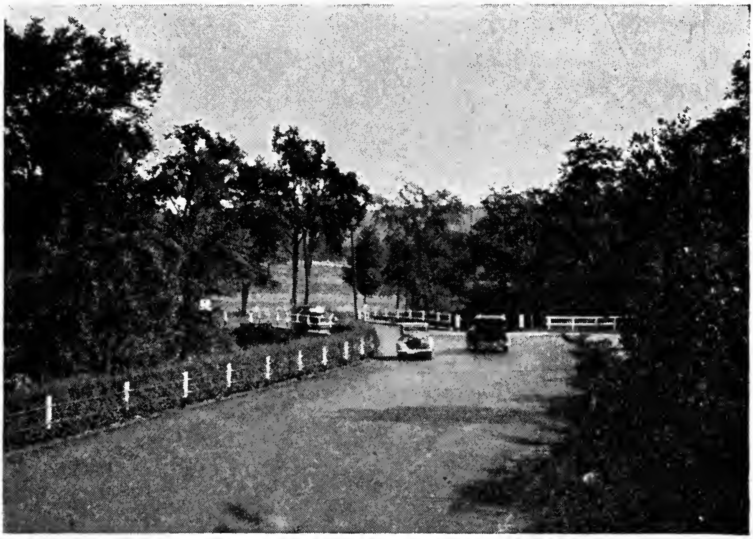
A motorist contemplates his predicament in the mud. The first automobiles met such situations frequently.

Near the end of the eighteenth century, tolls were sometimes levied upon travelers over roads and bridges. In 1806 Congress provided for construction of a National Road from the headwaters of the Potomac to the Ohio River. Upon this road no tolls were to be charged.[1]

[1] *The Encyclopedia Americana.* Americana Corporation. New York, 1929. Volume XXIII.

The Influence of the Cars on Roads

Railroad expansion reduced wagon road construction by the federal and state governments. The bicycle in the last few decades of the nineteenth century indicated strikingly the need for good roads. The auto-

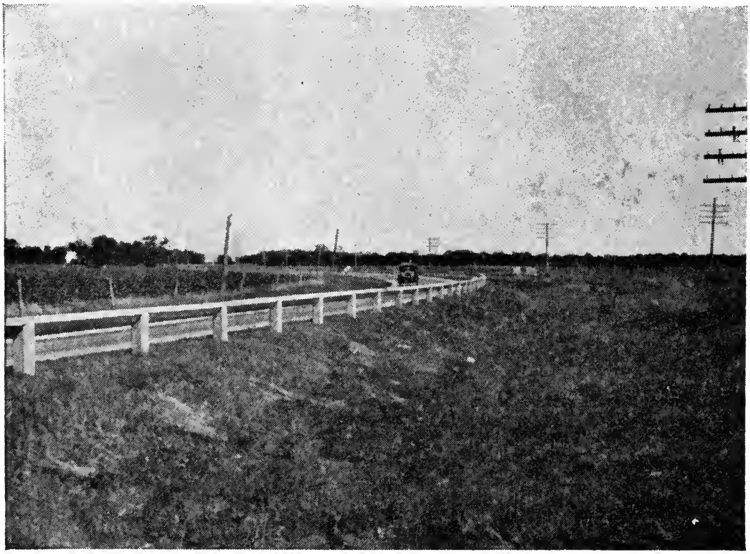


Courtesy of Portland Cement Association

Fig. X. A dangerous curve fitted with guard rail in Westchester County, New York.

mobile in the first part of the twentieth century confirmed and emphasized that need. Soon road construction became the concern of local, state, and national governments.

The speed of the automobile and the desire for comfort and smooth riding brought about an improvement in road construction as well as in car construction. In the early part of the present century, good road organizations were formed in all parts of the country. Coast-to-coast trails were blazed. Bridges and culverts spanned the greatest rivers and the smallest rivulets. Dirt roads, gravel roads, brick roads, asphalt roads,



Courtesy of Portland Cement Association

Fig. Y. A guardrail on a Minnesota road for the protection of motorists.

macadam roads, and concrete roads were constructed.

Funds were needed. Plans for taxation were discussed. Soon it became evident that the motorist must pay for the improvement of roads in one way or another. Today vehicle license fees, gasoline taxes, and drivers' license taxes give added revenue to that already supplied by the general property tax for the construction and maintenance of our 3,250,000 miles of roads.

Modern Road Construction

Experimentation has shown the comparative value of various types of road materials. The graveled and macadam roads before 1904 would not have sustained the heavy traffic of truck and automobile of today. But tars and asphalt, substituted for the weaker materials, have proven satisfactory. Motor trucks make rigid pavement very desirable.[1] Their heavy weight demands a firm surface and a sound foundation.

The "stage construction" plan of road building takes the growth of traffic into consideration. It justifies improvement and refinement of roads upon which traffic demands may become great by providing in the initial stage of construction a base for subsequent improvement. Ample right of way (land secured by local, state, or national government), grades to meet possible later requirements, and initial surfacing which can be used as the base for later surfacing, are among the principles of continuous stage construction.[1]

The predominating width of pavement highways is eighteen feet; however, there is a tendency to build roads twenty feet wide and even wider. Highways from large cities are built in multiples of twenty feet in order to accommodate the traffic. Surface-trueness tests must be met now in nearly all the states. Speed of traffic has been increased by the trend to longer vertical and easier horizontal curves. Alignments are becoming straighter. Super-elevation and wide shoulders are com-

[1] *The Encyclopedia Britannica.* Encyclopedia Britannica, Inc., New York. 14th Edition. Volume XIX. 1929.

mon. Grade crossings are giving way to overpass and underpass, and these have brought about a decrease in fatalities.

Differences in Road Surfaces

The gripping ability of road surfaces is of interest not only to the engineer; it is of great importance to the driver, whose life depends often upon road traction or friction. It is true that speed, tires, chains, slope, and temperature affect traction; this has been emphasized. It should be understood also that various surfaces offer different coefficients of friction. Slippery pavements have little traction; gritty surfaces have excellent traction. The National Safety Council has published the approximate coefficients of friction for new tires when the speed is ten miles per hour. Table 12 shows that

Table 12. The Gripping Ability of Road Surfaces [1]

Road Surface	Clean and Dry	Wet
Portland Cement Concrete	90%	Down to 60%
Asphaltic Concrete	85%	Down to 80%
Brick	85%	Down to 65%
Oiled Gravel	90%	Down to 65%
Gravel or Cinders	65%	About same
Snow, Packed	45%	About same
Ice or Sleet on Pavement	20%	About same
Ice on Puddles	10%	
Mud on Pavement		30%

[1] National Safety Council. Chicago, Illinois. *Public Safety Memo No. 22.* August, 1935 (Revised).

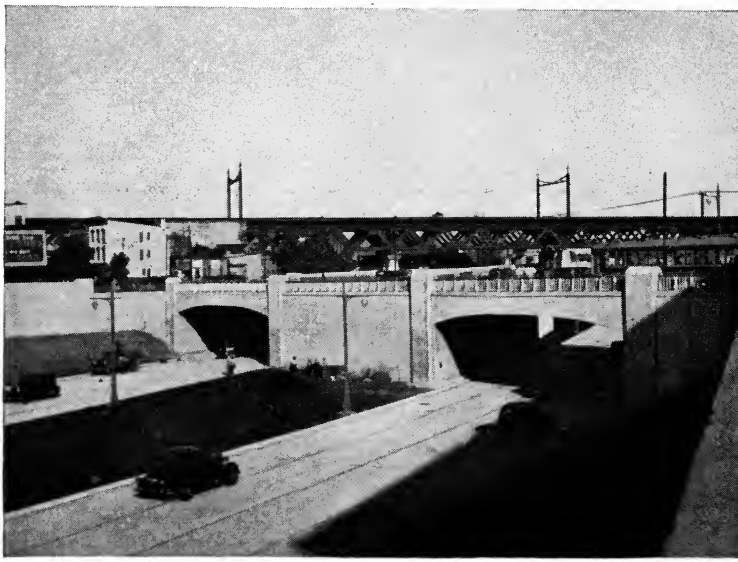
clean concrete, brick, and oiled gravel roads offer better traction than wet ones. It shows also that asphalt offers excellent traction in both dry and wet weather. It shows that oiled gravel and concrete offer better traction in dry weather than any other types of surfaces.

Courtesy of Portland Cement Association

Fig. 21. A clover-leaf grade separation, Chicago Park System.

Roads for Safety

Engineers have found a great many factors entering into the construction of safe roads. Crowned streets in cities make drainage better; on highways, because of the greater speed, roads are flatter than they are in cities. Roads are usually banked on curves. If they are not, skidding is a danger. All drivers should understand the necessity for care in proceeding around a curve in which the road is not banked, and the need for caution when driving upon a smooth road that is sharply crowned. Recently highway engineering has progressed greatly in road planning. The present problems indicate that more study will be made.



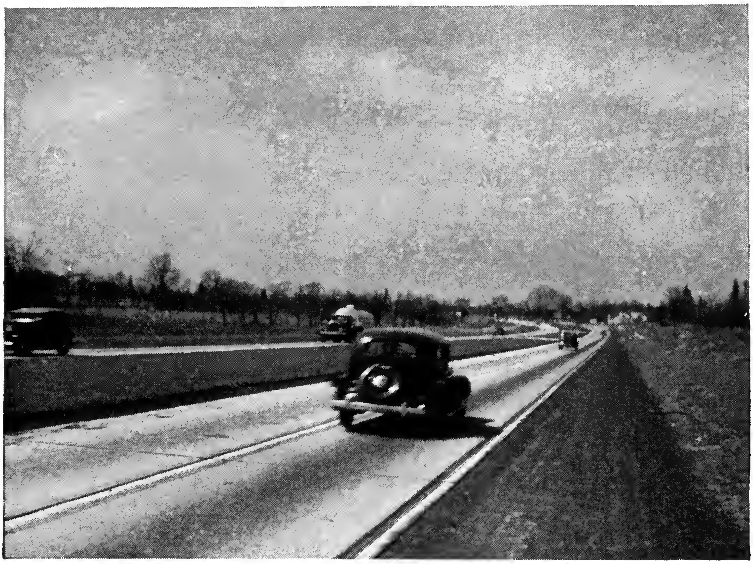
Courtesy of Portland Cement Association

Fig. 22. A divided highway grade separation, New York City.

In building roads which will be safe, the channelization of traffic flow and elimination of traffic friction must be considered. Channelization of traffic means the routing of traffic continuously in a lane. Traffic friction results in collisions in four places on the road; in intersections, in the middle of the road, in the stream of parallel traffic, and at the sides of the road.

Serious accidents occur at crossroads and intersections where traffic streams cross. The elevation of one of the roads prevents such friction. (See Figure 22.)

In the middle of the road where two streams of traffic pass in the opposite direction, fatal head-on collisions occur. These may be eliminated by a dividing parkway down the middle of the road. (See Figure 23.)



Courtesy of Portland Cement Association

Fig. 23. Limited way with mid-road friction eliminated.

In the multiple lane roads, there is always the danger of rubbing or sideswiping other cars going in the same direction when they get out of their respective lanes. Such accidents can be prevented by careful adherence to traffic regulations.

At the sides or margins of the road there are collisions with objects, trees, guardrails, and other cars. Such

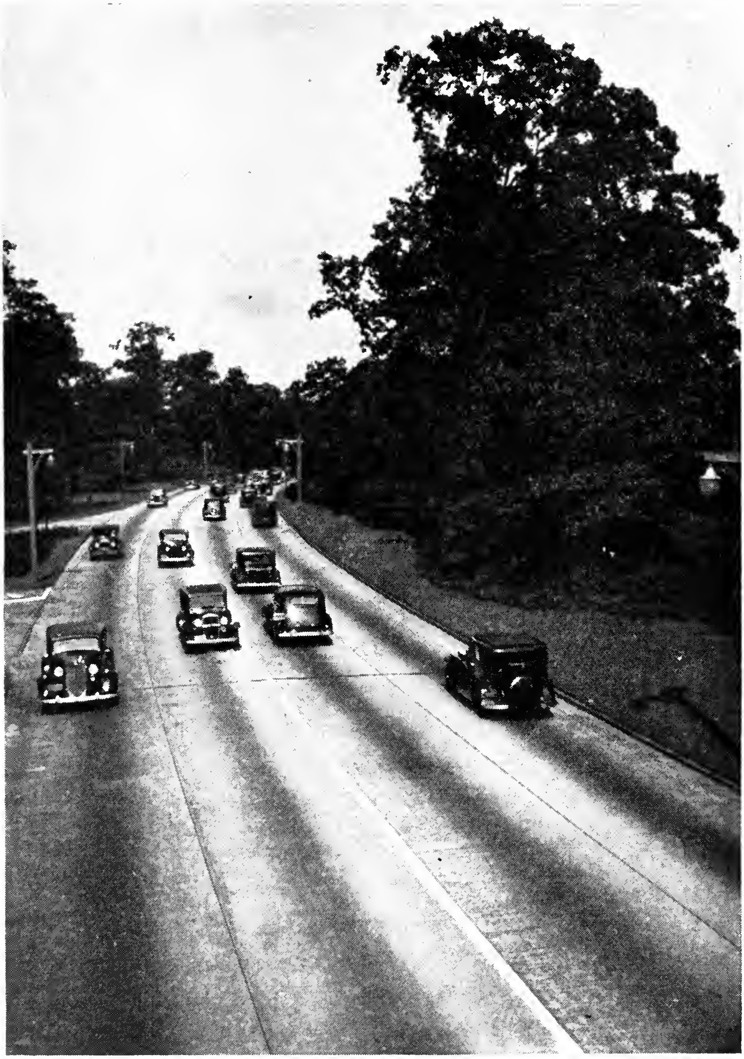


Fig. 24. A four-lane highway with mid-road friction.

collisions may be eliminated by the construction of limited ways with guarded approaches to them.

Eliminating the various types of traffic friction and perfecting traffic channelization are two important means of securing safety. Some of the devices which

Courtesy of Portland Cement Association

Fig. 25. Section of parkway limited way along Lake Michigan, Chicago, Illinois.

have been used for these purposes are: the limited way, multiple lanes, viaducts, traffic circles, grade separations, signs, and signals.

Multiple Lanes

Among the features of road construction which have proved discouraging during the last ten years are multiple lanes. The three-lane highway has produced many accidents. Drivers from both directions literally fought for the possession of the middle lane with terrible results.

Highways of four and six lanes proved just as disappointing. The smash-ups on these were more serious

Courtesy of Portland Cement Association

Fig. 26. A triple railway underpass with divided approach in Dallas, Texas.

and complex and the deaths proportionately more numerous. In two years on the superhighway between the Holland Tunnel and Trenton, 168 people were killed and 1800 were injured. In the two-year period there were on the average 21 accidents a mile. Every young driver should know the dangers of such a highway. He should drive on one of this type only with the greatest caution.

The Limited Way

A limited way is theoretically the ideal type of road. It guides traffic with the least possible danger. Several structural devices are common to it, among them the grade separation. See Figures 21 and 22, showing the clover leaf grade separation on the lake shore in Chicago and a divided grade separation in New York City. Note how intersectional friction is eliminated.

A dividing lane or island down the middle of the road is another aspect of the limited way that eliminates mid-road friction. (See Figure 23.) Note how mid-road friction would be impossible on such a road. Compare this figure with Figure 24. Note that in Figure 24 mid-road friction is possible.

The limited way may be an elevated road, a depressed road, or a tube. In any event there are no cross streets. The danger of marginal friction is reduced when access to the road from the side is cut off. The West Side elevated drive in Manhattan is an example of an elevated drive. Although 18,000,000 cars passed over it last year there were on it only 36 accidents.

The Holland Tunnel between New York and New Jersey is an excellent example of a limited way. In nine years there have been only five deaths, although 100,000,000 vehicles have sped through it, some on a lane for fast traffic and others on a lane for slow traffic. Intersectional, marginal, and mid-road collisions are impossible because there is no cross traffic, no opposing traffic, and no objects at the side of the road. Traffic is controlled by officers stationed at regular intervals to enforce the "stay-in-line" regulations.

A good example of a limited parkway road is the outer lake shore drive in Chicago from Jackson Park to Foster Avenue. (See Figure 25.) The entire route was opened for service in the late summer of 1937. On the north section of this road, while there have been accidents, no deaths have been reported in its six years of service.

Crossings and Intersections

Crossings and intersections offer a difficult traffic problem. The grade separation is one of the best means of solving it. (See Figure 26.) The circle or wheel turn is another good device for the elimination of cross friction. Weeds, trees, and other objects which obstruct the view at a turn should not be tolerated. If they are present, the driver should realize his danger and take the necessary measures for safety.

Shoulders and Safety Rails

Shoulders are constructed along the highway to be used when necessary; they accommodate pedestrians and cars stalled because of mechanical or tire trouble. A driver should always be aware of the type of shoulder on the road, for it may be necessary for him to decide whether he should drive on the shoulder or risk a collision.

Safety rails are devices for the protection of the motorist; usually they are placed near dangerous curves, across viaducts, bridges, and at precipices. The driver should realize that it is dangerous, and may be fatal, to hit them.

Bridges, Culverts, and Viaducts

A chain is said to be only as strong as its weakest link. Bridges and culverts may be the weak points in a highway. Narrow viaducts may offer highway friction. Signs usually indicate a narrow bridge. When signs are noted, the driver must proceed with caution. Speed on bridges and viaducts and over culverts should be slow. If signs and signals are followed, safety for all will be increased.

Road Signs

A good road has good signs where they are needed. Public safety and convenience demand the use of signs where control, warning, or guidance is necessary. They should help both the driver and the pedestrian to know what to expect of traffic.

Every driver should know where to look for signs, what they mean, and how to be best guided by them. He should understand these three kinds of signs: regulatory, guide, and warning.

It is helpful to know the size and shape of road signs so that the meaning and form may be more easily associated. For example, stop signs "are octagonal because their importance demands an exclusive shape for instant identification."[1] "The circular advance warning sign and the cross-buck RAILROAD CROSSING sign" have such an important function that they are distinctive.

The following summary of section 126 from the

[1] *Manual on Uniform Traffic Control Devices for Streets and Highways.* National Conference on Street and Highway Safety. Washington, D. C., November, 1935, p. 22.

Manual on Uniform Traffic Control Devices, should give to all young drivers much information needed to read signs. Learn to read road signs at a glance. They may save your life.

TYPE, SHAPE, AND COLOR OF SIGNS [1]

Type	*Shape*	*Color*	
		Background	*Message*
Regulatory			
Stop	Octagon	Yellow	Black or Red
Speed	Vertical	White	Black
Movement			
Turning	Vertical	White	Black
Signals	Vertical	White	Black
One-way	Arrow	White	Black
Alignment	Vertical	White	Black
Exclusion	Vertical	White	Black
Parking			
Prohibition	Vertical	White	Red
Restriction	Vertical	White	Green
Miscellaneous	Vertical	White	Black
Warning			
Slow	Diamond	Yellow	Black
Caution	Square	Yellow	Black
Railroad advance	Circle	Yellow	Black
Railroad crossing	Cross-buck	White	Black
Guide			
Route Marker			
U. S.	Shield	White	Black
State	Special	White	Black
Auxiliary signs	Horizontal	White	Black
Destination	Horizontal	White	Black
Location	Horizontal	White	Black
Information	Horizontal	White	Black
Rest Station	Clover leaf	Green	White

[1] Adapted from *Manual on Uniform Traffic Control Devices for Streets and Highways.* National Conference on Street and Highway Safety. Washington, D. C., November, 1935, p. 22.

Study Aids

A. *Experiences*

1. Have you ever ridden on a limited way? If so, tell the class of its advantages.
2. Have you ever experienced the effect of rain or ice on the traction of a car? If so, describe the experience.
3. If you have ever seen a clover leaf grade separation, describe it.
4. Have you ever seen a sign which was misplaced? If so, what was wrong with it?
5. Have advertisements along the road helped to make driving dangerous?

B. *Problems for Class Discussion*

1. Show how Roman law has affected roads in this country—their construction and maintenance.
2. In what way has English law and custom affected road building in America?
3. Show how the railroad and the automobile affected the construction and improvement of roads in this country.
4. Describe the "stage construction" plan of road building.
5. Discuss the gripping ability of different types of road surfaces in wet and dry weather.
6. Name and describe four kinds of traffic friction.
7. Why do automobile tires have deeply cut designs in them?

C. *Study Activities*

1. Write a report on the "Appian Way" and the "Flaminian Way."
2. Several groups may plan an improved road system for your city or town.
3. Write a paragraph including the essentials of a foolproof road.
4. Write a paragraph showing the dangers of multiple-lane roads.
5. Draw what you think are the two most important road signs. Why did you choose them?

D. *Questions*

1. What are tolls?
2. Where have you known tolls to be charged in our country?
3. How many miles of highway are there in the United States?
4. How wide should a road be?
5. What is meant by channelization of traffic?
6. What is meant by a divided highway grade separation?
7. How many kinds of limited way are there?
8. Name two well-known limited ways. Describe them.
9. What kind of friction occurs at crossings and intersections? Why is it so dangerous?
10. What is the value of shoulders on a road?
11. What is the purpose of road signs?

E. *Suggested Readings*

1. "Foolproof Roads." *Reader's Digest.* pp. 53-57. October, 1936.

2. *Manual on Uniform Traffic Control Devices for Streets and Highways.* National Conference on Street and Highway Safety. Washington, D. C., November, 1935. 166p.

3. Peters, Russell Holt. "Death on the Highway." *Reader's Digest.* pp. 18-22. April, 1935.

4. Peters, Russell Holt. "Stop, Look, and Listen." *Reader's Digest.* pp. 77-79. November, 1934.

5. *Public Safety Memo No. 22.* National Safety Council. Chicago, Illinois. August, 1935. (Revised.)

6. *The Encyclopedia Americana.* Americana Corporation. New York. 1929. Volume XXIII.

7. *The Encyclopedia Britannica.* Encyclopedia Britannica, Inc., 14th Edition. New York. 1929. Volume XIX.

8. *You in Your Car on City Streets.* Automobile Manufacturers Association. Detroit, Michigan. 1936. 63p.

CHAPTER 16

SPEED

SPEED IN ONE FORM or another is the greatest element in automobile accidents and death. The urge to move rapidly, the desire to arrive quickly, the wish to be ahead of the other fellow, and the thrill of stepping on the gas are killing tens of thousands of people yearly and making the car a deadly weapon, the road a place for slaughter and suffering.

So much has been said about the danger of automobile speeds and the results of speed that we wonder why the manufacturer builds such powerful engines. But the public seems to desire speed; the driver demands speed. While a fast driver may be a good driver and a slow driver may be a poor one, as a rule if a driver is going too fast in certain road and traffic conditions, he is driving recklessly and must slow down or pay a penalty for his folly.

WHY SPEED?

Manufacturers and designers were not particularly interested in making cars that would travel eighty miles an hour. But the driving public really wanted a car with quick "pick-up"; a car that would beat the other car when the light changed to green; a car whose rapid acceleration could be depended upon when another car was to be passed. In order to give that extra "pick-up" a powerful engine was necessary. A powerful engine, however, is capable of driving a car at a high rate of speed. Manufacturers of course hoped that the public would use this speed in the proper way. The majority of people do, but a few abuse power and speed, and accidents have consequently increased at a very alarming rate.

Misuse of Speed

Sometimes a driver weaving in and out of heavy traffic during the rush hours, speeding swiftly and dangerously past intersections, may seem at first glance to be making real progress. The cautious motorist may feel that he is a tortoise by comparison. Often, however, when the cautious motorist reaches the next stop light, just as it is changing to green, he will find the car ahead of him to be that of the hurrying driver who was darting in and out of traffic a few seconds before.

A number of recent tests sponsored by the Chicago Safety Council and the Accident Prevention Bureau of the Police Department have shown the amount of time saved when a car is driven madly and recklessly. In one case a motorist "gunning" his car through traffic, cutting through lanes, running through amber lights, taking long chances, and violating every traffic courtesy possible within the limits of the law, arrived after an eight-mile trip only three minutes ahead of his competitor who obeyed strictly every law, courtesy, and rule of the road. In another test of the same nature, six minutes were saved; in still another, the chance-taking driver saved two minutes in six miles.

Every young driver should ask himself the questions: What is the value of a minute saved by taking chances? What do I gain by excessive speed? What are my chances of going to the hospital or of being killed by reckless driving?

Each driver should answer those questions. If he is wise, he will see that time saved by speed at great risk is of little value. He will understand that he is betting a few minutes against a lifetime. To insure safety he will plan to have sufficient time for driving.

Speed and Tire Wear

Driving at a high rate of speed is hard on tires. Automobile companies and others have made exhaustive tests with regard to the increased cost of operation when cars go at various speeds. Figure 27 shows the decrease in the life of the tire as the speed is increased. One of the main functions of the tires is to give good traction so that the power of the engine can drive the car and so that the car will not skid. If tires are abused, a blowout or a skid may cause an accident.

If an engine develops 30 horsepower at 30 miles per hour, at 60 miles per hour the engine must theoretically produce four times as much power, or 120 horsepower. This power is being transmitted to the road through the rear tires. While the distance covered is only twice as great in the same time, the wear on the tire is about four times as great. The tire life will be greatly reduced at high speed.

The tire life will also be further reduced by the excessive heat generated by the fast speed. If the tires do not have good traction, the power is transformed into heat between the tire and the road. Every time the tire goes over a bump, a depression in the road, or a piece of

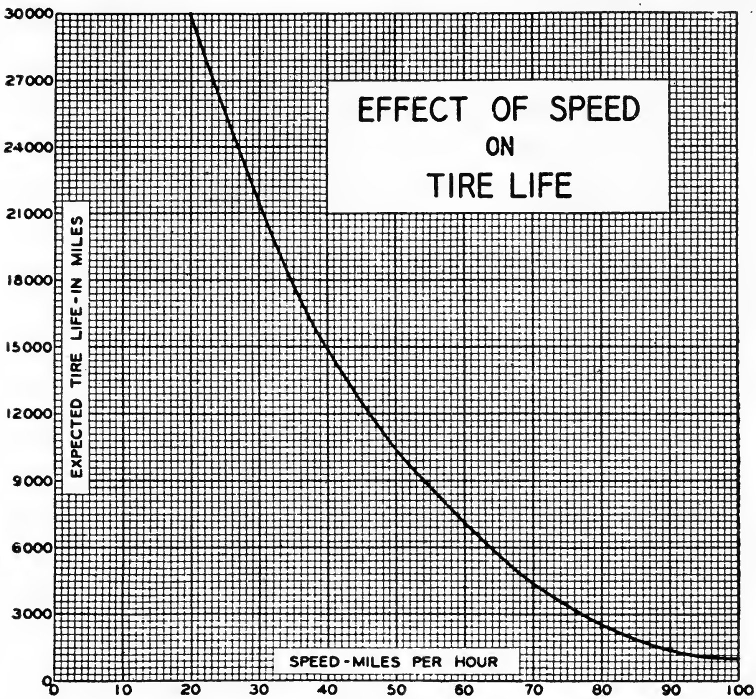


Fig. 27. High speed reduces the life of the tires.

rock, it is depressed, causing the layers of cord to slide on one another; thus additional heat is generated. The tires are a safety device if used properly, a source of danger if misused.

Speed and Gas and Oil Consumption

The consumption of gas and oil increases rapidly as the speed of the car increases. In fact, very little oil is generally used by the average car in good condition at 20 to 30 miles per hour, but when the speed is increased to 50, 60, or 70 miles per hour, the oil is circulated faster and a great deal of it is forced out of the crankcase

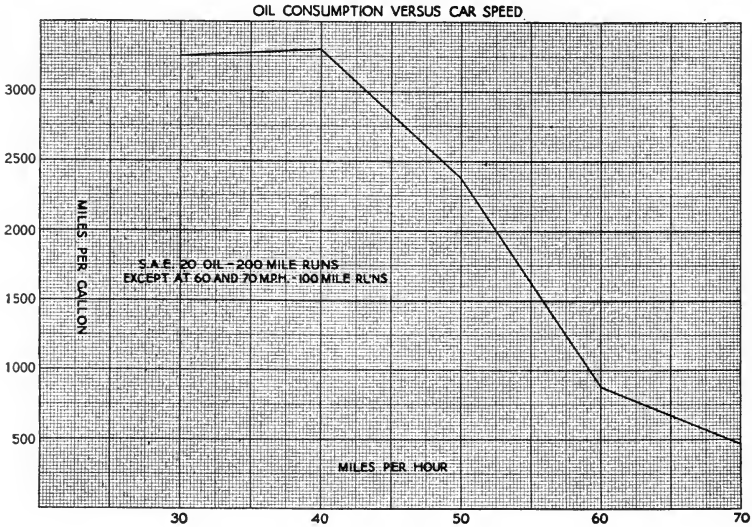


Fig. 28. Oil consumption increases as speed increases.

breather and also through the exhaust. Figure 28 shows the increase in oil consumption at various speeds.

Naturally, more gas per mile is required to travel at a high rate of speed than at a low rate. Figure 29 shows the increase in gas consumption at various speeds.[1]

Speed and Control

Most cities have a speed limit of from 10 to 20 miles an hour in the congested districts. In the residential

[1] The wind resistance of a moving object increases approximately in proportion to the ratio of the increase in speed squared.

districts, the limit is generally 5 or 10 miles greater; in the suburbs, 30 to 35 miles per hour is about the average. These limits are merely yardsticks of measurement for top speed. A good driver observes these limits.

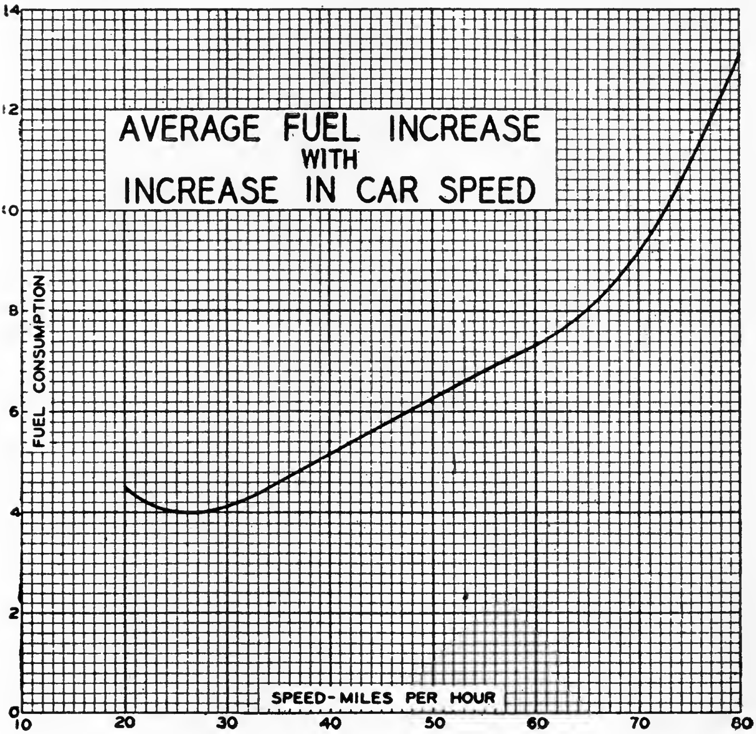


Fig. 29. More gasoline per mile is used at high speeds.

The driver must know the right speed for all conditions. The engineer of a transcontinental train is a good illustration of this point. When he gets the signal to start his train, he opens the throttle slowly, looking straight ahead and watching the signs to see that the track is clear. He sees a sign on the right of way which says, "10 miles." He knows the purpose of that sign; he obeys it. After he has *cleared the yards,* another sign says, "25 miles"; so he opens the throttle a little, keeping careful watch for a danger signal ahead. Soon he sees a sign, "Clear." He knows that he has passed the congested district; he is in the open where there are no crossroads.

The track is built for speed. The engineer knows that he must open the throttle on these stretches, for the train must be on time. He watches the track at all times. When he sees "X" on the post ahead, he blows his whistle, for he knows of a highway crossing just beyond. He may see a careless motorist who does not seem to see his train, so he blows several blasts to attract the motorist's attention.

Although there is a railroad crossing sign on the highway, the motorist comes at breakneck speed. Apparently he is not so attentive as the engineer. Perhaps he does not take his driving so seriously. Finally the motorist applies his brakes and stops with only a few feet to spare and the train whizzes by. Such narrow escapes are numerous. We do not read about them in the papers. Only the horrible accidents are given publicity.

The engineer mutters a few words about careless drivers and focuses his eyes on a yellow caution signal down the track. He closes the throttle and lets his train coast; he tests his brakes to make sure that he is ready for a quick stop if necessary. He knows that the next signal may be red, and would mean Stop until a signal to proceed is flashed. Finally this engineer brings his train into the suburbs of a city. The signs along the track tell him the speeds that are the safest and he obeys those signs. He travels along slower and slower as he approaches the station, and as he enters the station his train barely crawls. He has brought his train in safely because he has tended strictly to the business of driving.

Good car drivers handle their cars similar to the manner of the train engineer, at a comparatively high speed when it is safe, at a slower speed according to conditions. A few poor or criminal drivers have utter disregard for their own safety and the safety of others; these are the drivers who speed to accident, destruction, and death.

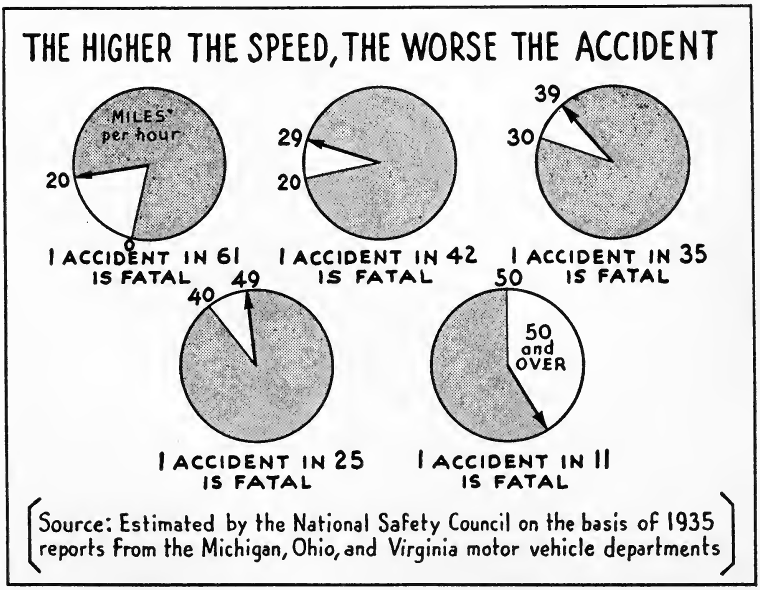


Fig. 30

Speed and Death

By referring to the facts and figures in Chapter 12 we find that speed is the cause of the greatest number of accidents. The driver loses control of the car more often at high speeds than at low. An accident at high speed is more likely to be fatal. (See Figure 30.) Note that at 20 miles an hour one accident in 61 is fatal; at 30 miles an hour one accident in 42 is fatal; at 40 miles an hour one accident in 35 is fatal; at 50 miles an hour one accident in 25 is fatal; at a rate above 50 miles an hour one accident in 11 is fatal. These facts show that speed is most dangerous. In fact it is vicious when used unwisely. Under some conditions, or with an inexperienced driver at the wheel, it brings horrible fatalities.

Study Aids

A. *Experiences*

1. Have you ever ridden in a car operated at very high speed? How did you feel?
2. Have you driven at a high speed at night? What is your opinion of the experience?
3. Have you ever had your patience tried by a "buggy-riding," dawdling driver on the road? How did you meet the situation?

B. *Problems for Class Discussion*

1. Discuss: Speed versus Moderate Driving.
2. Discuss: Safe Speeds versus Unsafe Speeds.
3. Why do tires break down at high speeds?
4. Why do we use more oil and gas at high speeds?

C. *Study Activities*

1. Why does an otherwise good citizen often become a speed demon when he gets behind the steering wheel of an automobile?
2. Write a paragraph in answer to one of the questions which every young driver should ask himself. Think how you would answer the other questions.
3. List three specific traffic situations and indicate a maximum speed for each.

D. *Questions*

1. Why are automobile engines made so powerful?
2. What is the proper speed for city streets? Give reasons for your reply.
3. What is the cause of most automobile accidents and especially serious ones? Why?
4. Is speed in automobile driving an economical use of time? What are the facts?
5. What is the length of life of a modern automobile tire? How can its life be considerably lengthened?

E. *Suggested Readings*

1. *Accident Facts.* National Safety Council. Chicago, Illinois. 1937.
2. *Calling All Drivers.* Metropolitan Life Insurance Company. New York. 16p.
3. *Live and Let Live.* Travelers Insurance Company. Hartford, Connecticut. 38p.

4. *Saving Seconds or Saving Lives.* Aetna Casualty and Surety Company. Hartford, Connecticut. 18p.

5. *Thou Shalt Not Kill.* Travelers Insurance Company. Hartford, Connecticut.

6. *You Bet Your Life.* Travelers Insurance Company. Hartford, Connecticut. 36p.

CHAPTER 17

REGULATION OF TRAFFIC

Many accidents are brought about because of the violation of traffic regulations. Traffic laws and regulations are made for the protection of the motorist as well as of the pedestrian. The thinking, careful, considerate driver will obey them. Penalties should be imposed on those who do not.

Drivers' License Laws

A number of states have passed laws regulating the driver of the automobile. Some states have passed laws affecting only the driver of a commercial vehicle, while others have passed laws for the certification of both the commercial and the private car operator.

One purpose of the drivers' license law is to place responsibility upon the motorist. Another purpose is to protect the public by eliminating those drivers who are mentally or physically unfit to operate a motor vehicle safely. Laws about drivers' licenses should go far to eliminate those who do not have the right attitudes and abilities for driving.

How well some of the state laws accomplish this purpose is a matter of opinion. In the states where laws about drivers' licenses have been put into effect, the accident and death rate decreased. The basic principle of the law seems to be correct and of value. Chapters 4 and 5 give in detail the qualities and attitudes of a good driver. Good laws will not permit licenses to drivers who are not qualified physically, mentally, and emotionally for driving.

Regulations and Enforcement

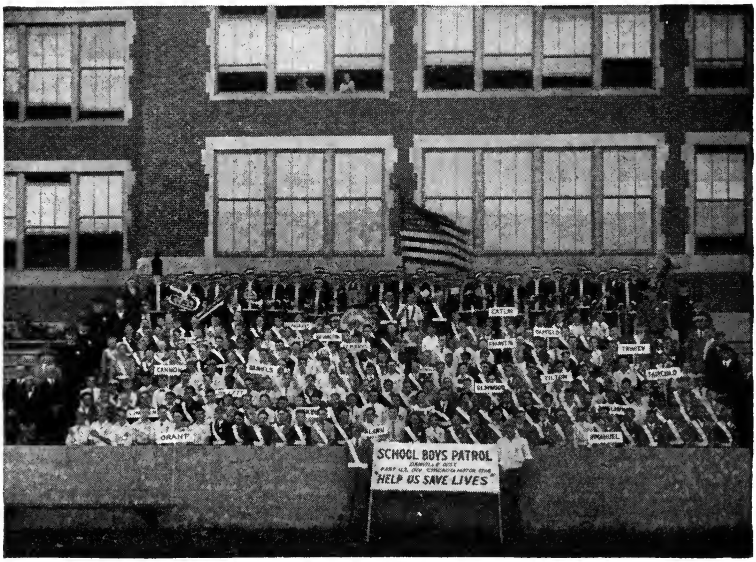
Enforcement of regulations is a most vital part of traffic control. Violators must be induced to obey the law willingly. Educational enforcement is sufficient for the great majority of people. The police and the law are necessary for a few. The National Safety Council has shown that a decreased number of accidents was the result of increased enforcement.[1] Reduction in accidents follows stringent enforcement. Real enforcement brings increased efficiency in traffic control.

Most cities have passed laws to regulate the flow of traffic and the assessment of fines for violations of these laws. It is the duty of the police and traffic officers to enforce them. True, it is sometimes not an easy matter to give an arrest ticket for a violation. Tickets, however, must be given to all traffic violators, rich and poor alike. Wealth or friendship is no bar to accidents. A friend or rich person is just as liable to cause an accident or death as anyone else if he is permitted to violate the law.

Police regulations should be known and obeyed. Ignorance of the law excuses no one. When parking, for example, one should not park in a restricted area.

[1] *Guides to Traffic Safety*, p. 39. National Conference on Street and Highway Safety, Washington, D. C. Reprinted February, 1936.

These restricted areas have been set aside after a careful study of that location and the traffic in the vicinity. Restrictions have been made mainly in the cause of safety and for safer and better movement of traffic.



School Boys' Safety Patrol.

In like manner regulations concerning such matters as double parking, parking lights, where to make turns, the use of lights, the use of the horn, and U-turns must be known, understood, and obeyed. Co-operation with police and other traffic officers is of extreme value in securing safety.

School Boys' Safety Patrol

There are now hundreds of thousands of boys, pupils in the public and private schools all over the country, who belong to the School Boys' Safety Patrol. These boys regulate the movement of traffic at crossings used by pupils going to and from school. The orders of the patrol boys are respected by the motorist and the student. It is to the interest of the pedestrians and the motorists alike to obey warnings and commands of these patrol boys.

Much of the credit for the decrease in death rate of children 5 to 9 years of age in the past 11 years belongs to the safety patrols. From 1922 to 1933 the death rate decreased 25 per cent. The elementary school children are pedestrians; they are being taught how to be better pedestrians. Similar training in high schools on safe ways of operating a car should bring corresponding results in saner driving, since most of the drivers learn to drive during their high school years.[1]

Car Licenses

The licensing of motor vehicles serves a twofold purpose. First, it places an identifying number on the vehicle; second, the fee paid for this license is used to provide paved and improved roads for the motorist. None can deny that the license plan is a good one. The fee varies in different states. The amount was originally set to produce the sum needed to build and maintain the highways of the state and to police them properly. In states in which there are few cars and a great road mileage is needed, the license fee is generally greater than in a small state in which there are many cars and a small road mileage.

[1] Travelers Insurance Company, quoted in *School Life*, p. 5. September, 1936.

The licensing of cars also provides an effective weapon against theft of the vehicle. A number of states have passed anti-theft laws requiring the owner to secure a certificate of title from the state. This title record is on file at the licensing bureau and is transferable only upon presentation of a bill of sale properly notarized. The operation of this act prevents a large number of thefts.

School Busses

With the improvement of roads and transportation came the opportunity to consolidate schools in rural districts and to increase the effectiveness of rural education by assembling the students in a larger building better equipped for the teaching of the pupils.

Rapid transportation of children, especially from the standpoint of safety, demands reliable school busses. The color of the bus should be distinctive, and signs both in front and rear should be visible to all forms of traffic. Eighty thousand school busses transport three million children daily to and from school.

The regulations concerning these busses are necessarily strict. Regulations in one or more different states demand that the school bus have a speed control governor set at thirty miles per hour, headlights, a rear light, stop lights, interior lights, reflectors, an interior rear-view mirror, a directional signaling device, a power driven windshield wiper, adequate heater not connected with exhaust, approved roof ventilators, exhaust pipe without leaks extending to rear of bus, window guards, bumpers so attached to the frame that pupils cannot ride them, traffic guardrails, horn in good working order, speedometer, strong front posts whose width must not be so great as to obstruct the driver's vision, gasoline tank outside the bus, fire extinguisher, tools for making minor repairs, skid chains, spare tire, extra light bulbs, first-aid kit, flags and flares, and hand ax.[1]

Most states have a law prohibiting all vehicles from passing a school bus while it is loading or unloading.

Overloading the Car

The laws against excessive loading and illegal seating of more than two persons in the front or driver's seat of an automobile, are regulations designed to control the load so that the driver may manipulate his car controls without handicap. Crowding in the front seat prevents the driver from making free and accurate movements for such control. When a car is overloaded it is generally out of balance; it is then difficult to control and dangerous to drive. Practices that endanger life and limb of both the pedestrian and the driver should be avoided.

Traffic Lights

Traffic lights or signals are used in most of the cities and towns at intersections where the traffic is heavy. Without these lights, traffic would be delayed and a greater number of accidents would occur at these intersections. Each light has a direct message to the public that should be obeyed. In general, the green traffic

1 "Safety in Pupil Transportation." *Research Bulletin*, National Education Association. Vol. XIV, No. 5. November, 1936. pp. 201 and 216.

light gives the right to proceed; the red light means to stop; the yellow light is cautionary. Following are the meanings of each light combination as adopted by the Uniform Traffic Code. This interpretation is general throughout the United States.

Green after Yellow: Proceed with caution after cross traffic has cleared.

Yellow after Green: Slow down and stop before crossing the crosswalk. If too close to the intersection to stop with safety, proceed but with caution.

Yellow after Red: Prepare to start the car after all cross traffic has cleared.

Red after Yellow: Stop before entering the crosswalk.

Flashing Yellow: (caution signal) Proceed through the light but with slowness and caution. This light is often used when traffic is not heavy.

Flashing Red: (stop signal) Stop. If traffic is cleared, proceed with caution. This light is also used where traffic is light, but when a dead stop is advisable.

At yellow after red do not try to get away to a flying start. That light is for the traffic to clear before cross traffic starts. Strict obedience to the command of the traffic lights makes for better, safer driving, and more rapid movement of traffic.

Hand Signals

A driver should signal his intent to stop or turn when on the public highway. Uniform hand signals have been adopted by most of the states as follows:

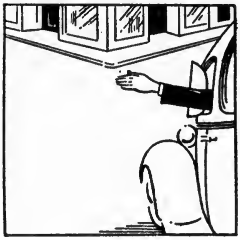


Fig. 31

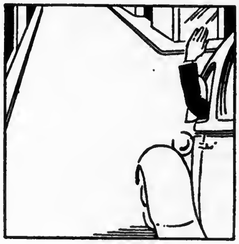


Fig. 32

Fig. 33

To make a left turn: *left arm extended straight out* as shown in Figure 31.

To make a right turn: *left arm extended upward* as shown in Figure 32.

To stop: *left arm extended downward* as shown in Figure 33.

Some localities vary these signals by adding the turning of the palm or pointing with the index finger, in addition to the above arm signals. If the above signals are used and obeyed, little trouble will be experienced in making your intentions known and in understanding the intentions of others. Although rules may vary in cities, most of them have an underlying uniformity.

Codes

Codes assist one to analyze one's own actions and those of others. Codes of the road help a driver to know what is a right act and what a wrong one. The ten commandments of driving in Chapter 7 make up a good set of rules. Study them carefully.

To keep to the right and to pass another car going in the same direction on the left are good general principles of driving. Use proper signals for turning. Wait until you have the right to use the road. Drive carefully and be a good citizen. All are important principles of a safe driving code.

Courtesy of the Chicago Motor Club

A Chicago School Safety Patrol in action at an intersection.

A few important specific rules follow: It is a general law in most cities that a vehicle must stop before entering a crosswalk or a street from an alley. A number of accidents are caused by motorists who do not obey this law.

Streetcars are used by millions of people daily. It is the right of these people to be able to enter and leave the streetcar with safety. Unless there is a safety island provided for the streetcar patrons, it is illegal in most states to pass a streetcar while it is being loaded or unloaded.

It is also illegal and dangerous to pass a streetcar on the left. A pedestrian may be crossing in front of the car while it is unloading. If the law is violated, a serious accident situation results.

It is a dangerous practice to coast on the street or highway. Many a boy or girl has been killed or crippled for life when control of the sled was lost while coasting. Automobiles cannot stop very quickly in snow or on ice.

Roller skating on the street is also a dangerous practice. In some states it is prohibited. The sidewalk is a safer place for roller skating than the street.

There is a law in most states prohibiting anyone from hanging onto, or riding on the outside of, any vehicle. This law was passed in the interest of safety. Many a boy has been fatally injured by this practice. If you would live a long, healthy life, ride on the inside of all vehicles.

Read the rules for safe walking and bicycle riding in the appendix. They too are important for safety.

Emergency Vehicles

All emergency vehicles, such as police cars, fire vehicles, ambulances, should always be given the right of way. Emergency vehicles are permitted to drive through the red lights upon proper warning, to drive on the left side of the street, and to do all things that will expedite their journey.

When the siren of the emergency vehicle is heard, the location of the vehicle must be immediately determined. If it is on the street on which you are traveling, stop your vehicle at once, as near to the curb as possible, making sure that the emergency vehicle has room to pass.

Model Traffic Ordinances

The Bureau of Public Roads of the United States Department of Agriculture has published *Model Traffic Ordinances* as prepared and revised by the National Conference on Street and Highway Safety. Part I of *A Model Municipal Traffic Ordinance* is of special interest to drivers. Every young driver should acquaint himself with these suggested regulations. The National Conference on Street and Highway Safety suggests also a uniform vehicle code and manual of uniform traffic control devices. Uniform standards, codes, and control devices would be of inestimable value in reducing accidents.

Right of Way

Vehicles, in general, must give way to the driver on the right when two cars reach an intersection at the same time. The driver on the main highway, however, usually has the right of way over a driver on a cross-road.

A driver desiring to make a left turn should drive on the inner right lane to the intersection and stop. When traffic from the opposite direction has passed, he may complete the left turn when the traffic light permits, leaving the intersection on the right of the center line.[1]

When driving on multiple lane roads, one should keep in general to the right, except when passing another car. On a four-lane road, two lanes are available for traffic moving in each direction. All vehicles should stay on the outside lane, except when passing other vehicles. The inside lane is used for passing other cars.

On a six-lane road, three lanes are for traffic moving in one direction and three for traffic moving in the other. Slow-moving traffic should stay in the outside or extreme right lane; traffic moving with moderate speed should follow the lane next to the outside; fast moving traffic should stay on the third or inner lane. Thus traffic will be well ordered and there will be little chance for confusion or accident.

Safety Zones

In the majority of cities and towns, safety zones are marked off and safety islands erected on which pedestrians who desire to enter or leave a streetcar may

[1] In some cities, Cleveland and others, a left turn is made from the curb lane when cross traffic starts to move.

stand. Some of these safety zones are well protected by steel or concrete bulwarks; yet the reckless driver often strikes the bulwarks with serious results to himself and to the pedestrians on the safety island.

Sometimes a zone is merely indicated by a line on the pavement. This zone should be respected by all drivers. It is illegal in most states to drive over it whether it is occupied by people or not.

Study Aids

A. *Experiences*

1. Have you ever been with a driver who received a ticket for passing a stop light? What were the circumstances?
2. Have you ever ridden with a driver who drove fast just to show off? What was your reaction?
3. Have you ever directed traffic? Who were the hardest to handle, the drivers or the pedestrians?

B. *Problems for Class Discussion*

1. Debate the question: *Resolved*, that all applicants for license to drive an automobile should be examined physically and mentally before being given the right to drive.
2. Discuss the value of flashing versus illuminated signs.
3. Should the pedestrian as well as the driver be compelled to obey the traffic signals?
4. Discuss the dangers of overloading the front seat.
5. Make up a set of traffic regulations which would improve safety in your community.

C. *Study Activities*

1. If there is a traffic light near your home or school, observe the number of violations made by the drivers of one hundred cars in passing. Make a summary of the violations committed.
2. Study your city or town and suggest where traffic lights are needed. Give reasons for your recommendations.
3. Is there a drivers' license law in your state? Make a study of it and make suggestions for improvement of this law.

D. *Questions*

1. If drivers are licensed, what should be the effect on the accident rate? Why?
2. What is the purpose of a safety zone?
3. Has the School Boys' Safety Patrol affected the accident rate in the past ten years? How?
4. Should an automobile be licensed? Why?
5. What precaution must be taken by motorists when a school bus stops to load or unload?
6. What is the purpose of traffic regulation?
7. What does a flashing yellow signal light indicate?
8. How would you make an arm signal to stop? to turn right? to turn left?
9. Why should a streetcar not be passed on the left side?
10. How should one drive on a four-lane highway?
11. Who enforces traffic regulations?
12. What is the license fee for a medium-sized car in your city? in your state?

13. What is meant by right of way?
14. What are the dangers of safety zones?

E. *Suggested Readings*

1. Allen, Thomas. *Safe and Sane Use of Highways.* E. M. Hale and Company. Milwaukee, Wisconsin. 96p.
2. *Guides to Traffic Safety.* National Conference on Street and Highway Safety. Washington, D. C. Reprinted February, 1936.
3. *Model Traffic Ordinances.* Bureau of Roads. Department of Agriculture. Washington, D. C. 1936.
4. *Research Bulletin* of the National Education Association, Vol. XIV, No. 5. November, 1936. Washington, D. C.
5. *Revised Motor Vehicle Laws of Illinois.* Springfield, Illinois. 1935.
6. "Sound Driving Practices." *Sportsmanlike Driving Series.* American Automobile Association. Washington, D. C. 108p.
7. *Studying the Movement of Motor Vehicles.* Metropolitan Life Insurance Company. New York. 24p.
8. *We Drivers.* General Motors Corporation. Detroit, Michigan. 36p.
9. Whitney, Albert W. (Editor). *Man and the Motor Car.* National Bureau of Casualty and Surety Underwriters. New York. 1936. 256p.
10. *You in Your Car on City Streets.* Automobile Manufacturers Association. Detroit, Michigan. 63p.

CHAPTER 18

THE TRAFFIC COURT

To THOSE INTERESTED in the tragedy that bad driving causes on street and highway, a visit to the traffic court in one of the large cities is enlightening. To those who live in rural districts or are prevented by circumstance from visiting the court, the opportunity is given of hearing the cases tried over the radio. Many large cities have periodic broadcasts of safety court sessions. These give information which is interesting and valuable to the intelligent listener.

Broadcasts should deter reckless, speeding, and drunken drivers. A half-hour broadcast will serve to indicate the various prevalent types of infractions and the remedial measures applied by the courts to remedy them.

Drivers are required to have information about simple traffic facts and a better knowledge of safe driving principles than ever before. The time is coming when a continued application of that knowledge will be necessary to retain a license to drive. Many states have laws providing for the revocation of license, a jail sentence, and fines for infractions of codes and regulations. How enforcement officers make their work with offenders educative as well as punitive is shown by the following cases.

Hit-and-Run Driver

A. J. was arrested because he had left the scene of an accident after a collision in a lane in which he had no right to drive. He was fined twenty-five dollars and his license to drive was revoked for a period of six months. The disregard of this motorist for the safety of others was criminal and brought him a scathing reprimand. In passing sentence, the judge condemned the cowardly hit-and-run driver who runs away after killing or injuring someone.

Reckless Driving

B. K. drove forty miles an hour through a stop light at an intersection, blowing his horn loudly and scarcely missing motor vehicles and pedestrians. A police officer followed and finally brought him to the curb after a long chase. He defended himself by saying that he was in a hurry. Although no one was hurt, the driver was reckless and might have killed someone. He was fined ten dollars for reckless driving.

C. L. drove through a stop sign and crashed into a car which had the right of way, injuring the driver and damaging the car. His defense was that he was in a hurry to get to his job, that a job was all important to him, and that he had to take care of it. He was admonished to allot a fair amount of time for driving to his job. He was fined twenty-five dollars.

Intoxicated Drivers

D. M. was in court on December 24, 1936. Evidence showed that while intoxicated the man drove an old car with poor brakes through stop lights, thus endangering the lives of drivers and pedestrians. This was his first offense. He had been a law-abiding citizen all his life. He worked hard and faithfully to support a large family. For years he had gone along without a slip, but on this night he had taken several drinks.

An old lawyer pleaded the defendant's case ably and eloquently. He admitted that the man had been drinking, but appealed to the judge that in the light of the man's past record as a good citizen, he should be let off. He called attention to the fact that it was the day before Christmas. He spoke of the Christmas spirit. He spoke of the fine family. He said that a jail sentence would cause sorrow to his family and bring a heavy penalty upon them. It would have a bad effect upon their pride.

The judge asked the wife of the defendant for her opinion. She said that this was her husband's first offense, therefore she felt that he should be let off with a money penalty. When the judge asked her if she thought that all first-time offenders should be given another chance, she replied that she believed all should be freed upon the payment of a fine if no one were injured.

In commenting upon the case, the judge said that he had sentenced others for the same offense. This man was admittedly intoxicated. He drove with poorly adjusted brakes through stop lights, regardless of the lives of others. It was merely by good luck that there were no fatalities. Therefore, in spite of the evidence proving that this man had violated the law for the first time in a long record of good citizenship, justice demanded a relatively fair and impartial judgment. He was given a ten-day jail sentence to begin after the holidays. This judge felt that no man should be given a second chance to kill people without a penalty being imposed for the first infraction of the law.

E. N. raced recklessly through stop lights and narrowly missed cars and pedestrians. An officer followed him two miles and arrested him when he hit a curb and was forced to stop. It was proved that he was intoxicated. He was sent to jail for ten days.

F. O. was a truck driver. He backed his truck into a car, which was damaged considerably. He was accused of intoxication but the charge was not proved. He was let off with a ten-dollar fine. The jail sentence would have been imposed if the intoxication charge had been proved.

More and more, intoxication is becoming a cause of accidents and deaths. The intoxicated driver must be kept off the road.

Speed

The cases of G. P. and H. R. are similar. Home for the holiday vacation, each separately drove in the streets of a great city at the speed of fifty-five miles per hour. These boys were taken to the County Hospital so that they could see the results of speed and recklessness in human misery and suffering.

J. S., a high school boy who was arrested for driving forty-five miles an hour in the city, tells his own story:

"When driving rapidly one morning, I was stopped by a policeman. He handed me a ticket saying, 'Appear at the Traffic Court on June 5, either with your mother or father.' On that day the judge came in at ten o'clock and gave a short speech on how accidents are caused. 'By reckless drivers and drunkards, and by speeding youngsters,' he said. The judge gave decisions in the cases of the young boys who were there for reckless driving or speeding. The penalty was a five-dollar fine and a visit to the County Hospital and Morgue.

"The sight at the hospital will never be forgotten by us boys. There were people without limbs, in terrible positions, with bandages and ugly scars. As the judge called our names one by one we walked up to the beds assigned to us and paid our fines to the victims of automobile accidents.

"The sickening odors and the terrible sights went to my head and just as the judge called my name I 'passed out.' The five-dollar fine which I paid, I shall not remember; but the beds, row on row, and the legs weighted, and the arms stretched straight on steel casts, I still see. Each time I drive the car, I keep on seeing them."

K. T., a young girl at a University, had attended a "prom" the night before and was late the next morning. She was driving at a terrific speed. A motorcycle officer found it necessary to drive sixty-five miles an hour to overtake her. She was sent to jail for a day and paid a fine of fifty dollars. Such was the cost of speeding fifty-seven miles an hour on the streets.

Some irresponsible, reckless, almost criminal young people endanger the lives of others on the road. They must be controlled by the decent, thoughtful, and law-abiding young people who understand the danger of the car as well as its value.

Justice

Many people have somehow or other the idea that "fixing" an arrest slip for a traffic violation is ethical. They think that they should be considered above the average of people and above the law. Good sportsmanship at least should be accorded the driver who pays his fine. The day of "fixing" for traffic violations is almost gone. Almost all judges are sympathetic, but they are just and impartial. Before the traffic court, rich and poor must be treated alike, if safety in driving is to be achieved.

Study Aids

A. *Experiences*

1. If you have ever attended a traffic court session, describe it to the class.
2. If you have ever seen an arrest made tell the class about it.
3. If you have ever been hit by a reckless driver, relate this unpleasant experience.

B. *Problems for Class Discussion*

1. Discuss Justice versus Mercy in connection with traffic violations.
2. How can the court handle traffic cases more satisfactorily for all concerned?
3. Show how the traffic court can be of the greatest assistance in making the roads safe.

4. Which is the more serious offense, driving while intoxicated or speeding? Why?
5. Why do you think the drunken drivers in the court cases in this chapter were given jail sentences?

C. *Study Activities*

1. Find out how many traffic violations police handle daily in your town or city.
2. List the traffic violations which you will observe in the next week and report on them.
3. List the charges for which traffic violators were arrested in your city over a period of one week.

D. *Questions*

1. Is reckless driving criminal?
2. Why should speeders be punished?
3. What can be done to eliminate the drunken drivers?
4. What is the most cowardly kind of driver?
5. How can traffic enforcement be made impartial?

E. *Suggested Readings*

1. Goodrich, Herbert F. "Smash." *Reader's Digest.* pp. 47-49. November, 1932.
2. Kenyon, Robert E., *Motor Massacre.* Chicago Lloyds. 8p.
3. *You Bet Your Life.* Travelers Insurance Company. Hartford, Connecticut. 36p.
4. The Daily Newspapers.
5. Safety Court Radio Broadcasts.

CHAPTER 19

LIVE AND LET LIVE

THE UNITED STATES is the land of opportunity; Americans boast more freedom, more wealth, more healthful working conditions, higher wages, better food than the people of any other country in the world. Our country is rich in natural resources, rich in products, in oil, wheat, corn, and cotton.

We have about three fourths of all the automobiles in the world. Almost everybody drives or rides in a car in America. Among the forty million drivers there are many good ones, but there are also many bad ones. There are drivers who learn about traffic regulations and obey the laws, drivers who keep their cars in good condition and understand the limitations of vision, hearing, and reaction time, and drivers who have good attitudes and who take good care to drive sanely and with due regard for the lives of others.

On the other hand, there are those who drive without knowledge or understanding of traffic regulations, without careful inspection of the safety devices of the car, and without regard for life or property. In other words, we have negligent, reckless, criminal people who use the car as a deadly weapon, who kill and slaughter and maim.

The young driver must learn to *live and let live.*

Banish Antagonism

A great deal of antagonism has developed between driver and pedestrian in recent years. Often when the pedestrian is crossing the street the motorist blows a shrill blast from a strident horn which shrieks: "Get out of the way, or I will run over you." The pedestrian has rights; generally, he has the right of way over the turning car. Only right attitudes on the part of both driver and pedestrian will improve perceptibly the safety of driving on the street.

Consider the psychological difference in being a driver and a pedestrian. As a driver you may think that you are fortified against injury and consequently feel superior. As a pedestrian you may take an entirely different attitude; you may think that the motorist must watch you, and so you walk recklessly and arrogantly with a daring stride and a scowling countenance. Both attitudes are absolutely wrong.

Driver and pedestrian must co-operate. They must render courtesies to each other. They must give assistance to the aged and the blind. They must be ever alert to prevent accidents.

Warnings and Railroad Crossings

The utter disregard for safety by drivers, the reckless exposure of themselves and their passengers to danger, and the mania to race with death (with the chances one hundred to one against them) are clearly set forth in the following editorial by William H. Fort:[1]

[1] Courtesy *The Chicago Daily News.*

A CAR DASHED ONTO TRACK
IN FRONT OF SPEEDING TRAIN—
LET ENGINEER FINISH STORY

"Old Newt Moore shifted his arm to a more comfortable position on the ledge of the open window of his cab and looked out at the world that sped by him almost with approval. Nice spring weather. Into Milwaukee on time, and 'Old 400' purring beneath him sweet as a sewing machine.

"Late out of Milwaukee on the return run, sure. But what was fifteen minutes to this big iron baby he was riding? Practically nothing. Only one worry. Newt had hit two automobiles in the last two days—and killed someone each time. Would this trip make it three? As every railroad man knows, those things always go in threes. A furrow appeared between his eyes. This was dangerous ground between Racine and Kenosha. Dangerous crossings, and a road paralleling the rails—on the other side, so he couldn't see it.

"The road should be taking a bend about here, away from the tracks, but it was due to come back within the next minute or two outside Berryville. A bad crossing, Berryville.

A Contest with Death

" 'See anything?' he demanded of his fireman.

" 'Well'—the fireman's voice was slightly bored. He hadn't killed two men in two days. 'It looks like—yup, it's a car all right. Close toward Berryville.'

"Newt's hand reached for the whistle cord and pulled it—two long, two short. He rubbed his moist hand around the throttle bar. Silly to feel like this. He cursed himself for a fool. They were pounding over the rails, Berryville not two minutes away. . . .

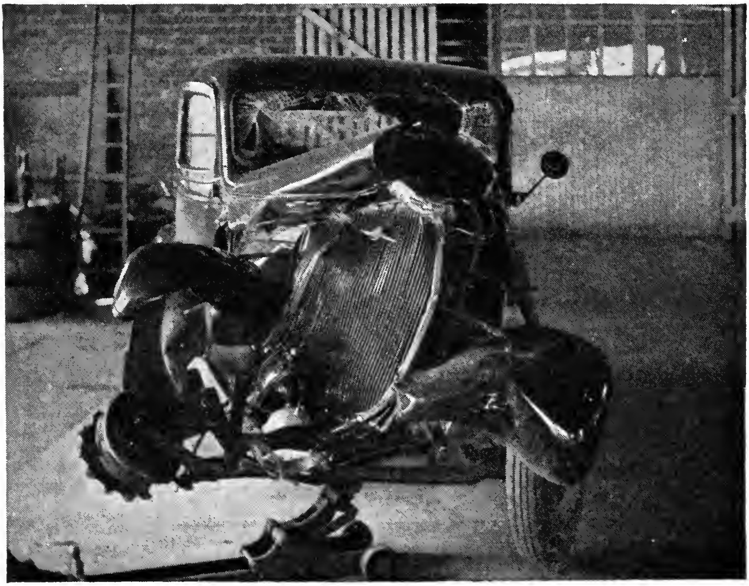


Fig. 34. This car struck the seventy-fifth car of a seventy-seven car train.

"The fireman's voice—'he heard you. He's stopping all right. . . . *No, he isn't!*' His voice rose shrill.

"To Newt the next few seconds were a lifetime. Leaning far out of the cab he glimpsed the front fenders of a car as it crossed his line of vision. 'The fool made it,' he muttered. Then his face set, his eyes suddenly became blank as he saw the front end of the automobile give a jerk and stop!

Stops Half a Mile Away

"Just as he had done yesterday—and the day before that—Newt pulled himself back inside the cab and ducked behind the boiler head even as he applied more pressure on the brakes. No use getting hit by flying steel—an automobile radiator—or a leg!

"He stopped the train, finally, half a mile beyond the crossing. Wearily old Newt climbed down from the engine. Automatically, as he had done everything during the last few seconds, he dislodged a wrinkled strip of tin from where it was hanging on the right cylinder. His hands were trembling, but methodically he pulled a wad of cotton waste from his overalls pocket and wiped the spattered blood from 'Old 400's' nose.

"That incident happened years ago. Old Newt is dead now. He retired soon after the incident related above. Three 'killings,' as he called them, in three days, were too much for his nerves. They were gone, and he died not many years after his retirement from the service of the Northwestern Railroad.

Experience Happens Often

"Modern counterparts of Newt Moore ride the rails today, and Moore's experience with motorists is duplicated more than once every day of the year, and any one of them will tell you the same story.

" 'The people that drive cars don't seem to know that there's anything else around,' says Neil Neiglick of the Northwestern, who's been driving engines for forty-six years. Neiglick—'The Flying Dutchman' as he is affectionately known among his fellow members of the railroad fraternity—sits in the cab of the North-western's famous '400' running between Chicago and the Twin Cities.

Courtesy of Portland Cement Association

A railroad crossing protected by signs, bells, and flash signals, Raleigh, North Carolina. Busses stop at all railroad crossings.

" 'The foolish things they do nobody would believe. Up in a Wisconsin town not long ago it was a streetcar bus. We were less than half a block from the crossing when he started right across the tracks. No chance for us to stop. He should have known it was suicide! Another time last winter, three days before Christmas, we were running into Racine. The gates at the crossing were down and we were almost there when a car drove up, crashed through the gates and stopped on the rails. . . .' Neiglick paused awhile, then said thoughtfully, 'There were five persons in the car. Four of them were killed. It was an old car. The driver should have known his brakes were bad.'

Autoists Have Mistaken Idea

"One of the chief faults of motorists, according to engineers who see them dash in to certain suicide, is that they have the impression a train can stop as quickly as an automobile. They don't realize that an engine on almost any of the popular runs is hauling somewhere around 1,000,000 pounds. The average automobile weighs little more than a ton. Running often at a speed of eighty to ninety miles an hour, as it must to keep its schedule, it is impossible for a train to stop in less than a mile. 'And when it hits an automobile,' said Neiglick, 'well, it's like hitting a fly with a sledge hammer.'

"Another example of foolhardy driving was given by Louis W. Ferguson. 'Ferg' has been conductoring trains for more than forty years.

" 'We were coming into Barrington. Old August Heldt was pulling me. He had engine No. 859, and she could step. About a mile north of Barrington a narrow lane comes out from a farmhouse, and parallels the railroad for a hundred yards or so, then turns into the road that crosses the tracks. I saw this woman. She must have seen us. August whistled for the crossing. We were about a hundred feet away when the woman turned out of the lane toward the tracks. But instead of stopping, she drove right into our path. August put on the brakes, of course—we always try to stop—but it was no use. We knocked that car seventy-five feet. Three of the four passengers in the car were killed.

" 'What gets into people, anyhow? Risking their lives to save maybe half a minute!'

"With a wag of his head, every engineer voices the same question.

"They're Crazy," Says Engineer

" 'At Glenview, it was.' John Gleisner talking now—one of the Chicago Milwaukee and St. Paul's oldtimers, an engineer for thirty-seven of his forty-six years of service, who now pilots the Pioneer Limited. 'I saw the car coming, saw the flash signals working. I whistled, then whistled again, but nothing could stop that fellow. He shot across the tracks. I was wondering whether I'd hit him or not—and then I knew. I saw the top of his car go sailing over the cab. I ducked behind the boilerhead and put on the brakes. There wasn't enough of that car left to put in a basket—and that's the way we had to pick up that driver.

" 'They're crazy! They'll run alongside. Think it's smart to race the engine, and turn around and wiggle their fingers at you as they edge ahead. And all the time I'm sitting there knowing that a few miles ahead the road is going to turn and cross the tracks. I blow the whistle and try to wave him back—and what does he do, that crazy driver? He steps on the gas. And I'm sitting there knowing the chances are ten to one if he tries to cross in front of me I'm going to kill him! It's not such a funny feeling.'

Case of Reckless Girl

"Michael Brucks and E. L. Tenney, both of whom have been handling a throttle since the turn of the century and who drive the Broadway, crack sixteen and a half hour Pennsylvania train to New York, can both tell similar experiences by the dozen.

" 'One morning,' Tenney recalled, 'they double-headed me out of here on 52 and I was coming up to 11th street in Gary. I saw this fellow coming up to the crossing. I pulled the whistle, but he didn't wait. He came right along. Mister, we carried that fool and his car 700 feet before we could stop.

" 'Another time at Valparaiso, Ind., there's a downhill grade crossing there—I saw a girl in a car come shooting down from the other side. I blew the whistle, but did she stop? She did not. But she made it. Well, sir, I was so mad I'd like to have thrown in the emergency bar and got out and give her the spanking she deserved. I shook my fist at her, and what do you suppose she did? Turned around and laughed and blew me a kiss!

" 'And in Warsaw, Ind., one time we were standing still. And darn me if a car didn't come rushing up to that crossing and smash smack into us—while we were standing still.'

" 'The way people drive used to bother me,' said Brucks. 'Bothered me for years. Now it makes me mad. But I've been running an engine for thirty-five years and drivers haven't any more sense now than they had when they drove a horse and buggy.'

Physical Examination Urged

"Ervin Frailey, who has been sitting in an engine cab for the New York Central more than thirty-three years, has his own suggestions to make about auto drivers.

" 'Why not make automobile drivers take a physical examination every year just as if they were engineers? See if their eyes, their hearing, are good, and how they react in sudden situations. A lot of people never should be allowed to drive a car at all. They're too nervous. And why not set a limit of distance that one driver can run without a good rest—300 miles, say? Nobody reacts quickly in an emergency when he's tired.'

"As an example of this, on the Century run from Chicago to New York, engine crews are changed six times, and the maximum distance any engineer is in charge of the train is 180 miles. As an additional safeguard they rest every other day. Frailey's run is only 108 miles, 'and believe me that's plenty of strain.'

"Analysis of many conversations with engineers and railroad officials brings out several interesting facts about grade-crossing accidents. When an engineer sees that there is no chance to avoid hitting an automobile, he does not throw on the emergency. Not only would this 'flat' every wheel on the train; it would also endanger the lives of his passengers. A few years ago an engineer pulling his train into Gary saw a car stall on the tracks ahead. Impulsively he put on the emergency, which slowed down the train just enough to grind the automobile under the wheels of the locomotive, derailing several cars, killing four passengers and injuring many more.

Women Called More Cautious

"Despite the squawks against them as back-seat drivers, women are more cautious than men.

"The majority of accidents happen to the new-type high-speed automobiles. The way engineers explain it is that, driving a high-speed car, the driver overestimates the acceleration of his own car and underestimates that of the train.

"L. J. Benson, general superintendent of the Milwaukee Railroad's special police, is more concerned for the safety of his crossing flagmen than for the motorists. 'Drivers pay no attention to the flagmen,' Benson declared. 'They drive right through. Recently a car hit our flagman at Libertyville and dragged him 200 feet. The driver just didn't see him.'

"Almost 50 per cent of grade crossing accidents throughout the country occur from motorists running into a train instead of being struck by the train.

"Engineers are not allowed to blow their whistles as they pass through Morton Grove. There's an ordinance against it and an engineer who disobeys will be sent a police summons. This, despite the fact that there are four grade crossings and trains run through sometimes at ninety miles an hour.

"The percentage of drunken drivers killed is comparatively low. Most of those killed are just in a hurry.

Sudden Stop Costs $2,000

"Every time the emergency brake is applied it costs the railroad around $2,000, because every wheel must be made round again, which cuts down the life of the wheel from one to two years.

"Railroad statistics show that of the total number of persons killed in automobiles during 1935, 4 per cent were killed in collision with trains, but of the total number of deaths caused by automobiles only .6 of 1 per cent were killed by railroad trains and only .5 of 1 per cent of the total injured in automobile cases were hurt in collision with trains.

"Analysis of grade crossing accidents in Cook County, according to a survey by Coroner Frank J. Walsh, shows that forty-three persons were killed by trains. Of these, three were killed at crossings where gates were not down, five at guarded crossings, fourteen at unguarded crossings. In five instances the automobile ran through the gates, in six deaths the driver disregarded the watchman's signal, and four occurred when watchmen were not on duty. One person was killed when the signal of an approaching train was not given and five deaths were due to automobile stalling on the railroad tracks."

Live

Drive safely and live. You have read of wrecks at railroad crossings. You have talked to survivors of such accidents. You may not have understood the carelessness and recklessness which caused these accidents. Figures 34 and 35 show bad wrecks. Mr. Fort's editorial gives you an understanding of many of the causes. You can hardly believe that sane human beings ever took such chances but they did, and the results were 1,770 killed and 5,810 injured at railroad crossings, and 36,800 persons killed and nearly a million more injured in all motor vehicle accidents in 1936.[1]

The saddest thing about these tragedies at the rail-

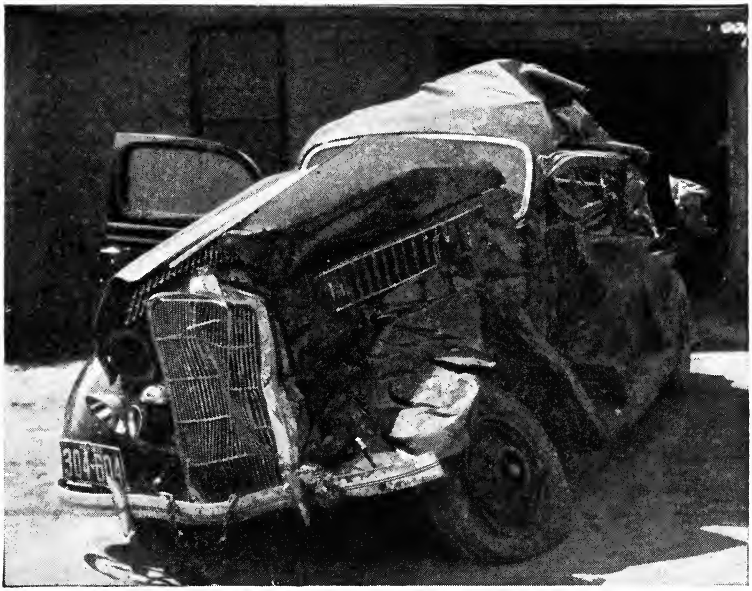


Fig. 35. New car hit by train.

road crossings and all other motor vehicle accidents is the needless slaughter by the drivers of friends and loved ones. The deaths are terrible, but the living, crippled and marked for life, are sad reminders generally of an avoidable mistake in judgment, one unnecessary lapse of attention, or a foolish slip in conduct or attitude. Think of a boy of nine doomed to be bedridden for the

[1] *You Bet Your Life.* Travelers Insurance Company. Hartford, Connecticut. 1936, p. 2.

rest of his life because of a careless driving act, or a girl of three condemned to a life with only one arm or one leg because a thoughtless driver wanted to save one minute of time.

Thousands of similar accidents and injuries occur each year. Would you care to be responsible for such an injury? How would you feel if you knew that your negligence was the cause of such a catastrophe?

You can avoid all this if you will learn to be a careful driver consistent in operating a car and considerate of the rights of others.

Drive well so that you will live.

Drive carefully so that others may live.

Study Aids

A. *Experiences*

1. Who is the most courteous driver among your acquaintances? Without naming him, describe his qualities to the class.
2. Have you ever observed a careless pedestrian crossing the street? Show what rules of safe walking were broken.
3. Have you ever seen a car which had been struck by a train? Describe it. Did it look like the one in Figure 35?
4. Do you know anyone who was crippled for life in an automobile wreck?

B. *Problems for Class Discussion*

1. Discuss the meaning of "Live and Let Live."
2. Show how antagonism has developed between

driver and pedestrian. How can better feeling be developed?

C. *Study Activities*

1. List the attitudes of good drivers and of poor drivers. Compare them.
2. Write a brief paragraph showing the differences in the same person as a driver and as a pedestrian.
3. List the essentials of learning to drive safely.
4. List on the blackboard:
   a. Reason for each individual's co-operation with traffic officials.
   b. The duties of each driver to the group in which he lives.
   c. The duties of society to each driver.
5. On the road the driver has duties, such as rendering first aid and calling a doctor in case of accidents. List other duties he may perform.

D. *Questions*

1. What responsibility has an engineer in running a locomotive?
2. What responsibility has a driver of an automobile in driving a car?
3. What is the greatest factor in driving safely?
4. Do you wish to be a safe driver?
5. How can you become a safe driver?

E. *Suggested Readings*

1. *I Drive Safely.* International Harvester Company. Chicago, Illinois. 61p.

2. *Saving Seconds or Saving Lives.* Aetna Casualty and Surety Company. Hartford, Connecticut. 18p.

3. *The New War on Accidents.* National Safety Council. Chicago, Illinois. 16p.

4. *Thou Shalt Not Kill.* Travelers Insurance Company. Hartford, Connecticut.

5. *You Bet Your Life.* Travelers Insurance Company. Hartford, Connecticut.

PART 6

Answer the Challenge

The dare to youth is:

Drive and Live.

The Girl He Left Behind Him

CHAPTER 20

THE DARE TO YOUTH

The Past

In 1892 the first horseless carriage in the United States ran at the rate of seven miles an hour if it did not stop or hit something. In 1896 there were four cars registered in the United States which could be driven approximately eleven miles per hour. In 1900 there were 8,000 cars in the country which could travel from fifteen to twenty miles an hour for a short distance. In 1936 there were more than 28,000,000 motor vehicles in the country, one for every five persons. Today it is possible for everyone in the United States to ride in an automobile at the same time.

In 1895 the automobile was a high-wheeled carriage with a one- or two-cylinder engine. In 1937 it is a streamlined motor vehicle with an engine of eighty horsepower, more or less, often with twelve cylinders.

In 1900 the roads were in general very poor, full of bumps, ruts, and holes. Many of them were mere paths across the prairies. Today there are 3,250,000 miles of road upon which automobiles travel. In the place of the old square turns, there are long winding curves, constructed well for speed and convenience.

In 1900 the traffic regulations varied in almost every town and village in the land; today there is a tendency to make more uniform the regulations of traffic control.

Interesting is the mechanical progress of the automobile. Closed bodies came into use in 1910, making all-year motoring practical. The self-starter appeared in 1911, eliminating cranking accidents. Four-wheel brakes were manufactured in quantity in 1923, contributing greatly to the safety of motoring. Crankcase ventilation was perfected in 1925, making the engine more durable. The Syncro-Mesh transmission brought out in 1928 provided easier, better, and safer driving. The Multibeam headlights placed on cars in 1932 made driving by night very much safer. Knee-action wheels marketed in 1934 reduced fatigue and made steering easier. The turret or one-piece steel top placed on the market in 1935 made driving more comfortable in winter and summer.[1]

The development of stronger and more durable metals, of better balanced cars, of more beautiful lines, of improved lubrication, and of more scientific cooling devices has made the motor car a thing of beauty and power. New models, improved safety appliances, more effective brakes, shatterproof glass, better lights, higher-powered motors, more beautiful and durable upholstery have made motoring a fascinating leisure activity. A conservative estimate is that in 1935 the American public spent more than three and a half billions of dollars in pleasure driving.

In the last forty years the nation has changed from a nation of walkers and buggy riders to a nation of motor-

[1] *We Drivers.* pp. 34-35. General Motors Corporation. Detroit, Michigan. 1935.

ists. Forty million motorists drive 28,000,000 motor vehicles of various types on improved roadways. Ours is a nation of fast travelers; it is a nation of speed; and in a certain sense the car is an integral part of American life.

In the United States the automobile industry is today the largest consumer of steel in all forms, of gasoline, lubricating oil, rubber, plate glass, nickel, lead, and mohair. The following table shows the per cent of the total of various raw materials used in the automobile industry.

Per cent of Total of Various Raw Materials Used in United States by the Automobile Industry

Steel, all forms	24.8	Leather (upholstery)	31.0
Alloy steel	72.2	Plate glass	76.0
Malleable iron	54.0	Nickel	31.0
Gasoline	89.0	Lead	37.0
Lubricating oil	59.0	Mohair	40.0
Rubber	80.0	Lumber	9.5
Zinc	16.1		

More than six million people were employed directly or indirectly in highway transportation in 1935. These figures show the interrelations of the automobile with American life.[1] They enable one to see that progress has been made in the past, and logic indicates that more progress will be made in the future. The automobile has become integrated with almost every phase of our national life, and it has revolutionized social customs.

[1] *Automobile Facts and Figures.* pp. 44-45. Automobile Manufacturers Association. New York. 1936.

The Present

The present is the age of the automobile—beautiful, powerful, streamlined! It is used extensively for business. Millions use it for pleasure and enjoyment. Hundreds of thousands rush to death in it. Millions are maimed by it. The picture is a picture of luxury and wealth, and of misery and death.

What part will you play in this drama of life and death? What can you do? What are you going to do?

Do not think that everything has been done or that all improvements have been made. There is more work today than ever before to do in connection with the automobile. New occasions! New problems! New duties! Constant change!

The world is changing. New inventions are needed; new policies are necessary; questions cry for answers. Problems demand solution.

The automobile is in its infancy. It is only forty-five years old. Improvements of every type and nature must be made—improvements in mechanics and in operation. But more important than these are improvements which increase safety and challenge the imaginative and creative powers.

The Future

The automobile will be your heritage; but it will come to you with all its problems. Its problems will be your problems; your fathers made it a device of beauty and power, and an instrument of danger and death. The future of the car will be in your hands; its future development will be of your brain and attitude. Your character will be reflected in the solutions and decisions which you make concerning it.

In the next forty years many of you will share in making the automobile mechanically more perfect. New lights will be perfected which will not blind other motorists, but by which the driver will see thousands of feet with light as bright as day. Visibility will be greatly improved. Better brakes will make it possible to stop almost automatically upon necessity. There will be few, if any, defects in the materials and the construction. The shock absorbers will be more perfect and will assure better qualities of riding. The applications of electricity will be beyond your wildest conjecture. You will have a great share in the improvement which will be made. Think. Read. Plan. Construct. Solve. Invent.

The mechanical improvements will be great, but the safety developments will be still greater. The safety of driving will be increased because improvement is absolutely necessary if the car is to be preserved as a benefit to people.

In your efforts to make the car safe, you will, as citizens, use poster displays, press publicity, radio education, safety literature—booklets and leaflets—organized public practices, schools for drivers, and contests to develop safety. You will study traffic problems and plan reasonable regulations. You will develop traffic laws and uniform code practices. Problems of traffic control, speed, licensing, elevated highways, elevated crossings, volume of traffic, night driving, and signaling will be investigated and solved, and the questions connected with them will be understood and answered.

But the greatest improvement must be made in the driver. This is necessary because he is now the greatest source of danger and accident. The driver of the future will be an educated driver—disciplined, appreciative, kindly, and altruistic. The egotist will be forced off the road by the law, and the ignorant and untrained will not be permitted on the highway. Only the trained, healthy, alert, and disciplined will drive. In the future, because of your investigations and study, driving will be much safer than it is today.

The Problem of Safety is Your Problem. It is a big problem. You will solve it, but you will have to work hard to save both the car and life.

What are you going to do?

Find your solution to the problem.
Apply it with care each day.
Drive and live.

Study Aids

A. *Experiences*

1. What new inventions have you noticed on recent cars? Of what advantage are they to the driver?
2. Have you ever known a road where traffic jammed in the past but where there is no congestion today? What has caused the improvement?

B. *Problems for Class Discussion*

1. Describe the development of the automobile in the last forty years.
2. Compare the automobile of fifteen years ago with the present-day car.
3. Discuss the best means for educating people to drive and live.
4. Show how investigation and study will help to solve the problem of safe driving.

C. *Study Activities*

1. Make a graph or table showing the increase in car registrations in the United States since 1896.
2. List the materials which are used in making automobiles.
3. List the problems in connection with the control of the automobile
4. Write a brief paragraph on "The Car of the Future."
5. Make a plan for traffic control so that driving will be safe in your community.

D. *Questions*

1. How do knee-action wheels reduce fatigue?
2. How many people profit directly and indirectly from the automobile?
3. Do you think that there will still be many improvements in the automobile?
4. What is the most important element in securing safety for all in connection with driving?
5. How can you help to make driving safer?

E. *Suggested Readings*

1. Kenyon, Robert E., *Motor Massacre.* Chicago Lloyds. Chicago, Illinois. 8p.

2. "The Horseless Carriage." *Reader's Digest.* pp. 69-74. November, 1936.

3. *The New War on Accidents.* National Safety Council. Chicago, Illinois. 16p.

4. *We Drivers.* pp. 34-36. General Motors Corporation. Detroit, Michigan.

5. Whitney, Albert W. (Editor). *Man and the Motor Car.* National Bureau of Casualty and Surety Underwriters. New York. 1936. 256p.

Appendices—Glossary
Bibliography

APPENDIX I

VISUAL AIDS

1. Films

1. *—And Sudden Death.* (Highway Safety) Paramount Pictures, Inc.
2. *Ask Daddy.* 35 mm. (Home and Street Safety) National Safety Council, Chicago, Illinois. Free.
3. *Carbon Monoxide.* 16 mm. and 35 mm. (Preventing Gas Poisoning) United States Bureau of Mines. Pittsburgh. Free.
4. *Cross Road Puzzle.* 35 mm. (Motor Journey) American Automobile Association. Washington, D. C. Rental.
5. *Development of Transportation.* 16 mm. State of Ohio Department of Education. Columbus, Ohio. Free.
6. *Everybody's Business.* Chrysler Corporation. Plymouth Division. Detroit, Michigan. Free.
7. *Four-Cycle Gas Engine.* 16 mm. State of Ohio Department of Education. Columbus, Ohio. Free.
8. *Gasoline Trails.* 16 mm. Chevrolet Motor Company. Detroit, Michigan. Free.
9. *Goofs.* 16 mm. (Warning against Traffic Accidents) Automobile Club of Southern California. Los Angeles, California.
10. *Highway Patrol.* 16 mm. Sound. Goodrich Tire and Rubber Company. Washington, D. C.
11. *Horse Sense in Horse Power.* 16 mm. and 35 mm. Silent and sound. (Highway Safety) Plymouth Motors. Detroit, Michigan. Free.

12. *Hydraulics.* 16 mm. Chevrolet Motor Company. Detroit, Michigan. Free.

13. *Learn and Live.* 16 mm. and 35 mm. (Resuscitation) United States Bureau of Mines. Pittsburgh, Pa. Free.

14. *Once Upon a Time.* 16 mm. and 35 mm. Silent and sound. (Need of Safety) Metropolitan Life Insurance Company, 1 Madison Avenue, New York. Free.

15. *Power.* 16 mm. Chevrolet Motor Company. Detroit, Michigan. Free.

16. *Power Within.* 16 mm. United States Bureau of Mines. Washington, D. C. Free.

17. *Readin' 'Ritin' an' 'Rithmetic.* 35 mm. and 16 mm. (Riding Safely) American Museum of Natural History. New York. Free.

18. *Remember Jimmy.* 16 mm. Silent. (Results of Automobile Accidents) Firemen's Insurance Company. 116 John Street, New York.

19. *Safe Roads.* 35 mm. (Safety on the Roads) Chevrolet Motor Company. Detroit, Michigan. Free.

20. *Saving Seconds.* 16 mm. and 35 mm. Silent or sound. (Avoidance of Highway Danger) Aetna Casualty and Surety Company. Hartford, Connecticut. Free.

21. *Spinning Levers.* 16 mm. Chevrolet Motor Company. Detroit, Michigan. Free.

22. *Sportsmanship.* 35 mm. Sound. (Careful Driving) Ray-Bell Films, Inc. St. Paul, Minnesota. Free.

23. *Street and Highway Safety.* 16 mm. National Bureau Casualty and Surety Underwriters. 1 Park Avenue, New York.

24. *Street Safety.* 16 mm. Silent. (Fundamental Points of Safety) Eastman Kodak Company. Rochester, New York. Rental.

25. *Story of the Gasoline Motor.* 16 mm. United States Bureau of Mines. Washington, D. C. Free.
26. *The Automobile.* 16 mm. State of Ohio Department of Education. Columbus, Ohio. Free.
27. *The Hit and Run Driver.* Metro-Goldwyn-Mayer.
28. *The Turn About Man.* 35 mm. Sound. (Highway Safety) Chevrolet Motor Company. Detroit, Michigan.
29. *We Drivers.* 16 mm. and 35 mm. Silent and sound. (Highway Safety) General Motors Corporation. Detroit, Michigan. Free.
30. *What Price Recklessness.* 35 mm. Motion Picture Institute. New York. Rental.
31. *Wheels of Progress.* 16 mm. Department of Agriculture. Washington, D. C. Free.
32. *Why Be Careless?* 16 and 35 mm. (Right and Wrong Driving Practices) John Hancock Life Insurance Company. Boston, Mass. Free.

2. Slides and Film Strips

1. *Condition of the Car.* Number 41. National Safety Council. Chicago, Illinois. Rental.
2. *Death Takes No Holiday.* (Traffic Conditions) Film strip. Western Union Telegraph Company. Rental.
3. *Garage Accident Hazards.* Number 5. National Safety Council. Chicago, Illinois. Rental.
4. *Improving Your Driving Skill.* National Bureau of Casualty and Surety Underwriters. 1 Park Avenue, New York. Free.
5. *Inertia.* 35 mm. Slide film with sound. (Physical Laws Governing Driving) National American Legion Headquarters or Local Post. Free.

6. *Learning the Skills of the Road.* National Bureau of Casualty and Surety Underwriters. 1 Park Avenue, New York. Free.
7. *Live and Let Live.* Travelers Insurance Company. Hartford, Connecticut. Free.
8. *Motorists and Pedestrians.* Number 3. National Safety Council. Chicago, Illinois. Rental.
9. *Rules of the Road.* Number 1. National Safety Council. Chicago, Illinois. Rental.
10. *Safe Driving at Intersections.* Number 39. National Safety Council. Chicago, Illinois. Rental.
11. *Safe Driving Between Intersections.* Number 40. National Safety Council. Chicago, Illinois. Rental.
12. *Safe-Efficient Driving.* Number 6. National Safety Council. Chicago, Illinois. Rental.
13. *Safety in Bicycle Riding.* Number 38. National Safety Council. Chicago, Illinois. Rental.
14. *School Boy Patrol.* Number 27. (Standard Patrol Practices) National Safety Council. Chicago, Illinois. Rental.
15. *Safety in Service Station Operation.* Number 8. National Safety Council. Chicago, Illinois. Rental.
16. *The Causes and Prevention of Highway Accidents.* National Bureau of Casualty and Surety Underwriters. 1 Park Avenue, New York. Free for transportation.
17. *The Other Fellow.* 35 mm. Slide film with sound. (Community Action for Safety Activities) National American Legion Headquarters or Local Post. Free.
18. *To Drive Without Accidents.* Number 42. National Safety Council. Chicago, Illinois. Rental.
19. *What Price Accidents.* National Bureau of Casualty and Surety Underwriters. 1 Park Avenue, New York. Free.

APPENDIX II

Safe Driving Examination[1]

The maximum score for each point is indicated in the column at the right. Give yourself whatever proportion of this perfect score you *honestly* believe you deserve. A total score of 90 or more rates you as an excellent driver; 80 to 90, good; 70 to 80, fair; under 70, poor.

	Your Score	Perfect Score
1. Do you always drive at a reasonable speed, giving due consideration to traffic, road conditions, weather, etc.?	——	10
2. Do you make sure that your car is at all times in good order, particularly as regards brakes, steering gear, lights, windshield wiper, and tires?	——	10
3. Do you refrain from passing other vehicles on the brow of hills, or on curves?	——	8
4. Do you make it the rule never to cut in and out of traffic?	——	8
5. Do you drive only when you are in full possession of your faculties?	——	7
6. Do you give the right of way to pedestrians, particularly children and the aged or infirm?	——	7
7. Do you at no time let your attention wander, either through conversation or sight-seeing?	——	6

[1] *Research Bulletin* of the National Education Association, Vol. XIV, No. 5, p. 222. Adapted from one of the safety leaflets of the Oklahoma State Highway Commission.

	Your Score	Perfect Score
8. Do you slow down when handicapped by approaching headlights?	——	5
9. Do you always give proper and adequate hand signals before turning, slowing down, or stopping?	——	5
10. Do you strictly observe all traffic lights, stop signs, and warning signals?	——	5
11. Do you approach intersections, particularly blind intersections, with your car under complete control?	——	4
12. Do you get into the left lane before turning left and into the right lane before turning right?	——	4
13. Do you pull into traffic only after looking and signaling?	——	3
14. Do you make way when a car wishes to pass instead of speeding up?	——	3
15. Do you cross grade crossings cautiously? ..	——	3
16. Do you keep at an adequate stopping distance from the car ahead?	——	3
17. Do you sometimes let the other fellow have your "right of way" in the interest of safety?	——	3
18. Is your rear-vision mirror O.K.?	——	2
19. Do you park your car so as not to interfere with traffic?	——	2
20. Do you lock your car when parked?	——	2
Total		100

How to Check Your Car for Safety [1]

For the sake of safe and efficient service every car should be checked periodically. If the owner is not mechanically minded, he should at least know what points others should check for him. Here are some of the most important ones:

Brakes—Good brakes are essential. Have yours tested periodically by an expert, and adjusted and relined when necessary.

Steering—This mechanism should be inspected for looseness and wear. Wheel wobble, sometimes noticeable only at high speeds, needs immediate attention.

Headlights—Improperly focused headlights may decrease road illumination and prove a menace to other drivers. Have the focus checked by a competent person.

Tires and Wheels—As a blowout of a front tire may throw a car out of control, place your best and well-mated tires on the front wheels. As under-inflation wears tires quickly and makes steering harder, have the air pressure checked frequently. Front wheels are occasionally thrown out of alignment by running against curbs and by road ruts. Poor wheel alignment is a driving hazard as well as a cause of excessive tire wear.

Lubrication and Greasing—In addition to greasing a car regularly, check the grease level in the gear box and differential. If you grease your own car, carefully follow the manufacturer's instructions and greasing diagram.

Battery—The battery should be checked frequently and the plates kept covered with distilled water. When a battery requires excessive amounts of water, it is probably being overcharged. The charging rate of the generator can be changed. Vaseline spread around battery posts will prevent corroding.

[1] *Calling all Cars.* Metropolitan Life Insurance Company, N. Y., p. 16.

Cooling System—Always keep the water in radiator at the proper level. Flushing it once or twice a year helps clean the cooling system of sediment.

Shock Absorbers—Shock absorbers need occasional adjustment or replacement of oil.

Chains—The wise motorist always carries a set of chains and uses them when they are needed.

Traffic Safety Rules for Boys and Girls

1. Look for approaching traffic before crossing streets.
2. Cross streets only at intersections or marked crosswalks, and obey traffic lights.
3. Be especially careful and do not hurry when crossing icy pavements.
4. Never chase a playmate into the street.
5. Do not roller skate, coast, or play games in the street.
6. Never dash into the street to retrieve a ball or other article.
7. Never make a game of dodging cars.
8. If necessary to walk on the pavement, stay close to the *left edge* and step off to the *left* when traffic approaches.
9. Do not enter or leave a vehicle while it is moving.
10. Never hook rides on automobiles, trucks, or street cars.
11. Obey all signals and instructions of the school safety patrolman.
12. Remind your parents and friends to always drive carefully.

State of Illinois
Henry Horner, Governor
Department of Public Works and Buildings
Division of Highways

Rules for Safe Bicycle Riding[1]

1. Obey all traffic laws, signs, and signals.
2. Display a white headlamp and a red taillight when riding between sunset and sunrise.
3. Be alert for traffic from all directions.
4. Give both pedestrians and motor vehicles the right of way.
5. Before leaving a driveway or crossing a street, look both ways and wait for approaching traffic.
6. Do not ride on streets where there is considerable traffic.
7. Ride near the right-hand pavement edge.
8. Do not ride alongside other cyclists. Ride in single file.
9. Do not ride double or do trick riding.
10. Do not hitch to motor vehicles or street cars.
11. Do not play riding games in the street.
12. Always keep your bicycle in good condition.

State of Illinois
Henry Horner, Governor
Department of Public Works and Buildings
Division of Highways

[1] The valuable safety rules on pages 262 and 263 are included by permission of the Division of Highways of the State of Illinois.

GLOSSARY

Definitions with asterisks are taken from *Uniform Act Regulating Traffic on Highways.* U. S. Department of Agriculture. Bureau of *Public Roads.* Washington, D. C. 1934.

Accelerator: The throttle control, operated by the foot, which regulates the supply of gas vapor to the engine.

Accident: An event taking place without being planned, often of an unfortunate character; a mishap.

Air cooling: Method of cooling an engine or pump by radiating the surplus heat directly into the air. This is sometimes called direct cooling, as there is no medium such as water to absorb the heat and then radiate it into the air.

Ammeter: An instrument for measuring the current flow in an electric circuit.

Arterial highway: A through highway; a state highway.

Attitude: A manner of thinking or acting because of opinion or feeling.

Automobile: A self-propelled passenger vehicle having a self contained power unit, designed to operate on roads or highways.

*__Authorized emergency vehicle:__ Vehicles of the fire department, fire patrol, police vehicles, and such ambulances and emergency vehicles of municipal departments or public service corporations as are designated or authorized by the proper authorities.

Back fire: A burning that occurs in the intake manifold of the engine. It is caused by a slow-burning mixture still in the flame state in the combustion chamber when the intake valve opens on the beginning of the next intake stroke.

Battery: See Storage Battery.

Battery acid: See Electrolyte.

Brake drum: A disc having a right angle flange at its outer edge and fastened to the wheel, the brake shoe making contact on the inner surface of the flange.

Brake lining: A material, generally with an asbestos base, covering the brake shoe. Its coefficient of friction is unusually high, making for great braking efficiency.

Breaker point: The contacts in the distributor that are opened by the cam. They are generally made of tungsten, a very hard material. Platinum is sometimes used on magneto breaker points.

Breather pipe: A pipe located in the crankcase, used to allow the circulation of the air through the crankcase to remove gas fumes caused from combustion.

***Business district:** The closely built up portion of any city, village, or incorporated town.

Camber: The position in which the front wheels rest out of the vertical plane. This is due partly to the sloping of the king pin and also to the sloping of the end of the spindle toward the ground.

Camshaft: A shaft on which the cams that operate the valves are located. The eccentric operating the fuel pump is generally located on this shaft.

Carburetor: A device for mixing a hydrocarbon fuel with air to form a combustible gas; the ideal carburetor varies the percentage of mixture according to the demands of the engine.

Caster: The sloping of the bottom of the king pin toward the front of the car.

Centrifugal: A rotating force. A centrifugal water pump spins the water in such a fashion that the centrifugal force causes the water to go away from the center of the pump and into the outlet of the pump.

Chamois: A soft pliant leather prepared from the skin of a small goatlike antelope. It is very soft when properly tanned and is used for wiping water from cars after it has been soaked in water and wrung out. When it is water-soaked, oil or gasoline will not pass through it. When it is dry, gasoline will pass through it but water will not. It makes an excellent filter for gasoline.

Channelization of traffic: Guidance of traffic in such a way that there is uninterrupted flow in a forward direction.

Chassis: All parts of the car except the body. The under-part of an automobile consisting of the frame (upon which the body is mounted) with wheels and machinery.

Choke valve: A valve, generally of the butterfly type, used to cut off the supply of air to the carburetor so as to produce a rich mixture for easy starting.

Clutch: A mechanical device used to gently connect the power of an engine or motor to that part which is being driven. The clutch in the car is generally made of a disc fastened to the transmission drive shaft. It is squeezed between two plates fastened to the engine when the power of the engine is to be applied to the rear wheels.

Clutch pedal: A foot pedal that is generally pushed in by the foot to disengage the clutch or disconnect the power of the engine from the rear wheels.

Clutch plate: A disc lined with a friction material clamped between two metal discs fastened to the engine.

Clutch plate lining: A heat resisting facing material having a high coefficient of friction, similar to brake lining, used to cover both sides of a clutch plate.

Clutch plate spring: A spring that holds the clutch in engagement unless it is held out of engagement by pressure on the clutch pedal.

Combustion chamber: The space between the piston head and the cylinder head where the burning or combustion of the fuel takes place.

Connecting rod: A rod, connecting the piston to the crankshaft.

Cotter pin: A split pin used to lock a nut in place.

Crankshaft: A device consisting of a shaft, a lever fastened to that shaft, and a crank pin or boss fastened to the lever. Pressure applied to the crank pin causes the shaft to turn. With the help of the connecting rod, the crankshaft transforms reciprocating motion of the piston into rotary motion of the crankshaft.

***Crosswalk:** That portion of a roadway ordinarily intended within the prolongation or connection of the lateral lines of sidewalks at interesections. Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface.

Current regulator: An electrical device used to regulate the amount of current produced by the generator.

Cylinder: A round opening having length, used to guide the piston on its movement and to form a seal against the rings.

Diesel engine: An internal combustion engine named from its inventor, Diesel. This engine has a very high compression, about 500 pounds per square inch and burns a very low gravity oil such as fuel oil. It compresses pure air to such a high point that the heat of the compression causes the fuel which is injected into the combustion chamber at the end of the compression stroke to ignite, no electric spark being necessary.

Differential: A gear divider so constructed that it will allow one rear or driving wheel to turn faster than the other, as when turning a corner.

Disc clutch: A disc attached to the transmission and held against the flywheel by a pressure plate. It is used to connect the powei of the engine to the transmission.

Distributor: An electrical unit used to break the primary circuit at the right time and to distribute the high tension current from the spark coil to the proper spark plug.

Distributor cap: The cover of the distributor having terminals that lead to the spark coil and the spark plugs.

Down draft carburetor: A carburetor whose gas and air mixture passes through it in a downward direction into the intake manifold.

Drive shaft: A shaft used to drive the pinion gear.

Electrolyte: That fluid in the battery acting as a vehicle through which the electrical reaction occurs between the plates.

Emergency brake: A brake to be used in case of emergency, sometimes called a hand brake.

Energy: That which produces work. It is the capacity for performing work. All work whether mechanical, electrical, or any other kind requires energy.

Exhaust: The product of combustion or the burnt gasses left after combustion has taken place in the cylinder.

Fan: A rotary mechanism having pitched blades used to produce a disturbance in the air. In the automobile it is generally used to cool the radiator.

Fatigue: A state of being weary or tired from labor or exertion.

Fender: A protective device covering the wheel to prevent road dirt from being splashed on the body of the car.

Filter bowl: A bowl that collects the dirt in the fuel. A screen prevents this dirt from entering the carburetor.

Filter bowl screen: A screen that prevents the dirt from leaving the filter bowl and entering the gas line or carburetor.

Float: A hollow piece of metal, a cork or other buoyant material, generally used to shut off a liquid supply when it reaches a certain height.

Flywheel: A balance wheel generally located at the rear end of the crankshaft to maintain a steady rotation of the engine at low speeds. The flywheel acts as a reservoir for energy which is being absorbed during the power stroke and given off during the dead strokes of the engine.

Focus: A point in which rays, as of light or heat, meet after being reflected or refracted.

Force feed: To feed a lubricant by force into and between various parts to be lubricated.

Four-stroke cycle: The cycle engine requires four strokes of the piston to complete the cycle, namely, intake, compression, power, and exhaust. On the intake stroke the inlet valve opens while the piston travels downward drawing into the cylinder a fresh charge of gas vapor. Then the inlet valve closes and the piston moves upward compressing the gas. This is the compression stroke. The spark then occurs, forcing the piston downward on the power stroke. The exhaust valve then opens and the piston moves upward, forcing the burned gasses out of the cylinder.

Four-wheel brakes: A system of brakes in which a brake is applied on each of the four wheels of the vehicle.

Gear: A piece of material having teeth or notches on its edge.

Governor: A mechanical device used to regulate the speed of an engine.

Heat engine: An engine that develops its power from the expansion of heat. The steam engine and the gas engine are both heat engines. They convert heat into mechanical energy.

Horsepower: A measurement of work. The power which a horse exerts. It is the average rate of work done day in and day out by an average horse. In mechanics one horsepower is the amount of work required to raise one pound 550 feet high in one second, or 550 foot pounds of energy per second. This would be 33,000 foot pounds per minute. The electrical measurement of horsepower is 746 watts.

Hydraulic brake: A braking system using a fluid as a medium of transmitting the energy exerted on the foot pedal to the expansion of the brake shoe.

Hydrometer: An instrument used to measure the weight or gravity of a fluid. It consists of a float having a stem graduated in decimal parts of gravity units. The float is placed in the solution to be tested and the specific gravity of the solution is read at the junction of the surface of the fluid and the scale on the stem of the float. This reading is in comparison to that of water, which has a specific gravity of one.

Ignition coil: A transformer coil used to step up the voltage of the battery to such a point that it will jump a gap when the gap is under pressure of several atmospheres, such as that in the combustion chamber of an engine. It consists of a soft iron core, a primary winding, and a secondary winding. The current from the battery passes through the small number of turns of the primary winding. When the current flow is interrupted, the collapse of the magnetic field set up when the current was in motion induces a current in the secondary winding of the coil. This current has sufficient strength to jump a gap under pressure and ignite the fuel in the combustion chamber.

Internal combustion engine: An engine deriving its power from the expansion of a gas due to the increase of temperature of that gas.

*__Intersection:__ The area embraced within the prolongation or connection of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways of two highways which join one another at, or approximately at, right angles, or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict.

Leaf spring: Composed of strips or leaves of spring steel.

Loading zone: Location set aside for loading and unloading freight or passengers.

Locking relay: A relay used to disconnect a circuit when too much current is flowing through that circuit. It locks the circuit open until it is closed by hand.

Lock nut: A nut having a special construction of many patented types so that when once tightened in place, it will have a tendency to resist removal.

Lock washer: A metal disc of various forms constructed so that it has a tendency to hold a nut on after it has been put in place.

Lubricant: Any material that has a tendency to decrease friction when placed between two moving parts resting on each other, as oil, grease.

Master cylinder: A term applied to the cylinder operated by the brake pedal in a hydraulic brake system.

Mazda: A very tough hard metal having a very high melting point. It is especially suitable as a material for the filament of incandescent lamps.

m.p.h.: Abbreviation for "miles per hour" or the rate of travel; the number of miles that will be covered in one hour.

Muffler: A silencing device used on the outlet for the exhaust gasses to allow them to be released slowly into the atmosphere, thus reducing the noise.

Oil filter: A unit designed to remove the foreign particles from the oil in the engine. This is generally accomplished by passing the oil through fabric, felt, or fine screens, or discs.

One wire system: A wiring system on a car that uses the frame of the car as a return or one side of the electrical circuit.

Pedestrian: Any person afoot.

Perception: A mental realization of an object, or idea.

Piston: A metal plug sliding in the cylinder used to receive the power of the gas expansion and transmit it to the connecting rod.

Piston head: The flat end of the piston that receives the power of the explosion.

Piston ring: A metal ring placed in grooves in the piston to make a seal against the explosion and to keep the surplus oil out of the combustion chamber.

Piston ring groove: A trough or groove in the piston to hold the ring in its proper place and position.

Piston skirt: The lower portion of the piston.

Poppet valve: A valve constructed in the shape of a mushroom. It closes an opening for the flow of fresh and exhaust gasses by a tight seal between the valve face and the valve seat in the cylinder head or in the cylinder block.

Power plant: The engine and its necessary accessories such as the cooling system, ignition system, lubrication system, and carburetion system.

Pre-ignition: The burning of a gas before the predetermined time. In the gas engine this generally causes a noise or a ping.

Pressure feed: See Force Feed.

Prone: Likely to have or be involved in; e.g., accident prone.

Psychology: A study of the action and reaction of the mind under various conditions. The science of behavior; the understanding of human nature.

Radiator: A contrivance that dissipates heat. The automobile radiator receives the water that has absorbed the surplus heat from the engine and radiates this heat into the air, thereby cooling the water.

Radiator core: That part of the radiator that contains the cooling surface through which the heat is dissipated into the air.

Radiator hose: A rubber-fabric connection between the radiator and the engine.

Radiator shell: A covering for the radiator to protect it from damage.

Radiator tank: That part of the radiator fastened to the top and the bottom of the core to deliver and receive the water that passes through the core.

Reaction time: The time required to do an act after necessity of action has been realized by the senses.

Reduction gear: A pair of gears that reduce the speed of the driven gear.

Reflector: A material that reflects light rays used in the lamps of an automobile.

Reverse current relay: A relay used between the generator and the battery. It closes the circuit between the battery and the generator when the voltage of the generator is greater than that of the battery and opens the circuit when the voltage of the battery is greater than that of the generator. The current flowing in the winding in a reverse direction causes the polarity of the electro-magnet, that is holding the circuit closed, to be reversed, thus allowing the spring on the circuit point to open it.

***Right of way:** The privilege of the immediate use of the highway. Also refers to property obtained by local, state, or national governments upon which a highway may be constructed.

r.p.m.: An abbreviation for the number of revolutions per minute.

S.A.E.: An abbreviation for the Society of Automotive Engineers, an organization of men instrumental in the production and servicing of automotive equipment.

S.A.E. horsepower: The horsepower as indicated by applying a certain formula to the measurements of the engine. This formula is used in all states to determine the horsepower of a car for licensing purposes. It is:

$$\mathbf{B^2 \times N \times .4 = H.P.}$$

When B = bore of the engine
N = number of cylinders

This horsepower rating will generally be developed at 1000 piston feet per minute.

***Safety zone:** The area or space officially set apart within a roadway for the exclusive use of pedestrians and which is protected or is so marked or indicated by adequate signs as to be plainly visible at all times while set apart as a safety zone.

Selective transmission: A set of gears when meshed with certain gears will furnish several gear ratios. Any ratio can be selected without passing progressively through other ratios.

Semi-elliptic spring: A number of tempered steel leaves held together in the center. The main leaf is the longest, the others are progressively shorter.

Semi-floating axle: A driving axle that carries all of the power to the rear wheels and also carries the weight of the rear part of the car.

Service brake: The brake that is operated by the right foot and used most of the time for retarding the movement of the car.

Shatterproof glass: A glass that will not shatter or fly into pieces when broken. It is made by placing a piece of transparent cellulose material between two pieces of glass and pressing the assembly together.

Shock absorber: A mechanical contrivance used to minimize shocks of sudden stopping or starting; a contrivance that minimizes the action of the spring and absorbs the road shock caused by the wheels passing over irregularities in the road.

Short circuit: An accidental path for electricity to return to its source.

***Sidewalk:** That portion of a street, between the curb lines or the lateral lines of a roadway and the adjacent property lines, intended for the use of the pedestrians.

Slipping clutch: A clutch that does not hold and allows the engine to turn faster than the clutch or main transmission gear.

Spark advance: Causes the spark to occur at an earlier time.

Spark plug: A plug used to carry the high tension current without loss into the combustion chamber at the proper time.

Spark plug insulator: That portion of the plug that insulates the current passing through the center electrode into the combustion chamber.

Spark plug heat range: The designing of various insulators in a spark plug so that one will radiate the heat faster than another. This is accomplished by making the porcelain or center insulator longer if the plug is to run hot and shorter if the plug is to run cold. The heat has a greater distance to travel to get to the water jacket in the hot plug; therefore it runs hot. Hot plugs are used in engines which have a tendency to foul, as a cold plug is not hot enough to burn off the oil. If the plug used has a tendency to pre-ignite or if the center electrode or insulator should crack, then a cooler plug, one having a shorter insulator, should be used.

Specific gravity: The weight of a substance in relation to the weight of an equal volume of water.

Speedometer: A device for measuring and indicating the speed of a vehicle.

Starter: A device used to start an engine.

Starter bendix: A special device that connects the power of the starter to the engine when the starter current is applied and automatically disengages the gear when the engine starts on its own power.

Starter switch: A switch used to complete the circuit between the battery and the electric starter.

Steering arm: A connection between the steering knuckle and the steering connecting rod or an arm on the steering gear.

Steering connecting rod (or tie rod): A rod connecting the steering knuckles of both front wheels.

Steering drag link: A connection between the steering arm and the steering connecting rod.

Steering gear: A gear mechanism using a set of reducing gears fastened to the bottom of the steering column. It reduces the ratio between the turning of the steering wheel and steering arm several times.

Steering knuckle: That part of the front axle assembly which fastens to the spindle and is held in place by the king pin.

Steering post: A shaft and its assembly housing with the steering gear mounted on one end and the steering wheel on the other.

Storage battery: An accumulator of electrical energy caused by a chemical reaction which occurs when a current of electricity passes through the battery. This energy is liberated when the terminals of the battery are made a part of a closed electrical circuit.

***Street or highway:** The entire width between property lines of every way or place of whatever nature, when any part thereof is open to the use of the public as a matter of right, for purposes of vehicular traffic.

Supercharger: A blower so constructed that it will increase the atmospheric pressure at the carburetor, causing a greater volume of gas to be taken into the cylinder.

Suppressor: A dampener that causes the oscillations of a spark to be minimized; e.g., suppressors are on the spark plugs of an engine so that the high tension current will not interfere with the received radio wave.

Syncro-mesh transmission: A transmission having gears that are meshed only after the gears have maintained the same speed.

Taper pin: A pin decreasing to a smaller diameter at one end.

Thermostat: A device controlled by heat that expands when it is heated and contracts when it is cooled. It is generally used to regulate the temperature of the water, also to open and close electric circuits.

Throttle: A valve located in the carburetor to regulate the amount of gas vapor taken into the combustion chamber and thus the speed of the engine.

Throttle lever: A lever used to open or close the throttle.

Timing gear: A gear having a certain gear ratio used to time the movement of one shaft to another. In the gas engine it is generally the set of gears that drives the camshaft at one half the speed of the crankshaft.

Toe-in: The difference between the distance from one front wheel to the other measured at the rim in front and back of the axle.

Torque: The turning effort on a shaft. It is measured in foot pounds.

*__Traffic:__ Pedestrians, ridden or herded animals, vehicles, streetcars, and other conveyances either singly or together while using any highway for the purpose of travel.

***Traffic control signal:** Any device, whether manually, electrically, or mechanically operated, by which traffic is alternately directed to stop and proceed.

Traffic lane: A lane marked off on the highway for the use of vehicular traffic.

Transmission: A set of gears in a gear box in which various gear ratios can be secured between the engine and the rear axle. It enables the engine to develop more speed and power and to drive the car slower when greater power is needed.

Transmission case: A housing which contains the transmission and shifting mechanism.

Transmission slow and reverse sliding gear: A gear, either spiral or bevel, located on the sliding gear shaft. It meshes with the low countershaft gear and with the reverse idler.

Transmission main counter drive gear: A gear, generally spur or spiral, located on the end of the countershaft and meshing with the main transmission drive gear.

Transmission main drive gear: A gear on the rear end of the transmission drive shaft that meshes with the main counter gear.

Transmission reverse counter gear: A gear, either spur or spiral, meshing with the reverse idler and the reverse counter gear. It is located on the countershaft.

Transmission reverse idler gear: A gear, either spur or spiral, pinned at the hub to the transmission case, meshing with the reverse counter gear and the low and reverse sliding gear.

Transmission second counter gear: A gear, generally spur or spiral, located on the countershaft and meshing with the second speed sliding gear.

Transmission second and high sliding gear: A gear, either spiral or spur, located on the sliding gear shaft and meshing with the second counter gear and interlocking with the main transmission gear.

Transmission sliding gear shaft: A shaft in the transmission on which are mounted two gears, the second and high, and the low and reverse sliding gears. It is supported at the front end by a pilot bushing and at the rear by the sliding gear shaft bearing.

Transportation: The act of moving freight and passengers from one point to another.

Tungsten: A very hard metal with a high melting point used to tip the breaker points of an ignition system.

Universal joint: A connection for transmitting power from one shaft to another not in a straight line.

Valve spring: A spring in the form of a coil used to close the valve.

Valve stem: A metal shaft, generally round, the principal function of which is to guide the valve head into its seat.

***Vehicle:** Every device in, upon, or by which any person or property is or may be transported or drawn upon a highway, except devices moved by human power or used exclusively upon stationary rails or tracks.

Washer: A disc with a hole in the center to space or bush up a bolt or part. It is also valuable to prevent the corners of a nut from digging into the material when the nut is tightened.

Water jacket: A space surrounding the cylinder bore containing water to absorb the surplus heat given off by the explosions.

Water manifold: Pipes to convey water to and from the water jacket.

Wheel cylinder: The hydraulic brake cylinder in the brake drum of the wheel.

Windshield: The glass front of the car used to shield the passengers from the wind.

BIBLIOGRAPHY

1. *Accident Facts.* National Safety Council, Inc. Chicago, Ill. 1937.
2. *Automobile Engineering.* American Technical Society. Chicago, Ill. 1936.
3. *Automobile Facts and Figures.* Automobile Manufacturers Association, Inc. New York. 1936 Edition.
4. *Calling All Drivers.* Metropolitan Life Insurance Company. New York.
5. *Chicago Daily News Almanac and Year Book.* The Chicago Daily News, Inc. Chicago, Ill. 1937.
6. *I Drive Safely.* International Harvester Company. Chicago, Ill.
7. Kenyon, Robert E. *Motor Massacre.* Chicago Lloyds. August, 1936.
8. Kuhns, Ray F. *Automotive Service.* Bruce Publishing Company. Milwaukee, Wis.
9. *Live and Let Live.* Travelers Insurance Company. Hartford, Conn. 1935.
10. Macdonald, Malcolm. "The Dangerous Age." *The Education Digest.* January, 1937.
11. *Model Traffic Ordinances.* U. S. Department of Agriculture. Bureau of Public Roads. Washington, D. C.
12. *Parents and the Automobile.* Bureau of Publications. Teachers College, Columbia University. New York. 1936.

13. "Questions and Answers That Will Help You Treat Yourself, Your Car with Greater Care." The Studebaker Corporation. South Bend, Ind.

14. *Safety Bulletin.* Vol. II. No. 9. Division of Highways. Springfield, Ill. December, 1936.

15. "Safety" issues. *Building America.* Society for Curriculum Study, Inc. Vol. I, No. 7; Vol. II, No. 2. 425 W. 123rd Street, New York.

16. "Safety in Pupil Transportation." *Research Bulletin.* National Education Association of the United States. Washington, D. C. November, 1934.

17. *Safe Walker's Memo Book, The.* Metropolitan Insurance Company. New York.

18. *Saving Seconds or Saving Lives.* Aetna Casualty and Surety Company. Hartford, Conn.

19. Schaeffer, Clemens T. *Automotive Mechanics Handbook.* Harper and Brothers. New York. 1929.

20. *Sportsmanlike Driving.* Chicago Motor Club. Chicago, Ill. 1935.

21. Stack, Herbert James (Editor). *A Teacher's Manual.* National Bureau of Casualty and Surety Underwriters. New York. 1937.

22. *Traffic Safety. A Manual for Indiana High School Teachers.* Indiana State Department of Public Instruction. Indianapolis, Ind. 1936.

23. *We Drivers.* General Motors Corporation. Detroit, Michigan.

24. *You Bet Your Life.* Travelers Insurance Company. Hartford, Conn.

25. *Your Capacity as a Safe Driver.* Chicago Motor Club. Chicago, Ill.

INDEX


HOW MUCH IS TOO MUCH?
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